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# THE EFFECTS OF A SKILL-BASED PAY SYSTEM ON ORGANIZATIONAL COMMITMENT AND ROLE ORIENTATION

By

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A Dissertation in Partial Fulfillment of the Requirements for the Degree

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### <u>Abstract</u>

Faced with continuing competitive pressures over the last few decades, organizations have been driven to seek more innovative approaches to management. In the compensation management area, skill-based pay (SBP) is one such innovative approach that is being increasingly applied. However, there is a paucity of research on this approach to pay and the consequences of applying it relative to the more traditional job-based approach to pay. The current study examines how SBP affects employees' perceptions of their employment relationship with particular focus on organizational commitment and role orientation. Using data from a large sample of employees from a steel manufacturing company, it finds that selected perceived SBP plan characteristics are significant predictors of employees' beliefs about the SBP plan fairness and effectiveness, organizational commitment, and role orientation. The study discusses the various theoretical and practical implications that result from these findings.

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## Chapter 1

## Introduction

Over the past few decades, organizations have been faced with continuing competitive pressures resulting from changing economic and social environments and workforce characteristics. These pressures are driving many organizations to transform their structures and seek more innovative management styles. In the compensation management area, various innovations in pay systems including variable pay, gain-sharing, broad-banding, skill-based pay (SBP), and team rewards are increasingly being applied. Among these new approaches to employee compensation, skill-based pay (variations of it are known as knowledge- or competency- based pay) involves the most substantial change in the pay system for a number of reasons. First, SBP abandons the tradition of using the job as the basis in deciding the base pay for employees and sets pay variations according to the number, type, and depth of skills and abilities they possess. Second, since skill-based pay results in changing the pay structure for employees, it usually results in changing other components of their total pay mix, especially benefits (Schuster & Zingheim, 1992). Third, SBP is practically more than a pay system since applying SBP is generally accompanied by fundamental changes in the way work is designed and managed and a new perception of human resources and their role in the organization.

The SBP system was pioneered by Procter and Gamble in the late 1960s and started to be applied increasingly by various organizations since then. Lawler, Mohrman, & Ledford (1992) reported that the number of Fortune 1000 firms using some form of SBP increased from 40 percent to 60 percent between 1987 to1993. According to the Conference Board of Canada's survey of compensation trends - which is based on a large (more than 500 employers) sample of private and public sector organizations- the percentage of organizations using SBP plans rose from 7% in 1990 to 10% in 1996 and 13% in 1998 (Conference Board of Canada, 1998). This clearly indicates an increasing interest among various organizations in applying this method of compensation.

SBP has a great intuitive appeal and fits well with the significant changes in organizational structures in the "post-bureaucratic" organization era (Heckscher & Donnellon, 1994). These new organizational structures are becoming more flat, de-layered, and flexible structures with fewer distinct job classifications and extensive use of cross-functional selfmanaged teams. However, despite the importance of this innovation and the relatively fast pace at which SBP plans are being applied by various organizations, there is paucity of research on this pay system and the consequences of applying it relative to more traditional job-based structures (Gerhart & Milkovich, 1992; Murray & Gerhart, 1998). Lawler (1994) suggests that many factors in today's business environment related to the changing nature of work and competitive conditions are likely to drive organizations toward adopting more competency-based structure and management system. The idea of individuals holding specific jobs may be no longer appropriate and should be replaced with a more flexible view of organizing based on the competencies and abilities that employees need to acquire to achieve organizational goals without limiting them to specific job descriptions. Lawler calls upon researchers in organizational behaviour and human resource management to address the new challenges and issues that organizations need to deal with in order to effectively transform to a competency-based management system.

The available evidence from survey based studies and case studies on SBP has generally reported favorable effects on various outcomes including workforce flexibility as a result of multi-skilling, improved productivity, improved product quality, lower labour costs, increased employee motivation, and increased organizational commitment (see Jenkins, Ledford, Gupta, & Doty, 1993; Ledford & Bergel, 1991; Tosi & Tosi, 1986; Leblanc, 1991; Shareef, 1998; Klein, 1998; Parent & Webber, 1994; Ledford, Taylor, & Dixey, 1991). Among the main potential disadvantages associated with SBP is the increase in average wage rates as employees gain higher pay with the learning of additional skills. Unless the increase in productivity outweighs the increase in average pay and training costs, higher overall labour costs will be the result. Also, Lawler (1986) warned that it may be difficult to maintain the motivation of employees who become used to continuously learning higher skills and achieving higher pay after having learned all the available skill blocks in the SBP system.

However, the existing literature about SBP or competency-based pay is very limited and does not provide sufficient guidance regarding its impact on organizational and employee effectiveness. Most of the existing studies on SBP followed either case study or exploratory survey approaches (where surveys are directed to human resource or compensation managers). Despite the importance of the results obtained, most of these studies suffer from lack in generalizability or analytical rigor (Murray & Gerhart, 1998). In order to understand the appropriate conditions for effective application of SBP and its outcomes, there is a need for studies that use rigorous research methods, rely on relevant theoretical models, use reliable measurements of constructs, and apply necessary controls. These studies should examine the determinants and outcomes of effective application of new pay plans such as SBP, as well as the processes and conditions that lead to specific outcomes under different pay plans (Heneman, Ledford, & Gresham, 2000). This kind of research can answer questions about the determinants of specific attitudes and behaviours under SBP plans that may lead to different organizational outcomes.

Some studies of this quality started to appear recently. Murray and Gerhart (1998) examined the effects of applying SBP on plant performance outcomes using time series data from treatment and comparison facilities. They found greater productivity, lower labour costs

per part, and favorable quality outcomes with skill-based pay. In order to understand the process leading to those outcomes, they called for research that examines specific mechanisms and factors that may explain how these outcomes are achieved. Lee, Law, & Bobko (1999) examined the effect of employees' fairness perceptions in mediating the relationship between SBP and employee pay satisfaction and assessment of SBP plan benefits. They found that SBP plans that provide training and that are better understood and communicated will lead to higher pay satisfaction and more positive evaluations of the plan a year later.

A key feature of SBP is that it alters the nature of the relationship between employees and the employer, and redefines the roles of employees so that they become cross-functional and are able to undertake a broader set of tasks and responsibilities. This implies a change in employees' perceptions of the terms of their exchange agreement with their employing organization – a concept referred to as the "psychological contract" (Rousseau, 1995). The success of SBP system will be largely dependent on the organization's ability to design and manage the pay plan in a way that motivates employees to develop the desired attitudes and behaviours. It is important in this regard to examine how the SBP system and the changes it brings to the work environment affect employees' perceptions of their relationship with their employer and their work roles.

The current study will focus on this issue. Specifically, the study will assess the relationship between the SBP plan's characteristics and both organizational commitment and perceptions of work roles. The study will apply a quantitative field research method to achieve this objective. A path model outlining the expected effects of SBP plan characteristics on these employee attitudes will be developed and tested. The model suggests a theoretical representation of how different factors in the work environment under SBP affect specific employee perceptions and attitudes and in turn affect their level of attachment to the organization (organizational commitment) and understanding of their work roles (role

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orientation). Understanding the determinants of employees' commitment and role orientation under SBP is very important because these attitudes will determine subsequent employee behaviours such as staying or leaving the organization and willingness (and ability) to perform the roles/activities expected in the SBP work environment.

The current study is composed of several chapters. Chapter 2 provides a brief description of the SBP plan and the main issues in its design and implementation. Chapter 2 then discusses the theoretical underpinnings of SBP and presents a framework of SBP that will be partially tested in the current study. Chapter 3 discusses the theoretically expected effects of SBP on employee organizational commitment and role orientation, and discusses the path model and study hypotheses to be empirically tested in this study. Chapter 4 discusses the research methodology and choice of data analytic techniques. Chapter 5 presents the empirical results and results of hypotheses testing based on data collected from a sample of employees at a major manufacturing organization in Canada. Chapter 6 provides a discussion of the study results and presents main conclusions and implications of the study findings and suggestions for future research.

## **Chapter 2**

### Skill-Based Compensation: Concept, Design, and Theory

### 2.1 What is Skill-Based Compensation?

Gerhart & Milkovich (1992) classify compensation decisions that any organization makes into four broad categories: pay level, pay structures, individual differences in pay, and benefits. Our interest here is focused on pay structure since it represents the main difference between a traditional job-based pay system and a skill-based pay (SBP) system. Pay structure refers to the nature of pay differentials between different positions and individuals within an organization or a work unit (see Gerhart & Milkovich, 1992; Fossum & McCall, 1997; Gerhart, Minkoff, & Olsen, 1995). It determines what is known as the 'base pay' component of the employee total compensation. In the traditional job-based compensation system, pay structure consists of job families defined for pay purposes and a number of grades or steps in the structure and pay differentials between them. In a skill-based pay structure, differences in pay are associated with predefined skill-blocks required within a specific work unit. Differences in base pay between individuals under the SBP system depend on the breadth, type, and depth of skills they are able to acquire and use rather than the jobs or positions they are assigned or promoted to.

Under job-based pay, when individuals are promoted or offered higher-paying jobs they automatically are rewarded for taking these jobs before they demonstrate their ability to perform the required work. In skill-based pay or knowledge-based pay (KBP), people are paid according to their worth to the organization and not the job they hold. Lawler (1996) argues that these person-based pay systems are on the way to replacing the traditional job-based pay systems. While the main thrust of the skill-based pay system is to base compensation on the number, variety, and depth of skills a person can perform given the relevance of these skills for the organization, the actual details of the skill-based pay plans may vary considerably depending on the nature of tasks at the work units, the objectives of the plan, and the characteristics of the workers and the organization. Organizations applying SBP have to provide training and skill acquisition resources in order to enable employees to advance to higher skill levels.

SBP can co-exist in a compensation system along with a pay-for-performance or a merit-pay plan. SBP plans that are most commonly used affect pay structures while other elements of the pay system including variable pay and benefits can also be applied in the same way as in the case of job based pay systems.

#### 2.1.1 The Skill-Based Pay Plan

The success of SBP plans depends largely on carefully designing the plan to suit the nature of the tasks at the work unit and the employees the plan covers. Generally, any skill-based pay plan starts with the identification of tasks that need to be done in the organization. Then, the skills needed to perform those tasks are identified and tests or measures are developed to determine whether an individual has learned them (Lawler & Ledford, 1985).

Following is a brief discussion of the main design and implementation issues of the SBP system (for more details on these issues see Klein, 1998; Leblanc, 1991; Ledford & Bergel, 1991; Ledford et al., 1991; Shareef, 1998; Tosi & Tosi, 1986).

Analyzing the Organizational Context. As indicated earlier, SBP plans are usually tailor-made to suit the specific conditions at the organization and the goals that are sought from the pay system. The company's strategy and long-term objectives, its human capital plans and objectives, the nature of the employees, the technology used, and the availability of resources to manage and maintain the new system must be analyzed in order to achieve the SBP design that is suitable for the specific organizational context.

Defining Skills and Skill Blocks. The major elements of the SBP plan are the skill blocks, which constitute the "compensable factors" in this pay system. Whether they are called skill blocks or skill units or competency levels, the concept refers to sets of skills and abilities required to properly perform specific tasks and duties that represent part of the overall work at the organization and on which pay decisions will be based. The number, depth, and breadth of skill blocks depend on the nature of the tasks and other practical considerations relevant to the specific organization. It is not an easy task to price skill blocks in a competitive way given the fact that SBP plans are not largely practiced and market rates are not usually available. Designers of the SBP plan should use their judgment to price skills in a way that is consistent with conditions in the organization's labour market.

*Training and Certification*. SBP plans generally imply a significant increase in the training activities at the organization to allow employees to advance through the SBP system. Various companies use different training methods depending on the nature of the tasks and the resources available. Some companies use existing employees who possess the skills as trainers. Certification measures or exams must be administered to determine whether an employee has acquired the required skills to be promoted to the next skill level.

*Managing the SBP Plan*. Skill-based pay systems create a new reality at the work units where they are used. Various problems might arise from applying this system that need to be dealt with appropriately. The fact that employees under this system will be continuously motivated to acquire new skills will mean that a trade-off between skill acquisition and production must be given constant attention (Lawler & Ledford, 1985). Also, SBP plans usually compensate employees for only skills that are usable at the organization. The problem of obsolete skills must be dealt with as some skills become no longer needed. Some companies cut the pay for

such skills and encourage employees to acquire new skills that become required. For example, the company where data for this study was collected added an "earnings protection program" that applies to cases where an employee is moved to perform new assignments or tasks in positions that are at a lower level in the pay structure than the person's current position.

### 2.2 Theoretical Underpinnings of Skill-Based Compensation

The following analysis of the theoretical underpinnings of SBP covers the factors that affect the decision to adopt SBP, the effective design and management of the SBP plan, and expected outcomes of SBP on the employee and organizational levels. This analysis will rely on and draw from a number of disciplines including economics, organization theories, and behavioural theories. Figure 2-1 presents a theoretical framework describing three main sets of variables that determine the effective application of SBP. These include:

- The organizational context including competitive conditions in the organization's product markets, technology used, characteristics of the internal and external labour markets, organizational structure and the various human resource management programs and policies applied.
- 2) The design of the SBP plan and management of its implementation process. This includes the process used to develop the plan and the management of the change process involved in shifting to the new pay system.
- The expected effects of SBP on various organizational performance and employee behaviour outcomes, and the processes leading to the achievement of these outcomes.

# Figure 2-1

# A General Framework of Skill – Based Pay Systems



The framework presented in Figure 2-1 intends to provide a general theoretical representation of the main factors that affect the implementation, operation, and outcomes of the skill-based pay system. This general framework can be used to develop testable theoretical models and hypotheses that can be examined empirically. The current study intends to test part of the relationships outlined in Figure 2-1. In the following chapter, a theoretical model of the effects of skill-based pay on organizational commitment and role orientation will be developed to be then empirically tested in this study. Similar models to examine the relationship between SBP and other work attitudes as well as main determinants and outcomes of SBP may be developed and tested in future studies.

Figure (2-1) shows that once the SBP system is in operation its impacts on various organizational outcomes will start gradually to take place. These impacts are observed, measured, and used as yardsticks by which the success of the plan can be assessed. The model also indicates that the feedback information obtained from applying the SBP plan will help in improving the design and management of the pay system. The feedback arrows to the organizational context, employee and organizational outcomes, and the design of SBP plan indicate the importance of feedback and follow up in the model.

The following is a discussion of the main elements of the framework shown in Figure 2-1 and the theoretical underpinnings of the SBP system.

#### 2.2.1 Organizational Context

The procedures an organization chooses to establish and rationalize its pay structure depend on a number of factors. Gerhart and Milikovich (1992) indicate that the determinants of pay structure decisions include industry, human capital, and transaction costs. They further suggest that several organizational theory models including the resource dependency model (Ulrich & Barney, 1984; Pfeffer & Salancik, 1978; Lepak & Snell, 1999) and the institutional model (Dimaggio & Powel, 1983; Oliver, 1991) can be used to explain the decision to adopt a specific internal pay structure.

Organizational Theory Perspectives on SBP. Both the institutional and resource dependency theories indicate that organizational choice is determined by a variety of external pressures and that organizations must be responsive to external demands in order to survive (Oliver, 1991). However, the two theories imply different patterns of response to these external pressures. While institutional theory emphasizes conformity and adherence to the existing and common practices and norms, resource dependency theory emphasizes the need for active management of resource flows and adapting to environmental uncertainty (Oliver, 1991). The resource dependency theory suggests that core employee skills and competencies should be developed and maintained internally while general skills and abilities should be recruited from the external labour market (Lepak & Snell, 1999). Adoption of innovative new work systems and practices such as the SBP system can be explained from a resource dependence perspective as a proactive organizational intervention aimed at optimizing the utilization of internal resources and creating unique competencies for the organization. This is especially the case with organizations that pioneer the adoption of these innovations in their industry sector. The institutional theory, on the other hand, implies that as pioneering organizations succeed in introducing new effective work system, others will be compelled to consider adopting these innovations in order to stay competitive. Therefore, as more and more organizations start to apply the SBP system, there will be increasing institutional pressures on nonusers to imitate practices of other firms in their environment who successfully adopted SBP.

The shift from traditional job based pay to a SBP is usually induced by the firm's effort to adapt to uncontrollable changes in its environment or by the firm's effort to be proactive in adopting planned change processes in its systems and operations in order to enhance its performance and effectiveness. In most cases, these two incentives to apply SBP systems operate simultaneously. Agarwal (1997) indicates that many experts in the field have recently started to call for fundamental changes in reward systems. Proponents for such changes argue that existing reward systems "do not fit with the context and needs of the emerging downsized, delayered, flexible, participative, dynamic, and diverse organizations" (Agarwal, 1997, p. 63). Changes in a firm's environment such as increased competition in product markets, changing technology, changes in firm's external labour market as well as changes in the organization's structure and human resource management policies and practices can induce an organization to change from a job-based pay (JBP) to a SBP system. In most cases, SBP systems are used as part of a larger package of organizational change interventions such as the use of autonomous work teams, high involvement management practices, downsizing, and organizational restructuring.

The increasing interest in SBP also comes generally as part of a new paradigm with regard to the effective management of organizations in today's economy. Three major changes in today's business environment are causing major pressure on organizations to change their structures and management systems including globalized markets, technological changes, and changes in the demographic composition of the population (Agarwal, 1997). Globalization of product, capital, and labour markets put unprecedented pressures on organizations to improve their efficiency and competitiveness. The changing technology creates a greater need for highly skilled employees who are able to keep their knowledge and competencies current. Also, employers are faced with the challenge of effectively utilizing their increasingly diverse and educated workforce and to design suitable pay systems to reward effective performance. The new economy is a knowledge-based economy with the knowledge content of products and services growing rapidly as information technology is increasingly becoming an integral part

of products and services. By paying for individual knowledge and skills, organizations are hoping to empower employees and increase their development potential. By increasing workers' skill levels and redirecting their attention, organizations gain increased workforce flexibility, decreased labour costs, and increased productivity (Murray & Gerhart, 1998). It is widely believed that changes in employee's attitudes, habits, and work orientation are essential for some organizations. According to Turnbull (1986, p. 203), "the organization and management of employees, together with their attitudes, are perhaps the most important resource on which productivity and competitive performance ultimately depend."

Human Capital Perspective on SBP. The adoption of SBP systems can be seen as a reflection of the firm's goals and policies in regard to the management of its human capital in a way that helps acquiring an optimal skill variety and establishing an optimal ratio of labour cost relative to labour productivity.

The human capital theory (Becker, 1993) states that people, through education, training, and experience, acquire skills, knowledge, and abilities, which can be viewed as a form of capital - human capital. According to the human capital theory, employers are interested in maintaining the capabilities of their employees and the effectiveness of the system developed by the organization. This requires the maintenance of the quantity and quality of needed skills. Obsolescence of skills and knowledge, turnover, and aging can all act to deplete the human resources of the organization (Flamholtz & Lacey, 1981). Specifically trained employees are considered an investment by the firm that is expected to produce future returns. It would be rational, therefore, to pay to train and keep those employees. It would also be rational to attract and hire employees with high aptitudes and abilities to continuously acquire skills needed to sustain and increase the organization's competitiveness. Employees, on the other hand, make job choices based on present value of future earnings. A promise by

the employer to provide specific training to the employee and to share the return from that training would increase the present value of future earnings and hence represent a mutual benefit for both the employer and the employee.

The more the training provided is directed toward firm-specific skills, the less are the possibilities of employees leaving their jobs after the training and hence higher retention levels of valued employees. The human capital theory indicates that investments in the development of general skills are incurred by workers, while firm-specific training is paid for by the firm (Becker, 1993). It should be noted, however, that it may be difficult sometimes to distinguish between generic and firm-specific skills. As the complexity of the business environment increases, the line between the two types of skills blurs, especially with the heightened attention on generic competencies associated with work environments characterized by empowered employees working in highly autonomous teams and required to independently make important decisions. The SBP system requires that employers not only pay for training on firm-specific skills, but also that the pay system is set to directly and automatically reward the skill acquisition and application.

The organization's long-term goals regarding its human capital will be shaped by a number of factors including the types of current and future skills needed by the organization, the conditions in the external labour markets, the way work is designed (especially the degree of interdependence between tasks and individuals), and the need for individuals with high firm specific skills. Also, conditions in the external labour market will affect the organization's decision to invest in the training and development of its employees and to reward them for skill acquisition. If the organization sees a need to rely on its internal labour market to develop organization specific skills and competencies, then linking the pay system to skill acquisition would help to achieve these human capital goals. The more unique and firm-specific the skills

and abilities required are, and the more tight the external labour market is, the more likely that a firm will apply a SBP system.

According to Lepak and Snell (1999, p.35), "such practices as team-based production and unique operational procedures that lead to enhanced social complexity, causal ambiguity, and the development of tacit knowledge will enhance the uniqueness of a firm's human capital. Because these skills often involve idiosyncratic learning processes, firms are not likely to find these skills in the open labour market."

The nature of the industry, technology, the strength of competition, and the nature of the product combined with the quality of workforce a firm has and the conditions in its labour market should play an essential role in shaping the firm's human capital philosophy and that will influence its decision to encourage continuous skill acquisition behaviour and may subsequently lead to adopting a skill-based pay system.

### 2.2.2 SBP Plan Design and Management

There is no one SBP plan design that can work with every organization. Instead, the best design should be determined by a complete analysis of the work activities, organizational culture, and the available human, technical, and financial resources. A pay system in general should be tailored to fit the technical system and the social system in the organization (Ledford & Bergel, 1991) and this is particularly important when the pay system is relatively new and not commonly used as is the case with SBP. An important issue here is to analyze the existing organizational culture and the degree of readiness to accept the change implied by adopting a SBP system. The lack of previous knowledge and experience with the SBP by both employees and managers requires that careful planning be undertaken to ensure the smooth transition to the new pay system. It is very important to inform, involve, and continuously

communicate with employees to ensure their understanding, acceptance, and participation throughout the process of planning, designing, and implementing the SBP system.

There are various methods that can be used to define the basic compensable factors in the SBP structure. Bunning (1992) identified six basic models for designing SBP structures ranging from the basic model in which existing jobs are used as the basic 'skill blocks' where an employee's pay is increased as he/she learns to perform additional jobs to more complex designs in which a new job/work analysis for each work unit is conducted and groups of skills are identified to represent the basic skill blocks in the pay structure. However, there is no reason to be limited to specific predefined models of SBP structures and different organizations may create different SBP structures depending on the organizational context and the nature of tasks performed and work complexity. Generally, it is important that skill blocks are designed in a way that they can be measured reliably and also priced competitively. This task may not be easy to undertake because of possible lack of comparable pay surveys given that most available surveys are based on job-based pay structures. Also, the issue of measuring and pricing abstract managerial and professional skills and competencies is particularly complex and is still a subject of continuous debate (see Lawler, 1996 and Hofrichter & Spencer, 1996).

The SBP system is significantly different from the conventional job-based pay system and adopting this system implies a major change in work relationships for employees and the way work is performed. The successful application of the SBP system requires treating it as a "planned change process" and preparing employees and management to adapt to the resulting change.

One of the fairly established facts about SBP is that it works best with a participative, high involvement, and non-bureaucratic work environment (Lawler, 1990). Studies on Skill-Based Pay indicate that this compensation system has normally come as part of a large change process involving other innovations such as team-based and high involvement management and sociotechnical systems (STS) (Bunning, 1989; Klein, 1998; Musselwhite & Christopher, 1988; Sisson & Kaverman, 1995; Tosi & Tosi, 1886). Organizations that fail to create the changes required for this pay system have failed to apply it successfully. Morris (1996) reports on the experience of a large service organization where the implementation of a SBP system faced serious difficulties and was finally abandoned in all but one of the departments. The lessons learned were that each department had to design its own plan, employee acceptance and trust of the system and involvement in the design was essential, and management support was crucial for the success of the SBP system.

The successful application of SBP, also, depends on the nature of workers, their potential for skill acquisition, and their interest in acquiring more skills for higher future earnings. Employees with high levels of self-efficacy and consciousness are expected to perform well under the SBP system. Cable and Judge (1994) found that job seekers with high self-efficacy were more attracted to organizations that offer SBP than those with lower self-efficacy. As discussed earlier, SBP plans work best with participative management and with high involvement organizations. The values and policies common to participative management environments are those that place importance on employee development. Among the main values of organizational development theory are those that focus on viewing employees as whole persons rather than limiting them to restricted job descriptions (Tannenbaum & Davis, 1972). According to Tannenbaum and Davis (1972, p. 16) "people generally have much more to contribute and to develop than just what is expected of them in their specific positions. Whole persons, not parts of persons, are hired and available for contribution. The organizational challenge is to recognize this fact and discover ways to provide outlets for the rich, varied, and often untapped resources available to them."

A study that reviewed 97 SBP plans covering 70 different organizations showed that SBP users make heavy use of employee empowerment and information sharing practices (Jenkins et al., 1993). Jenkins et al. concluded that SBP users can be viewed as "innovative islands that are systematically different from other, more traditional parts of the corporation" (p. 18). In another study, Lawler, Ledford, and Chang (1993) found that SBP plans are especially prevalent in organizations that use high-involvement and total quality management (TQM) practices. They also found that organizations adopting SBP tend to be flatter and faced with strong foreign competition in their product markets.

#### 2.2.3 Effects of SBP on Employee Attitudes and Behaviours

The effectiveness of a pay system is measured by multiple criteria including cost, productivity, innovation, quality, financial, and attitudinal dimensions (Gerhart et al., 1995). The effects of pay system changes on employee attitudes and behaviours have been studied extensively in the compensation literature. Among the central factors studied in this regard are the employee perceptions of fairness of the pay system and perceptions of the pay system's effectiveness in motivating the desired employee behaviours. At the individual employee level, pay plans are used to energize, direct, and control employee behavior (Gerhart et al., 1995). The procedures an organization uses to establish pay structures influence employee behaviours directly by signaling what is valued and indirectly through the resulting pay structures (Gerhart & Milkovich, 1992).

The basic goal of SBP is to motivate skill acquisition and utilization behaviors. Murray and Gerhart (1998) suggest that both the Job Characteristic Model (Hackman & Oldham, 1980) and the Valence-Instrumentality-Expectancy (VIE) model (Vroom, 1964) can be used to explain how a SBP plan can increase employees' motivation. Fairness perceptions of the pay system including the distributive (outcome) fairness (Adams, 1965) and the fairness of procedures used to make the pay decisions (procedural justice) (Konovsky, 2000) are also important in determining employee perceptions and reactions to alternative pay schemes such as the SBP system.

Figure (2-1) shows that a properly designed and administered SBP plan can help the organization to achieve the desired changes in employee motivation, attitudes and behaviours. Such changes are essential to achieving the desired organizational performance outcomes.

In a study that surveyed organizations using SBP, Jenkins et al. (1993) asked respondents (usually human resource managers or plant managers at facilities that apply SBP) to compare their experience with those of similar facilities not using SBP. It was found that, on most dimensions, respondents see SBP facilities as better than those that do not use SBP. In particular, the study found that SBP facilities had better levels of employee motivation, performance, productivity, and supervisor-employee relationships.

Also, the few empirical studies on SBP that measured employee perceptions of justice showed that employees perceived SBP system as more equitable in general than the traditional job-based pay system (see Ledford & Bergel, 1991; Ledford et al., 1991; and Leblanc, 1991). The following few pages discuss why a properly designed and managed SBP system would result in higher levels of employee motivation using three main theoretical perspectives on employee motivation including the job/role design theory, the expectancy theory, and the justice theories of motivation.

The Motivational Effect of Job/Work Redesign Under SBP: The notion that jobs/tasks can be designed in a way that increases the intrinsic motivation level of employees is well established in the I/O psychology literature (Steers & Mowday, 1977; Hackman & Oldham, 1980). The job characteristics model (JCM) (Hackman & Oldham, 1980) explains how job design/redesign can lead to higher levels of intrinsic motivation. According to the JCM, the motivational potential of the job depends on five core dimensions: skill variety, task identity, task significance, autonomy, and feedback. A SBP system as described earlier will result in a change in employees' jobs/roles in a way that will give them a higher motivating potential. The motivational approaches to job design share the common theme that well designed jobs "increase both the *number* and *level* of skills required" (Campion & Berger, 1990, p. 43). Given that the purpose of SBP plans is to motivate skill acquisition, jobs/roles should be redesigned and enriched to allow employees to apply the acquired skills when using this system.

Murray and Gerhart (1998) suggest that four actions could be taken to increase the motivational potential of jobs when using SBP. First, individuals with higher skill competencies can be assigned to jobs of greater skill variety. Second, jobs can be redesigned so that a more skilled worker can complete the whole unit and thus achieve increased task identity. Third, if increased skill competencies allow an individual to have a greater control over the work process with less supervision, the individual may experience a greater sense of autonomy. Fourth, greater skill acquisition may enable a worker to personally conduct quality inspection and give him/her access to information regarding productivity.

An Expectancy Theory Perspective: One of the most accepted theories of motivation, the expectancy theory (Vroom, 1964) is a cognitive process theory that describes motivation as "a process that drives the individual to voluntarily produce effort in his work" (Igalens & Roussel, 1999, p. 1006). According to this theory, there are three factors that affect motivation: the desirability of the reward (valence), the person's estimate of the probability that effort will result in successful performance (expectancy), and the person's estimate of the degree to which performance will result in receiving the reward (instrumentality) (Vroom, 1964). The expectancy theory is relevant to the discussion of motivation under SBP since it describes "a complex process that mediates the distant relationship between the pay system and organizational outcomes" (Murray & Gerhart, 1998, p. 69). This process will involve the formation of specific employee attitudes and behaviours that will lead to a highly capable, motivated, and committed workforce and subsequently lead to improvements in productivity, product quality, and other measures of organizational performance.

A well designed SBP system is expected to produce higher employee motivation by enhancing both the expectancy and instrumentality of the skill acquisition and other work behaviors required to achieve the reward. Typically, the objective of the SBP system is to enable and motivate employees to acquire and apply new skills, therefore improving employee productivity and organizational performance. A SBP plan that clearly outlines the desired skills and the reward attached to mastering and applying these skills and at the same time provides sufficient resources to acquire them will result in highly motivated employees by increasing their effort-performance and performance-reward expectancies. This will increase employees' confidence in the ability of the pay system to effectively reward their efforts and contributions. As will be discussed later, employees' perceptions of the effectiveness of the SBP plan is expected to influence their attitudes and behaviours including organizational commitment and work role orientation. Effort-performance expectancy will also be affected by employee characteristics such as ability to learn skills, self-efficacy, and ability to fit into the work team.

Expectancy theory also emphasizes the importance of outcome valence (desirability of skill acquisition and higher pay) as a motivator. This factor should be considered by management when deciding to apply a SBP plan on a group of employees. SBP plans should be designed in a way that makes pay raises between different skill levels high enough to motivate employees to continuously seek promotion and advancement in the pay structure through skill acquisition.

*Perceptions of Pay System's Justice Under SBP*: The ideals of justice or fairness as a basic requirement in organizational policies and programs have been long recognized by social

scientists (Greenberg, 1990). James (1993) defines organizational justice as "individuals' and groups' perception of the fairness of treatment (including, but not limited to, allocations) received from organizations." Adam's (1965) equity theory argues that employees judge fairness by comparing their relevant inputs to the rewards they receive and also by comparing their inputs/rewards ratio to those of other people. While distributive justice refers to the perceived fairness of the amounts of compensation employees receive, procedural justice refers to the perceived fairness of the procedures used to determine the rewards.

Heneman (1985) argues that pay equity enters into any discussion of pay satisfaction. In the traditional job-based pay system, employees will receive a higher pay as soon as they are promoted to higher jobs even before they demonstrate an ability to perform well on those jobs. SBP, on the other hand, makes pay decisions dependent mainly on the employee's ability to acquire and apply required skills and competencies rather than his/her position in the organizational hierarchy.

Research suggests that distributive justice and procedural justice are distinct, but highly related constructs (Folger, 1987) and that the two forms of justice interact (Brockner & Wiesenfeld, 1996). Previous studies found that procedural justice is a stronger predictor of employee attitudes towards the employing organization and its representatives (such as organizational commitment and trust in supervisors) than distributive justice perceptions (Folger & Konovsky, 1989; McFarlin & Sweeny, 1992). Lee et al. (1999) suggested that, since skill blocks and pay levels are often established in advance, it is procedural justice that is crucial in determining the employees' future pay under the SBP system. Therefore, this study will focus on procedural justice in discussing fairness perceptions of the SBP system.

There are several theories that explain the cognitive and affective components that determine the conceptualization of procedural fairness perceptions and their consequences. Konovsky (2000) describes four commonly applied procedural justice theories including the

self-interest models, the group value model, justice judgement theory, and the fairness heuristics model. Self-interest models are based on the instrumental effects of procedural justice. These models propose that individuals' interest in fair procedures is due to their belief that these procedures will lead to favorable outcomes (Konovsky, 2000). One example of self-interest models is the process control model. Based on their studies of reactions to dispute resolution process, Thibaut and Walker (1975) developed their process control model of procedural justice. They found that verdicts resulting from procedures offering disputants process control were perceived as fairer than identical decisions resulting from procedures that denied process control. Several studies later showed that the process control model is applicable in a broad variety of contexts (Greenberg, 1990).

In the context of SBP system, process control may be influenced by the degree that employees feel involved in the process of designing and administering their pay plan. Therefore, characteristics of the SBP plan including employees' understanding of the plan, their perceptions of involvement, and their satisfaction with the process of skill training and certification will influence their perceptions of the pay plan fairness.

According to the group-value model, people's judgements of the procedural justice of organizational decisions or systems depend on three factors: neutrality, trust, and standing (Tyler, 1989; Tyler & Lind, 1992). Neutrality refers to the degree to which an individual is treated without bias; trust is related to the perceptions of decision maker's motives and whether they are viewed as intending to treat people in a fair and reasonable way; and standing involves the decision maker's treatment of people with politeness, respect for their rights, and dignity. The justice judgment theory (Leventhal, Karuza, & Fry, 1980) suggests that there are six criteria for fair procedure. The six criteria include that fair procedures are: applied consistently, free from bias, accurate, correctable, representative of all concerns, and based on prevailing ethical standards.

The fairness heuristic theory proposes that individuals are largely uncomfortable with authority relations because they provide opportunities for exploitation (Konovsky, 2000). Since we do not often have information regarding the trustworthiness of authorities, we use the fairness of an authority's procedures as an indicator of trustworthiness (Van den Bos, Wilke, & Lind, 1998). Folger, Konovsky, and Cropanzano (1992) described three characteristics of a due-process appraisal system including adequate notice, fair hearing, and judgement based on evidence. Although these characteristics describe an appraisal system, they can be also applied on other decisions affecting employees including changes in human resource management practices such as the introduction of SBP.

#### 2.2.4 Effects of SBP on Organizational Outcomes

As was mentioned earlier, existing studies indicate that SBP results in improvement in a number of organizational outcomes including workforce flexibility, productivity, product quality, as well as overall labour cost (Jenkins et. al., 1993; Ledford & Bergel, 1991; Tosi & Tosi, 1986; Leblanc, 1991Klein, 1998; Ledford et al., 1991; and Murray & Gerhart, 1998). Also, SBP usually results in higher base pay for employees as they acquire more skills.

Skill-based pay system results in employees acquiring a larger number of skills relevant to the tasks at their work units. The greater the skill sets of the workers, the less are the constraints on labour scheduling. SBP affects organizational outcomes directly through improved employee skill levels, workforce flexibility and ability to assign employees to cross-functions, and improved teamwork effectiveness. It also affects outcomes indirectly through its effects on employee attitudes and behaviours. Murray and Gerhart (1998) provided quantitative evidence - using time series data from a treatment and control facilities (two different plants within the same company) – indicating greater productivity, lower labour cost, and favorable quality outcomes with SBP as compared to the traditional JBP system.
However, the mechanism through which organizations utilize the benefits of SBP to improve outcomes is still largely unresearched.

Murray and Gerhart (1998) suggested that research is required to examine the processes that lead to specific outcomes. They suggested that two approaches may provide insight in this regard; a behavioural approach that explains the interaction of the worker and the work, and an operational approach that addresses the scheduling of production jobs and the constraints of labour assignment flexibility. These issues are still largely unresearched and we have very little empirical evidence on what specific processes at the organizational and employee level lead to the specific outcomes. There is a need to build and test relevant theoretical models to assess and explain the role of specific behaviours and attitudes induced by SBP on organizational outcomes. Some of the effects on employee attitudes could be attributed to the way an organization designs, communicates, and administers the SBP plan.

It is, therefore, important to examine the procedures applied in designing and administering the SBP plan and how they affect employee attitudes and behaviours. Also, it is important to examine the changes in managerial practices that take place after organizations apply SBP. How does the organization use the multi-skilled workforce? What effects do SBP plans have on employee selection and training, employee involvement, delegation, scheduling, and span of control? Also, from the employee side, how does SBP affect employees' work roles and their development and advancement in the organization? What are the advantages attained and the challenges encountered in effectively administering a SBP system and how could these challenges be overcome?

The current study will contribute to our understanding of the process by which SBP systems affect employees' attitudes. It develops and empirically tests a theoretical path model linking the SBP plan to employee role orientation and organizational commitment. Within the model, it is hypothesized that perceived characteristics of the SBP plan, in addition to

employees' characteristics (including self-efficacy and identification with the work group), will predict employees' perceptions of pay plan fairness and effectiveness as well as their organizational commitment and role orientation. Chapter 3 discusses the proposed path model and the hypotheses generated from the model. Analysis of empirical findings and conclusions are presented in the subsequent chapters.

# Chapter 3

# Determinants of Role Orientation and Organizational Commitment Under Skill-Based Pay Systems: A Path Model

# **3.1 Introduction**

As mentioned earlier, one of the most salient features of the SBP system is the fact that it redefines the desired role of the employee from specializing in one specific job to being able to function in multiple jobs and assume variable roles depending on the production and operations needs. In order for employees to function effectively in this environment, it is very important not only that their roles are actually redesigned, but also that their role perceptions and orientation are changed as well. Employees are expected to develop broader roleorientation under a SBP system than they are under a job-based pay system. The change in pay system also implies a change in the employee-employer relationship and that is expected to affect other employee attitudes and behaviors including organizational commitment.

When employees become more involved in the operation of their work units, perform multiple functions, and continuously acquire new skills and achieve higher pay, they may become more committed and loyal to the organization. One can argue that as employees develop a better appreciation of the organization's business and objectives they may develop higher affective attachment to the organization. Also, the investment of time and effort in learning new company-specific skills as a result of applying a SBP system may make the cost of leaving the organization for the employee higher from the point of view of the transactional perspective on organizational commitment (Becker, 1960). Compensation practices in general are expected to influence the formation, fulfillment, and violation of psychological contracts in employment (Rousseau & Ho, 2000). The psychological contract refers to "individual beliefs shaped by the organization, regarding the terms of a reciprocal exchange agreement binding both the individual and the organization (Rousseau and Ho, 2000, Rousseau, 1995). Rousseau and Ho (2000) indicate that "the meaning of compensation systems is far broader than mere economic terms, signaling much about the nature of the employment relationship and the attachment between the worker and the firm" (p. 304). This is particularly true in the case of a SBP system as it involves both high employer investment in employees and high expectations for employee performance contributions.

As discussed above, the introduction of SBP fundamentally changes both the basis for determining employees' pay as well as their expected work roles. This change in the rules governing the employment relationship is expected to consequently affect the psychological contracts for employees and their attitudes toward both the organization and their own work roles. Two of the main manifestations of an employee's psychological contract are his/her commitment to the organization and work role orientation. Role orientation refers to the tasks, problems, and competencies that an employee considers as part of his/her perceived work role (Parker, Wall, & Jackson, 1997). Organizational commitment is defined as the strength of an employee's identification with and involvement in a particular organization (Mowday, Porter, & Steers, 1982). The current study will examine the factors determining the effects of SBP on employee commitment and role orientation.

I referred earlier to a study by Lee et al. (1999) in which they showed that perceptions of the SBP plan fairness partially mediated the relationship between SBP plan characteristics and both employees' pay satisfaction and assessment of the SBP plan benefits. The current study will follow a similar approach to examine the determinants of employee role-orientation and organizational commitment under a SBP system. It is hypothesized in this study that SBP plan characteristics (indicated by employee understanding of and involvement in the plan as well as perceptions of training and advancement opportunities) in addition to employee self-efficacy and group identification will affect these attitudes both directly and indirectly through their effects on perceptions of pay system fairness and effectiveness. Employee role orientation and organizational commitment under SBP are discussed using a path model explaining the process by which SBP affects these outcomes. Based on the model in Figure 3-1, hypotheses will be developed and tested in the present study.

# 3.2 Employee Role-Orientation.

Under SBP, employees learn and perform a larger set of tasks and activities in the production of goods and services which in turn leads to higher level of worker identification with tasks (Tosi & Tosi, 1986) and consequently, a higher feeling of importance and instrumentality of one's role in the process. Schuster and Zingheim (1992) indicate that the traditional concept of the 'job' restricts employees' ability and willingness to acquire new skills to improve performance. Because of its focus on the individual employee, his/her current job, and the next higher job hierarchy, traditional base pay may cause employees to become concerned only with internal job relations and vertical career growth rather than horizontal job and skill opportunities and helping the organization outperform its business competitors. Schuster and Zingheim argue (1992) that what they called the 'new base pay' should encourage acquisition of skills and knowledge, horizontal growth, and rewarding employees for preparing themselves to perform a wider range of duties and responsibilities that add value to the organization (Schuster & Zingheim, 1992, P. 85). Skill-based pay is

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# Figure 3-1: A path Model of the Relationships among Perceptions of the Pay Plan, Self-Efficacy, Group Identification, Organizational Commitment and Role Orientation under a Skill-Based Pay System.



more likely to achieve these objectives than job-based pay because it bases pay differentials on skill acquisition, resulting in multi-skilling, and hence facilitates flexibility in work assignments and encourages learning as a way of life at the organizations where it is applied (Gerhart et al., 1995).

Role orientation refers to the "psychological boundary of a role" (Parker et al., 1997). It includes the tasks, problems, and competencies that an individual includes as part of his/her perceived work role given the opportunities within the environment. According to Parker et al. (1997), role orientation includes two aspects. The first is "production ownership," which refers to work goals and problems that the individual feels responsible for. The second aspect refers to an employee's recognition of the importance of gaining and using a wide range of skills and knowledge in order to perform effectively. By encouraging continuous skill acquisition and utilization, the skill-based pay system is expected to change the role orientation of employees and broaden their ability to contribute in their work roles.

Also, a well known fact about SBP is that it is used widely by innovative organizations that adopt high involvement approaches to the management of their human resources (Lawler et al., 1993). High involvement management naturally allows and motivates employees to assume broad role orientation. Recent research on SBP provides support for this conclusion. Jenkins et al. (1993) found that the adoption of SBP results in increased employee understanding of the 'big picture'. Klein (1998) indicated that due to the cross-training and cross-functioning workforce, firms using SBP encounter less of "that is not my job" thinking.

Many researchers recently suggested that employees in the modern organization have to embody a broader and more proactive approach to their roles in which they both feel ownership and responsibility for work beyond their immediate operational tasks and recognize the importance of acquiring and using a wide range of skills and knowledge to enable them to undertake such broader roles (Parker et al., 1997). Karasek & Theorell (1990) indicated that narrow role orientation are derived from "learned responses to early job experiences in which taking initiative and using extra skill and judgment were severely penalized as overstepping the bounds of one's (unnecessarily restricted) authority" (cf. Parker et al., 1997, p. 901). On the other hand, learning additional skills and multi-functioning are not only encouraged, but also expected and required from employees under a SBP system.

# 3.3 Organizational Commitment.

Organizational commitment is generally defined as the strength of an individual's identification with and involvement in a particular organization (Mowday et al., 1982). Mowday et al. (1982) suggest that the concept is characterized by three factors: acceptance of the organization's values, willingness to exert effort on behalf of the organization, and desire to remain an employee of the organization. Price and Muller (1986) argue that each of the three factors represent employee "loyalty" to the organization. Organizational commitment studies have traditionally adopted either of two different perspectives: attitudinal commitment (commitment as an attitude or a mind-set) or behavioural commitment (the intent to behave in a certain way) (Mowday et al., 1982; Mathieu & Zajac, 1990; Meyer & Allen, 1997).

Meyer and Allen (1991, 1997, 1998) suggested, drawing from the collective findings of previous research, that the organizational commitment construct is comprised of three interrelated dimensions: affective, normative, and continuance commitment. Affective commitment is defined as "an emotional attachment to, identification with, and involvement in the organization" (Meyer & Allen, 1998, p. 39). Normative commitment consists of "the totality of internalized normative pressure to act in a way that meets organizational goals and interests" (Weiner, 1982, p. 421). Continuance commitment is the individual's attachment to an employer because of transactions that occur between the employee and the organization (Pinder, 1998). This approach to organizational commitment is originated in Becker's (1960) 'side bets' theory, which describes various forms of investments over time such as seniority rights, pension plans, and company-specific work skills which an employee would lose if he/she decided to leave the organization.

Meyer and Allen (1997) indicated that their measure of affective commitment is equivalent to Mowday, Steers, and Porter's (1979) measure known as the Organizational Commitment Questionnaire (OCQ), which is the most widely used unidimensional measure of organizational commitment. Meyer, Stanely, Herscovitch, & Topolnytsky (2002) found, using meta-analysis, a correlation of 0.88 between the two measures. OCQ will be used to measure organizational commitment in this study.

Organizational commitment is considered desirable for organizations generally because of its positive effects on a number of outcomes including employee retention, attendance, performance, citizenship behaviour, and general employee well-being (Meyer and Allen, 1997). Under a SBP system an organization is expected to be more interested in retaining its employees as a result of its investments in their training and skill acquisition which makes replacing a departing employee more costly.

Meyer and Allen (1997) indicate that while there are a variety of factors that may affect organizational commitment including individual differences, the strongest influences on the three dimensions of commitment are usually situational. Various types of change processes in organizations such as restructuring, downsizing, or introducing new work systems and practices are expected to impact the employee-organization relationship and may consequently affect employees' organizational commitment to various degrees. Pay is at the center of the employment relationship and changes in the pay system are expected to affect employees' attitudes towards their work and the organization including their organizational commitment.

The adoption of a SBP system results in a number of benefits to employees including higher pay, higher skill levels, and more empowerment. It is expected, therefore, that employees in general will develop higher levels of organizational commitment under a SBP system. The degree to which the commitment level is affected will of course depend on contextual factors such as the characteristics of the SBP plan, other human resource management practices, and the quality of the relationships among employees and with their supervisors as well as specific individual characteristics of the employee. The Jenkins et al. survey study (1993) reported that 98 percent of respondents indicated that their SBP plans were successful in increasing employee commitment and satisfaction levels. The study also found that SBP resulted in lower absence and quit rates. Other studies also showed that SBP resulted in higher levels of commitment and lower turnover and absenteeism rates (Ledford & Bergel, 1991; Leblanc, 1991; Parent & Webber, 1994).

# 3.4 Effects of SBP Plan Characteristics, Self-Efficacy, and Group Identification on Organizational Commitment and Role Orientation: A Path Analysis.

In order to understand the process by which the SBP plan is expected to affect employees' attitudes towards the organization and their own work roles, we developed a path model describing the determinants of organizational commitment and role orientation under SBP based on relevant theoretical perspectives. The path model presented in Figure 3-1 above outlines the expected relationships between the two outcome variables (employee commitment and role orientation) and SBP plan characteristics, employee self-efficacy, and employee identification with his/her work group. The model proposes that these explanatory variables have both direct effects on the outcomes and indirect effects mediated by perceptions of SBP plan fairness and effectiveness.

Research shows that organizational commitment is differentially related to certain characteristics of the employee's role in the organization. For example, studies found a positive relationship between organizational commitment and 'role scope' and a negative

relationship between commitment and both 'role ambiguity' and 'role conflict' (Meyer &Allen, 1997; Mathieu & Zajac, 1990; Meyer et al., 2002). Also, several studies reported strong correlation between organizational commitment and job challenge, degree of autonomy. and variety of skills the employee uses (e.g., Colarelli, Dean, & Konstans, 1987; Dunham, Grube, & Castaneda, 1994; Steers, 1977) (cf., Meyer & Allen, 1997). However, we do not have sufficient empirical evidence or theoretical argument to suggest a specific direction of causality between organizational commitment and role orientation. It might be argued that more highly committed employees are more inclined (than lowly committed employees) to define their roles more broadly and to assume more responsibility and ownership for the work that they do - as their interests are more aligned with the interests of their employing organization. On the other hand, one might argue that broader role orientation and high levels of employee involvement could lead to better understanding of the organization's business and its mission and goals, which may in turn lead to higher levels of organizational commitment. Therefore, I will not assume any causal effects between the two variables although I believe that they will be correlated even after controlling for the shared correlation that is accounted for by the explanatory variables specified in the path model.

Hypothesis 1: There will be a positive relationship between employees' role orientation and their organizational commitment.

# **3.4.1 SBP Plan Characteristics**

As was mentioned earlier, skill-based pay leads to a major change in the nature of the employment relationship. It presents new challenges and opportunities for employees in terms of career achievement opportunities that are different from the case under the traditional jobbased and seniority based system. The nature of employees' work roles, criteria for advancement and career progress, and the relationships among employees are all different under the SBP system. Four characteristics of any SBP plan are expected to largely shape employees' attitudes towards the pay system, their own work roles, and the organization. These characteristics are derived from the nature of the SBP system and the way it operates. The four main characteristics are the employees' understanding of their SBP plan, involvement and participation of employees in the decision making process regarding the design and administration of the plan, the training opportunities available, and the certification and advancement procedures applied in the SBP plan.

As discussed above, employees' beliefs about the effectiveness of the SBP plan will depend on how well the plan maximizes their effort-performance and performance-reward expectancies. To make an accurate assessment of these expectancies, employees need to understand clearly the pay system characteristics. Hence, in order for employees to develop the motivation to acquire skills which is required for the SBP system to work, they must understand the plan well. Employee involvement and participation in the design and administration of the SBP plan are also expected to increase their understanding and acceptance of the plan and consequently, their beliefs about the plan's effectiveness.

Lawler (1981) argues that employee involvement and participation in the pay system means that they have more information and better understanding of the system resulting in a feeling of responsibility, control, and commitment. That could also lead to high trust of the system and consequently favorable perceptions of the effectiveness of the pay plan. When a reward system is designed in a top-down authoritative manner, the acceptance level of the reward system is often low and the system fails to take into account important information about the preferences and desires of employees (Lawler, 1981). A SBP plan that involves employees in the design and implementation of the pay plan, provides them with relevant training on the skills required, and provides clear rules for advancement and skill certification is expected to lead to a high employee perception of the pay plan effectiveness in achieving the desired objectives.

Hypothesis 2: Employee perceptions of SBP plan characteristics (including understanding, involvement, and training and advancement opportunities) will be positively related to their perceptions of the SBP plan effectiveness.

My review of organizational fairness theories indicated that several factors may determine fairness perceptions. Early studies in this field focused on structural elements such as organizational policies and rules, including giving advance notice for decisions and opportunities for voice (Konovsky, 2000). Later conceptualizations introduced interpersonal dimensions such as treating others with dignity and respect (referred to as interactional justice) and providing adequate information regarding decision making (referred to as informational justice). Therefore, for a SBP to be perceived as fair, it has to provide employees the opportunity for voice through involvement and participation in the design and administration of the plan. Also, the process-control theory predicts that employee understanding of the plan and availability of clear rules for training and certification will give the employee a sense of trust and control and consequently lead to a higher level of fairness perceptions.

Lee et al. (1999) argue that the main issues that determine fairness perceptions in the SBP system are the design level and the skill certification process. The availability of training and rotation opportunities as well as the process of skill certification determine the ability to advance in the SBP structure and, therefore, employees' perceptions regarding these aspects of the SBP system are expected to affect their perceptions of the SBP plan fairness. The current study hypothesizes that the fairness perceptions of the SBP system are affected by the perceived SBP system's characteristics (including employee understanding of the SBP plan,

knowledge of how to advance in the SBP structure, training and rotation opportunities, and employee involvement and participation in the process) (See path model in Figure 3-1).

Understanding is a very important factor in shaping employee perceptions of fairness of organizational systems and practices. Lawler and Hackman (1969) (c.f. Brown and Huber, 1992, p. 286) found that employee understanding of the pay plan is more important than the specific mechanics of the plan. Brown and Huber (1992) found that perceived understanding of an earning-at-risk pay system was strongly related to both satisfaction with pay plan procedures and outcomes.

Lawler and Jenkins (1976) reported that employees' participation in designing a basepay system for their organization resulted after six months of the system being in effect in "significant improvements in turnover, job satisfaction, and satisfaction with pay" (cf. Lawler, 1981). Lawler (1981) concludes that participation lead to feelings of ownership of the plan and to a belief that the plan was fair and trustworthy. Similarly, Lee et al. (1999) found that perceptions of SBP plan characteristics (including understanding, training opportunities, and knowledge of how to advance in the SBP structure) were positively related to employee perception of fairness of the plan.

Hypothesis 3: Perceptions of SBP plan characteristics (including understanding, involvement, and training and advancement opportunities) will be positively related to perceived SBP plan fairness.

Also, employee understanding of the pay system characteristics increases employee pay satisfaction and results in a positive affect towards the company and the pay plan (Lee et al., 1999). From a psychological contract perspective, employees' perceptions of the characteristics of their pay plan will affect their psychological contracts with the organization since pay is an important component in the employment relationship. The resulting change in the psychological contract may influence employees' attitudes towards the organization and their own work roles. So we can expect a direct effect of SBP plan characteristics on both organizational commitment and role orientation.

Hypothesis 4: Employees' perceptions of SBP plan characteristics will be positively related to their organizational commitment.

Hypothesis 5: Employees' perceptions of SBP plan characteristics will be positively related to their role orientation.

# **3.4.2 Perceptions of SBP Plan Fairness**

Fairness in organizational systems and policies is important because it is considered a fundamental organizational value, it serves as a heuristic to simplify the world and facilitate decision making, and finally because fairness perceptions determine important consequences such as employee behaviour and attitudes (Konovsky, 2000). Fairness perceptions are bound then to affect employees' reactions to various management decisions and interventions. As indicated earlier, several studies demonstrated that fairness perceptions predict employee attitudes towards the organization and its representatives including organizational commitment and trust in supervisors (Folger & Konovsky, 1989; McFarlin & Sweeney, 1992). Therefore, we hypothesize that:

*Hypothesis* 6: *Perceptions of the SBP plan fairness will be positively related to organizational commitment.* 

Similarly, procedural fairness is expected to affect employees' attitudes towards their own roles. Previous studies found that procedural justice perceptions have a positive effect on leader-subordinate relationship resulting in improvement in various employee behaviours such as organizational citizenship behaviour (OCB) (Konovsky, 2000). Therefore, it is expected that fairness perceptions will affect role-orientation, which is a related concept to OCB. Both OCB and role orientation are indicators of employees' perceptions of their roles within the organization. While OCB focuses on extra-role behaviours, whistle blowing, and being a good corporate citizen in general (Organ, 1988; Konovsky & Pugh, 1994), role orientation in this study is defined in terms of desired role perceptions in organizational settings that formally abandon the narrowly defined job descriptions and encourage employee multi-skilling, multi-functioning, and broader participation and involvement in organizational affairs.

Hypothesis 7: Employees' perceptions of the SBP plan fairness will be positively related to their role orientation (higher perceptions of pay plan fairness will be associated with broader role orientation).

#### **3.4.3 Perceptions of SBP Plan Effectiveness**

Besides fairness perceptions, beliefs about the SBP plan effectiveness are expected to affect employees' attitudes and reactions including their attitudes towards the organization and their work roles. Before introducing a SBP plan, the organization communicates to its employees the objectives desired from applying such a pay plan. These objectives typically involve encouraging employees to become multi-skilled and multi-functional by tying their pay increases to skill acquisition. Therefore, the organization has a flexible, cross-functional, and highly productive workforce. Employees, on the other hand, have more interesting work experience with better opportunities for promotion and higher pay levels. From an expectancy theory perspective, employees' beliefs about the effectiveness of their pay plan will depend on how well their expectancies of effort-performance and performance-reward motivate them to work towards achieving the desired goals. Under SBP, employees who feel that they can contribute more than others in the same pay rate can move to a higher pay rate through demonstration of having higher levels of skill. Typically, a SBP system provides employees with the opportunity to get higher pay as they advance from one skill level to the other. Ideally, the SBP system makes the decision to advance largely based on the employee him/herself with equal opportunity for all employees to access training and progress to higher levels of skill and pay. This will consequently enhance employees' perceptions of SBP plan's fairness and effectiveness since it provides them with objective procedures to progress to higher pay and higher positions as they master additional skills.

It is hypothesized in this study that employees' perceptions of SBP plan effectiveness will predict their organizational commitment and their role-orientation. The more employees believe that the SBP plan is effective and the more they support it, the higher their commitment to the organization will be and the more likely that they will develop a broader role orientation in performing their work.

Hypothesis 8: There will be a positive relationship between employees' perceptions of the SBP plan effectiveness and their organizational commitment.

Hypothesis 9: There will be a positive relationship between employees' perceptions of the SBP plan effectiveness and their role-orientation.

# 3.4.4 Self-Efficacy

Figure 3-1 shows that the two mediating variables in the path model, perceptions of SBP plan fairness and effectiveness, are affected by employee's self-efficacy. Self-efficacy refers to one's judgement of personal capability. Bandura (1982) indicates that perceived self-efficacy "is concerned with judgements of how well one can execute courses of action required to deal with prospective situations" (p. 122). From an expectancy theory perspective, SBP can be expected to work best where employees are confident of their abilities to learn and anticipate sufficient rewards to warrant the required investment of time and energy (Thompson & LeHew, 2000).

Cable and Judge (1994) found that job seekers with high self-efficacy are more likely than those with lower self-efficacy to be attracted to organizations that offer skill-based pay systems. A SBP system is believed to create a more challenging work environment for individuals (Cable & Judge, 1994). Employees with higher self-efficacy will be motivated to perform well under this system by continuously acquiring skills and maintaining high proficiency. It seems logical to assume that individuals who have high belief in their abilities will prefer SBP and will be more likely to view this pay system as effective.

Hypothesis 10: An employee's general self-efficacy will be positively related to his/her perception of SBP plan effectiveness.

If employees with higher self-efficacy are more likely to prefer a SBP over a job-based pay system, we may also predict that they will view this pay system as more fair as well. According to the self-interest model of procedural fairness, individuals' interest in fair procedures is derived from their belief that fair procedures will lead to better rewards. Individuals with high self-efficacy are more likely to perceive themselves as able to achieve higher rewards under SBP. Therefore, the self-interest model predicts that people with high self-efficacy will be more likely to view the SBP plan as fair since it allows them to achieve higher pay levels consistent with their abilities. Therefore, it is hypothesized that:

Hypothesis 11: There will be a positive relationship between employees' self-efficacy levels and their perceptions of SBP plan fairness.

Also, it is expected that self-efficacy will have a direct positive effect on employee role-orientation and organizational commitment. It seems logical to predict that people with high confidence in their capabilities are likely to seek higher involvement and perceive themselves as performing a broader role than those with lower self-efficacy. Organizational commitment literature suggests that people's perceptions of their own competence might play a role in their affective commitment (Mathieu & Zajac, 1990).

Meyer and Allen (1997) indicate that it is difficult to ascertain whether "dispositional self-confidence" is truly a cause of affective commitment. They suggested that a possible explanation for the positive association is that competent people are able to choose higherquality organizations and that may have inspired stronger affective commitment. Another possible explanation is that competent individuals are able to provide significant contributions in their work roles and receive relevant rewards as they help the organization achieve its goals. This, in turn, results in a mutually beneficial relationship and higher organizational commitment. An organization that applies SBP system should be an ideal context for testing this proposition. Hence, it is hypothesized that:

Hypothesis 12: There will be a positive relationship between employees' levels of self-efficacy and their organizational commitment.

Hypothesis 13: There will be a positive relationship between employees' levels of self-efficacy and their role-orientation.

# 3.4.5 Group Coherence

The work environment where SBP is applied requires a high level of employee interaction and cooperation. This may explain why most organizations that apply SBP also adopt various forms of high involvement work systems to encourage teamwork (such as participation groups, job enrichment, and self-managing teams) (Lawler et al., 1993). Decisions regarding skill training and certification as well job rotation and cross-functioning involve a process of negotiation and cooperation between employees within the work unit. In many cases, senior employees are involved in training and certifying their fellow co-workers for promotion to higher skill levels. Also, cross-functioning and employee rotation between different tasks and assignments means that as employees within a specific work unit rotate between different tasks and assignment, they will experience changing group dynamics and more involved interrelationships among themselves and with individuals and teams from other work units.

Also, as they acquire higher levels of skill and competency, employees will be expected to undertake higher levels of responsibility and decision making in performing their roles within their respective work teams. This implies higher levels of interaction and interdependence with others. It follows that an employee's success in achieving his/her career goals under SBP is dependent to some extent on the support and cooperation of other employees. Therefore, creating a collaborative and cohesive team environment will affect both the success of the SBP system and the degree of employees' support and endorsement of this

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system. The quality of the employee's relationship with fellow team members is reflected by his/her level of group identification.

Tajfal (1978) suggests that group identification is part of an individual's self-concept which involves his/her knowledge of membership of the group, and the value and emotional significance attached to that membership. Group identification involves three components including the knowledge or cognitive aspect of group membership, an evaluative component referring to the value that a person places on group membership, and an emotional-affective aspect of group membership (Hinkle, Taylor, Fox-Cardamone, & Crook, 1989).

In a SBP work environment, coherence and cooperation amongst individuals within a work unit become important determinants of individual employees' ability to function effectively and advance in the SBP structure. Multi-functioning and task rotation mean that employees will experience higher levels of interaction with co-workers. Also, interdependence between employees may be increased by higher levels of employee involvement and participation in decision making in the SBP environment. Under SBP, roles are broadly defined and the average employee responsibilities are increased as the need for supervision decline with higher employee skill levels. There are more lateral relationships among employees and less hierarchical relationships in the SBP work contexts compared with the traditional JBP approach. It follows that the quality of relationships between individuals within the work unit will affect their reactions to the SBP system. One would expect, therefore, that group identification will influence an employee's perception of both SBP plan fairness and effectiveness.

Hypothesis 14: An employee's level of identification with his/her work group will be positively related to his/her perception of SBP plan fairness.

#### And similarly:

Hypothesis 15: An employee's level of identification with his/her work group will be positively related to his/her perception of SBP plan effectiveness.

Also, it is expected that an employee's perception of the SBP plan will be correlated with the type of relationship he/she has with fellow team members. Under SBP, employees are commonly involved in making decisions regarding training and advancement of others within the same work team. Also, an employee's understanding of the SBP system is likely to be influenced by the type of experiences and information shared with team members. Similarly, an employee's perception of involvement under the SBP system will be correlated with their identification and interaction with their work group. However, no causal direction of the relationship between group identification and perceptions of SBP plan is expected.

Hypothesis 16: There will be a positive correlation between an employee's group identification and his/her perceptions of the four SBP plan characteristics (understanding, involvement, advancement, and training).

The importance of group identification under the SBP system means that it is likely to have an impact on the employee's attachment to the organization and also on perception of his/her own work role. As long as the employee feels that the organization provides favorable work environment, he/she will be expected to develop a higher level of organizational commitment. The quality of an employee's relationship with his/her work group is likely to affect the quality of work life and consequently attachment to the organization. Therefore, it is hypothesized that:

Hypothesis 17: An employee's level of identification with his/her work group will be positively related to his/her organizational commitment.

Also, it is hypothesized that employees' identification with their work group will affect their orientation towards their own work roles. A positive interaction with co-workers and a collegial work environment is expected to make work more interesting and enjoyable and, subsequently, employees will be more likely to develop a broader involvement and broader orientation, and more proactive perspective on their own work roles.

Hypothesis 18: An employee's group identification will be positively related to his/her role orientation including both perception of ownership of production problems and desire for production knowledge (the higher an employee's identification with the work group, the broader his/her role orientation will be).

# **3.4.6 Control Variables**

Age, organizational tenure, and pay level will be included as control variables in the estimation. Commitment to the organization increases with employee's age and organizational tenure (Meyer & Allen, 1997). This may be explained by the fact that the older the employee is, the more likely he/she will experience job satisfaction, promotions, and advancement which may result in higher levels of organizational commitment. Employees with low organizational commitment are more likely to leave the organization early, while those who stay for long time are more likely to be the ones who believe in the organization and its mission and values (Dunham et al., 1994).

Also, tenure could be associated with various types of investments by the employee in the organization that will be lost in the case of leaving such as relationships with co-workers, retirement investments, and company-specific skills acquired over the period of employment. The positive relationship between organizational commitment and both age and tenure has been confirmed by meta-analytic evidence (Mathieu & Zajac, 1990).

Since there is very limited research on role-orientation in general, no empirical evidence regarding the effects of age and organizational tenure on role-orientation exists. However, I predict a negative relationship between role-orientation and both of age and organizational tenure. The reason is that employees with longer tenure are more likely to be accustomed to the old styles of work and management before the SBP system was applied and will be less likely to adjust their role-orientation than employees with shorter tenures. For the same reason I expect that tenure and age will have a negative relationship with perceptions of SBP plan fairness and effectiveness.

# Chapter 4

# **Data and Methodology**

# 4.1 Introduction

This section describes the research setting, participants, and the methods of data collection and analysis used in the study. The research design used is a posttest-only with one group of participants. This design is suitable for the type of analysis intended in this study (i.e; explanatory path analysis) (Cook & Campbell, 1979). The methodology used in this study followed two main steps. The first step was to validate the scales used in data collection by examining their reliability (stability) and their underlying factor structure (scale dimensionality). Once the required psychometric properties of the measures were established, the second step was to estimate the explanatory path model describing the expected relationship between study variables and then to test the study hypotheses. Results of model estimations will be presented and analyzed in chapter five. This will be followed by discussion of results, conclusions, and suggestions for future research in chapter six.

# 4.2 Research Setting

The study was conducted at a non-union manufacturing company in Ontario, employing approximately 7000 employees. Starting in the 1980s, the company embarked on an initiative to improve productivity and performance by increasing employee involvement and participation. The company's business was experiencing a state of relative growth and successful performance at that time compared to competitors. However, senior managers started to realize a trend of increasing levels of competition in the global market of the company's products. It was realized that productivity levels could be increased substantially by increasing levels of flexibility in work assignment and by allowing employees to function in multiple roles. Several meetings and focus group discussions involving employees at all levels in the organization confirmed this conclusion. Employees indicated that they felt their current job assignments were narrow and limiting, and that they would prefer to be more involved in running the business within their respective work units. One employee described the common feeling by employees well when he said "I feel that I have to park my brain at the gate when I come here because the job is repetitive and routine!"

A team of senior managers then embarked on a mission to survey the best employee involvement practices applied in the industry across North America. Results of this research mission lead to a decision to adopt a flexible work system where employees would be motivated to acquire higher skill levels and become more involved in making decisions in their respective work roles. The resulting system involved a pay-for-skill plan and a reorganization of work towards a more extensive use of work teams. Today, all production and professional employees in the manufacturing part of the company are covered by the SBP system.

The skill-based pay structure was designed to replace the old job-based 'line of progression' structure. The SBP plan included 36 skill levels. Under the new pay structure employees were initially placed at the pay level corresponding to the pay level for their old job positions. The SBP plan was accompanied by training and certification programs to allow employees to learn higher skills and move up the SBP ladder. Employees were organized in teams and each team was asked to develop criteria/testing for skill certification and pay increases.

# 4.3 Procedure and Participants

The researcher held a series of meetings with managers from the Human Resource Department and senior managers who were involved in the design and implementation of the SBP system at the company from the early stages. These meetings intended to collect information about the details and mechanics of the SBP plan and various issues related to administration of the pay system and its outcomes at the employee and organizational levels. During this period, a questionnaire to collect data from employees was developed and agreed on by the senior managers of the company. It was decided that the sample for the study should be drawn from all manufacturing departments that use a SBP plan so that it represents all employee who work under the SBP system. A representative sample of 1200 employees was selected by the Human Resource Department and a survey packet was mailed to each employee at his/her home address.

Prior to the mailing of the survey packets, an email message from the company's Communication Department announcing the mailing of the surveys was sent to all employees. Each survey packet included two cover letters and a copy of the survey questionnaire with a university-addressed return envelope. A cover letter by the researcher on the university letterhead explained the purpose of the study, assured anonymity of respondents, and asked them to return the completed questionnaires within two weeks. To assure anonymity, respondents were not asked to write their names or provide any other information which could identify them. Also, the survey packet included a second cover letter on the official letterhead from a Vice President of the company, explaining the value of the study to the company and encouraging employees to participate in the survey.

Within the stipulated two-week turnaround period for the survey, responses were received from 263 out of 1200 employees who received the survey, which represent a response rate of 21.9 percent. As this sample size was deemed sufficient for the study, no further reminders or additional mailings of the survey were sent. Almost all the sample respondents were male (only two were female), with an average age of 47 years (the minimum age in the sample was 37 years and the maximum was 63). The mean company tenure of

respondents is 26 years with a minimum of 15 years and maximum of 41 years. The majority of respondents had a high school level of education (N=150, 57%) with 9 participants (3.4%) who had elementary school education, 74 participants (28.1%) with college diploma, and 26 respondents (9.9%) with a university degree. The average wage level of respondents was 25/hour (skill level 25 out of 36 on the SBP ladder). The minimum wage was 20/hour and the maximum 32/hour.<sup>1</sup>

#### **4.4 Measures Used**

Variables used in estimating the explanatory path model were measured using multiitem scales that were either obtained from previous research or developed for use in the current study. A copy of the survey questionnaire including all the items used in the data collection is presented in the Appendix. The following is a description of the various scales used to measure outcome and explanatory variables used in the study.

# 4.4.1 Outcome Measures

**Organizational Commitment**. Commitment to the organization was measured using the nine-item version of the Organizational Commitment Questionnaire (OCQ) (Mowday et al., 1979). Each item was scored on a 7-point scale, ranging from 1 = 'strongly disagree' to 7 = 'strongly agree'. An example of an item is "I am extremely glad that I chose (company name) to work for over other organizations I was considering at the time I joined." The reported reliability alpha coefficient for the OCQ was .88. The reliability coefficient for the current sample was 0.90.

<sup>&</sup>lt;sup>1</sup> Without providing details, the company assured the researcher that these sample characteristics were representative of the employee population from which the sample was drawn.

**Role Orientation**. The two dimensions of role orientation that I described earlier in Chapter 3 were measured using two scales from Parker et al. (1997). The first scale measures an employee's perception of 'ownership of production problems,' which reflects the extent to which an employee feels ownership or responsibility with respect to problems and goals related to his/her work role in the organization. The production ownership scale included nine items, each representing a specific production problem. An example of an item in this scale is 'the way some things were done in your work area meant a lot of re-work was needed.' In each item, respondents were asked to indicate to what extent they felt that the problem was of personal concern to them, using a 4-point scale ranging from 1 = 'to no extent, of no concern to me' to 4 = 'to large extent, of high concern to me'. <sup>2</sup>

The second role orientation scale used is a measure of an employee's feeling about the 'importance of work knowledge' in performing his/her work role. This aspect of role orientation is conceptualized to capture the extent to which employees recognize the importance of acquiring a wide range of skills and knowledge related to their work roles. This measure consisted of 15 items. Employees were asked to indicate in each item how important the specific skills and knowledge are for them in order to perform their roles effectively. An example of an item is 'understanding how work flows in your work area.' Each item was scored using a 5-point scale ranging from 1 = 'not at all important' to 5 = 'extremely important.'

Parker et al. (1997) reported reliability coefficients of .94 and .93 for the 'production ownership' and 'importance of work knowledge' scales, respectively. The reliability coefficients obtained from the current sample were 0.89 and 0.93 for the two measures, respectively.

<sup>&</sup>lt;sup>2</sup> The scoring scale for these items was intended to include a fifth point, 5 = 'to a very large extent, most certainly of concern to me'. However, due to a printing error that was not detected before mailing out the

**Pay Plan Fairness**. Procedural fairness of the SBP plan was measured using four items taken from Lee et al., (1999). Each item was scored using a 7-point scale, ranging from 1 = 'strongly disagree' to 7 = 'strongly agree.' The four items measure perceived fairness of the SBP plan in general and fairness of the certification process. An example of an item is 'the skill-based pay certifications are a fair test of employee ability to perform a set of tasks.' The reported coefficient alpha for this scale was .80. The coefficient alpha for the current sample was 0.83.

**Pay Plan Effectiveness**. Employee perceptions of the SBP plan effectiveness was measured using eight items. Five of the items were taken from Lawler (1981) and the other three were developed for this study. The employee's agreement or disagreement on each item was assessed using a 7-point scale. An example of an item in this scale is 'the skill-based pay plan fulfills its objectives well.' The reliability coefficient of this measure was 0.89.

#### **4.4.2 Predictor Measures**

SBP Plan Characteristics. SBP plan characteristics were assessed using four scales that measure employees' perceptions regarding understanding/communication, training/job rotation, advancement opportunities, and employee involvement (i.e; employee perception of involvement in the design, administration, and decision making under SBP). The first three scales were taken from Lee et al. (1999). The scale measuring employee perception of participation and involvement was developed specifically for this study. All the four scales were scored with a 7-point rating scale. Understanding/communication was measured using four items. An example of an item is 'there has been very good communication about how the

questionnaires, the fifth point was not printed in the scoring scale. Therefore, the items were rated with a 4-point scoring scale instead of a 5-point scoring scale.

SBP plan works.' The reported alpha coefficient for this scale was .76. The reliability coefficient obtained from the current sample was 0.84.

Perceptions of SBP 'training/job rotation opportunities' was measured using four items. An example of an item is 'there is enough cross training for employees to earn pay increases under the skill-based pay program.' The reported alpha coefficient for the scale was .78. The reliability coefficient obtained from the current sample was 0.93.

Understanding advancement under the SBP plan was measured using three items. An example of an item is 'I understand exactly how I can advance to the next skill-based pay level.' The reported alpha coefficient for this scale was .75. The reliability coefficient from this sample was 0.93. Employee perception of involvement/participation under the SBP plan was measured with four items. An example of an item is 'when my supervisor makes pay decisions for me, he/she discusses them with me before making the final decision'. The reliability coefficient for this measure was 0.80.

**Group Identification.** Employees' identification with their particular work group was assessed using a nine-item group identification scale developed by Hinkle et al. (1989). All items were scored with a 7-point scale. An example of an item is 'I see myself as an important part of this group'. The reported alpha coefficient for the scale was .85. The alpha coefficient obtained from the current sample was 0.89.

**Self-Efficacy**. Self-efficacy was assessed using a 17-item scale of general self-efficacy developed by Sherer, Maddux, Mercandante, Prentice-Dunn, Jacobs, and Rogers (1982). Each item was scored using a 7-point scale. An example of an item is 'if I can't do a job the first time, I keep trying until I can.' Sherer et al. reported an internal consistency coefficient of .84. The reliability coefficient in the current sample was 0.85.

**Control Variables**. Organizational tenure, age, and pay level were measured using single items in the questionnaire.

# 4.5 Method of Data Analysis

The main purpose of this study was to examine the relationship between employees' attitudes and perceptions regarding their skill-based pay plan and the accompanying changes in work environment and their attitudes towards the organization and their own work roles. Therefore, the study involves a process of measurement of a number of constructs and latent variables then investigation of the relationships between these constructs through estimation of an explanatory path model that provide a theoretical representation of how these constructs are expected to interact. The data analytic method to be used should, therefore, enable us to examine the psychometric soundness of the latent constructs' measurement and also to assess empirically the hypothesized relationships between the latent variables. The best approach to handle this type of analysis is the method of structural equation modeling (SEM).

SEM can be used to examine the construct validity of measurement scales (by estimating measurement models) and to estimate explanatory path models (structural models) either separately or simultaneously in a complete structural equation modeling analysis (Pedhazur & Schmelkin, 1991; Hair, Anderson, Tatham, & Black, 1998; Tabachnick & Fidell, 1996). An advantage of SEM is that it can estimate several equations at once. These equations can be interrelated where the dependent variable in one equation can simultaneously be an independent variable in one or more other equations (Hair et al., 1998; Klem, 2000; Wulf, 1999).

The analysis conducted in this study involved two phases, the first was the scale validation phase where scales used to measure various latent variables were tested for reliability, uni-dimensionality, and construct validity to establish their psychometric properties. The second phase involved estimation of the explanatory path model and testing of study hypotheses. Both stages of analysis were conducted using AMOS 4.0 and SPSS statistical packages. AMOS (Analysis of MOments Structure) provides tools for data analysis using the structural equation modeling approach similar to other programs such as LISREL and EQS.

Reliability refers to the degree to which measures are consistent and therefore free from random errors of measurement. There are three commonly used approaches to assess reliability including test-retest, equivalent forms, and internal consistency (Pedhazur & Schmelkin, 1991). Obviously, it would not be possible to use the first two methods in the current study due to unavailability of data. Therefore, reliability of various measures used in this study were assessed by estimating their internal consistency coefficients. Internal consistency assesses the degree to which the items in a composite score are actually measuring the same phenomenon (Pedhazur & Schmelkin, 1991). One of the most commonly used measures of internal consistency is Cronbach's alpha (1951). I used the criterion set by Nunnally (1978) that a Cronbach's alpha coefficient of .70 or higher is considered acceptable.

To examine the factor structure underlying the data and to test the dimensionality of latent variables, confirmatory factor analysis (CFA) were conducted. Fit indices generated from the CFA are useful in testing the theorized factorial structure and help identify alternative factor structures that best fit the data (given that substantive theoretical interpretations of the factor structure are available). Detailed CFA analyses were conducted for measures that were either new in this study or that received limited previous validation including the four SBP plan characteristics scales, the SBP plan fairness and effectiveness scales, and the two role orientation scales. Other measures including organizational commitment, group identification, and self-efficacy have established psychometric properties from previous research and, therefore, I will accept the reported results of validation for these measures.

### 4.5.1 Goodness-of-Fit Indices

When using SEM, one is interested in determining the overall goodness-of-fit of the theoretical model to the empirical data. Although there are many guidelines suggested by different authors in the field, there is no consensus on what the best basis for determining model fit (Bollen & Long, 1993; Hair et al., 1998). However, one point of consensus is that the chi-square test statistic (or any other single criterion) should not be the only criterion used. Instead, multiple measures of model fit should be considered because several fit statistics examine different aspects or conceptions of fit (Thompson, 2000). Goodness-of-fit measures can be classified into absolute fit measures and incremental (or comparative) fit measures (Bentler & Bonnett, 1980; Hair et al., 1998; Kelloway, 1998).

Absolute fit measures assess the overall model fit with no comparison with other models. The most commonly used absolute fit measures are the chi-square test, the ratio of chi-square/degrees of freedom (df), the goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI), the root mean square residual (RMR), and the root mean square error of approximation (RMSEA). Incremental fit measures compare the proposed model to another model (or models) used as a "baseline" model for comparison (Kelloway, 1998, p.29).<sup>3</sup> Commonly reported comparative fit indices are the comparative fit index (CFI), the normed fit index (NFI), the Tucker and Lewis index (TLI), incremental fit index (IFI), the Acaike Information Criterion (ACI), and expected cross-validation index (ECVI). This study will use

<sup>&</sup>lt;sup>3</sup> In AMOS 4.0, fit measures are reported for the proposed model (user specified) and two additional models called the "saturated model" and the "independence model". The saturated is the most general model possible with no constraints on the population moments. The independence model, on the other hand, is severely constrained where all the observed variables are assumed to be uncorrelated.

the following goodness-of-fit indices: chi-square, chi-square/df ratio, GFI, AGFI, RMSEA, CFI, NFI, TLI, AIC, and ECVI.

Chi-square statistic is used to test if there is significant difference between the covariance matrix implied in the model and the covariance matrix observed from the empirical data. In this test, we are interested in not rejecting the null hypothesis since it (the null hypothesis) states that the proposed model fits the data perfectly. Thus, a large chi-square statistic indicates a bad model fit (Loehling, 1987; Hair et al., 1998; Kelloway, 1998; Tabachnick & Fidell, 1996). Hayduk (1987) indicates that chi-square is the preferred measure when non-nested models are compared. However, because chi-square is based on the restrictive assumption that the model fits perfectly in the population, some authors suggested that instead of treating chi-square as a test statistic to accept or reject models, it should be regarded as a measure of goodness (or badness) of model fit in the sense that large chi-square values correspond to bad fit and small chi-square values to good fit (Diamantopoulos & Siguaw, 2000, p. 84).

Several authors have suggested the use of chi-square/degrees of freedom ratio as a measure of model fit. Wheaton, Alwin, & Summers (1977) suggest that a ratio of five or less could be considered reasonable. However, others suggest that ratios in the range of 2 to 1 or 3 to 1 are indicative of acceptable model fit (Carmines and McIver, 1981, p. 80).

The goodness-of-fit index (GFI) measures the amount of variances and covariances accounted for by the model (Tabachnick & Fidell, 1996). Tanaka and Huba (1989) suggest that GFI is equivalent to  $R^2$  in multiple regression. The adjusted goodness-of-fit index (AGFI) is simply the GFI adjusted for the degrees of freedom in the model. The values of GFI and AGFI fall between 0 and 1, and values >0.90 are usually considered acceptable (Diamantopoulos & Siguaw, 2000, p. 87).

The assumption of chi-square statistic that the model fits perfectly in the population is highly restrictive since any model that we use is just an approximation to reality (Diamantopoulos & Singuaw, 2000, pp. 84-85). Therefore, rather than trying to ask whether a model is correct or fits the population covariance exactly, it may be more reasonable to assess the lack of fit of the model instead. The root square error of approximation (RMSEA) focuses on the discrepancy between the covariance matrix derived from the model and the covariance matrix in the population with adjustment for the degrees of freedom. Byrne (1998, p. 112) noted that "RMSEA has only recently been recognized as one of the most informative criterion in covariance structure modeling" (c.f, Thompson, 2000). Browne and Cudeck (1993) suggest that based on their experience, an RMSEA value of 0.05 or less would indicate a close fit of the model and a value between 0.05 and 0.08 would indicate a reasonable error of approximation. They also suggest that they would avoid employing a model with an RMSEA value greater than 0.1.

Bentler and Bonett (1980) suggested the normed fit index (NFI) to examine the model fit in comparison with a 'baseline' model. They point out that the NFI indicates the percentage improvement in fit over the baseline independence model. Therefore, an NFI of 0.90 means that the model is 90% better fitting than the independence model.

Bentler (1990) proposed a comparative fit index (CFI) based on the noncentral chisquare distribution. The CFI ranges between 0 and 1 with values exceeding 0.90 indicating a good model fit (Kelloway, 1998).

The Tucker-Lewis (1973) coefficient is another comparative fit index that involves a comparison with a baseline model based on the chi-square/degrees of freedom ratio. The typical range for TLI falls between 0 and 1, but it is not limited to that range. TLI values close to 1 indicate a very good model fit (Arbuckle & Wothke, 1999).

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Akaike's information criteria (AIC) and expected cross-validation index (ECVI) are examples of a set of measures known as information criteria that are used to compare models (Diamantopoulos and Siguaw, 2000). These are parsimonious fit indices in the sense that they are concerned primarily with the trade-off of model fit and degrees of freedom (Kelloway, 1998). For both indices, smaller values indicate a more parsimonious model. Therefore, these indices are used to compare competing models and choosing the one that shows most parsimony.

### Chapter 5

### Results

### 5.1 Introduction

This chapter presents the results from data analysis including validation of measures used in the study, estimation of the hypothesized research model, and testing of the hypotheses. I start with a general examination and verification of the data to ensure plausibility and consistency with assumptions of the SEM approach. The results of scale validation are then presented, followed by structural model estimation and hypotheses testing.

#### **5.2 Data Verification**

First, I checked the accuracy of data entry and recoded reverse scored questionnaire items. The minimum and maximum values, means, and standard deviations for each of the items were inspected for plausibility. Data were then inspected for missing values, outliers, and consistency with the SEM analytic approach. All items were checked for univariate outliers and univariate normality. Inspections of multivariate outliers and multivariate normality were conducted based on OLS regression estimations of each of the five structural equations derived from the path model shown in Figure 3-1.

#### 5.2.1 Missing Data

Except for the demographic variables, all variables in the data set had very few missing values. The maximum number of missing answers for any single item in the data set was 11

cases (4.2%) and most items had between 0-3 missing values. Therefore, it was decided to replace missing values with the series mean for each variable (i.e; item in the questionnaire).

#### 5.2.2 Outliers

Outliers are unusual and atypical data points that stand out from the rest and unduly affect the final results from data analysis (Pedhazur & Schmelkin, 1991). Before a decision on what to do about outliers is made, one must ensure that no outliers are caused by data entry or related errors. Data were inspected for univariate outliers using the standardized score criterion. Cases with standardized scores in excess of 3.29 (p<0.001), two tailed test) are considered potential outliers (Tabachnick & Fidell, 1996, p. 67). However, Tabachnick and Fiddle (1996) indicate that the extremeness of a standardized score depends on the sample size and that few standardized scores in excess of 3.29 are to be expected in large samples. There were no extremely high standardized scores with only few values that slightly exceeded 3.29. Therefore, no cases were deleted from the data set due to univariate outliers. Multivariate outliers are cases that have unusual pattern of scores when two or more variables are considered together (Tabachnick & Fidell, 1996). I examined the final measures (composite scale scores) that were used in the estimation of the structural mode for multivariate outliers using the Mahalanobis distance test. Mahalanobis distance is a discriminant functional analysis where an equation is computed that best separates one case from the rest of the cases (Tabachnick & Fidell, 1996). The test was applied on OLS regression estimations of the five structural equations derived from the path model in Figure 3-1. Only one case with a high Mahalanobis distance value was found (82.3, p<0.001), which is substantially higher than the critical chi-square value of 27.9 (df = 9). Therefore, the case was removed from the data set, leaving a sample of 262 cases.

#### **5.2.3** Normality

Most of the estimation techniques used in SEM assume multivariate normality (Bollen, 1989; Bentler, 1990; Joreskog & Sorbom, 1989). Deviation from multivariate normality can inflate the chi-square statistic and affect standard errors. Multivariate normality can be tested by examining the skewness and kurtosis values of individual variables prior to model estimation or by screening the residuals from multiple regression equations. In regression, if residuals are normally distributed, then there is no need to screen individual variables for normality (Tabachnick & Fidell, 1996).

All variables were examined for univariate normality using their skewness and kurtosis values. There were no extreme deviations from univariate normality. The highest skewness value for a variable is (-0.59) with a standard error (SE) of 0.15, which is within a fairly acceptable range (Tabachnick & Fiddle, 1996, p. 73). The highest kurtosis value for a variable was (-1.27) with SE of (.30), also within an acceptable level (Tabachnick & Fiddle, 1996, p. 73). More importantly, the requirement of multivariate normality was met in all structural equations of the path model. Examination of histograms of standardized residuals and normal probability plots using SPSS showed that the structural variables used in model estimation followed a multinormal distribution.

#### **5.3 Scale Validation (Measurement Models)**

When using SEM, a lack of fit can be attributed to a poorly-fitting measurement model, a poorly-fitting structural model, or both (Gerbing & Anderson, 1988; Kelloway, 1998). Therefore, Gerbing and Anderson (1988) recommended a two-step modeling approach where one first tests the measurement model and then proceeds to estimate the structural model. This is the approach I chose to apply in this study. In order to examine the psychometric properties of the measures used in the study, I conducted a confirmatory factor analysis (CFA) of all the items measuring the eleven constructs included in the hypothesized path model (see Figure 3-1). CFA provides a rigorous test of the factor structure underlying a set of scales and allows testing of various aspects of a measure's validity including unidimensionality, convergent validity, and discriminant validity (Bollen, 1989; Maxim, 1999).

Unidimensionality should be established for all multiple indicator scales before assessing their reliability (Hair et al., 1998; Gerberg and Anderson, 1988; Hattie, 1985). The following section presents results of scale validation for SBP plan characteristics (training, advancement, understanding, and involvement), SBP plan fairness and effectiveness, and role orientation ('production ownership' and 'importance of work knowledge'). These scales were either developed for this study or have not received substantial validation before. The other measures used in the study (i.e; organizational commitment, group identification, and selfefficacy) all have established psychometric properties from the previous literature and, therefore, I did not conduct validation analysis for these measures.

### **5.3.1 SBP Plan Characteristics**

I hypothesized that the four dimensions of SBP plan characteristics will be measured by fifteen items (items A1-A15 in the questionnaire in appendix A). An exploratory factor analysis using principal component analysis yielded the hypothesized four factor structure with cumulative sum of squared loadings of 74.8%. One of the items (A9) was a complex item with loadings on two factors (loading of 0.44 on the expected factor and 0.42 on another factor). Removing this item from the analysis lead to substantial improvement in the cumulative sum of squared loadings to 79.3%. It was therefore decided to remove item A9 from subsequent analysis. The factorial structure indicated by the principal component analysis was confirmed using confirmatory factor analysis. Results from the CFA including tests of model fit and item loadings are presented in Table 5.1.

The four factor model of SBP characteristics produced the best goodness-of-fit indices with chi-square/df = 1.47, GFI = 0.949, and AGFI of 0.92. All other fit indices are within acceptable range and the RMSEA value of 0.042 also indicates an acceptable model fit. A graphical presentation of the four factor SBP characteristics model is shown in Figure 5-1. The four factor model was compared to two alternative models. One is the baseline null model, which assumes that all variables are not related. The other alternative model was a one factor model which assumed that all items loaded on one single factor.

The choice of the independence and the one factor models for comparison is based on the fact that they represent two extreme cases with the independence model assuming that the items are not related while the one factor model assuming that all items are perfectly correlated. The four correlated factors model falls between these two models. The four factor model yielded a better chi-square/df ratio (1.47) than both the one factor (11.55) and the independence (31.9) models. Chi-square difference tests were also significant at all levels. The comparative fit indices including CFI, RMSEA, AIC, and ECVI all indicated that the four factor model is the best model to represent the data. The chi-square difference test comparing the four factor to the one factor models showed statistically significant difference in favor of the four factor model (Chi-square difference = 744.5 with difference in degrees of freedom of 6, significant at p = 0.000).



### Figure 5-1: Confirmatory Factor Analysis 4-Factor Model of SBP Plan Characteristics

(\*) See items a1-a15 in appendix A1. r1-r14 refer to the errors of measurement for items a1-a15 (excluding a9), respectively.

#### Table 5-1

Items A	1-A15 (See Table A1 in	appendix)	<u></u>					
		Item		Goodness-of-Fit Indices				
		Loading	$R^{2}$ (SMC)					
1.	Training							
				Chi-Square = $98.896$ , d.f = $67$ , p = $0.007$				
	AI	0.854**	0.730	Chi-Square/d.f = $1.476$				
l	A2 A3	0.90	0.810	GFI = 0.949				
	A4	0.796**	0.634	$\Delta GFI = 0.920$				
				DMSEA = 0.042				
		• ,•		$\begin{bmatrix} \text{KWSEA} = 0.042 \\ \text{CDV} = 0.000 \end{bmatrix}$				
2.	Understanding /Co	mmunicatio	n	CF1 = 0.989				
				NFI = 0.966				
	A5	0.778	0.605	TLI = 0.985				
	A6 47	0.808	0.652	AIC = 174.896 (AIC for the 1-factor model = 903)				
	A8	0.922**	0.850	ECVI = 0.668 (ECVI for the 1-factor model = 3.47)				
3.	Advancement							
				Correlations *				
	A10	0.955**	0.912	involv <> advan 0.456				
	A11	0.911	0.830	unders <> advan 0.571				
				unders <> involv 0.641				
4.	Involvement			train <> involv 0.723				
•-				train <> unders 0.549				
	A17	0.830**	0.688	train <> advan 0.308				
	A12 A13	0.645**	0.415	r5 <> r6 0.344				
	A14	0.739**	0.546	r2 <> r1 0.448				
	A15	0.665**	0.442					

### **Confirmatory Factor Analysis: Four Factor Model of SBP Characteristics**

(\*) r1, r2, r5, and r6 are the errors of measurement for items A1, A2, A5, and A6, respectively.

The CFA results above show that indicators of the four latent variables have relatively large loadings on their respective factors. This is evidence of convergent validity of the four constructs in the sense that different methods (items here) used to measure the same construct appear to converge (Pedhazur & Schmelkin, 1991). On the other hand, the relatively moderate

correlation coefficients (0.31-0.72) between the four latent variables, as shown in Table 5-1, is an indicator of their discriminant validity (Pedhazur & Schmelkin, 1991, p. 74).

The presence or absence of discriminant validity can be inferred by testing whether or not correlations among factors are different from unity. This test is done practically by comparing the four factor CFA of the 14 items representing perceptions of SBP plan characteristics with the competing one factor CFA model and testing for a statistically significant difference in the model fit measures.<sup>4</sup> As shown before, the test of chi-square difference between the two models indicated a statistically significant difference in favour of the four factor specification.

### 5.3.2 SBP Plan Fairness and Effectiveness

The path model in Figure 3-1 hypothesized that employees' perceptions of SBP plan fairness and effectiveness are two intermediate outcomes that partially mediate the relationship between explanatory variables, including SBP plan characteristics, group identification, and self-efficacy, and the three outcome variables in the model (organizational commitment, production ownership, and desire for production knowledge).

SBP plan fairness was measured using four items (items A16-A19 in the survey questionnaire- see appendix A1). Employees' perception of SBP plan effectiveness was measured using eight items (items A20-A27 in the questionnaire). A principal component analysis of the 12 items did not yield the expected two factor solution. Instead 10 of the items loaded on one factor and the remaining 2 items (A26 and A27) loaded on another factor. Confirmatory factor analysis was applied on the 12 items to compare the originally hypothesized two correlated factors model to an alternative model where the 12 items were assumed to represent one factor.

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### Figure 5-2

Confirmatory Factor Analysis: SBP Plan Fairness and Effectiveness\*



(\*) See items a16-a27 in appendix A6-1. r16-r27 refer to the errors of measurement for items a16-a27, respectively.

<sup>&</sup>lt;sup>4</sup> Setting all correlations between the four factors to '1' means statistically making them a one factor.

### Table 5-2

### Confirmatory Factor Analysis: 2-Factor Model of SBP Fairness and Effectiveness\*

Items	A16-A27 (See appe	endix A1)	Goodness of Fit Indians			
		Item		Goodness-of-int malces		
		Loading	$R^{2}$ (SMC)			
1.	Fairness A16 A17 A18 A19 Effectiveness A20 A21 A22 A23 A24 A25 A26 A27	0.709** 0.774** 0.641** 0.791** 0.805** 0.808** 0.809** 0.630** 0.793** 0.473** 0.577**	0.503 0.599 0.411 0.625 0.625 0.654 0.654 0.654 0.654 0.397 0.629 0.223 0.333	Chi-Square = 122.425, d.f = 50, p = 0.000 Chi-Square/d.f = 2.449 GFI = 0.925 AGFI = 0.883 RMSEA = 0.074 CFI = 0.962 NFI = 0.938 TLI = 0.950 AIC = 178.425 ECVI = 0.684 Correlations Effectiveness <> fairness 0.987 r22 <> r23 0.314 r20 <> r19 0.427 r26 <> r27 0.422		

(\*) r19, r20, r22, r23, r26, and r27 are the errors of measurement associated with items A19, A20, A22, A23, A26, and A27, respectively.

### Table 5-3

Items A16-A27 (See app Item	eendix A1) Item Loading	R <sup>2</sup> (SMC)	Goodness-of-Fit Indices
A16 A17 A18 A19 A20 A21 A22 A23 A24 A25 A26 A27	0.703** 0.766** 0.634** 0.805** 0.749** 0.806** 0.630** 0.630** 0.772** 0.472**	0.494 0.587 0.402 0.648 0.648 0.561 0.650 0.649 0.396 0.629 0.223 0.333	Chi-Square = 123.331, d.f = 51, p = 0.000 Chi-Square/d.f = 2.418 GFI = 0.925 AGFI = 0.886 RMSEA = 0.074 CFI = 0.962 NFI = 0.937 TLI = 0.951 AIC = 177.331 ECVI = 0.679 Correlations* r22 <> r23  0.321 r19 <> r20  0.414 r27 <> r26  0.422

### Confirmatory Factor Analysis: 1-Factor Model of SBP Plan Fairness and Effectiveness<sup>5</sup>

(\*) r19, r20, r22, r23, r26, and r27 are the errors of measurement associated with items A19, A20, A22, A23, A26, and A27, respectively.

<sup>&</sup>lt;sup>5</sup> The construct that combines the two dimensions of pay plan fairness and effectiveness can be called 'SBP plan support' or 'pay plan endorsement'

### Figure 5.3

### Confirmatory Factor Analysis: A 1-Factor Model of SBP Plan Fairness and Effectiveness Combined (SBP Plan Endorsement)\*





The results from CFA were inconclusive. The chi-square/d.f ratios for the 2-factor and 1-factor models were 2.449 and 2.418, respectively. The Chi-Square difference between the two models is 0.906 with one degree of freedom, which is not statistically significant. A graphical representation of the 2-factor model is presented in Figure 5.2. The complete CFA results for the 2-factor and 1-factor models are presented in Table 5-2 and Table 5-3.

Given the inconclusive statistical test of the factor structure, the one factor model appears to be preferable on grounds of model's parsimony.

### 5.3.3 Role Orientation

Employee role orientation was measured using 24 items taken from Parker et al. (1997). Role orientation is hypothesized as represented by two latent variables, ownership of production problems and importance of production knowledge (see page 39 for theoretical discussion of role orientation). The first construct was measured using 9 items and the second was measured by 15 items (See items B1-B9 and C1-C15 in appendix (A1). Results of the principal component analysis of the 24 items supported the hypothesized two factor structure of role orientation. All items showed relatively high loadings as expected. Confirmatory factor analysis was then conducted where the hypothesized 2-factor model was compared to two alternative models including a 1-factor model (that assumes all of the 24 items measure one construct) and a baseline independence model (that assumes all items are unrelated).

The chi-square/df ratio was lower for the 2-factor model compared with both the 1factor model and the baseline model. The ratios were 1.849, 3.39, and 14.69 for the 2-factor, the 1-factor, and the independence model, respectively. The chi-square difference test was statistically significant when the 2-factor model is compared to the 1-factor model (Chi-square difference = 359.29, df = 1, significant at p = 0.000). Detailed results of the CFA are presented in Table 5-4. As shown in Figures 5-4 and 5-5, the best model fit measures were obtained when the error terms of some items were allowed to correlate. Allowing correlated errors of measurement is a tricky issue in CFA and should be treated carefully. If the correlations between error terms are not supported by substantial interpretation of the reasons why the error correlations exist, then it is possible that a model's chi-square and other fit measures may be mistakenly inflated by capitalizing on sample specific data patterns that do not represent any meaningful relationships in the theoretical model. Therefore, a substantial interpretation of why some errors of measurement may correlate should be provided before incorporating such correlations in the model.

Bollen (1989) indicates that there are several acceptable reasons for correlated errors of measurement. Errors in measuring an indicator may correlate over time (i.e; same measure applied in two different time periods), measurement errors may correlate because indicators came from the same source (common method variance) because of respondent group's bias in answering survey questions, or any other reasons.

The items with correlated errors of measurement in the role orientation CFA models are shown in Figure 5-4 and 5-5. The values of error correlations are shown in Tables 5-4 and 5-5. A close look at the items with correlated errors reveals that the similarity of the contents of these pairs of items combined with the fact that they are obtained using the same method from one source may explain the correlated errors. In other words, although the pairs of items tap on different aspects of the construct, they share some similarity that makes respondents

# Table 5-4 Confirmatory Factor Analysis: 2-Factor Model of Role Orientation

Items D1-D9 and E1-E1:	5 (See appendix A1)	<u>, , , , , , , , , , , , , , , , , , , </u>					
	Item		Goodness-of-Fit Indices				
Item	Loading	$R^{2}$ (SMC)					
1. Production O D1 D2 D3 D4 D5 D6 D7 D8 D9	0.599" 0.724" 0.716" 0.831" 0.629" 0.750" 0.499" 0.586" 0.611"	0.359 0.524 0.513 0.690 0.396 0.563 0.249 0.344 0.373	Chi-Square = $427.170$ , d.f = $231$ , p = 0.000 Chi-Square/d.f = $1.849$ GFI = $0.882$ AGFI = $0.847$ RMSEA = $0.057$ CFI = $0.948$ NFI = $0.895$ TLI = $0.938$ AIC = $565.170$ ECVI = $2.165$				
2. Production K	nowledge		Correlations *				
E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14 E15	0.736** 0.659** 0.717** 0.764** 0.742** 0.772** 0.731** 0.652** 0.666** 0.619** 0.572** 0.496** 0.633** 0.640** 0.635**	0.542 0.435 0.515 0.583 0.551 0.596 0.534 0.425 0.444 0.383 0.327 0.246 0.401 0.409 0.404	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				

(\*) r1-r9 are the errors of measurement associated with items D1-D9, respectively. r10-r24 are the errors of measurement associated with items E1-E15, respectively.



## **Confirmatory Factor Analysis: Role Orientations\***



(\*) r1-r9 are the errors of measurement associated with items d1-d9, respectively. r10-r24 are the errors of measurement associated with items e1-e15, respectively.

### Figure 5-5





(\*) r1-r9 are the errors of measurement associated with items d1-d9, respectively. r10-r24 are the errors of measurement associated with items e1-e15, respectively.

answer them with a degree of consistency. The nature of the sample of respondents and the method of data collection also may explain why similarity in some item responses may be expected.

#### **5.4 Structural Model Estimation**

In this section I report the results of empirical estimation of the theoretical model presented in Figure 3-1. The Maximum Likelihood estimates of the model's path coefficients will be used to test the study hypotheses.

#### 5.4.1 Zero-Order Correlations

Zero-order correlations, descriptive statistics, and reliability alpha coefficients for all the study variables are presented in Table 5-5. The correlation matrix indicates that most zeroorder correlations between dependent and independent variables in the theoretical model (Figure 3-1) are statistically significant. However, no correlations are too high to suggest potential biases in the structural model estimates. Two of the three variables intended as control variables in the structural model estimation, namely, age and tenure, have no significant correlations with the other variables in the model. Therefore, these two variables will not be included as control variables in the path model estimation. Only wage level, which has statistically significant zero-order correlations with most of the outcome and explanatory variables in the model was controlled for in the final estimation of the structural model. The process involved estimating a correlation matrix of the model variables with the effect of wage level partialled out. The resulting correlation matrix is then used in the SEM analysis to obtain estimates of the structural model coefficients.

<u></u>														······································			
Variables	NI	Mean	S.D	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Organizational Commitment		5 57	115	(0.90)													
	,	5.57	1.15	(0.90)													
2. Ownership of Production Problems	9	3.13	0.78	0.24**	(0.89)												
3. Importance of Production Knowledge	15	4.20	0.75	0.4**	0.43**	(0.93)											
4. SBP Plan Fairness	4	4.44	1.5	0.52**	0.20**	0.34**	(0.83)										
5. SBP Plan Effectiveness	8	4.00	1.53	0.58**	0.14	0.30**	0.83**	(0.89)									
6. Training	4	4.34	1.73	0.48**	0.17**	0.26**	0.55**	0.58**	(0.93)								
7. Understanding	4	4.87	1.64	0.4**	0.12	0.28**	0.55**	0.52**	0.48**	(0.93)							
8. Advancement	2	4.79	1.75	0.29**	0.08	0.22**	0.38**	0.40**	0.27**	0.55**	(0.93)						
9. Involvement	4	3.66	1.55	0.54**	0.22**	0.35**	0.69**	0.67**	0.61**	0.56**	0.41**	(0.80)					
10. Group Identification	9	5.47	1.18	0.49**	0.22**	0.38**	0.52**	0.48**	0.38**	0.33**	0.29**	0.50**	(0.89)				
11. Self-Efficacy	17	5.97	0.82	0.29**	0.25**	0.38**	0.24**	0.18**	0.16**	0.15	0.08	0.18**	0.30**	(0.85)			
12. Wage Level	- 1	24.98	2.13	0.13*	0.09	0.17**	0.09	0.002	0.08	0.14	0.04	0.17**	0.13*	0.14			
13. Age	1	47.1	6.13	0.03	0.09	-0.012	0.06	0.08	0.14	0.006	-0.06	0.10	0.04	-0.14	-0.06		
14. Tenure	1	25.8	4.6	-0.05	0.04	0.02	0.003	-0.007	0.09	-0.01	-0.15°	0.03	0.05	-0.14°	0.05	0.75**	

.

Table 5-5: Descriptive statistics, zero-order correlations and alpha coefficients for the study variables

NI = number of items (for each variable the composite score is the mean response to items). \*\* p< 0.01; \* p < 0.05. Alpha coefficients are shown in parenthesis, on the diagonals. SBP plan characteristics are

.

variables 6-9; role orientations are variables 2 & 3

### 5.4.2 Estimation of the Hypothesized Model

The structural paths of the hypothesized model (see Figure 3-1) were estimated using SEM analysis in AMOS 4.0. The standardized coefficients, their standard errors, and their t-values for all the structural paths in the model are presented in Table 5-6. Also, the coefficients of determination ( $\mathbb{R}^2$ ) for each dependent variable are presented in Table 5-6. Table 5-6 shows that the estimated model yielded a chi-square value of 3.27 (df = 4), which is not statistically significant (p = 0.514), indicating that the estimated model provides a reasonable fit for the data.

All goodness-of-fit indices, as shown in Table 5-6, provide evidence that this model is a reasonable representation of the relationships between perceived SBP plan characteristics, employee characteristics as reflected by self-efficacy and group identification, perceptions of SBP plan fairness and effectiveness, organizational commitment, and role orientation. However, some of the hypothesized relationships in Figure 3-1 were not supported, especially in the partial mediation part of the model. This means that a refined model would provide a better representation of the true relationships between the study variables. Theory trimming is a commonly used approach to improve model fit by removing the nonsignificant paths from the model (Pedhazur 1982; Kelloway 1998). Therefore, I estimated a refined model that retained only the statistically significant relationships from the model in Figure 3-1.

Morgan and Hunt (1994) suggested multiple criteria to compare any two SEM models including overall fit of both models as measured by comparative fit index (CFI), parsimony of both models, statistical significance of hypothesized paths in the two models, and squared multiple correlations (SMC) for each of the endogenous constructs in the two models. The results of estimation for the revised model are presented in Table 5-7. The revised model is presented in Figure 5-6. The revised model's chi-square was 18.95 (df = 21), which is not statistically significant (p = 0.588) indicating that the model provides a good overall fit for the

data. The chi-square difference test between the original and the refined model was not statistically significant (chi-square difference of 15.7 with 17 degrees of freedom). There is no difference between the two models as measured by comparative fit index (CFI) (CFI for both models is 1.00). Also, as shown in Tables 5-6 and 5-7, no additional explanatory power is gained from the additional paths in the original model compared to the parsimonious refined model. All the structural coefficients that were statistically significant in the original model were also significant in the revised model. The differences in SMC values for the five endogenous constructs between the two models are negligible.

The SMC values show that the proportion of total variance in the outcome variables accounted for by the explanatory variables in the model were 62%, 60%, 47%, 25%, and 10% for perceptions of SBP plan fairness, perceptions of pay plan effectiveness, organizational commitment, importance of production knowledge, and ownership of production problems, respectively. Therefore, the model explained a significant proportion of the total variance in the first three outcome variables. However, the proportion of variance explained in both dimensions of role orientation were relatively low (although both SMC values were statistically significant at p<0.01 -- with F(3,258) = 9.55 and F(3,258) = 28.73 for importance of production problems, respectively).

This means that the revised model is a better model in fitting the data, mainly on grounds of model parsimony. This is confirmed by the results as shown in Tables 5-6 and 5-7 when the two models are compared using parsimony adjusted goodness-of-indices (i.e; PGFI, PCFI, PNFI, AIC, CAIC, and ECVI) which all indicated that the revised model provides a better fit for the data.<sup>6</sup> Values of PGFI, PCFI, and PNFI were higher for the revised model

<sup>&</sup>lt;sup>6</sup> PGFI, PNFI, and PCFI refer to parsimony goodness-of fit index, parsimony normed fit index, and parsimony comparative fit index, respectively.

### Table 5-6

### **Results of Structural Model Estimation**

Variables	Structural	S E	t Values	Goodness of Fit Indians
	Coefficients *	S.E	t-values	Goodness-oi-Fit Indices
Dependent ← Independent				Chi-Square = $3.266$ , d.f = 4, p = $0.514$
orgcommt < selfeffc	0.166	0.065	3.583	Chi-Square/df = $0.817$
orgcommt < fair	-0.232	0.069	-2.579	GFI = 0.998
orgcommt < advanc	0.014	0.036	0.248	AGFI = 0.963
orgcommt < involv	0.254	0.052	3.627	RMSEA = 0.000
orgcommt < grpident	0.30	0.052	5.574	CFI = 1.00
orgcommt < train	0.157	0.040	2.613	NFI = 0.997
orgcommt < effect	0.312 "	0.066	3.573	TLI = 1.008
orgcommt < unders	0.060	0.043	0.952	AIC = 127.266
rolekndg < train	0.055	0.031	0.776	ECVI = 0.488
rolekndg < advanc	0.056	0.028	0.868	
rolekndg < unders	0.085	0.034	1.150	
rolekndg < involv	0.200	0.040	2.405	Souared Multiple Correlations $(R^2)$
rolekndg < effect	-0.065	0.051	-0.631	
rolekndg < fair	-0.048	0.053	-0.454	fair 0.62
rolekndg < grpident	0.267	0.040	4.198	effect 0.60
rolekndg < selfeffc	0.291	0.050	5.291	roleknda 0.26
roleownr < selfeffc	0.198	0.058	3.273	roleownr 0.11
roleownr < effect	-0.194	0.059	-1.705	orgcommt 0.47
roleownr < fair	0.065	0.062	0.559	
roleownr < grpident	0.154	0.046	2.208	
roleownr < involv	0.192	0.046	2.102	
roleownr < train	0.085	0.035	1.086	Correlations
roleownr < unders	-0.028	0.039	-0.343	<u></u>
roleownr < advanc	0.010	0.032	0.144	arpident $<>$ involv 0.272
effect < selfeffc	0.045	0.074	1.114	train <> unders 0.485
effect < grpident	0.285	0.054	6.833	unders <> advanc 0.546
fair < grpident	0.311	0.051	7.658	involv <> advanc 0.408
fair < train	0.137	0.042	2.777	groident <> train 0.192
fair < unders	0.179	0.047	3.448	train <> advanc 0.270
fair < advanc	0.027	0.039	0.576	nvolv <> train 0.608
effect < train	0.218	0.044	4.303	involv <> unders 0.556
effect < unders	0.131	0.049	2.453	arpident <> unders 0.171
effect < advanc	0.067	0.041	1.413	grpident <> advanc 0.181
effect < involv	0.361	0.053	6.601	grpident <> selfeffc 0.207
fair < involv	0.403	0.051	7.587	fair <> effect 0.582
fair < selfeffc	0.092	0.070	2.367	orgcommt <> roleownr 0.07
				roleownr <> rolekndg 0.320
				orgcommt <> rolekndg 0.090

Notes: \* These are the standardized regression coefficients. \*\* Significant at p<0.01 Grpident = Group Identification; orgcommt = organizational commitment; roleownr = ownership of production problems; rolekndg = importance of production knowledge; selfeffc = general self-efficacy, fair = SBP plan fairness; effect = pay plan effectiveness; train = training; unders = understanding; involve = involvement; advance = advancement.

### Table 5-7

	Structural			
Variables	Coefficients *	S.E	t-Values	Goodness-of-Fit Indices
Variables Dependent - Independent fair < grpident fair < train fair < train fair < unders effect < grpident effect < grpident effect < selfeffc orgcommt < selfeffc orgcommt < selfeffc orgcommt < fair orgcommt < fair orgcommt < fair orgcommt < effect roleownr < grpident roleownr < grpident roleowng < grpident roleowng < grpident roleowng < grpident rolekndg < grpident rolekndg < selfeffc	0.318 <sup>"</sup> 0.136 <sup>"</sup> 0.192 <sup>"</sup> 0.214 <sup>"</sup> 0.407 <sup>"</sup> 0.067 <sup>"</sup> 0.299 <sup>"</sup> 0.164 <sup>"</sup> 0.371 <sup>"</sup> 0.166 <sup>"</sup> 0.294 <sup>"</sup> 0.167 <sup>"</sup> -0.216 <sup>"</sup> 0.272 <sup>"</sup> 0.156 <sup>"</sup> 0.322 <sup>"</sup> 0.120 0.234 <sup>"</sup> 0.240 <sup>"</sup> 0.286 <sup>"</sup>	S.E 0.051 0.042 0.042 0.044 0.050 0.057 0.053 0.045 0.053 0.065 0.057 0.052 0.039 0.068 0.050 0.031 0.065 0.041 0.027 0.036 0.050	7.912 2.757 4.093 4.218 7.744 2.126 7.323 3.387 6.842 3.569 3.247 5.465 2.801 -2.428 3.974 2.546 3.694 1.918 4.191 4.210 5.212	Goodness-of-Fit Indices         Chi-Square = 18.95, d.f = 21, $p = 0.588$ Chi-Square/df = 0.903       GFI = 0.987         AGFI = 0.987       AGFI = 0.959         RMSEA = 0.000       CFI = 1.000         NFI = 0.985       TLI = 1.004         AIC = 108.954       ECVI = 0.417         Squared Multiple Correlations (R <sup>2</sup> )       effect         effect       0.599         fair       0.623         rolekndg       0.252         roleownr       0.097         orgcommt       0.471         Correlations       selfeffc <> grpident         selfeffc <> involv       0.556         grpident <> involv       0.608         train <> involv       0.608         train <> involv       0.608         grpident <> train       0.192         grpident <> advanc       0.270         unders        0.485         grpident <> advanc       0.546         involv <> advanc       0.546         involv <> PF       0.319

### Results of Estimation of the Revised Structural Model with Significant Paths Only

Notes: \* These are the standardized regression coefficients. \*\* Significant at p<0.01 Computing and the standardized regression or geometry = organizational commitment; r Grpident = Group Identification; orgcommt = organizational commitment; roleownr = ownership of production problems; rolekndg = importance of production knowledge; selfeffc = general self-efficacy, fair = SBP plan fairness; effect = pay plan effectiveness; train = training; unders = understanding; involve = involvement; advance = advancement. than the original model while values of AIC, CAIC, and ECVI were lower, indicating that the revised model is a better model in fitting the data.

#### 5.4.3 Tests of Study Hypotheses

Hypothesis 1 predicted that organizational commitment will be positively correlated with both dimensions of role orientation, namely, 'ownership of production problems' and 'importance of production knowledge.' Table 5-5 shows that the correlation coefficients between organizational commitment and the two role orientation variables were 0.24 and 0.40 for 'production ownership' and 'importance of production knowledge', respectively. Both correlation coefficients are significant at p<0.01, lending support to hypothesis 1.

Subsequent exploratory analysis showed that there is no significant causal relationship between organizational commitment and the two role orientation variables in either direction in the structural model (i.e, neither of the variables predict the other). This means that the zero-order correlation between the three outcome variables is resulting from shared correlation that they have with other explanatory variables in the model.

#### **5.4.3.1 SBP Plan Characteristics**

Hypothesis 2 stated that "employees' perceptions of SBP plan characteristics (including understanding, involvement, training, and advancement opportunities) will be positively related to their perceptions of SBP plan effectiveness." This hypothesis was supported by the empirical data.

Three of the four SBP plan characteristics (understanding (B = 0.16, p<0.01), training (B = 0.21, p<0.01), and involvement (B = 0.37, p<0.01)) had positive and statistically significant relationships with employees' beliefs about the effectiveness of the SBP plan. The relationship between perceptions of advancement opportunities and perceived pay plan

Figure 5-6 Path diagram of the effects of SBP on organizational commitment and role orientations suggested by the results of this study



Notes:

The figures shown are the standardized regression coefficients. All coefficients shown on the graph are significant at p<0.01

Grpident = Group Identification; orgcommt = organizational commitment; roleownr = ownership of production problems; rolekndg = importance of production knowledge; selfeffc = general self-efficacy, fair = SBP plan fairness; effect = pay plan effectiveness; train = training; unders = understanding; involve = involvement; advance = advancement.

effectiveness was positive as expected, but short of being statistically significant (B = 0.067, p>0.1). Thus, the higher employees' understanding of the SBP pay plan, the higher their perceptions of the pay plan effectiveness was. Similarly, the higher the employees' involvement in the process of managing the pay plan and the higher their ratings of available training opportunities, the higher their perceptions of the pay plan's effectiveness were.

The results for hypothesis 3, involving perceptions of fairness, mirror those involving perception of effectiveness in that perceptions of SBP plan characteristics predicted employees' perceptions of the SBP plan fairness. Table 5-6 shows that three of the four structural relationships between fairness and pay plan characteristics (understanding (B = 0.19, p<0.01), training (B = 0.13, p<0.01), and involvement (B = 0.41, p<0.01) were positive and statistically significant. Perception of advancement opportunities under the SBP plan had a positive relationship with pay plan fairness perceptions as expected, but the relationship was not statistically significant (B = 0.03, p>0.10).

Hypothesis 4 stated that the four SBP plan characteristics will be positively related to employees' organizational commitment. This hypothesis was partly supported by the results. Two characteristics of the SBP plan, namely, employees' perceptions of involvement (B = 0.27, p<0.01) and their ratings of training opportunities to support the plan (B = 0.17, p<0.01), were statistically significant predictors of their organizational commitment. Thus, the higher employees' perceptions of involvement under the SBP plan and the higher their ratings of training opportunities available to support the plan, the higher their commitment to the organization was likely to be. However, the relationships between organizational commitment and both employees' understanding of the pay plan (B = 0.06, p>0.10) and their perceptions of advancement procedures (B = 0.014, p>0.10) were positive as expected but not statistically significant.

Hypothesis 5 suggested that employees' perceptions of the SBP plan will be positively related to their role orientation including 'ownership of production problems' and 'importance of production knowledge.' This hypothesis was supported by a single structural relationship for each of the two role orientation dimensions. Employees' perceptions of involvement under the SBP plan was a significant predictor of both their feelings of 'ownership of production problems' (B = 0.156, p<0.01) as well as their ratings of 'importance of production knowledge' (B = 0.234, p<0.01).

As Table 5-6 shows, other structural relationships between role orientation and SBP plan characteristics were positive as expected (except the path coefficient from understanding to 'problem ownership' which was negative) but statistically not significant.

### **5.4.3.2 Tests of the Partial Mediation Hypotheses**

The path model in Figure 3-1 hypothesized that the relationships between SBP plan characteristics and the three outcome variables (organizational commitment, orientation towards production problems, and orientation towards importance of production knowledge) would be partially mediated by employees' perceptions of the SBP plan fairness and their beliefs about its effectiveness. The results of model estimation, as shown in Tables 5-6 and 5-7, indicate limited support for the partial mediation hypotheses. However, in terms of overall model fit indices, the partial mediation model had a better fit than both the full mediation and the no mediation rival models. The partial mediation model had a chi-square/df ratio of 0.987 compared to ratios of 2.79 and 1.4 for the full mediation and the no mediation models, respectively. The partial mediation model had a GFI, CFI, and RMSEA indices were 0.987, 1.00, and 0.000, respectively. The full mediation model had a GFI, CFI, and RMSEA of 0.953, 0.964, and 0.083, respectively. For the no mediation model the GFI, CFI, and RMSEA indices were 0.979, 0.993, and 0.039, respectively. Therefore, the partial mediation model yielded a

better overall fit for the data in the current sample. Hypothesis 6 was: 'Perceptions of SBP plan fairness will be positively related to organizational commitment.' This hypothesis was not supported. In fact, the structural coefficient of fairness on organizational commitment was negative and surprisingly statistically significant (B = -0.216, p<0.01). This means not only that fairness perceptions did not improve organizational commitment but that an increase in fairness perceptions is accompanied by a decline in organizational commitment. The negative relationship between fairness perceptions and organizational commitment is a surprising and perplexing finding.

I also found no support for hypothesis 7 which predicted that employees' perception of SBP plan fairness will partially mediate the relationship between SBP plan characteristics and the two role orientation outcome variables. Again, the structural coefficients between fairness and the two dimensions of role orientation (i.e; importance of production knowledge (B = 0.065, p>0.10) and ownership of production problems (B = -0.048, p>0.10)) were both statistically not significant.

Hypothesis 8 predicted that employees' beliefs about the SBP plan effectiveness would partially mediate the relationship between SBP plan characteristics and organizational commitment. I found a positive and statistically significant relationship between employees' perceptions of SBP plan effectiveness and their organizational commitment (B = 0.322, p<0.01), lending support to this hypothesis. I also found that the direct paths from all four SBP plan characteristics (training, understanding, advancement, and involvement) to organizational commitment become stronger when the structural relationships between pay plan effectiveness and organizational commitment is removed from the partial mediation path model, thus confirming the mediating effect of SBP plan effectiveness.

Hypothesis 9 was not supported. Employees' perceptions of SBP plan effectiveness did not predict their role orientation. The structural coefficients linking pay plan effectiveness to ownership of production problems (B = -0.194, p>0.10) and importance of production knowledge (B = -0.065, p>0.10) were both negative and not statistically significant.

Therefore, the proposition that employees' perceptions of SBP plan fairness and effectiveness will partially mediate the relationships between SBP plan characteristics and organizational commitment and role orientation received only limited support.

#### 5.4.3.3 Self-Efficacy

The results in Table 5-7 show a positive relationship between self-efficacy and perceptions of SBP plan fairness (B = 0.067, p<0.01), lending support to hypothesis 10. The higher an employee's level of general self-efficacy is, the higher his/her rating of SBP plan fairness is likely to be. However, hypothesis 11 was not supported as shown by the structural coefficient linking self-efficacy to SBP plan effectiveness in Table 5-6 (B = 0.045, p>0.10). Although the relationship between self-efficacy and beliefs about the SBP plan effectiveness was positive as expected, it is not statistically significant.

Hypotheses 12 and 13 were both supported by the results. The higher employees' levels of self-efficacy are the higher their organizational commitment and role orientation would be. Table 5-7 shows that the structural coefficients linking self-efficacy to organizational commitment (B = 0.166, p<0.01), 'ownership of production problems' (B = 0.196, p<0.01), and 'importance of production knowledge' (B = 0.286, p<0.01) were all positive and statistically significant.

Thus tests of hypotheses 10, 11, 12 and 13 demonstrate the importance of employee self-efficacy in predicting positive attitudes in the work environment where SBP is applied. In a SBP work environment, self-efficacy is a significant predictor of employees' attitudes towards the SBP plan as well as their attitudes towards the organization and their work roles.

#### 5.4.3.4 Group Identification

Table 5-5 shows that there are positive and statistically significant correlations between group identification and perceptions of SBP characteristics including training, understanding, advancement, and involvement. The correlation coefficients between group identification and the four SBP plan characteristics were 0.38, 0.33, 0.29, and 0.50 for training, understanding, advancement, and involvement, respectively. All these coefficients were significant at p<0.01 lending support for hypothesis 16.

Hypotheses 14, 15, 17, and 18 were all supported by the results as shown in Table 5-6. Employees' identification with their work groups was positively related to their perceptions of their SBP plan fairness and effectiveness, as well as their organizational commitment and role orientation. The structural coefficients linking group identification to perceptions of SBP plan fairness (B = 0.318, p<0.01), pay plan effectiveness (B = 0.299, p<0.01), organizational commitment (B = 0.294, p<0.01), 'importance of production knowledge' (B = 0.240, p<0.01), and 'ownership of production problems' (B = 0.12, p<0.05) were all positive and statistically significant.

The results discussed above are represented in Figure 5-6, the path diagram with all the statistically significant structural paths from the estimation of the theoretical model outlined earlier in the study (Figure 3-1).

### 5.4.4 Model Re-specification

It is an acceptable practice when using SEM analysis to investigate alternative model specifications when the results suggest that an alternative model may provide a better fit for the data (Bollen & Long, 1992; Hair et al., 1998).

Two of the results from estimating the hypothesized model in this study, as described in Figure 3-1, indicate that a model re-specification may be warranted. First, results from CFA showed that two of the constructs in the path model, perceptions of SBP plan fairness and pay plan effectiveness, are highly correlated (correlation between the two factors in the CFA model estimation was 0.98, and the zero-order correlation between the composite scores of the two factors in the sample was 0.83). Second, results from the structural model estimation showed that the relationship between perceptions of SBP plan fairness and organizational commitment was unexpectedly negative and statistically significant. These two findings suggest that a re-specification of the model with perceptions of SBP plan fairness and effectiveness combined in one factor may result in improving both model parsimony and model fit.

Therefore, a revised model was estimated with the two measures of pay plan fairness and effectiveness combined into one factor that was labeled 'employee support of the SBP plan.' Assuming here that employees' assessments of the SBP plan fairness and effectiveness represent the degree to which they support the pay plan. Therefore, the path model shown in Figure 5-6 was re-specified as shown in Figure 5-7. The results from estimating the revised model are shown in Table 5-7.

Following Morgan and Hunt (1994), I used multiple criteria to compare the two models including a chi-square test, statistical significance of the hypothesized parameters in the two models, and the squared multiple correlations for each of the endogenous constructs in both models.

Chi-square tests showed that both models provided a reasonable fit for the data with the original model slightly better than the new model. The original model with two mediating factors (Figure 5-6) had a chi-square of 18.95 with df = 21 (p = 0.588). The rival model (Figure 5-7) had a chi-square of 20.69 with df = 17 (p = 0.24). Therefore, the original model

provides a slightly better fit for the data. The change in chi-square is statistically significant (difference of 1.74 in chi-square with 4 degrees of freedom, p<0.025).

All path coefficients common to both models that were significant in the original model were also significant in the new model giving support to the robustness of the rival model. The relationship between employees' support of the SBP plan and their organizational commitment was positive and statistically significant as expected.

Finally, the results shown in Tables 5-7 and 5-8 indicate that the original model had a slightly better explanatory power than the rival model. The difference in SMC ranged between 0.066 in the case of organizational commitment to 0.022 in the case of 'ownership of production problems.'

Therefore, if statistical tests alone are to be used, the re-specified model described in Figure 5-7 does not provide a better fit for the data compared to the original model (Figure 5-6). It should be noted, however, that model evaluation should not be treated as an entirely statistical matter (Joreskog, 1993). Joreskog (1993, p. 307) suggests that the best model is the one among a class of models with reasonable fit "which also has the property that every parameter of the model can be given a substantively meaningful interpretation." Using these broader criteria would lead us to probably prefer the re-specified model as it is a more parsimonious model with all parameter estimates having meaningful interpretations.

However, given the exploratory and ad hoc nature of the analysis conducted here, the results obtained should be treated as tentative findings until the model is tested with additional samples to examine its stability and external validity.

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### Table 5-8

	Structural			
Variables	Coefficients *	S.E	t-Values	Goodness-of-Fit Indices
Dependent ← Independent sbpsprt < grpident sbpsprt < train sbpsprt < unders sbpsprt < involv sbpsprt < selfeffc orgcommt < selfeffc orgcommt < grpident orgcommt < train orgcommt < involv roleownr < involv roleownr < sbpsprt rolekndg < grpident rolekndg < grpident	0.219 <sup>"</sup> 0.189 <sup>"</sup> 0.205 <sup>"</sup> 0.353 <sup>"</sup> 0.049 0.127 <sup>"</sup> 0.191 <sup>"</sup> 0.277 <sup>"</sup> 0.174 <sup>"</sup> 0.130 <sup>"</sup> 0.169 <sup>"</sup> 0.134 <sup>"</sup> 0.273 <sup>"</sup> 0.186 <sup>"</sup> 0.204 <sup>"</sup> 0.090	0.056 0.042 0.042 0.051 0.068 0.058 0.051 0.056 0.041 0.052 0.034 0.030 0.041 0.046	4.669 3.641 4.175 6.197 1.191 2.579 3.137 4.903 2.994 2.079 2.375 1.987 3.829 2.972 3.185 1.304	Chi-Square = 20.69, d.f = 17, p = 0.240 Chi-Square/df = 1.217 GFI = 0.984 AGFI = 0.950 RMSEA = 0.029 CFI = 0.996 NFI = 0.978 TLI = 0.989 AIC = 96.692 ECVI = 0.370 Squared Multiple Correlations (R <sup>2</sup> ) sbpsprt 0.582 rolekndg 0.212 roleownr 0.081 orgcommt 0.406 Correlations grpident <> involv 0.468 train <> unders 0.480 unders <> advanc 0.546 involv <> advanc 0.270 involv <> train 0.606 involv <> train 0.606 involv <> unders 0.294 grpident <> unders 0.294 grpident <> selfeffc 0.206 R4 <> R5 0.334

### **Results of the Re-specified Structural Model Estimation**

Notes: \* These are the standardized regression coefficients. \*\* Significant at p<0.01 Grpident = Group Identification; orgcommt = organizational commitment; roleownr = ownership of production problems; rolekndg = importance of production knowledge; selfeffc = general self-efficacy, fair = SBP plan fairness; effect = pay plan effectiveness; train = training; unders = understanding; involve = involvement; advance = advancement.

Figure 5-7 The re-specified model of the effects of SBP on organizational commitment and roleorientations



Notes:

The figures shown are the standardized regression coefficients. All coefficients shown on the graph are significant at p<0.01 (except two paths that are not significant, grpident on roleownr and selfeffc on sbpsprt) Grpident = Group Identification; orgcommt = organizational commitment; roleownr = ownership of production problems; rolekndg = importance of production knowledge; selfeffc = general self-efficacy, sbpsprt = support of the SBP plan; train = training; unders = understanding; involve = involvement; advance = advancement.

### **Chapter 6**

### Discussion

#### 6.1 Findings

The present study intended to examine the effects of Skill-Based Pay (SBP) on employee work attitudes. For this purpose, it developed a path model that included four measures of perceived SBP plan characteristics (employee understanding, employee involvement, training opportunities, and advancement opportunities) and two measures of personal characteristics (self efficacy and group identification) of employees working under a SBP plan as explanatory variables; two evaluative measures of a SBP plan, perceived fairness and perceived effectiveness, as mediating variables; and one measure of organizational commitment and two measures of role orientation, as outcome variables. The path model hypothesized that the explanatory variables would have direct effects as well as indirect effects through the mediating variables on the outcome variables.

The results of the study provide support in large part for the hypothesized direct effects of all explanatory variables. They show that three of the four perceived SBP plan characteristics, employee understanding, employee involvement, and training opportunities, are related positively to employee perceptions of SBP plan fairness and effectiveness; two of these characteristics, employees' perceptions of involvement and training opportunities, are related positively to organizational commitment; and one characteristic, employee perception of involvement, is related positively to role orientation. These findings clearly demonstrate the importance of employee perceptions of their involvement with the SBP plan in predicting their work attitudes. They indicate that employees who feel that they are involved in the design and administration of the SBP plan tend to have higher perceptions of SBP plan fairness and effectiveness, stronger organizational commitment, and broader role orientation.
The findings with respect to the effect of perceived involvement on SBP plan fairness and effectiveness complement those of previous studies, which found support for the importance of employee participation and involvement in successful application of SBP plans (Jenkins et al., 1992) and long-term survival of these plans (Shaw et al., 2000). Practitioners in the field also point to the need for employee involvement in the change process from a job-based pay to skill-base pay plans. "Resolving the pay conundrum may turn out to be the hardest part of restructuring. But the right way to do it is starting to sound familiar: Repeatedly and sincerely ask those who will be affected what they think; they know more about it than you suspect" (Fierman, 1994, p.64).

However, the findings of the present study with respect to the direct effects of perceived employee involvement on organizational commitment and role orientation are new. No previous studies have examined these relationships. These finding support the notion that employees who feel involved in designing and administering SBP plans that they work under are likely to develop greater identification and involvement with the organization. Such employees are also likely to develop a broader view of their roles in the organization, taking greater interest in identifying and resolving work unit problems.

The above findings concerning the direct effect of perceived SBP plan characteristics also show the importance of employees perceptions of training opportunities in predicting favourable work attitudes. Training is a critical element of a SBP system. It is through training that employees realize the benefits of SBP by acquiring more skills and achieving higher pay. Thus, a SBP plan that is accompanied by greater training opportunities is more likely to be perceived as being fair and effective by employees. In addition, providing employees with training opportunities in areas that are of importance to the organization creates greater awareness among employees about organizational and role goals and requirements. This also sends a message to employees that their organization considers them to be valuable assets and is willing to invest in them. Such an environment is likely to enhance organizational commitment among employees.

The results of this study show that employee's perceived growth and advancement opportunities do not predict the outcome variables studied. Similar results were reported in a previous study by Lee et al. (1999) who found that advancement opportunities were unrelated to employees assessment of their SBP plan's fairness, SBP plan's benefits, and pay satisfaction. One possible explanation for this finding could be that the certification and advancement procedures when objectively and consistently applied may render this variable to be irrelevant.

The hypothesized direct effects of the other explanatory variables, self-efficacy and group identification, on work attitudes are also supported in the present study. The results show that employees with higher self-efficacy have higher perceptions of SBP plan fairness and effectiveness, are more committed to the organization, and perceive their roles more broadly. Cable and Judge (1994) found that job applicants with high self-efficacy tended to prefer organizations that use SBP plans. The present study extends this finding by suggesting that once hired, such employees would also view SBP plans as being more fair and effective. The results of the study also show that employees' identification with their work groups is positively related to their perceptions of SBP plan fairness and effectiveness as well as their organizational commitment and role orientation. This finding makes sense because SBP plans, by their very logic, involve a highly interactive and cooperative work environment. These plans require employees to frequently rotate among different jobs and functional areas as a means to enable workers to acquire more skills and the organization to have greater workforce flexibility in allocating work assignments.

The results of the present study provide very limited support for hypothesized indirect effects of the explanatory variables through the two mediating variables, perceived SBP plan

The results of the present study provide very limited support for hypothesized indirect effects of the explanatory variables through the two mediating variables, perceived SBP plan fairness and perceived SBP plan effectiveness. Only one partial mediation hypothesis is supported. Employees' perceptions of SBP plan effectiveness do partially mediate the relationship between perceptions of SBP plan characteristics and organizational commitment. This means that the explanatory variable, SBP plan characteristics, has both direct and indirect effects on employees' organization commitment. Perceived SBP plan effectiveness does not have any other mediating effects. A more surprising finding of the present study is that a negative and statistically significant relationship exists between perceptions of SBP plan fairness and organizational commitment. This finding is inconsistent with previous studies that showed a positive relationship between pay fairness and organizational commitment (Folger & Konovsky, 1987; McFarlin & Sweeny, 1992; Meyer et al., 2002). A possible explanation for the negative relationship between perceived SBP plan fairness and organization commitment is that it could have been caused by model specification. The fact that the zero-order correlation between these two variables was positive and statistically significant supports this possibility and indicates that perceptions of pay plan's fairness may have acted as a suppressor variable in the model. A suppressor variable is "a variable that increases the regression weight and, thus, increases the predictive validity of other variables in a regression equation" (Conger, 1974, pp. 36-37). One example of a suppressor variable is the case of a net suppressor which happens when the beta weight of the variable is of opposite sign from its correlation with the criterion (Krus and Wilkinson, 1986, p.22). This seems to be the case in the current model since the beta coefficient for perceptions of SBP plan's fairness with organizational commitment is negative while the zero-order correlation between the two variables is positive (0.52). At the same time, the beta coefficient between perceptions of SBP plan's effectiveness and organizational commitment declines when the perceptions of pay

plan's fairness is removed from the model (from 0.32 to 0.19). The suppressor variable in this case may be caused by the high correlation between perceptions of SBP plan's fairness and effectiveness. In the present sample, employees' perceptions of their SBP plan's fairness and the plan's effectiveness are highly correlated. As mentioned above, perceptions of SBP plan effectiveness do partially mediate the relationship between perceived SBP plan characteristics and organizational commitment. Therefore, the negative relationship between perceptions of SBP plan fairness and organizational commitment could be caused by the shared correlation that the two variables have with pay plan effectiveness, which is partialled out when both effectiveness and fairness are entered in the model simultaneously. Incidentally, when perceptions of pay plan fairness and pay plan effectiveness are combined and entered in the model as one factor (the composite factor was called 'support for the SBP plan'), the relationship between organizational commitment and the composite factor is positive as expected. Also, the partial mediation hypothesis is supported in the re-specified model (i.e.; 'Support for the SBP Plan' partially mediated the relationship between perceived SBP plan characteristics and organizational commitment). However, this ad hoc re-specification of the model should be treated as tentative until the same analysis is repeated with new samples.

Both scholars and practitioners have commented on the state of current knowledge in the field and have called for more systematic and rigorous studies. For example, Heneman et al. (2000) point out that organizations are experimenting with new types of pay systems including SBP plans. However, practice is ahead of research in this field. They point to a need for analytical, theory driven research that examines the conditions and factors necessary for these new pay systems to be successful. Similarly, Zingheim and Schuster (2002) note that designers of SBP plans "struggle to define 'best practice'. Broadly accepted, valid and reliable guidelines about what does and does not work have never been developed, so opinions and anecdotes are taken at face value without enough of the hard, validating data needed to act theories from a variety of disciplines. It posits plausible relationships between explanatory and outcome variables, some of which have never been explored before. In particular, like previous studies, the present study includes outcome variables at the SBP plan level (fairness and effectiveness). But, it also includes outcome variables at the role and organizational levels (role orientation and organizational commitment) that have not been examined before. The results show that the path model employed provides a reasonable representation of the relationships between the explanatory and outcome variables. The model explains substantial proportion of the total variance in employees' assessment of the SBP plan's fairness and effectiveness and their organizational commitment. The model also explains significant, though smaller, variance in employee role orientation.

In addition, most of the limited number of empirical studies that are available in the field are based on data collected from HR executives/managers from organizations using SBP plans, typically including one respondent per organization. Conclusions drawn in these studies represent what HR managers or executives perceive to be the factors associated the success or failures of SBP plans. A leading example of such a study is Jenkins et al. (1993). The present study is based on data collected directly from a large sample of employees who work under an SBP environment. This approach to data collection would provide a more accurate measure of employee perceptions than the other case in which corporate executives are asked about their opinion regarding employee perceptions. Therefore, more reliable and valid conclusions can be drawn from this database.

#### **6.2 Practical Implications**

Three key implications emerge from the findings of the present study, which might be of interest to managers and professionals who are involved in designing and administering SBP plans.

First, the results stress the need for organizations to ensure that employees understand their SBP plans well, that they are involved and consulted in the design and the administration of the plan, and that training resources are provided to ensure employees' ability to attain the benefits of SBP system through skills acquisition and subsequently higher pay. The specific programs and policies to ensure employee understanding, acceptance, and involvement in the process should be chosen to fit the particular organizational contexts and cultures. In the organization where this study was conducted, employees were involved from the early stages of planning to introduce the SBP system through extensive discussions and meetings with employees at all levels throughout the organization. The transformation from a job-based to skill-based pay system in different departments and sections within the company was carried out gradually through a process of internal negotiations and consultations over a period of several years. It was left up to each group of employees, in consultation with their managers and the Human Resource Management department, to decide when is the right time for them to change to a SBP plan and to work out the details of the application plan. As employees started to realize the benefits of the SBP system, the transformation process became faster as those departments and employee groups who were initially skeptical became interested in switching to a SBP system.

Second, another finding that may be useful for managers and practitioners is that selfefficacy is a significant correlate of employees' assessment of the SBP plan fairness as well as their organizational commitment and role orientation. This means that any interventions that enhance employee self-efficacy through selection, training, or work redesign may contribute to the successful application of SBP plans. Research shows that training in specific tasks and in innovative problem solving facilitates greater self-efficacy (Gist, 1989). Also, redesigning jobs/roles to give employees a sense of control over their work environment can enhance selfefficacy (Wood & Bandura, 1989).

Third, the results point to the importance of group identification and cohesiveness in the SBP work environment. Any organizational initiatives that enhance high involvement and collaborative work environment in the workplace are likely to improve employees' acceptance of the SBP system as well as improve their organizational commitment and role orientation.

#### 6.3 Limitations and Future Research

A major strength of this study is that it examines the relationships between employees' perceptions of their SBP plan and their work attitudes in a field setting. Notwithstanding its strengths, the study design has a number of limitations.

First, the study employed a post-test cross-sectional design with no equivalent group, which does not permit drawing conclusions concerning the causality of the relationships in the estimated path model. Future studies should focus on conducting field research that uses longitudinal and experimental research designs in order to allow causal inferences with more confidence. Second, there is a possibility that the findings of this study may be partly affected by common method variance. The study used one single questionnaire to measure all constructs. Although it used valid and reliable measures and placed items in the survey questionnaire in a way to reduce the possibility of common method biases (Crampton & Wagner II, 1994), the strength of relationships between different constructs may still be inflated. Therefore, future research that uses multiple sources of data (e.g., supervisors and peers in addition to self-report) may be required to further substantiate the findings of this study. Third, the current study involved only one organization, one industry, and one SBP

plan. Any conclusions or interpretations drawn from the findings of the study are not necessarily generalizable to other organizational and industrial settings. Future studies should replicate the current analysis with different samples to establish external validity and generalizability of these findings.

There are a number of other related areas where research is needed that do not flow from the limitations of the current study as outlined above. The current study was the first to examine the relationship between employees' perception of their SBP plan and their organizational commitment and role orientation. The study findings should, therefore, be treated as preliminary and future research is needed to repeat the same analysis in different contexts. Also, future research is required to examine the relationships between SBP and other employee attitudes and behaviours as shown in Figure 2-1 in Chapter 2. For example, future studies should examine the relationships between SBP and organizational citizenship behaviour (OCB), absenteeism, effort, and motivation. Theoretical models to represent these various relationships should be developed and tested in different work contexts.

This study found that employee self-efficacy and group identification were strong correlates of employees' assessment of their SBP plan and their organizational commitment and role orientation. Future studies should further examine the relationships among individual employee characteristics, group dynamics, and employee attitudes and behaviours under the SBP system. Are there particular employee characteristics (besides general self-efficacy) that favor the SBP system? What are the particular team dynamics that affect employees' attitudes towards their SBP plans and their performance under the SBP system?

Future studies should also examine certain contextual factors that may moderate the relationship between SBP and various employee attitudes and behaviours. For example, the current study found a negative relationship between perceptions of pay plan fairness and organizational commitment. Research should examine whether certain contextual factors may

have lead to this unexpected relationship. For example, the fairness theory (Folger & Cropanzano, 2001) suggests that people compare their currently experienced aversive states to ones that are more positive, defined in terms of what things should be. The question that may be raised here is how are these comparison states chosen in the context of SBP. In this context employees might not have available to them comparable cases to use as basis for building their fairness judgments due to the relative rarity of SBP plans. So future research may be needed to examine the process by which employees form their fairness judgments in the SBP environment.

Finally, the variance explained of role orientation in the current study is relatively low. Future studies should further examine the concept of role orientation and the measurement, antecedents, and correlates of this construct. It is possible that the scales used to measure the two dimensions of role orientation in this study did not capture all the facets of this construct or that there are other antecedents of role orientation that were not included in the path model tested in this study. Studies are needed to further explore the concept of role orientation within a more comprehensive nomological network.

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# Appendix

# A. Employee Perceptions of the SBP Plan

# 1. Skill-Based Pay Plan Characteristics (A1-A15)

This section is concerned with your agreement or disagreement about components of skillbased pay plan.

<u>Items</u>

- A1. Employees have many opportunities to get the training they need to advance under the skill-based pay plan.
- A2. There is enough formal training available for employees to earn pay increases under the skill-based pay program.
- A3. There is enough cross training for employees to earn pay increases under the skill-based pay program.
- A4. There is enough job rotation to permit employees to learn new job skills.
- A5. I understand how my skill-based pay is determined.
- A6. I understand how skill-based pay raises are tied to tests of skill level.
- A7. The written materials I have received are very helpful in understanding the skill-based pay plan.
- A8. There has been very good communication about how the skill-based pay plan works.
- A9. I am stuck in my current skill-based pay level because guidelines for advancement to the next skill-based pay level are unavailable. ®
- A10. I understand exactly how I can advance to the next skill-based pay level.
- A11. I understand exactly the skills I should learn in order to advance to the next skill-based pay level.
- A12. The management at this company always listens to and takes seriously employees' suggestions for changes in the design and administration of the SBP plan.
- A13. If I feel dissatisfied with any decision regarding my SBP plan, I always feel comfortable expressing my views to my supervisor.
- A14. Decisions regarding the SBP plan (such as training assignments, rotation, and skill certification) for employees in my work unit are usually made after consultation with every member of the group equally.
- A15. When my supervisor makes pay decisions for me, he/she discusses them with me before making the final decision.

Items tapping on training/job rotation, understanding\communication, understanding of how to advance in the SBP structure, and involvement/participation in SBP plan design and administration are A1-A4, A5-A8, A9-A11, and A12-A15, respectively.

# <u>Scale</u>

## 2. Skill-Based Pay Plan Fairness (A16-A19):

### <u>Items</u>

- A16. Supervisors do a good job of certifying employees for skill-based pay raises.
- A17. The skill-based pay certifications are a fair test of employee ability to perform a set of tasks.
- A18. If an employee really knows how to perform the tasks that make up a skill level, the employee will be able to pass the certification tests for that skill level.
- A19. The skill-based pay plan is fair to most employees.

#### <u>Scale</u>

Responses to each item are measured on a 7-point scale with scale point anchors labeled: (1) strongly disagree; (2) moderately disagree; (3) slightly disagree; (4) neither disagree nor agree; (5) slightly agree; (6) moderately agree; (7) strongly agree.

### 3. Skill-Based Pay Plan Effectiveness (A20-A27):

### Items

A20. The skill-based pay plan fulfills its objectives well.

- A21. The attraction and retention of competent employees is fostered by the skill-based pay plan
- A22. The skill-based pay plan significantly contributes to the motivation of participants.
- A23. The skill-based pay plan helps foster interdependency and collaboration.
- A24. I feel the pay system should be kept as it is.
- A25. The SBP plan makes it worthwhile for me to spend the effort to acquire additional training to advance to higher pay levels.
- A26. If I had the choice I would rather stay with the old job-based pay system than the SBP plan. ®
- A27. The SBP plan gives me a better opportunity to advance to higher positions and acquire higher pay than the old job-based pay system.

### <u>Scale</u>

# **B.** Organizational Commitment Questionnaire (OCQ)

### Instructions:

Listed below are a series of statements that represent possible feelings that individuals might have about the company or organization for which they work. With respect to your own feelings about the particular organization for which you are now working, please indicate the degree of your agreement or disagreement with each statement by checking one of the seven alternatives below each statement:

### **Items**

- B1. I am willing to put a great deal of effort beyond that normally expected in order to help this organization be successful.
- B2. I talk up this organization to my friends as a great organization to work for.
- B3. I would accept almost any type of job assignment in order to keep working for this organization.
- B4. I find that my values and the organization's values are very similar.
- B5. I am proud to tell others that I am part of this organization.
- B6. This organization really inspires the very best in me in the way of job performance.
- B7. I am extremely glad that I chose this organization to work for over others I was considering at the time I joined.
- B8. I really care about the fate his organization.
- B9. For me this is the best of all possible organizations for which to work.

## <u>Scale</u>

Responses to each item are measured on a 7-point scale with scale point anchors labeled: (1) strongly disagree; (2) moderately disagree; (3) slightly disagree; (4) neither disagree nor agree; (5) slightly agree; (6) moderately agree; (7) strongly agree.

## C. The Group Identification Scale:

## Items

- C1. I identify with this group
- C2. I am glad to belong to this group
- C3. I feel held back by this group. ®
- C4. I think this group worked well together
- C5. I see myself as an important part of this group
- C6. I do not fit in well with the other members of this group ®
- C7. I do not consider the group to be important ®
- C8. I feel uneasy with the members of this group ®
- C9. I feel strong ties to this group.

# <u>Scale</u>

#### **D. Production Ownership Items (Role Orientation):**

To what extent would the following problems be of personal concern to you (note that some of these problems may be someone else's concern, such as your supervisor's, or they may even not be a problem)?

#### Items

D1. Orders for the product you deal with were repeatedly not being met on time.

D2. Customers for the products you deal with were dissatisfied with what they receive.

D3. The quality of the products made in your work area was not as good as it could be.

D4. There was much unfinished work sitting in your area.

D5. There was a pile of completed work in your area.

D6. The way some things were done in your work area meant a lot of re-work was needed.

D7. Others in your work area were not pulling their weight.

D8. People in your work area were not coordinating their efforts.

D9. There was a lack of well-trained people in your work area.

Items tapping problems concerning the categories goal achievement, operational inefficiencies, and group cohesion and coordination are items D1-D3, D4-D6, and D7-D9, respectively.

#### <u>Scale</u>

The response scale ranged from 1, to no extent, of no concern to me, to 5, to very large extent, most certainly of concern to me.

#### E. The Importance of Production Knowledge (Role Orientation):

How important are the following skills and knowledge for you to do your job effectively?

#### Items

E1. Knowing the root causes of production problems that occur.

- E2. Being able to measure and analyze problems in the production process.
- E3. Being able to anticipate and prevent production problems.
- E4. Being able to make decisions as part of a group.
- E5. Being able to involve and motivate people.
- E6. Being able to understand other people's point of view.
- E7. Understanding how work flows in your work area.
- E8. Knowing what skills everyone in your work area has.
- E9. Knowing the priorities of work in your area.
- E10. Knowing the requirements of your end customers.
- E11. Knowing the overall objectives of the company.
- E12. Knowing what is different about the products made in this company compared to those made by competitors.
- E13. Being willing to challenge and question the way things are done.
- E14. Being willing to take on and accept new responsibilities.
- E15. Being able to work out what to do when instructions are vague.

Items tapping cognitive activities, team working, knowing local production requirements, understanding of wider manufacturing, and self-direction are E1-E3, E4-E6, E7-E9, E10-E12, and E13-E15, respectively.

<u>Scale</u>

The response scale ranged from 1, not at all important, to 5, extremely important.

## F. General Self-Efficacy Scale

<u>Items</u>

- F1. When I make plans, I am certain I can make them work.
- F2. One of my problems is that I cannot get down to work when I should. ®
- F3. If I can't do a job the first time, I keep trying until I can.
- F4. When I set important goals for myself, I rarely achieve them. ®
- F5. I give up on things before completing them. ®
- F6. I avoid facing difficulties. ®
- F7. If something looks too complicated, I will not even bother to try it. ®
- F8. When I have something unpleasant to do, I stick to it until I finish it.
- F9. When I decide to do something, I go right to work on it.
- F10. When trying to learn something new, I soon give up if I am not initially successful. ®
- F11. When unexpected problems occur, I don't handle them well. ®
- F12. I avoid trying to learn new things when they look too difficult for me. ®
- F13. Failure just makes me try harder.
- F14. I feel insecure about my ability to do things. ®
- F15. I am a self-reliant person.
- F16. I give up easily. ®
- F17. I do not seem capable of dealing with most problems that come up in life. ®

## <u>Scale</u>