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and Citizenship Behaviors in
Understanding Relations between Human
Resources Practices and Turnover
Intentions of IT Personnel**

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The Role of Organizational Commitment and Citizenship Behaviors in Understanding Relations between Human Resources Practices and Turnover Intentions of IT Personnel*

Guy Paré[†], Michel Tremblay[‡], Patrick Lalonde[§]

Résumé / Abstract

Dans cette étude, nous présentons et testons un modèle de recherche portant sur la rétention des spécialistes en TI. Ce modèle examine les relations entre diverses pratiques de GRH, les comportements discrétionnaires, l'engagement organisationnel et les intentions de quitter des spécialistes en TI. Un questionnaire fût développé et envoyé aux membres de la Fédération de l'Informatique du Québec (FIQ). Les données de 394 questionnaires ont servi aux fins d'analyses statistiques. Les résultats de cette étude révèlent que les spécialistes en TI au Québec sont particulièrement sensibles à quatre types de pratiques de GRH, soit : la justice distributive, la reconnaissance non-monnaire, le développement des compétences professionnelles et la responsabilisation. Notre étude est également la toute première à démontrer clairement que l'impact des pratiques de GRH sur l'intention de quitter des spécialistes en TI dépend à la fois du niveau d'engagement et de mobilisation des employés. Nos résultats confirment enfin l'importance relative de deux formes distinctes d'engagement organisationnel (affectif et continu) dans un tel contexte. Sur la base des résultats obtenus, nous faisons une série de recommandations aux hauts dirigeants.

The primary objective of this study is to present and test an integrated model of turnover intentions which addresses the unique nature of the information technology (IT) profession. It identifies a multidimensional set of human resources (HR) practices likely to increase retention among IT employees. It also considers organizational citizenship behaviors and two distinct types of organizational commitment as key antecedents of turnover intentions. A second goal is to explore the moderating effects of organizational commitment and citizenship behaviors on HR practices-turnover intention relationships. A questionnaire was developed and sent to the Québec members of the Canadian Information Processing Society. Data from 394 respondents were used to validate

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the measures and test the research model. Findings reveal that IT specialists are particularly sensitive to four types of HR policies and practices: distributive justice, competence development, empowerment, and recognition. Results also provide additional support for the generalizability of the two-component model of organizational commitment in the IT context. This study is the first to show that the effects of various HR practices on turnover intentions among IT specialists depend upon the nature of their commitment to the organization. Similarly, we found that citizenship behaviors not only mediate but also moderate HR practices–turnover intention relationships. Implications of these results for practice and research are discussed.

Mots Clés : Gestion du personnel en TI, roulement du personnel en TI, pratiques de GRH

Keywords: IS staffing issues, IS turnover, HRM practices

1. INTRODUCTION

In today's highly competitive global economy, developing and retaining talented IT staff is a major challenge for CIOs and HR executives. In fact, retention is often referred to as the most critical human resource issue in the minds of executives today (Evans et al. 2000). Since late 1996, the labor market for IT professionals has reached a fever pitch: IT professional compensation has soared, turnover has rocketed to 15% to 20% annually, job-hopping has become the norm and only eight out of ten IT positions get filled with qualified candidates (Callas 1998; McNee et al. 1998). Even though some improvement has recently been reported in turnover rates, problems in the IT labor market will not go away for many years (Morello and Claps 2000). The rising demand for high-performing individuals required to support accelerated growth and globalization, the scarcity of IT talent, and the growth in full-time self-employment are among the key factors which contribute to the complexity (Evans et al. 2000). According to human resource consultants William M. Mercer, Inc., no improvement in supply and demand is expected for at least 10 years in the IT industry (Mercer 2000). During that critical period, senior HR and IT executives must work together to correct or refine corporate policies that inhibit retention and recruitment.

A growing body of literature reveals that a heavy investment in human capital and the implementation of HR practices may contribute to corporate financial performance (Huselid 1995; Huselid et al. 1997) and intermediate employee outcomes such as turnover of IT personnel (Agarwal and Ferratt 1999; Roepke et al. 2000). The primary objective of this study is to present and test an integrated model of turnover intentions that addresses the unique nature of the IT profession. It identifies a multidimensional set of HR practices likely to increase retention among IT employees and considers organizational citizenship behaviors (OCB) as well as two distinct types of organizational commitment as key antecedents of turnover intentions. Specifically, this study addresses two research questions: 1) What HR practices are needed to implement an effective strategy for retaining IT professionals? 2) Do organizational commitment and citizenship behaviors mediate the effects of HR practices on the turnover intentions of IT personnel? A second objective of this paper is to explore the moderating role of organizational commitment and citizenship behaviors on HR practices-turnover intention relationships.

This study departs from previous IT literature in this area in several ways. First, although sets of innovative HR management practices have been proposed to retain talented IT employees (e.g., Foote 1998; Scheier 1998; Morello 1999), the present empirical study is the first to propose a theoretically grounded configuration of practices and to test its influence on the quit intentions of IT professionals. Second, this is the first time the mediating influence of citizenship behaviors and organizational commitment has been presented in the IT literature. Third, this study explores the moderating influence of both intervening variables on HR practices-turnover intention relationships. Fourth, our analysis explicitly addresses the issue of common method, a methodological problem confronting survey-based research on this topic. Finally, the present research represents one of the very few attempts to study IT turnover intentions using a non-US population.

2. RESEARCH MODEL

Figure 1 presents the integrated model of turnover intentions tested in this study. The model comprises two sets of independent variables (HR practices, and compensation & market opportunities), two mediating variables (organizational commitment and organizational citizenship behaviors), and one criterion variable (turnover intentions). Previous IT empirical studies on turnover have used intent to leave rather than actual turnover behavior as a criterion variable (Baroudi 1985; Igarria and Greenhaus 1992; Guimaraes and Igarria 1992; Igarria and Guimaraes 1999; Moore 2000). These researchers evoked, among other factors, the modest costs associated with collecting turnover intention statements. Additionally, turnover intentions which are under more individual control can provide results much more quickly, and are less difficult to predict than actual turnover (Price and Bluedorn 1977). For these reasons, turnover intentions have been used in the present study.

Insert Figure 1 about here

Organizational Citizenship Behaviors (OCB)

As mentioned previously, the present study is the first to investigate the influence of OCB on the turnover intentions of IT specialists. OCB is defined as an employee's willingness to go above and beyond the prescribed roles which he/she has been assigned (Organ 1990). These extra-role behaviors are considered to be a contribution to the maintenance and enhancement of the social and psychological context which supports task performance in the organization (Organ 1997). At the same time, such discretionary behaviors are not explicitly recognized by a formal rewards system, and their contribution to organizational success is based on resource transformations, innovativeness and adaptability (Organ 1988). Shore et al. (1995) and Chen et al. (1998) argue that a high level of OCB reflect employees' true willingness to be involved in the organization. Conversely, lack of willingness to exhibit citizenship behaviors may be a clear indication of employee withdrawal from the organization.

In the present study, we considered a major form of citizenship behavior, namely, helping behaviors (Podsakoff et al. 2000). Helping behavior involves voluntarily helping others with, or preventing the occurrence of, work-related problems. The first part of this definition (helping others with work-related problems) includes Organ's altruism, peacemaking, and cheerleading dimensions (Organ 1988, 1990); Graham's interpersonal helping (Graham 1989); William and Anderson's OCB-I (William and Anderson 1991); and the helping others constructs from George and Brief (1992) and George and Jones (1997). The second part of the definition captures Organ's (1988, 1990) notion of courtesy, which involves helping others by taking steps to prevent the creation of problems for coworkers. Past empirical research has generally confirmed that all of these various forms of helping behavior load on a single factor (e.g., MacKenzie et al. 1993; Podsakoff and MacKenzie 1994; Podsakoff et al. 1997).

To our knowledge, only Chen et al. (1998) and MacKenzie et al. (1998) have empirically tested the relationship between OCB, quit intentions and actual turnover. The results of the

first study revealed a negative relationship between OCB and quit intentions while an even stronger negative association between OCB and actual turnover was reported in both studies. In a recent meta-analysis, Podsakoff et al. (2000) showed that helping behaviors enhance morale, group cohesiveness, and the sense of belonging to a team, all of which may enhance performance and help the organization retain better employees. Therefore, we posit that citizenship (helping) behaviors will be positively related to turnover intentions (H1).

Organizational Commitment

A number of empirical studies confirm the important role of organizational commitment in the turnover process for IT personnel (Igarria & Greenhaus 1992; Igarria and Guimaraes 1999). Organizational commitment was found to comprise three distinct dimensions: affective, continuance and normative commitment (Meyer and Allen 1997). *Affective commitment* corresponds to an employee's personal attachment to and identification with the organization resulting in a strong belief in the organization's goals and values. *Continuance commitment* is conceived as a tendency to engage in consistent lines of activity based on the individual's recognition of the "costs" associated with discontinuing the activity. *Normative commitment* suggests that employees exhibit behaviors solely because they believe it is the right and moral thing to do. Prior studies of turnover intentions among IT personnel have considered the first and most studied dimension of the construct, namely, affective commitment (e.g., Igarria and Greenhaus 1992; Igarria and Guimaraes 1999). In order to further push our understanding of the mediating role of organizational commitment, we considered both affective and continuance commitment, as suggested recently by King and Sethi (1997). We omitted normative commitment for two primary reasons: 1) past research showed a positive relationship between affective and normative commitment (e.g., Meyer and Smith 2000) and a strong overlapping in the determinants and consequences of both constructs (e.g., Sommers 1995); and 2) prior findings are much more conclusive for the affective dimension than for the normative one (e.g., Bolon 1997).

Results from another recent meta-analysis (Griffeth et al. 2000) confirmed that affective commitment is negatively and strongly related to actual turnover. Past research has also found a negative relationship between continuance commitment and turnover intentions (e.g., Jaros et al. 1993; Chen et al. 1998). Interestingly, most empirical studies have found a stronger relationship between affective commitment and turnover intentions than between continuance commitment and turnover intentions (e.g., Sommers 1995; Chen et al. 1998). This result suggests that employees are more willing to remain in an organization when they have an emotional attachment to the organization than when they perceive a cost of leaving it. In this light, Hypothesis 2 predicts that organizational commitment will have a direct effect on the turnover intentions of IT personnel. Specifically, affective and continuance commitment are expected to be negatively related to turnover intentions. We also posit that the link between affective commitment and turnover intentions will be stronger than the relationship between continuance commitment and turnover intentions.

Several empirical studies have tested the link between organizational commitment and OCB. Allen and Smith (1987), Meyer and Allen (1991) and Chen et al. (1998) found that affective commitment correlated positively with self-report measures of OCB and continuance commitment correlated negatively with citizenship behaviors. However, two recent meta-analysis studies conducted by Organ and Ryan (1995) and Podsakoff et al. (2000) asserted that only affective commitment was related to OCB. A plausible explanation for the latter finding is that employees are willing to invest their time and energy in extra-role activities if and only if they are emotionally attached to the organization. In light of these recent empirical findings, Hypothesis 3 predicts that affective commitment is associated with OCB. Specifically, we posit that affective commitment will be positively related to helping behaviors. Moreover, we expect no significant relationship between continuance commitment and OCB.

HR Policies and Practices

Although several sets of innovative HR management practices have recently been proposed to enhance effectiveness in organizations and to retain talented employees (Arnett and Obert 1995; Pfeffer and Veiga 1999; Dessler 1999), these configurations of practices are narrowly focused and are often not theoretically grounded. For example, Stokes (1995) identified team-based reward and recognition practices as a major factor; and Gilliam (1994) recommended that IT managers focus on moving computer people out into the user community, offering non cash inducements, and stressing teamwork. In our view, the conceptual model of Lawler (1986), which is seen as the primary contributor to the evolution of contemporary strategic HR management (McMahan et al. 1998), may be a good starting point for analysis. Specifically, Lawler suggests that four organizational processes may influence work-related attitudes and behaviors: empowerment; competence development; information sharing; and reward. However, recent studies have shown that *reward* is a complex process which may not be fully understood without taking into account some of its underlying dimensions, namely the distributive, procedural and recognition aspects (Sheppard et al. 1992; Milkovich and Newman 1998). In addition, recent literature suggests that work-family conflict is a critical challenge for an organization owing to its consequences on individual attitudes and behaviors (Chiu and Ng 1999). Greater individual and organizational effectiveness is expected when all these processes and human resource policies are spread throughout the organization. Therefore, the present study examines six HR policies and practices that an organization can employ to increase commitment, induce extra-role behaviors and decrease turnover intentions among IT employees. We will describe each of these practices in turn.

First, for most IT professionals, a significant part of their motivation comes from the recognition they get from managers for a well job done and the feeling that they are an important part of the organization (Agarwal and Ferratt 1999; Gomolski 2000). In this study, *recognition practices* refer to non-monetary means (e.g., extended vacations, tickets to a baseball game, awards ceremony, thank you notes) by which an organization tangibly signals its appreciation of good quality work and accomplishments. These practices also included those efforts made by the organization to study employee suggestions carefully and provide them with regular feedback. Second, Agarwal and Ferratt (1999) found that

successful IT organizations are devoting resources toward *empowering* IT professionals to take increasing responsibility for their work and for decision making. Third, we posit it is easier to retain people in an organization where IT professionals have a sense of justice. In this study, we distinguish between distributive and procedural justice (Tremblay et al. 2000b). *Distributive justice* refers to the perceived fairness of various job outcomes including: compensation conditions, performance evaluations, and job assignments. *Procedural justice* relates to the perceived fairness of the means, rules and/or procedures used to assign jobs as well as the determination of compensation conditions and performance evaluation criteria (Folger 1977). Fourth, *competence development practices* (e.g. job rotation programs, mentoring, training) convey to employees that the organization considers human resources to be a competitive advantage (Schwochau et al. 1997), and that it is seeking to establish a long-term relationship with them (Tsui et al. 1995; Guptill 1998; Agarwal and Ferratt 1999). Last, with the shortfall of IT staff not expected to disappear in the near term, it is sensible business practice to accommodate those employees who may not join the workforce for a typical 9-to-5 workday because of other constraints in their personal life (Agarwal and Ferratt 1999). Here, *work-life policies* correspond to work conditions provided by organizations to take into account the needs of the IT workforce and to minimize the consequences of conflict between the work and family issues (Honeycutt and Rosen 1997; Kopelman et al. 1983).

Given recent empirical results in the HR field (e.g., Grover and Crooker 1995; Rodwell et al. 1998; Schwochau et al. 1997; Chen et al. 1998; Appelbaum et al. 2000), we posit that HR practices will have direct effects on organizational commitment, OCB, and turnover intentions. Specifically, it is predicted that all six practices will be positively related to both affective commitment (H4) and OCB (H5), and negatively related to turnover intentions (H6).

Compensation and Market Opportunities

Four compensation variables were examined in this study: salary, annual bonus, signing bonus and retention bonus. These variables are differentiated from distributive justice practices because they represent objective variables and they are not founded on judgments or comparisons with other individuals or groups of employees. Market opportunities correspond to the number of formal job offers (Griffeth et al. 2000). It is expected that both compensation conditions and market opportunities will have a direct impact on organizational commitment and turnover intentions. Salary has been found to be positively related to organizational commitment and negatively to turnover intentions among IT personnel (e.g. Igbaria and Greenhaus 1992). Similar results are anticipated for annual bonus, signing bonus and retention bonus. Meyer and Allen (1990) found continuance commitment and lack of alternative job offers to be positively associated. In consequence, Hypothesis 7 predicts that compensation conditions and market opportunities will have direct effects on organizational commitment and turnover intentions. Specifically, salary, annual bonus, signing bonus, and retention bonus are hypothesized to all be positively related to continuance commitment and negatively related to turnover intentions, whereas the number of formal job offers will be negatively related to continuance commitment and positively related to turnover intentions.

Control Variables

Organizational behavior and management researchers have also identified two demographic variables which tend to correlate with turnover intentions. Indeed, age and organizational tenure have shown consistent association (in a negative direction) with voluntary turnover (Griffeth et al. 2000). Furthermore, organizational tenure has consistently been found to be positively associated with organizational commitment (Arnold and Feldman 1982; Cotton and Tuttle 1986). Accordingly, age and organizational tenure were assessed and statistically controlled in the present study. It is worth noting that age and organizational tenure have not been found to be related to OCB in past studies (Podsakoff et al. 2000).

3. METHODOLOGY

In order to test our research hypotheses, a questionnaire was developed and sent to the 2,398 Quebec members of the Canadian Information Processing Society (CIPS). The sample was chosen because CIPS members represent a wide variety of IT jobs and organizational settings. Excluded from the sample were two CIPS members who had been surveyed in the pre-test of the instrument. A total of 394 questionnaires were returned to the researchers within an 8-week period; 134 questionnaires were returned because of unspecified address changes (net response rate of 17.4%). The somewhat low response rate was to be expected for several reasons. First, the questionnaire was distributed toward the end of November 1999. Several members of CIPS telephoned us upon reception of the reminder letter to let us know they could not complete the questionnaire simply because of the “red tape” associated with the Y2K problem and/or the end of the fiscal year. Another reason is related to the characteristics of the sample itself; a small portion of CIPS members in Quebec is believed to be self-employed, and hence not directly concerned by the current study. We believe these reasons to be more plausible causes for non-response than the nature of the question under study.

Nevertheless, in view of the somewhat low response rate, it was necessary to determine how representative the sample was of the population of CIPS members in Quebec. It was reported (CIPS 1999) that 80.1% of their Quebec members were men, whereas 77.3% of our sample were men. With regard to education, 72% of CIPS members in Quebec were reported to have a university degree, compared with 75% in our sample. Furthermore, 56.6% of CIPS members in Quebec work as systems analysts, programmers, consultants, or directors compared with 53.5% in our sample.

Measures

The items measuring turnover intentions, organizational commitment, OCB and HR practices are presented in Appendix. The criterion variable was measured using a two-item scale developed by Meyer et al. (1993). The ten items used to construct the commitment scale were derived from Meyer and Allen (1990). OCB was measured using a 5-item scale adopted from Podsakoff et al. (1990) and Williams and Anderson (1991). Specifically, respondents were asked to think how their supervisor would evaluate their own helping

behaviors on 7-point Likert-type scales. In terms of HR practices, recognition was measured using a 6-item scale adapted from Tremblay et al. (2000a). Empowerment was measured by a 4-item scale developed by Tremblay et al. (1997), and adapted by Tremblay et al. (2000a). Two scales were designed to measure the different types of organizational justice (Tremblay et al. 2000b). The first scale (distributive) comprises 5 items while the second scale (procedural) includes 6 items. Competence development practices were measured using a 6-item scale mainly based on the work of Tremblay et al. (2000a). Work-life policies were measured using a 5-item scale based on Beehr et al.'s (1976) study of work overload and Kopelman et al.'s (1983) work on work-family conflict.

All four compensation variables were each measured by one item. The salary measure was based on annual salary in current position. Categories ranged from 1) below \$40,000 to 5) \$100,000 or above. Annual bonus was measured using categories that ranged from 1) 0% of annual salary to 6) 100% or above of annual salary. We also asked respondents if they had received a signing bonus when they were hired, and if they had signed a Y2K retention bonus (no = 0, yes = 1). In addition, the number of formal job offers received by the respondent was measured using a Likert-type scale ranging from 1) no job offers to 7) several job offers. Last, age and organizational tenure were each measured by a single-item scale and are assumed to perfectly assess the underlying constructs.

Data Analysis

Analysis began with an examination of the measurement model in terms of its reliability and construct validity. Table 1 presents the results associated with the assessment of the internal consistency of each scale. The composite reliability coefficients of all the measurement scales but one, satisfied Nunally's (1978) guidelines. Only *empowerment* showed a weak reliability coefficient of 0.68. Based on the results of the reliability analysis and the interitem correlation coefficients matrix (not shown here), two items were removed from their respective measurement instruments. Since EMP4 "Employees in my work unit are extensively involved in key decision-making" did not correlate highly with any of the three other items composing the construct (convergent validity), it seems that as far as the population investigated in this study is concerned, involvement in key decision making might be more conceived of as a form of recognition than as empowerment itself. As a result of this change, the reliability coefficient of the *empowerment* scale moved up to 0.73. Second, CC5 "One of the few serious consequences of leaving my organization is the scarcity of current alternatives" was also removed from its respective scale in order to obtain a much more reliable scale ($\alpha = .78$).

Insert Table 1 about here

A factor analysis was also conducted to confirm the validity of the scales. Items from the six HR practices, affective and continuance commitment, OCB, and turnover intentions scales were entered into the factor analysis and ten factors were forced. As shown in Table 2, the factors emerged cleanly and each had an eigenvalue greater than 1.0. Of the remaining 47 items, only two cross-loaded to a different scale. First, the DJ3 item was removed from the distributive justice scale since its factor loading was less than 0.50.

Similarly, AC5 was not retained in the affective commitment scale since its factor loading was not above the cutoff point. In summary, the reliability and construct validity of our measures are highly satisfactory.

Insert Table 2 about here

A major concern in this study was common method and to control for it Harman's one factor statistical test was performed (Podsakoff and Organ 1986). Following Moore (2000), an exploratory factor analysis was conducted on the scale items used to assess the ten variables considered in the present study. A total of 45 items were entered into the analysis, and 10 factors emerged possessing an eigenvalue greater than 1.0. The first factor in the unrotated solution was made up of various items from the recognition, procedural justice, distributive justice, and competence development scales. Some of those items also cross-loaded strongly on subsequent factors. Items from work-life policies, OCB, continuance commitment, affective commitment and turnover intentions loaded highly on subsequent factors. Hence, the results of this test indicate that the items used to assess the independent, mediating, and dependent variables in the present study tended not to load on a single general factor.

Next, in order to test for the presence of serious multicollinearity, the correlations among the independent, mediating, dependent, and control variables were calculated. As shown in Table 3, the correlations ranged from .01 to .67, showing no serious problem of multicollinearity.

Insert Table 3 about here

4. RESULTS

4.1 Hypotheses testing

Following the assessment of the measurement model, hypothesis testing was first evaluated using partial correlations coefficients (controlling for age and organizational tenure) and Mann-Whitney tests. As may be seen from Tables 4 and 5, only two of the seven hypotheses were not fully supported by the data. Hypothesis 1 was supported. Indeed, both types of organizational commitment are negatively correlated with turnover intentions and, as expected, the association between affective commitment and turnover intentions is stronger than the relationship between continuance commitment and the criterion variable. Citizenship behaviors were found to be negatively related to turnover intentions and, hence, H2 was supported. Furthermore, we found strong support for the link between affective commitment and OCB and, as expected, no significant association between continuance commitment and OCB was observed (H3). Most hypotheses linking HR practices to affective commitment (H4), OCB (H5), and turnover intentions (H6) were supported. Indeed, only work-life policies appeared to be unrelated to affective commitment, providing partial support for H4. With regard to compensation and market opportunities, we found that annual bonus was positively related to continuance commitment and negatively related to turnover intentions, while number of job offers was negatively related

to continuance commitment and positively associated with turnover intentions. Salary, signing bonus and retention bonus were not found to have any influence on these outcomes. Therefore, only partial support was found for H7. This result confirms that while salary might be crucial for recruiting good IT staff, pay level appears to be much less effective in retaining good IT workers (Evans et al. 2000).

Insert Tables 4 and 5 about here

A revised model containing only those relationships found to be significant at the .001 level or below (see Tables 4 and 5) was tested using linear regression analyses. As shown in Table 6, a linear regression of predictors on turnover intentions was conducted (controlling for tenure and age). The full model explains 46% of the variance in the criterion variable. Seven of the predictors were statistically different from zero. The standardized regression coefficients show that both forms of commitment (-), number of job offers (+), helping behaviors (-), organizational tenure (-), and two HR practices, namely, distributive justice (-) and competence development (-), had significant and *direct* effects on turnover intentions. On the other hand, age and three HR practices (procedural justice, recognition, and work-life policies) had no significant direct effect on turnover intentions.

Insert Table 6 about here

Table 7 presents results pertaining to the relationships of the predictors of affective commitment (controlling for tenure). Three HR practices were found to have significant positive effects on affective commitment: recognition; competence development; and empowerment. As expected, tenure within the organization was found to have a significant positive effect on affective commitment. On the other hand, the data show that organizational justice practices (distributive and procedural) were not found to have a significant and direct effect on affective commitment. The study variables explained 28% of the variance in affective commitment.

Insert Table 7 about here

Last, Table 8 reports results pertaining to the determinants of citizenship behaviors. Seventeen percent of the variance in OCB is explained by the independent variables. Among the six hypothesized predictors, only non-monetary recognition practices were found to have a significant positive influence on citizenship behaviors among IT personnel. Affective commitment, distributive and procedural justice, empowerment and competence development were all found to be nonsignificant. A summary of the significant findings is shown in Figure 2.

Insert Table 8 and Figure 2 about here

4.2 The Moderating Role of Organizational Commitment and OCB

To our knowledge, very few empirical studies have attempted to examine the moderating influence of commitment and OCB on turnover intentions. In fact, only Sommers (1995)

suggested that a high level of continuance commitment may moderate the relationship between affective commitment and intention to quit. No prior study has examined the moderating role of organizational commitment and OCB on the relationship between HR practices and turnover intentions.

The present study attempted to fill this gap by using sub-group analyses, as suggested by Arnold (1982). These have been used in recent IS studies on organizational commitment (e.g., King and Sethi 1997; Igbaria and Guimaraes 1999). As a first step, our sample was divided in four groups of IT professionals by a median split on both affective commitment (AC) and continuance commitment (CC). Group 1 was composed of 109 low commitment professionals (low AC and low CC) while 121 highly committed individuals (high AC and high CC) formed group 4. Groups 2 and 3 were intermediary ones. Group 2 was composed of 83 professionals with a relatively high level of AC and a relatively low level of CC. Last, seventy four respondents with a relatively low level of AC and a relatively high level of CC formed group 3. Low AC was defined as a median score of less than 5.0 while low CC was defined as a median value below 3.5.

Our aim was to assess the extent to which these four groups were sensitive to each of the six HR practices. An ANOVA was first performed to examine significant differences in the means of the different variables. The results show significant differences in organizational tenure, where professionals with relatively low levels of affective and continuance commitment (group 1) have less experience within the organization than professionals from the other three groups (see Table 9). It should be noted that no significant differences were observed with regard to age. Overall, IT professionals with a relatively high level of AC (groups 2 and 4) perceived higher levels of recognition, distributive and procedural justice, empowerment, and competence development opportunities in their organizations than professionals with a relatively low level of AC (groups 1 and 3). Furthermore, professionals from group 1 (low committed individuals) also reported the highest level of turnover intentions, as expected. Sommers (1995) observed the same pattern.

Insert Table 9 about here

Following Igbaria and Guimaraes (1999), the hypothesized moderator effects of organizational commitment on the relationships between HR practices and turnover intentions were tested using separated regression equations (controlling for organizational tenure). First, we found that HR practices explain more variance in turnover intentions for low-committed employees than for high-committed professionals, ranging from 41% of the variance for group 1 to 20% for group 4 (see Table 10). This key finding reveals that HR practices are more effective in retaining low-committed IT employees than highly committed individuals. A second key result shows that recognition had only a significant negative effect on turnover intentions for highly-committed IT employees. Third, while regression analyses did not confirm the influence of procedural justice on turnover intentions (see Table 6), the current test reveals that it does play an influence on quit intentions, but only for those low-committed IT employees (group 1). Fourth, distributive justice appears to have a major effect for those with a relatively high level of affective commitment (groups 2 and 4) while competence development practices have a greater

influence on quit intentions for low AC professionals. Fifth, results confirm the nonsignificant effect of empowerment practices on turnover intentions among IT personnel. Sixth, we found that work-life policies have significant effects on turnover intentions only for those individuals in group 2 (high AC and low CC). Last, organizational tenure had a strong negative effect on quit intentions for those with a relatively low level of affective commitment and a relatively high level of continuance commitment (group 3), as would be expected.

Insert Table 10 about here

Next, our sample was divided in two groups by a median split on OCB. Group 1 was composed of 209 low OCB professionals while 178 high OCB individuals formed group 2. High OCB was defined as a median value equal or greater than 5.8. A *t* test was performed to examine significant differences in the means of the research variables. As shown in Table 11, no significant differences were observed with regard to age and organizational tenure. As expected, IT professionals with a relatively high level of citizenship behaviors reported a lower level of quit intentions than those demonstrating fewer extra-role behaviors. The former group also perceived higher levels of recognition practices, procedural justice, empowerment, and competence development opportunities in their organizations than the latter group. Furthermore, in support to hypothesis 3, a significant difference was observed with regard to affective commitment while none was found with regard to continuance commitment.

Insert Table 11 about here

As a final step, the moderator effects of citizenship behaviors on the relationships between HR practices and turnover intentions were tested using separated regression equations (controlling for organizational tenure). As shown in Table 12, differences can also be observed with regard to the sensitivity of low and high OCB employees to particular HR practices. Indeed, while low OCB individuals pay more attention to recognition practices, helping IT professionals (high OCB) appear to be more sensitive to distributive justice and empowerment practices in their quit intentions. Further, we observe that both groups of IT employees are sensitive to competence development practices. Lastly, results confirm once more the less critical role played by procedural justice practices and work-life policies on quit intentions of IT professionals.

Insert Table 12 about here

5. DISCUSSION & IMPLICATIONS

Organizations today are concerned not just with preventing individuals from leaving but with being able to create a sustained and mutually beneficial exchange with employees. This means more than just approaching retention as a defensive play; it means approaching it as an offensive strategy (Evans et al. 2000). Agarwal and Ferratt (1999) recently recommended that considering the variety of HR practices available, IT executives must

choose among those practices which are likely to address the particular needs of IT specialists best.

Figure 2 demonstrates clearly that IT specialists are particularly sensitive to four types of HR practices: distributive justice; competence development; empowerment; and recognition. The more IT staff perceive a high level of distributive fairness or justice in allocating compensation and benefits, in performance evaluation, and in job assignments, the less they intend to quit. Fair treatment by employers connotes that they value employees and care about their well-being and reinforces employees' expectations that they will be fairly treated throughout their tenure (Moorman et al. 1998). Previous research has observed a stronger relationship between procedural justice and turnover intentions than between distributive justice and quit intentions (e.g. Dailey and Kirk 1992; Sweeney and McFarlin 1997). Interestingly, the present study failed to support this established finding. Indeed, regression analyses showed that, while distributive justice represented a major predictor of turnover intentions, procedural justice had no significant influence on the criterion variable. A potential explanation for this unexpected and intriguing finding may be that in such a highly favorable IT job market, perceptions of unfair treatment with regard to procedures and rules may be perceived as much less important by employees since they can easily change the overall HR system by switching employers.

Another interesting result is that distributive justice had a stronger influence on intent to quit for those highly-committed IT employees and for those who go above and beyond the roles which they have been assigned. This group of employees seems to react strongly and negatively to the lack of distributive justice. An explanation can be linked to the psychological contract theory proposed by Rousseau (1996). This well-known theory suggests that individuals continuously develop beliefs regarding reciprocal obligations between the organization (employer) and themselves. A psychological contract may change over time if one or both parties perceives that obligations have been violated. In the context of the present study, it seems that unfairness with regard to job outcomes is perceived by valuable IT employees (high commitment and high OCB) as a strong violation of obligations on the part of the organization. Some employees may go as far as to leave the organization as a sign of frustration or dissatisfaction. IT and HR executives should therefore keep in mind that valuable IT professionals are extremely sensitive to distributive justice when developing their retention strategy.

The second set of HR practices found to have a direct and negative effect on turnover intentions is related to competence development. It is well-known that IT professionals have a vested interest not only in keeping in tune with the industry, but also in staying several steps ahead of the experience and skill curve (Morello and Claps 2000). Training is too often seen as a perk when it should be seen as essential investment in the intellectual capital of the organization. This is true in every professional field, but is perhaps more acute in IT where change is rapid and one can become the "department's dinosaur" in a flash. Other practices such as coaching, job rotation programs, and opportunities for experimentation also send a clear message that management is seeking to establish a long-term relationship and a relational contract with employees (Tsui et al. 1995). While such investments in human capital could backfire eventually by making employees too attractive

to outside recruiters, they are seen as necessary and beneficial to the organization (Guptill 1998). In this regard, we suggest that for such practices to be really effective, managers must help employees shape and direct their careers, so they can gain experience within the enterprise rather than outside it. Interestingly, Table 10 reveals that IT professionals who have not yet developed a personal attachment and strong identification to their organization are most sensitive to competence development practices. This finding suggests that investments in training may be an important substitute for organizational commitment in retaining shorter-term IT specialists.

A careful examination of Table 6 shows that both affective and continuous commitment were found to be predictors of turnover intentions. This finding provides additional support for the generalizability of the two-component model of organizational commitment in the IS context (King and Sethi 1997). As did Griffith et al. (2000), we found that the link between affective commitment and turnover intentions was stronger than the relationship between continuance commitment and the criterion variable. Managers must therefore keep in mind that IT specialists who identify with and feel emotionally attached to their organization are those who are least likely to leave. Figure 2 shows that, besides competence development practices, two other HR practices have significant and direct effects on affective commitment, namely, recognition and empowerment. This result is in line with the conceptual model of Lawler (1986) and provides additional support for previous empirical studies (e.g., Fiorito et al. 1997; Rodwell et al. 1998; Cohen et al. 1996; Dillon and Flood 1992). A company which sets up a non-monetary reward system to recognize individual contributions, encourages greater participation in decision-making and promotes latitude in the definition, organization and conduct of work, sees its workforce as having a greater identification with the organization and a higher level of affective commitment. In short, empowerment and recognition practices make IT employees feel important, responsible, and free to turn their creativity and competencies to good account. As a consequence, these practices are perceived by employees as a major form of intrinsic reward and/or organizational support (Fiorito et al. 1997; Leana and Florkowsky 1992).

As mentioned above, most previous studies on turnover intentions have included organizational commitment as a mediator variable (e.g., Igarria and Greehaus 1992; Mathieu and Zajac 1990). In the present study, however, we found that organizational commitment not only mediates but also moderates the effects of HR practices on quit intentions. It is not only that low commitment employees show highest quit intentions (see Table 9), but more importantly, that the effects of HR practices on turnover intentions, as explained above, depend on the nature of the commitment. In this regard, the most intriguing result is that HR practices have a smaller influence on quit intentions for highly committed employees than for low-committed individuals. It is possible that personality traits or factors such as positive affectivity (Posakoff et al. 2000) and need for affiliation (Meyer and Allen 1997) might predispose some IT employees to develop a high level of emotional or affective attachment toward their organization and that they would be less sensitive to HR policies and practices in the withdrawal process. Future research should pay greater attention to the influence of such personality factors in refining models of IT turnover intentions.

As did Chen et al. (1998), we found that citizenship behaviors constitute another key indication of intention to quit. This result suggests that a lack of willingness to exhibit helping or extra-role behaviors may be an indication of withdrawal from the organization. More importantly, we found that recognition practices represent the only predictor of OCB. Indeed, results reveal that IT employees whose work performance is recognized by superiors and/or peers will tend to do more than what is formally required of them. While previous empirical research (e.g., Scholl et al. 1987; Organ and Konovsky 1989) has shown that monetary or pay rewards are important predictors of OCB, the present study is the first to provide empirical evidence of a strong positive link between perceived non-monetary rewards and discretionary behaviors. In line with our results, Tremblay et al. (2000a) recently found that non-monetary recognition practices had a stronger influence on OCB than monetary recognition practices. In short, recognition practices, as suggested by Moorman (1991), are likely to increase the perception of interpersonal justice and the feeling of being treated with consideration and respect. As a result, employees are more easily inclined to engage in extra-role activities.

The present study is also the first to show the moderating role of OCB on HR practices–turnover intention relationships. Specifically, results show that recognition practices appear to play an even more important role among those who adopt relatively few extra-role behaviors (i.e., the low OCB group). The high OCB group is more sensitive to distributive justice, competence development, and empowerment practices. It was quite intriguing to observe that recognition practices tended to reduce quit intentions of those employees exhibiting low OCB.

To conclude, retention of valued IT specialists is a crucial concern for many organizations (Moore 2000). Therefore, an effective retention strategy is imperative. Results from this study will help practitioners in regard to this issue. Our findings reveal that IT workers are particularly sensitive to four types of HR policies and practices: distributive justice; competence development; empowerment; and non-monetary recognition. This study is the first to show that the effects of various HR practices on turnover intentions among IT specialists depend upon the nature of their commitment to and involvement in the organization. Organizations which are serious about retaining IT workers may need to consider these contingency factors in deploying their strategy.

Limitations and Directions for Future Research

The present study enlightens practitioners and researchers with regard to IT turnover but several limitations must be considered in future investigations. First, cross-sectional data cannot confirm the direction of causality implied in our research model. Furthermore, longitudinal studies are needed in order to validate the predictive dimension of the model through the integration of the construct “actual turnover”. In this light, researchers could view actual turnover as an extreme on one side of a withdrawal continuum. Less extreme manifestations might include job search behaviors such as contacting employment agencies, sending out resumes, and job interviewing. Such an approach would move turnover from a binary to a continuous variable, at the same time increasing insights into what causes IT personnel to leave.

Second, as does most of the research in this area, the present study relied on single methods. Even though Harman's one-factor test (Podsakoff and Organ 1986) is useful in controlling for common method variance, we suggest that future research attempt to gather data from multiple sources including employee self-reports, co-workers, supervisors and company records, as well as multiple methods such as structured interviews, questionnaires, and observation. Third, although most correlation and regression coefficients are significant, the links between independent, mediating and dependent variables explain no more than 46% of the variance in the criterion variable. Further research should examine a wider variety of antecedents of turnover intentions including previously studied variables such as role ambiguity, role conflict, career opportunities (Baroudi 1985; Guimaraes and Igarria 1992; Igarria and Greenhaus 1992) as well as new variables such as superior-employee relationship (Griffeth et al. 2000). Future work in this area could also include other potential predictors of citizenship behaviors and organizational commitment such as trust in leader, leader support, personality traits (Podsakoff et al. 2000; Penner et al. 1997) and socialization practices (Caldwell et al. 1991). Finally, additional research should investigate IT turnover in a variety of organizational and cultural contexts. It would be interesting, for instance, to identify the predictors of turnover for IT specialists in public, private, and consulting firms as well as from North American and European countries.

REFERENCES

- Agarwal, R., and Ferratt, T.W. *Coping With Labor Scarcity in IT: Strategies and Practices for Effective Recruitment and Retention*, Pinnaflex: Cincinnati, OH, 1999.
- Allen N.J., and Smith J. "An Investigation of 'Extra-Role' Behaviors Within Organizations", *Proceedings of the annual meeting of the Canadian Psychological Association*, 1987, Vancouver, British Columbia, Canada.
- Arnett, K.P., and Obert, T.L. "What IS Employees Really Want", *Datamation*, 1995, 41(5), p.84.
- Arnold, H.J., "Moderator Variables: A Clarification Conceptual, Analytic, and Psychometric Issues", *Organizational Behavior and Human Performance*, 1982, 29, pp.143-174.
- Arnold, H.J. and Feldman, D.C., "A Multivariate Analysis of the Determinants of Job Turnover". *Journal of Applied Psychology*, 1982, 67, pp.350-360.
- Baroudi, J.J., "The Impact of Role Variables on IS Personnel Work Attitudes and Intentions", *MIS Quarterly*, December 1985, pp.341-356.
- Beehr T.A., Walsh J.T., and Taber T.D., "Relationship of Stress to Individually and Organizationally Valued States: Higher Order Needs as a Moderator", *Journal of Applied Psychology*, (61:1), 1976, pp.41-47.
- Bolon, D.S., "Organizational Citizenship Behavior Among Hospital Employees: A Multidimensional Analysis Involving Job Satisfaction and Organizational Commitment", *Hospital & Health Services Administration*, (42:2), 1997, pp.221-241.
- Caldwell, D.F., Chatman, J.A., O'Reilly, C.A., «Building Organizational Commitment: A Multifirm Study», *Journal of Occupational Psychology*, 63, 1990, 245-261.
- Callas, E., "Getting at the Heart of the Turnover Puzzle", *Health Management Technology*, (19:13), 1998, pp.41-44.
- Chen X.P., Hui C, and Segó D.J., "The Role of Organizational Citizenship Behavior in Turnover: Conceptualization and Preliminary Tests of Key Hypotheses", *Journal of Applied Psychology*, (83:6), 1998, pp.922-931.
- Chiu, W., and Ng, C., "Women-Friendly HRM and Organizational Commitment: A Study Among Women and Men of Organizations in Hong Kong", *Journal of Occupational and Organizational Psychology*, 72, 1999, pp.485-502.
- Cohens, L., Ledford, G., Spreitzer, G., «A Predictive model of Self-Managing Work Team Effectiveness», *Human Relations*, 1996, 49, 5, 644-674.
- Cotton, J.L. and Tuttle, J.M., "Employee Turnover: A Meta-Analysis and Review with Implications for Research", *Academy of Management Review*, 11(1), 1986, pp.55-70.
- Daily, R.C., Kirk, D.J., «Distributive and Procedurale Justice as Antecedent of Job Dissatisfaction and Intent to Turnover», *Human Relations*, 45, 3, 1992, 305-317.

- Dessler, G., "How to Earn Your Employees' Commitment", *Academy of Management Executive*, (13:2), 1999, pp.58-66.
- Dillon, A., Flood, P. «Organizational Commitment: Do Human Resource Management Practices Make a Difference», *Irish Business and Administration Research*, 1992, 13, 48-60.
- Evans, R.S., Gponzalez, J., Popiel, S., and Walker, T., "Whose Capital Is It. Trends in Human Resources", *Ivey Business Journal*, (64:3), 2000, pp.28-37.
- Fiorito, J., Bozeman, D., Young, A., «*Organizational Commitment: Human Resource Policies and Organizational Characteristics*», College of Business, Florida State University, 1997, 45p.
- Folger, R. "Distributive and Procedural Justice: Combined Impact of Voice and Improvement on Experienced Inequity", *Journal of Personality and Social Psychology*, 35, 1977, pp.108-119.
- Foot D., "Recruit with your brain, retain with your heart ", *Computerworld*, October 1998, @www.computerworld.com/home/features.nsf/all/981012mgt1, (99-02-15).
- George, J.M. and Brief, A.P. "Feeling Good –Doing Good: A Conceptual Analysis of the Mood at Work-Organizational Spontaneity Relationship", *Psychological Bulletin*, 112, 1992, pp.310-329.
- George, J.M. and Jones, G.R., "Organizational Spontaneity in Context", *Human Performance*, 10, 1997, pp.153-170.
- Gilliam, P., "Tame the Restless Computer Professional", *HR Magazine*, (39:11), 1994, pp.142-144.
- Gomolski, B. "Management Update: Tips to Identify Successful Candidates for Telecommuting", *InSide Gartner Group*, June 7, 2000.
- Griffeth, R.W., Hom, P.W. and Gaertner, S., "A Meta-Analysis of Antecedents and Correlates of Employee Turnover: Update, Moderator Tests, and Research Implications for the Next Millennium", *Journal of Management*, 26(3), 2000, pp.463-488.
- Grover, S.L., and Crooker, K., "Who Appreciates Family-Response Human Resource Policies: The impact of Family-Friendly Policies on the Organizational Attachment of Parents and Non-Parents", *Personnel Psychology*, 48, 1995, pp.271-288.
- Guimaraes, T., and Igbaria, M., "Determinants of Turnover Intentions: Comparing IC and IS Personnel", *Information Systems Research*, (3:3), 1992, pp.273-303.
- Guptill, B. "Value in IT: Staffing Issues for 1999", *Gartner Group Commentary*, December 21, 1998.
- Honeycutt, T.L., and Rosen, B., "Family Friendly Human Resource Policies, Salary Level, and Salient Identity as Predictors of Organizational Attraction", *Journal of Vocational Behavior*, 50, 1997, pp.271-290.

- Huselid, M.A., "The Impact of Human Resource Management Practices on Turnover, Productivity, and Corporate Financial Performance", *Academy of Management Journal*, (38:3), June 1995, pp.635-662.
- Igbaria M., and Greenhaus J.H., "Determinants of MIS Employees' Turnover Intentions: A Structural Equation Model", *Communication of the ACM*, (35:2), 1992, pp.35-49.
- Igbaria, M., and Guimaraes, T., "Exploring Differences in Employee Turnover Intentions and Its Determinants Among Telecommuters and Non-Telecommuters", *Journal of MIS*, (16:1), 1999, pp.147-164.
- Jaros, S., Jermier, J., Koehler, J., Sincich, T., «Effects of Continuance, Affective and Moral Commitment on the Withdrawal Process: An Evaluation of Eight Structural Equations Models», *Academy of Management Journal*, 36, 1993, 951-995.
- King, R.C. and Sethi, V., "The Moderating Effect of Organizational Commitment on Burnout in Information Systems Professionals", *European Journal of Information Systems*, 1997, 6, 86-96.
- Kopelman R.E., Greenhaus J.H., and Connolly T.F., "A Model of Work, Family, and Interrole Conflict: A Construct Validation Study", *Organizational Behavior and Human Performance*, 32, 1983, pp.198-215.
- Lawler, E.E., *High-Involvement Management*. San Francisco: Jossey Bass, 1986.
- Leana, C., Florkowski, G., "Employee Involvement Programs: Integrating Psychological Theory and Management Practice". *Research in Personnel and Human Resources Management*, vol.10, 1992, p.233-270.
- Mathieu, J.E. and Zajac, D., "A Review and Meta-Analysis of the Antecedents, Correlates, and Consequences of Organizational Commitment", *Psychological Bulletin*, 108(2), 1990, pp.171-194.
- MacKenzie, S.B., Podsakoff, P.M. and Fetter, R., "The Impact of Organizational Citizenship Behaviors on Evaluations of Sales Performance", *Journal of Marketing*, 57, 1993, pp.70-80.
- MacKenzie, S.B., Podsakoff, P.M., and Ahearne, M., "Some Possible Antecedents and Consequences of In-Role and Extra-Role Salesperson Performance", *Journal of Marketing*, 62, 1998, 87-98.
- McMahan, G.C., Bell, M., and Virick, M., "Strategic Human Resource Management: Employee Involvement, Diversity, and International Issues", *Human Resource Management Review*, (8:3), 1998, pp.193-214.
- McNee, B. Morello T. Zidar, E. and Smith, C., "IT Staff Retention and Recruitment: Addressing a Critical Problem for the IS Organization", *Gartner Group Strategic Analysis Report*, September 28, 1998.
- Mercer (William M. Mercer, Inc.), *2000 Attracting & Retaining High-Technology Talent Report*, 2000.

- Meyer J.P., and Allen N.J., "The Measurement and antecedent of affective, Continuance and Normative commitment to the Organization", *Journal of Occupational Psychology*, (63:1), 1990, pp.1-18.
- Meyer J.P., and Allen N.J., "A Three Component Conceptualization of Organizational Commitment", *Human Resource Management Review*, 1991, pp.61-89.
- Meyer, J.P., and Allen, N.J., *Commitment in the Workplace*, Sage Publications, 1997.
- Meyer J.P., Allen N.J., and Smith C.A., "Commitment to Organizations and Occupations: Extension and Test of a Three-Component Conceptualization", *Journal of Applied Psychology*, (78:4), 1993, pp.538-551.
- Meyer, J.P. and Smith, C.A., «HRM Practices and Organizational Commitment: Test of a Mediation Model», *Canadian Journal of Administrative Sciences*, 17(4), December 2000, pp.319-331.
- Milkovich, G.T., and Newman, J.N., *Compensation*, Boston, Irwin, 1998.
- Moore, J.E. "One Road to Turnover: An Examination of Work Exhaustion in Technology Professionals", *MIS Quarterly*, 24(1), March 2000, pp.141-168.
- Moorman, R.H., «Relationship Between Organizational Justice and Organizational Citizenship Behaviour: Do Fairness Perceptions Influence Employee Citizenship», *Journal of Applied Psychology*, 1991, 76, 6, 845-855.
- Morello, D.T., and Claps, C. "Building a Compelling Place to Work: New Heights in IT Human Resources Management", *Gartner Strategic Analysis Report*, 5 April 2000.
- Morello D.T., and Lehman J., "Values-Driven Retention and Recruitment: A Model", *Gartner Group Report*, January 1999, pp.1-4.
- Nunnally, J., *Psychometric Methods*, 2nd edition. McGraw-Hill, New York, NY, 1978.
- Organ D.W., *Organizational Citizenship Behavior: The Good Soldier Syndrome*. Lexington, MA: Lexington, 1988.
- Organ D.W., "The Motivational Basis of Organizational Citizenship Behavior", In B.M. Staw & L.L. Cummings (eds.), *Research in Organizational Behavior*, 12, 1990, pp.43-72.
- Organ D.W., "Organizational Citizenship Behavior: It's Construct Clean-Up Time", *Human Performance*, 1997, pp.85-97.
- Organ, D.W. and Konovsky, M.A., «Cognitive versus Determinants of Organizational Citizenship Behaviour», *Journal of Applied Psychology*, 1989, 74, 157-164.
- Organ, D.W., and Ryan, K., "A Meta-Analytic Review of Attitudinal and Dispositional Predictors of Organizational Citizenship Behavior", *Personnel Psychology*, 48, 1995, pp.775-802.
- Penner, L.A., Midili, A.R., Kegelmeyer, J., «Beyond Job Attitudes: A Personality and Social Psychology Perspective on the Causes of Organizational Citizenship Behaviour», *Human Performance*, 10, 2, 1997, 111-131.

- Pfeffer, J., and Veiga, F., "Putting People First for Organizational Success", *Academy of Management Executive*, (13:2), 1999, pp.37-48.
- Podsakoff, P.M. and MacKenzie, S.B., "Organizational Citizenship Behaviors and Sales Unit Effectiveness", *Journal of Marketing Research*, 3(1), 1994, pp.351-363.
- Podsakoff P.M., MacKenzie S.B., Moorman R.H., and Fetter, R., "Transformational Leader Behavior and Their Effects on Followers' Trust in Leader, Satisfaction, and Organizational Citizenship Behaviors", *Leadership Quarterly*, 1990, pp.107-142.
- Podsakoff, P.M., Ahearne, M. and MacKenzie, S.B., "Organizational Citizenship Behavior and the Quantity and Quality of Work Group Performance", *Journal of Applied Psychology*, 82, 1997, pp.262-270.
- Podsakoff, P.M., MacKenzie, S.B., Paine, J.B. and Bachrach, D.G., "Organizational Citizenship Behaviors: A Critical Review of the Theoretical and Empirical Literature and Suggestions for Future Research", *Journal of Management*, 26(3), 2000, pp.513-563.
- Podsakoff, P.M., and Organ, D.W. "Self-Reports in Organizational Research: Problems and Prospects", *Journal of Management* (12:4), 1986, pp.531-544.
- Price J.L., and Bluedorn, A.C., "Intent to Leave As a Measure of Turnover", *Proceedings of the 37th annual meeting of the Academy of Management*, Orlando, FL, United States, August 1977.
- Rodwell J., Kienzle R., Shadur M., «The Relationship Away Work Related Perceptions, Employee Attitudes, and Employee Performance: The Integral Role of Communication,» *Human Resource Management*, 1998, 37, 277-293.
- Roepke, R., Agarwal, R. Ferratt, T.W., "Aligning the IT Human Resource with Business Vision: The Leadership Initiative at 3M", *MIS Quarterly*, (24:2), 2000, pp.327-353.
- Rousseau, D.M. *Psychological Contracts in Organization: Understanding Written and Unwritten Agreements*. 1996, Thousand Oaks: Sage
- Scheier R.L., "15 Ways to Keep Your People", *Computerworld*, September 8 1998, @www.computerworld.com/home/online9697.nsf, (99-02-15).
- Scholl, R.W., Cooper, E.A., McKenna, J.F., «Referent Selection in Determining Pay Equity Perceptions: Differential Effects on Behavioral and Attitudinal Outcomes», *Personnel Psychology*, 40, 1987, 113-124.
- Schwochau, S., Delaney, J., Jarley, P., and Fiorito, J., "Employee Participation and Assessments of Support for Organizational Policy Changes", *Journal of Labor Research*, (18:3), 1997, pp.379-401.
- Sheppard, B.H., Lewicki, R.J., and Minton, J., *Organizational Justice*, Lexington Books, 1992.
- Shore, L.F., Barkdale, K., Shore, T. « Managerial Perceptions of Employee Commitment to the Organization», *Academy of Management Journal*, 38, 6, 1995, 1593-1615.

- Sommers M.J., "Organizational Commitment, Turnover and Absenteeism: An Examination of Direct and Interaction Effects", *Journal of Organizational Behavior*, (16:1), 1995, pp.49-58.
- Stokes, S.L.Jr., "Rewards and Recognition for Teams", *Information Systems Management*, (12:3), 1995, pp.61-65.
- Sweeney, P.D., McFarlin, D.B., « Process and Outcome: Gender Differences in the Assesment of Justice», *Journal of Organizational »Behaviour*, 18, 1997, 83-98.
- Tremblay, M., Guay, P., Simard, G., «Organizational Commitment and Extra-behaviors: The Influence of Human Resource Practices », *Working Paper Series #2000s-24*, 2000a, CIRANO, Montreal, Canada, 24p.
- Tremblay M., Rondeau A., and Lemelin, M., "La mise en œuvre de pratiques innovatrices de GRH a-t-elle une influence sur la mobilisation", *GRH face à crise: GRH en crise?*, Presses HEC, 1997, pp.97-109.
- Tremblay , M., Sire, B., Balkin, D., «The Role of Organizational Justice in Pay and Employee Benefit Satisfaction, and its Effects on Work Attitudes», *Group and Organization Management*, 25, 3, 2000b, 268-289.
- Tsui, A.S., Pearce, J.L., Porter, L.W., and Hite, J.P., "Choice of Employee-Organization Relationship: Influence of External and Internal Organizational Factors", In G.R Ferris (ed.) *Research In Personnel and Human Resource Management*, Greenwich, CT: JAI Press, 1995, pp.117-151.
- Williams L.J., and Anderson, S.E., "Job Satisfaction and Organizational Commitment as Predictors of Organizational Citizenship and In-Role Behaviors", *Journal of Management*, (17:3), 1991, pp.601-617.

Table 1: Assessment of the internal consistency of each scale

Scale	Cronbach's alpha	Number of items
Recognition	.83	6
Distributive justice	.83	5
Procedural justice	.86	6
Competence development	.87	6
Empowerment	.68	4
Work-life policies	.87	5
Affective commitment	.80	5
Continuance commitment	.70	5
OCB	.85	5
Turnover intentions	.85	2

Table 2. Confirmatory Factor Analysis Results

	1-CD	2-PJ	3-WLP	4-OCB	5-DJ	6-REC	7-AC	8-CC	9-EMP	10-TI
REC1	.395	.345	.002	.128	.150	.578	.159	.007	-.001	.035
REC2	.362	.270	-.002	.165	.161	.623	.116	.008	.003	.002
REC3	.223	.162	.123	.115	.140	.691	.006	.009	.112	.073
REC4	.241	.330	.005	.205	.248	.506	.007	.005	.278	.021
REC5	.010	.185	.154	.176	.004	.495	.135	-.008	-.134	.012
REC6	.354	.237	.007	.195	.005	.619	.134	.004	.154	.006
PJ1	.254	.729	.002	.000	.106	.228	.005	.000	.004	-.005
PJ2	.008	.702	.004	.003	.002	.154	.009	-.009	.004	.001
PJ3	.130	.630	.009	.143	.153	.198	.245	-.008	-.156	.002
PJ4	.253	.720	.000	.102	.121	.003	.000	.003	.006	-.008
PJ5	.198	.670	.000	.002	.140	.153	.119	-.001	.111	.000
PJ6	.298	.769	.003	.003	.151	.005	.002	.005	.116	.009
DJ1	.227	.231	.123	.001	.720	-.002	.160	-.005	.008	.021
DJ2	.114	.005	.119	.002	.864	.005	.005	.002	.007	.004
DJ3	.431	.388	.009	.172	.266	.344	.206	-.134	-.006	-.003
DJ4	.124	.190	.004	.000	.731	.224	.009	-.002	.113	-.001
DJ5	.160	.169	.001	.176	.743	.185	.004	.004	.005	-.008
EMP1	.005	.004	.000	-.001	.008	-.004	-.004	.008	.809	-.007
EMP2	.163	.009	.008	.139	.173	.227	.181	-.145	.636	.000
EMP3	.008	.004	.115	.139	.004	.121	.198	-.009	.704	.000
CD1	.747	.308	.002	.005	.214	.009	.148	.002	.002	.000
CD2	.665	.274	-.004	.002	.236	.145	.000	-.001	.142	.002
CD3	.776	.218	.009	.106	.006	.169	-.002	-.002	.004	-.005
CD4	.678	.225	.008	.125	.167	.268	.177	-.006	.195	.005
CD5	.694	.184	.137	.123	.004	.134	.101	.007	.003	.002
CD6	.581	.006	-.005	.129	.006	.217	.289	-.106	.004	.000
WLP1	-.114	.004	.691	-.183	.010	.175	-.116	.006	.003	.000
WLP2	.003	-.005	.660	.004	.101	.117	.003	-.126	.000	.001
WLP3	.008	.007	.888	.005	.008	-.002	-.003	-.002	.008	.004
WLP4	.000	.005	.889	.103	.007	-.001	-.003	-.008	.004	.002
WLP5	.100	.006	.859	.100	.001	-.003	-.003	-.106	.003	-.002
OCB1	.004	.010	.111	.795	.003	.103	.010	-.003	.121	-.004
OCB2	.008	.001	.005	.844	.003	.010	.000	-.004	.006	.003
OCB3	.005	.008	-.003	.787	.009	.167	.005	-.003	.005	.008
OCB4	.007	.003	.001	.789	.005	.005	.004	-.001	-.002	.009
OCB5	.191	.006	.000	.627	.004	.003	.128	.009	.004	.026
CC1	.006	.008	-.180	.005	.000	.002	.357	.660	-.002	.000
CC2	-.124	.007	-.216	-.007	-.001	-.003	.282	.631	.002	.003
CC4	.002	-.105	-.008	.001	.130	.004	.104	.764	-.002	.009
CC4	-.003	-.118	.104	-.005	-.144	.003	-.205	.663	-.009	.008
AC1	.004	.144	-.166	.000	.000	.203	.700	-.003	.116	.002
AC2	.199	.007	.009	.129	.138	.000	.690	.004	-.001	.003
AC3	.208	.109	-.010	.008	.004	.004	.566	.333	.194	.039
AC4	.107	.009	-.002	.118	.141	.112	.722	.241	.009	.000
AC5	.459	.317	-.002	.126	.190	.318	.396	.137	.114	.001
TI1	.175	.004	-.007	.004	.187	.005	.003	.025	.044	.787
TI2	.203	.010	.003	.007	.146	.002	.000	.009	.015	.685
Eigenvalue	11.619	3.953	2.903	2.301	1.945	1.658	1.543	1.359	1.135	1.032
% variance	25.82	8.78	6.45	5.11	4.32	3.69	3.43	3.02	2.52	2.29
Cumulative % variance	25.82	34.60	41.05	46.16	50.48	54.17	57.60	60.62	63.14	65.43

Table 3. Descriptive statistics for study variables (n=394).

	Mean	s.d.	REC	PJ	DJ	EMP	CD	WLP	CC	AC	OCB	TI	AGE	OT
REC	4.98	1.15	1.0											
PJ	4.30	1.43	.614 **	1.0										
DJ	4.62	1.45	.452 **	.415 **	1.0									
EMP	5.44	1.09	.336 **	.210 **	.278 **	1.0								
CD	5.24	1.17	.668 **	.574 **	.438 **	.336 **	1.0							
WLP	4.07	1.45	.169 **	.109 *	.195 **	.126 **	.134 **	1.0						
CC	3.44	1.33	.030	-.012	-.013	-.046	-.020	-.195 **	1.0					
AC	4.83	1.27	.424 **	.335 **	.279 **	.251 **	.384 **	-.074	.312 **	1.0				
OCB	5.67	0.91	.377 **	.215 **	.148 **	.182 **	.282 **	.082	-.018	.232 **	1.0			
TI	3.18	1.73	-.474 **	-.427 **	-.395 **	-.115 *	-.491 **	-.135 **	-.220 **	-.423 **	-.314 **	1.0		
AGE	41.16	7.91	-.005	.201 **	.043	-.031	.044	-.117 *	.111 *	.069	-.003	-.117 *	1.0	
OT	7.61	7.51	.060	.166 **	-.018	-.048	.076	-.120 *	.314 **	.177 **	.087	-.244 **	.458 **	1.0

** p<.01; * p<.05

Table 4. Partial Correlations Results (controlling for age and organizational tenure) (n=366)

Hypothesis	Independent variable	Dependent variable	Coefficient	p	Supported
1	OCB	TI	-.306	***	Yes
2	AC	TI	-.409	***	Yes
2	CC	TI	-.259	***	Yes
3	AC	OCB	.216	***	Yes
3	CC	OCB	-.065	ns	Yes
4	REC	AC	.450	***	Yes
4	PJ	AC	.341	***	Yes
4	DJ	AC	.300	***	Yes
4	EMP	AC	.268	***	Yes
4	CD	AC	.394	***	Yes
4	WLP	AC	.025	ns	No
5	REC	OCB	.405	***	Yes
5	PJ	OCB	.226	***	Yes
5	DJ	OCB	.173	***	Yes
5	EMP	OCB	.207	***	Yes
5	CD	OCB	.301	***	Yes
5	WLP	OCB	.103	†	Yes
6	REC	TI	-.473	***	Yes
6	PJ	TI	-.403	***	Yes
6	DJ	TI	-.409	***	Yes
6	EMP	TI	-.138	*	Yes
6	CD	TI	-.497	***	Yes
6	WLP	TI	-.267	***	Yes
7	SAL	TI	-.024	ns	No
7	SAL	CC	-.098	ns	No
7	NJO	TI	.204	***	Yes
7	NJO	CC	-.129	†	Yes

*** p<.001; ** p<.005; * p<.01; † p<.05

Table 5. Hypothesis testing using Mann-Whitney tests

Hypothesis	Independent variable	Dependent variable	Mann-Whitney	p	Supported
7	Annual bonus	CC	3182.5	†	Yes
7	Recruitment bonus	CC	1826.0	ns	No
7	Y2K bonus	CC	2314.5	ns	No
7	Annual bonus	TI	3128.0	†	Yes
7	Recruitment bonus	TI	1743.0	ns	No
7	Y2K bonus	TI	2125.0	ns	No
† p<.05					

Table 6: Linear regression of independent variables on turnover intentions (controlling for age and organizational tenure)

Variable	Parameter Estimate	SE	Standardized Coefficients	t-value	p<
Intercept	9.227	.701		13.158	.000
Affective commitment ***	-.255	.065	-.186	-3.933	.000
Continuous commitment †	-.141	.058	-.109	-2.437	.015
Competence development ***	-.326	.082	-.225	-3.988	.000
Procedural justice	-.103	.064	-.087	-1.608	.109
Distributive justice ***	-.215	.054	-.183	-3.973	.000
Recognition	.000	.093	-.037	.592	.554
OCB **	-.240	.082	-.126	-2.923	.004
Work-life policies	.000	.050	-.044	-1.040	.299
Age	.000	.010	.015	.340	.734
Organizational tenure *	.000	.011	-.129	-2.752	.006
Number of job offers ***	.184	.035	.216	5.252	.000

*** p<.001; ** p<.005; * p<.01; † p<.05
Overall model. F = 27.78. p<.001; R² = 0.46; Adjusted R² = 0.45

Table 7: Linear regression of independent variables on affective commitment (controlling for organizational tenure)

Variables	Estimated Parameters	SE	Standardized Coefficients	t-value	p<
Intercept	1.462	.351		4.166	.000
Competence development †	.145	.070	.135	2.064	.040
Procedural justice	.004	.054	.044	.710	.478
Distributive justice	.006	.046	.065	1.209	.227
Recognition **	.247	.074	.227	3.314	.001
Empowerment †	.138	.058	.119	2.403	.017
Organizational Tenure **	.003	.008	.157	3.383	.001

** p<.005; † p<.05
Overall model. F=19.541. p<.001; R²=0.28; Adjusted R²=0.26

Table 8: Linear regression of independent variables on OCB

Variables	Estimated Parameters	SE	Standardized Coefficients	t-value	p<
Intercept	3.798	.264		14.387	.000
Affective commitment	.006	.038	.085	1.581	.115
Competence development	.005	.052	.060	.879	.380
Procedural justice	-.004	.040	-.060	-.941	.347
Distributive justice	-.003	.034	-.047	-.833	.406
Recognition ***	.270	.056	.351	4.853	.000
Empowerment	.006	.043	.069	1.337	.182

*** p<.001

Overall model. F=12.540. p<.001; R²=0.17; Adjusted R²=0.16

Table 9: Analysis of average responses of four groups of committed IT workers among the main study variables

Variables	Group 1 (n=109)	Group 2 (n=83)	Group 3 (n=74)	Group 4 (n=121)	F test
Age	40.3	41.4	41.7	41.4	0.62
Organizational tenure	4.37	7.45	9.03	9.58	11.23 ***
Recognition	4.59	5.59	4.45	5.22	21.93***
Procedural justice	3.90	5.03	3.76	4.46	15.27***
Distributive justice	4.28	5.20	4.16	4.81	10.27***
Empowerment	5.38	5.73	5.00	5.55	6.74***
Competence development	4.84	5.86	4.80	5.43	19.07***
Work life policies	4.19	4.32	4.06	3.78	2.73 †
OCB	5.57	5.99	5.24	5.82	11.14***
Affective commitment	3.69	5.74	3.89	5.81	217.04***
Continuance commitment	2.18	2.54	4.34	4.62	271.16***
Turnover intentions	4.08	2.59	3.66	2.46	25.49***
Group 1 = Low AC & Low CC; Group 2 = High AC & Low CC Group 3 = Low AC & High CC; Group 4 = High AC & High CC					
*** p<.001; † p<.05					

Table 10 : Moderating effect of affective and continuance commitment on the HR practices – turnover intentions relationships (controlling for organizational tenure)

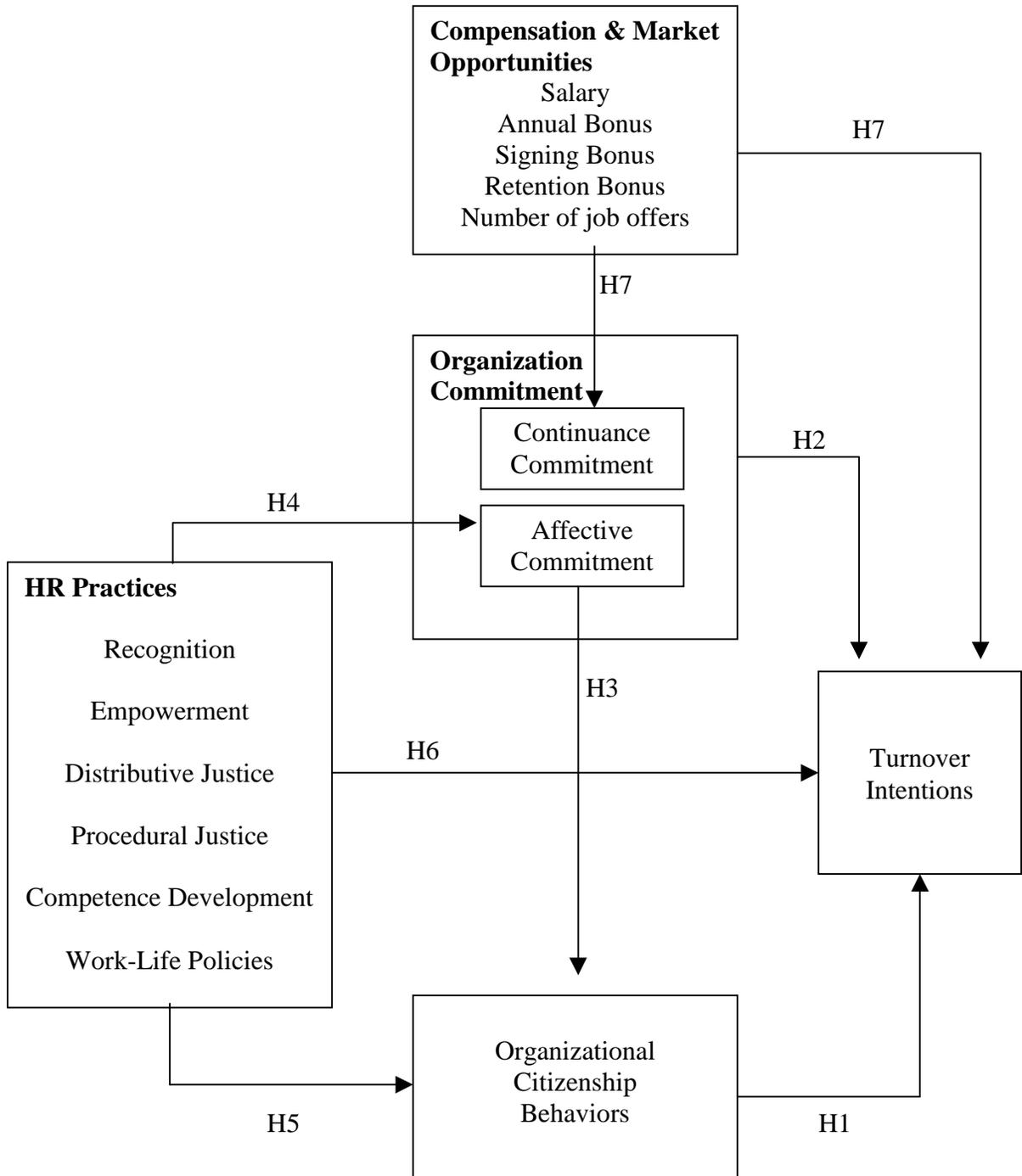
	Turnover intentions			
	Group 1 (n=109)	Group 2 (n=83)	Group 3 (n=74)	Group 4 (n=121)
Recognition	-.21	.04	.04	-.28 *
Procedural justice	-.23 †	-.11	-.13	.10
Distributive justice	-.03	-.35 **	-.12	-.26 **
Empowerment	-.12	-.18	-.12	-.14
Competence development	-.29 *	-.16	-.32 *	-.08
Work life policies	-.10	-.23 †	-.16	.01
Organizational tenure	-.09	-.20	-.26 †	-.16
R ²	0.41 ***	0.36 ***	0.34 ***	0.20 **
Group 1 = Low AC & Low CC; Group 2 = High AC & Low CC				
Group 3 = Low AC & High CC; Group 4 = High AC & High CC				
*** p<.001; ** p<.005; * p<.01; † p<.05				

Table 11 : Analysis of average responses of low OCB and high OCB individuals among the main study variables

Variables	Low OCB (n=209)	High OCB (n=178)	t test
Age	41.2	41.0	.238
Organizational tenure	7.27	7.97	-.904
Recognition	4.72	5.27	-4.764 ***
Procedural justice	4.11	4.52	-2.777 *
Distributive justice	4.51	4.74	-1.514
Empowerment	5.27	5.62	-3.224 **
Competence development	5.05	5.44	-3.350 **
Work life policies	3.99	4.13	-.956
OCB	5.07	6.38	-20.284 ***
Affective commitment	4.62	5.05	-3.268 **
Continuance commitment	3.46	3.39	.520
Turnover intentions	3.41	2.91	2.860 **
*** p<.001; ** p<.005; * p<.01			

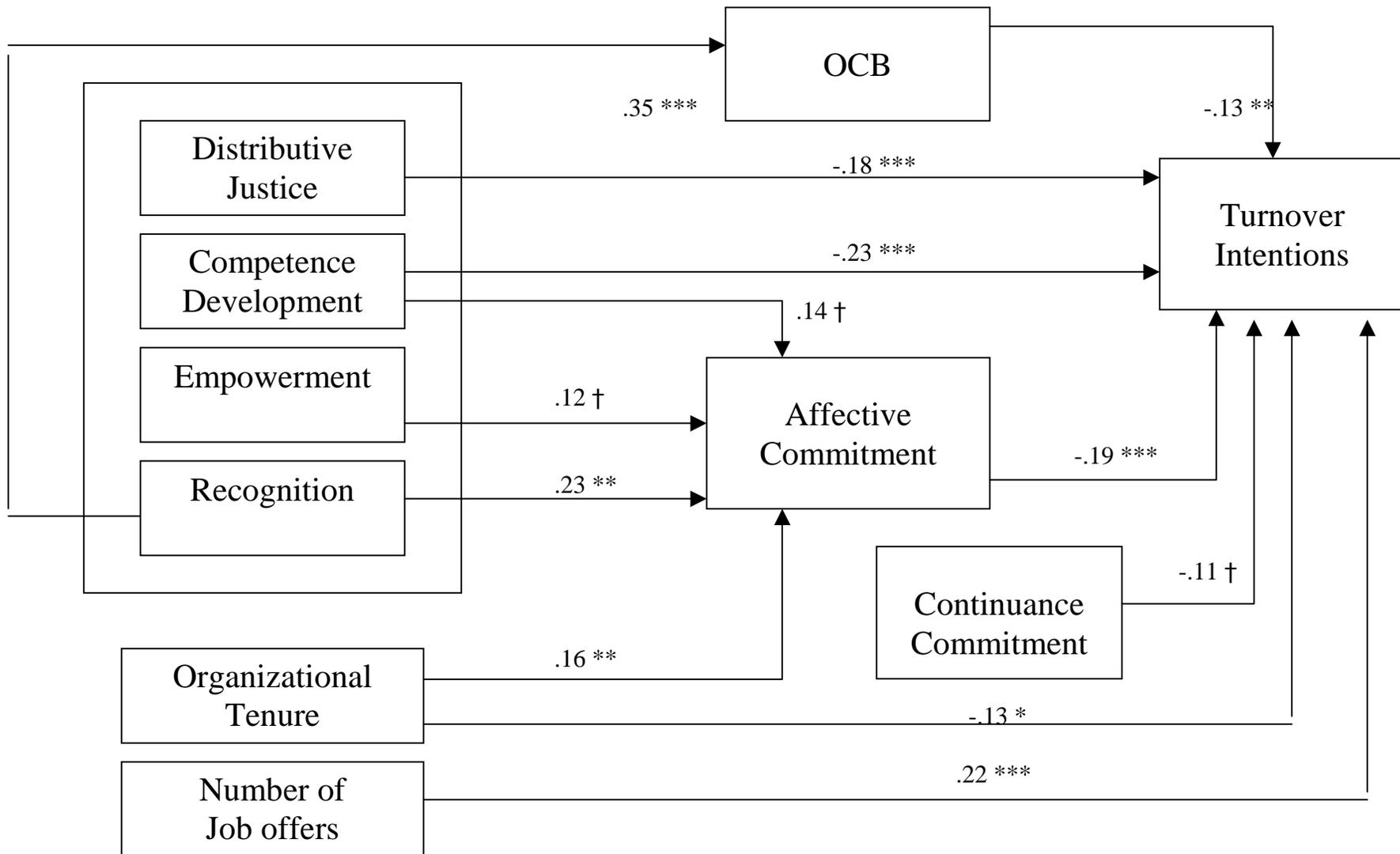
Table 12 : Moderating effect of OCB on the HR practices – turnover intentions relationships

	Turnover intentions	
	Low OCB (n=209)	High OCB (n=178)
Recognition	-.250 **	-.089
Procedural justice	-.111	-.100
Distributive justice	-.101	-.315 ***
Empowerment	-.034	-.213 **
Competence development	-.199 †	-.312 ***
Work life policies	-.058	-.025
R ²	0.30 ***	0.36 ***
*** p<.001; ** p<.005; † p<.05		



Controlling for AGE and ORGANIZATIONAL TENURE

Figure 1. Research Model



*** $p < .001$; ** $p < .005$; * $p < .01$; † $p < .05$

Figure 2. Revised Model

Appendix. Survey items

Turnover intentions(TI)

1. How often do you feel like quitting your job in this organization?
2. How likely is it that you will actually leave your organization within the next year?

Affective commitment(AC)

1. I really feel as if my organization's problems are my own
2. I do not feel a strong sense of belonging to my organization (reverse)
3. My organization has a great deal of personal meaning for me
4. I feel emotionally attached to the strategic choices of my organization
5. The values advocated by top management are aligned with my own (removed)

Continuance commitment (CC)

1. It would be very hard for me to leave my organization right now even if I wanted to
2. It would be too costly for me to leave my organization now
3. Too much in my life would be disrupted if I decided to leave my organization now
4. I feel I have too few options to consider leaving my organization
5. One of the few serious consequences of leaving my organization is the scarcity of current alternatives (removed)

Citizenship behaviors (OCB)

1. I help colleagues who have been absent from work
2. I help colleagues who have heavy work loads
3. I am mindful of how my behavior affects other people's job
4. I go out of way to help new employees
5. I take a personal interest in my colleagues' job

Recognition practices(REC)

1. Employees' suggestions are seriously taken into consideration
2. In my work unit. follow-ups are regularly given to employees concerning prior suggestions they had made
3. When an employee does good quality work. his colleagues regularly show him their appreciation
4. In my work unit. supervisors use different ways to recognize in a tangible way the employees' efforts (e.g.. tickets for cultural or sports events; free dinners at restaurants)
5. In my work unit. employees receive recognition in writing from their supervisors (e.g.. memos)
6. In my work unit. supervisors regularly congratulate employees in recognition of their efforts

Procedural justice practices (PJ)

1. The criteria used to grant promotions are clearly defined
2. Employees do not exactly know how to obtain a promotion (reverse)
3. Promotions are fundamentally determined by unfair political games (reverse)
4. The criteria used to grant pay raises are known from employees

5. Management is transparent in terms of compensation management
6. In my work unit. the criteria used to grant pay raises are clearly defined

Distributive justice practices(DJ)

1. I estimate my salary as being fair internally
2. My salary is fair in comparison with what is offered for a similar job elsewhere
3. In my work unit. our supervisors hand out mandates in a fair manner (removed)
4. In my work unit. employees consider that their compensation level reflects adequately their level of responsibility in the organization
5. The pay increases and/or bonuses I received in the last two years reflect adequately my recent performance evaluations

Empowerment practices (EMP)

1. A great latitude is given to employees for the organization of their work (e.g.. work schedules)
2. Employees in my work unit have a lot of autonomy in regard to project management
3. In my work unit. employees have a great deal of liberty in the conduct of their work
4. Employees in my work unit are extensively involved in key decision-making (e.g.. recruiting. technological investments) (removed)

Competence development practices(CD)

1. Employees have the possibility to develop their skills in order to increase their chances of being promoted
2. Employees have the possibility to rotate jobs to develop their skills
3. Several professional development activities (e.g.. coaching. training) are offered to employees to improve their skills and knowledge
4. Managers encourage employees to apply their new abilities and skills in the context of their daily work
5. Proficiency courses such as specialized technical courses and professional certifications are encouraged by management
6. I am able to apply my new skills in my work

Work-life policies (WL)

1. I often feel like there is too much work to do (reverse)
2. My organization provides work conditions (e.g.. flexible schedules. child care facilities. telecommuting programs) which take into account the emergent needs of employees
3. My work schedule is often in conflict with my personal life (reverse)
4. My job affects my role as a spouse and/or a parent (reverse)
5. My job has negative effects on my personal life (reverse)

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