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FACTORS AFFECTING THE ORGANIZATIONAL COMMITMENT OF TECHNICAL KNOWLEDGE WORKERS: GENERATION X, BABY BOOMERS, AND BEYOND

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Factors Affecting the Organizational Commitment of Technical Knowledge Workers: Generation X, Baby Boomers, and Beyond

Abstract

Gaining the commitment of knowledge workers will be one of the central management challenges in the new millennium. We address an important gap in the literature on commitment: how predictors of affective and continuance commitment for technical knowledge workers vary across age groups or career stages. Our results suggest that technical skill development and pay for individual performance are important for younger or mid career employees. Work/non-work balance is important for mid career workers. Career advancement is important for mid or later career employees. Job security is important to older employees. A climate for innovation and risk, and pay for organizational performance are important across career stages. Implications for career stages and generational differences between Generation X, baby boomers and others are discussed.

Keywords: Organizational Commitment, Career Stages, Knowledge Workers

Factors Affecting the Organizational Commitment of Technical Knowledge Workers: Generation X, Baby Boomers, and Beyond

Knowledge workers, the highly educated individuals who manipulate information rather than conduct manual labor, constitute a large and increasingly important part of the workforce (Drucker, 1996; Mohrman, Cohen & Mohrman, 1995). Gaining the commitment of these workers is one of the central management challenges in the new millennium. Many employees work amidst widespread downsizings, restructurings, and use of contingent workers in a global business environment that demands low cost and fast cycle time – all conditions that undermine the traditional employment relationship and hence commitment to the organization. The commitment of knowledge workers to the organization is further weakened by a strong job market that facilitates employee mobility and frequent job changes.

How is the commitment of knowledge workers gained in such a context? Many argue that commitment will be based on "employability" rather than job security (Waterman, Waterman & Collard, 1994; Altman & Post, 1996). General Electric CEO Jack Welch (1998) asserts that organizations can, paradoxically, build employee commitment by developing the skills of their employees so that they will be attractive to other employers. Others argue that the employment "contract" must be forged to take into account the perspectives and needs of different groups within organizations (Brousseau, Driver, Eneroth, & Larsson, 1996). This goes beyond the already common use of different kinds of contracts for core versus periphery workers (e.g. contractors, temporary staff), to recognize that individuals come to the workplace with different requirements and expectations about the employment relationship. Some organizations attempt to meet the differing needs of

employees through the expanded use of flexible work practices such as telecommuting, job-sharing and flextime (Rappaport & Associates, 1998).

In this paper, we go one step further in identifying the varying needs of different groups of employees by focusing on the role of age and careers stages in the commitment of technical knowledge workers. Both age and career stages of the employee can be expected to influence employee needs (e.g., Hall, 1976) and their reactions to various attributes of the employment relationship. There is also the confounding issue that those in different career stages have grown up with cohorts whose attitudes have been shaped by different social conditions. For example, the popular press suggests that the members of Generation X, who will constitute the core knowledge workforce for the first half of the new millenium, have a very different set of expectations about employment than their predecessors (e.g. Conger, 1998). This generation grew up in the era of downsizing and seems to have internalized the new labor market reality. As such they seem to no longer expect or even desire a long-term relationship with a particular firm, instead moving among companies in order to further their personal career objectives.

The purpose of this paper is to examine the factors of the changing employment relationship that facilitate organizational commitment for different generations of a particular category of knowledge workers -- scientists and engineers. We are interested in whether the factors that drive commitment for early career, younger knowledge workers (congruent with Generation X) differ from those that secure the commitment of older cohorts of knowledge workers. We take a pluralistic approach in asserting that the needs and career expectations of various cohorts of technical employees differ, and that different aspects of the employment relationship contribute to their organizational commitment. Based on previous work done in the field of careers and the employment expectations of technical

workers, along with the popular literature that discusses the characteristics of the Generation X cohort and how it differs from its predecessors, we develop several hypotheses about differences that we might expect across different ages/career stages. We then empirically examine them in a cross-industry sample of professional knowledge workers.

BACKGROUND AND HYPOTHESES

We focus on the commitment of one segment of the workforce -- the knowledge workers who are at the core of the product development and production processes in technical organizations – in this case engineers and scientists. Hence, it is important to examine the research on the careers and motivation of scientists and engineers. In addition, any exploration of whether there are generational differences within the technical population is closely related to the literature on career stages and the changing nature of careers in the new employment context. These different academic literatures help provide a framework for interpreting some of the popular accounts of Generation X employees relative to other groups currently in the workforce. Key issues from these different literatures and the hypotheses that they generate are presented below.

Commitment

Commitment has been defined "in terms of the strength of an individual's identification with and involvement in a particular organization" that is "characterized by at least three factors: (a) a strong belief in and acceptance of the organization's goals and values; (b) a willingness to exert considerable effort on behalf of the organization; and (c) a definite desire to maintain organizational membership." (Porter, Steers, Mowday & Boulian, 1974). Although there have been a number of different conceptualizations, two key dimensions of commitment appear in the literature. Continuance

commitment reflects the duration of the relationship, and is based on "side bets" or the cost of leaving the organization. Continuance commitment has been found to increase when employees have fewer alternatives and also to be positively associated with the amount of sacrifice one makes for the firm. Affective or attitudinal commitment derives from pleasure from being associated with the organization or from a normative feeling of duty toward the organization, and reflects the strength of the relationship (Becker, 1960; Mathieu & Zajac, 1990, Rousseau & Wade-Benzoni, 1996). Affective commitment has particularly been found to relate to member contribution to the organization and to performance outcomes that are within the control of employees (Meyer & Allen, 1997).

Age and organizational tenure are two of the most common variables included in studies of organizational commitment (Mathieu & Zajac, 1990), and yet, virtually none of these studies has looked at whether the factors that drive commitment are distinct for different age groups or those at different career stages. A major review of the organization commitment literature concluded that with one exception (Van Maanen, 1975), "no research to date has examined how organizational commitment develops at various career stages" (Mathieu & Zajac, 1990: 189). The single exception in our review of the literature was a study of public sector employees (Aryee & Heng, 1990) which found that the antecedents of commitment differed substantially across employee levels. Most studies, however, have included age and tenure as control variables or examined their direct effects on different kinds of commitment (e.g. Cohen, 1991; Fox, 1989). Matieu and Zajac's (1990) meta-analysis of these studies shows that age and organizational tenure have strong positive relationships to both affective and calculative/continuance commitment.

Technical Employees

Based on their expertise and training, scientists and engineers tend to be governed in part by their identification with their profession and their commitment to work; they also expect collegial maintenance of standards (Raelin, 1985; Miller, 1986). This introduces a tension because the commitment of high technology workers is to their profession and their work, and not as strongly to the company and its success (Von Glinow, 1988). Previous studies have shown that job content that allows employees to remain state of the art in a rapidly advancing technological arena and job design that permits autonomy are of central importance to these employees, as is the availability of the most up-to-date tools to accomplish their tasks. On the other hand, career advancement is considered important for all technical professionals, and job security and project stability are important for engineers (Von Glinow, 1988). Overall the literature suggests that technologists focus primarily on growing their expertise and practicing their profession, and expect to have a stable arena for applying and growing their expertise.

While much of this literature treats scientists and engineers as part of one wider group of technical professionals (e.g. Kaplan, 1965), there is another line of research which draws a sharp distinction between the groups and their primary basis for identity and commitment. Scientists are described as "cosmopolitans" who identify with and measure themselves against their wider professional community and are seen to be less attached to a particular company (Shepard, 1956). Engineers, in contrast, have been found to be more predominantly "locals" who are committed to helping their organization attain its goals and advancing within it.

Many of the changes taking place within technical organizations appear to be blurring the distinction between scientists and engineers. There is greater use of cross-functional teams and the shift away

from functional bureaucracies has integrated research scientists far more closely with the rest of the organization. At the same time, however, the traditional paths of managerial advancement to which many engineers aspired have been greatly reduced, as organizations have become flatter and eliminated many rungs on the management ladder. In their place, many companies are instituting technical ladders that offer individuals the opportunity to advance by developing deeper technical expertise, rather than managing people.

Computer resources. In several respects, Generation X is seen to embrace an extreme form of the technical professional culture. Like scientists and engineers, they place a heavy emphasis on having state of the art technology and tools for getting the work done. For them the tool of choice is the computer (Lawrence, 1997). Unlike baby boomers, who grew up with cumbersome punch cards and mainframes, or the previous generation that formed their main set of skills prior to the computer age, Generation Xers came of age with the personal computer, reaching college campuses just when the first IBM PC arrived in 1981. They are thus generally much more adept and comfortable with computers than older employees and view it as an indispensable part of getting work done. The widespread diffusion of computers in the workplace has in some respects reversed the traditional patterns of who holds the knowledge, and accompanying power and status, within technical organizations; as Conger (1998) observes: "…a phenomenal skill gap is growing between the generations in computer literacy. In olden times, wisdom came with experience and age. Today, wisdom is increasingly tied to youth, thanks largely to very rapid rates of change in technology." This suggests the first hypothesis regarding generational differences about technology and commitment:

H1: Adequate computer resources will be more important for the commitment of younger, earlier career stage technical workers than for older, later career stage technical workers.

Climate for innovation. Another key belief that Generation Xers are seen to hold in common with scientists and engineers is their strong desire for autonomy and innovation. Their distrust of large corporate bureaucracies and traditional forms of hierarchical control has been shaped by a number of forces: the waves of downsizing that undermined the old social contract with companies and the accompanying embrace of the free market. This is reflected in the shift in American's values from an emphasis on obedience toward an emphasis on independence (Russell, 1993). Like the traditional, cosmopolitan scientist, Generation Xers are thus more likely to identify with the work and the set of skills a particular project will develop, than with a large organization (Howe & Strauss, 1992). This is reflected in the preference of many new graduates, including the graduates of some of the country's top business schools, for small, entrepreneurial firms over large corporations that were traditionally the dominant recruiters on college campuses (BusinessWeek, 1998). Today's technical professional is willing to change jobs frequently in the search for a company that offers the most favorable conditions (cutting edge work, good support) for carrying out the technical work. All of these things can be encompassed within a climate that values innovation and risk. The following hypotheses follow from this discussion:

H2: A climate for innovation will be important for the commitment for all technical employees.

H2a: A climate for innovation will be more important for the commitment of younger, early career technical employees than for older, later career technical employees.

The Changing Concepts of Career Stages and the Employment Relationship

Historically, models of career development have been predicated on the assumption that individuals go through their career within the context of an organization and that their career

progression occurs simultaneously with their personal progression through a series of developmental and life stages (for example, see Hall, 1976). Frequently, a series of life stages posited through the work of Erik Erikson (1963) have been used as the backdrop for considering career stages. After childhood, individuals must first achieve identity, followed by the capacity for intimacy and building a family, and ultimately enter into a period of generativity during which they are concerned with contributions that have a lasting value. Various career stage theorists have posited similar and parallel career development cycles (e.g., Hall & Nougaim, 1968; Miller & Form, 1951). These include the notion that the early years of a career are years of trial and establishment. The middle career period is one of advancement and achieving a stable career, leading finally to a period of maintenance and ultimately withdrawal.

It follows from these conceptualizations that career and developmental life stages shape the needs and expectations of employees and help define what is important to them (Veiga, 1983). Early career employees, for example, have to develop mastery in one or more areas, and receive the organizational support and autonomy required to do so. In addition, they have to work through their feelings of rivalry and competition vis-à-vis other employees at a similar stage as they seek to advance in the organization. Mid-career employees grow by taking on broader organizational roles, including coaching and helping others, and become increasingly oriented toward relational work with others. They face pressures for career advancement. Later career employees take on increasing responsibilities for consulting and providing guidance, and may begin gradually to detach from the organization (Hall, 1976, p. 90).

Given the changes in the environmental context which demand dynamic and flexible organizations and the accompanying trend toward flat organizational structures, a new form of career is evolving that

is not characterized by steady, life-time progression within a company, but rather by progression through many cycles of learning and mastery defined by the challenges at hand in a sequence of career moves that are likely to span multiple companies (Hall & Mirvis, 1996). The rapid pace of change in knowledge and processes and the greater uncertainty about the duration of the employment relationship means that individuals have to continually develop new competencies in order to contribute effectively in today's organizations. Hall and Mirvis (1996) have referred to the new "protean" career, symbolic of the continual changes in shape that characterize it. The protean career is decoupled from any particular organization, and is instead guided by individuals to meet their own needs. In this new concept of careers, therefore, career stage is likely to have a less clear impact on what attaches individuals to organizations, while ongoing skill development will increase in saliency for all age groups.

Although generation X employees are hypothesized to have internalized the new Protean Career contract's emphasis on development, there is mixed evidence with respect to the importance they attach to career advancement. On the one hand, they appear willing to move around, and have accepted the notion that a career does not consist of vertical advancement within one company. On the other hand, anecdotal evidence suggests that some of this movement is in order to obtain higher titles and levels of responsibility; thus, it is possible that such movement is driven not only by the desire to seek more interesting work and opportunities to stay state of the art technically, but also to advance hierarchically. Thus, there is no clear prediction with respect to the importance of advancement to this younger generation, while career advancement is likely to retain its importance for baby boomers, leading to the hypothesis:

H3: Career advancement will be more important for the commitment of mid-career technical workers than for younger, earlier career or older, later career workers.

Despite the recognition of the change in the landscape of organizations and careers, there has, as noted, been very little research about how this change impacts the commitment of different generations of employees and their willingness to provide the high levels of performance demanded in today's fast-paced, global economy. The growing literature on the changing psychological contract between employees and employers is not explicit about whether the types of contract, and hence the sources of commitment, vary systematically for individuals at different career stages (Rousseau, 1995); rather it focuses on how organizational changes in the global economy are changing the employment relationship for all individuals, not just those in Generation X. As we examine different aspects of the employment relationship, we will explore the reasons they might be expected to have different impacts on varying age groups of employees.

Employment security. Generation Xers have grown up and entered the workforce during a time when traditional notions of job security have largely disappeared from the American workplace. At the same time, however, Generation X has had the good fortune to enter the American labor force during one of the most sustained periods of growth since World War II as part of a cohort much smaller than the preceding wave of baby boomers. In these tight labor markets, college graduates with new, up-to-date skills have been able to choose among many job offers and shift easily among firms until they find one that meets their needs. Accordingly, this has led Generation X to formulate a different concept of employment security that fits closely with the transactional employment relationship; instead of seeing security as contingent on their relationship with a particular firm, it is seen to depend on their maintaining the marketability of their own set of skills. This focus on *employability*, rather than *employment security* is reflected in the strong emphasis that they, even more so than traditional new

career entrants, have placed on opportunities for skill development. A 1998 Gallup Poll of Generation Xers, for example, found that 80% said "training was a factor in accepting new jobs" and that those who received more than six days of training per year were significantly more satisfied with their jobs (Cole-Gomolski, 1998).

These same forces are likely to have had an impact on the commitment of members of older generations who have experienced the changes occurring within firms first hand and may have become disillusioned as their expectations no being longer met (Rousseau, 1995). More senior workers, however, will have a heavy investment in firm-specific competencies and are likely to find it more difficult to find a new position if they leave the organization. Because of these sunk costs, job security is likely to be more important to them in securing commitment. This suggests the following set of hypotheses regarding employment security versus employability.

H4: Job security will be more important for the commitment for older, later career technical workers than for younger, earlier career technical workers.

H5: The development of technical skills will be important for the commitment of all technical employees.

H5b: The development of technical skills will be more important for the commitment of younger, earlier career technical workers than for older, later career technical workers.

Work/non-work balance. As the competitive pressures on organizations and their employees increase at the same time that more Americans are part of two-career or single-parent families, there is a growing demand, from all ages of workers, for greater balance between work and the other aspects of life (Rappoport & Associates., 1998). As Young (1996) argues, it is important not to equate work-life balance with family-work balance. While two-career families with children have often been the focus of firm's work-life policies, all segments of the workforce may have work-life balance issues.

Those in the cohort over 50 are likely to have one or more parents in declining health that may require their care. And they themselves may be interested in scaling back on work in order to enjoy other aspects of life. Single adults without children are often asked to pick up the work, resulting in added stress and the lack of a social life outside the workplace (Young, 1996).

The popular literature on Generation X is ambiguous with regards to work-life balance (Tulgan, 1998). This cohort is seen to be very interested in pursuing interests outside of the workplace and thus issues of balance are likely to be salient (Bruzzese, 1998). However, others suggest that when Generation Xers find an organization that they can identify with and whose values they share, that they are likely to be fully committed to it, working long extra hours and devoting their energy to helping achieve its aims (McMakin, 1998; Conger, 1998). Regardless, those at middle career levels are likely to have the most work-balance issues to deal with, as they struggle to balance a strong desire for career advancement with major family responsibilities. People in their 30s and 40s are typically starting and raising a family at the same time that career pressures for advancement become most intense. Thus, the following hypotheses follow from this discussion.

H6: Work-life balance will be important for the commitment of all technical employees.

H6a: Work-life balance will be more important for the commitment of middle career technical workers those who are in earlier or later career stages.

Rewards. Adequate financial rewards have been found to be important in instilling organizational commitment (Mathieu & Zajac, 1990). Financial rewards are likely to be even more salient for knowledge workers in the current labor market context, when individuals have an array of alternative employment opportunities. The logic regarding the relative salience of financial rewards and recognition for different age groups is ambiguous. On the one hand, younger workers are likely to

have fewer family responsibilities, and thus may place a lower priority on compensation than mid-level or more senior technical employees. Recent graduates, however, may also be more likely to have college debts and less likely to have accumulated savings, and thus may place a greater premium on a high salary. In addition to *how much* individuals are paid, the impact of *how* they are paid may have an important impact on employee commitment that may be related to age. Those who view their employment relationship as shorter term or less certain in nature, and hence a more transactional relationship or pure form of economic exchange, are likely to place a greater premium on receiving the full market value for their individual performance (Rousseau, 1995, Tsui, Pearce, Porter, & Tripoli, 1997). To the extent that members of Generation X have fewer sunk costs within organizations and a transactional view of their employment relationship, than they are also likely to be more attracted to organizations that tie pay to individual performance. Those employees who expect to have a longer, more relational contract with the organization may be less concerned with their immediate individual reward than with the total compensation that they can expect to receive over the duration of the employment relationship.

Programs that more explicitly link pay to organizational performance are argued to be a key element of building a new, more "balanced" employment contract that can obtain long-term employee commitment in the absence of long-term employment security (Rousseau, 1995). Pay for organization performance is likely to be an effective way of instilling commitment for all generations of employees (Lawler, 1998). The attractiveness of this model for younger knowledge workers has been clearly demonstrated by the stock-option laden compensation packages prevalent in Silicon Valley and other high-technology start-up firms (Fox, 1997). More senior workers, who already have higher levels of

firm-specific investments and identification with the organization, are also likely to respond favorably to reward packages that tie their pay more closely to the firm's performance.

H7: Pay for individual performance will more important for the commitment of younger technical workers than for older technical workers.

H8: Pay for organizational performance will be important for the commitment of technical employees of all age groups.

Summary of Hypotheses

Each of the literatures reviewed above has suggested some hypotheses about what may be the key drivers of commitment for different generations of technical employees in the current employment environment. Table 1 summarizes the hypothesis and the literatures from which we have derived them.

Insert Table 1 about here

STUDY DESIGN AND METHODS

Sample and Data Collection Procedures

The data reported here come from the initial (1998) round of a larger, longitudinal study looking at organizational and human resource factors that impact technical performance. The data were collected from scientists and engineers in multiple business units of five large corporations in a range of industries including chemicals and pharmaceuticals, vehicle development and production, energy, and aerospace. The firms all had significant global operations. Two of them were headquartered in Europe and other three in the United States. All of the companies were large, well-

established organizations involved in the challenges of managing new process and product technologies. All had to manage the diffusion of knowledge and embedding of learning over multi-site locations.

The sample consisted of employees located in the United States, Canada, and Italy. We studied the most highly educated portion of the technical workforce – degree-level scientists and engineers and those working in equivalent positions who had advanced their knowledge through experience and targeted development rather than obtaining university degrees. Technical managers and individuals with technical degrees and classifications who were working in some other parts of the organization (e.g. supplier management, project management, operations) were also included in the sample.

Respondents were informed that the study was intended to provide data to participating companies that would be useful in determining whether the conditions were in place for fostering a high level of technical performance and meeting the needs of the technical workforce. Across all businesses, 4,504 anonymous surveys were administered to either all or a random sample of technical employees meeting the above criteria. Depending on the preference of the company, the surveys were either group administered and returned to the researchers in a batch or distributed through the internal mail system with a pre-paid envelope that was returned directly to the researchers. In all, 1951 surveys were returned, a response rate of 43% that ranged from 35% to 92% across the five companies. After adjusting for missing data, the final sample size for the analyses was 1907. A total of over 225 in-depth interviews and focus groups with employees and managers were conducted in the organizations prior to survey administration to gain a better understanding of the context in which the data were collected.

Demographic characteristics for the three age cohorts are provided in Table 2. 274 individuals fell in the 30 and under category. 1223 individuals were between 31 and 50 years old. And 410 individuals were classified in the over 50 age group. Not surprisingly the oldest group had the longest organizational tenure, almost 25 years as compared to an average of 3.5 years for the youngest group. The youngest group had the lowest education, with the average individual having just about a bachelor's degree. This too is not unexpected because many in the youngest age group have not had time to complete an advanced degree. Each age cohort had a small number of scientists, ranging from 9% for the youngest group to 11% for the oldest group. Finally, the youngest group had the largest number of individual contributors, 89% as compared to 57% of the middle group and 54% of the oldest groups**.** We controlled for these demographic differences. The number of women in these positions was so small in several of the organizations, that it was not viable to add a control for gender.

Insert Table 2 about here

Measures

The items to measure each predictor and dependent variable in the model are provided in the appendix. With the exception of the demographic variables, all of the variables were assessed on a 5-point Likert scale.

Predictor variables. Four of the measures for the independent variables were derived from a section of the questionnaire that asked respondents about their level of satisfaction with various aspects of their job and their career. Satisfaction with the opportunity to develop technical skills is a five-item scale that measures whether individuals are satisfied with their opportunities to grow their technical

expertise and to "maintain marketable skills". Career advancement satisfaction is a 3-item scale that measures satisfaction with the opportunity to advance along either a technical or managerial progression. Satisfaction with job security and satisfaction with the ability to balance personal and work life were each measured with single items.

With regard to rewards, we measured the extent to which individuals felt they were rewarded for two different kinds of performance, individual or organization. Pay for individual performance is a scale consisting of three items measuring the extent to which the individual feels rewarded for individual contribution, including individual performance, competencies and skills, and contribution to value creation activities. Pay for organizational performance is a three-item scale measuring the extent to which individuals feel their pay is determined by organizational performance and the extent to which they feel they share in the success of the business.

Two scales measure the extent to which work conditions are in place that have been found to be particularly important to technical employees. Computer resources are measured with eight items that assess the adequacy of the computer information systems, including whether they are up-to-date and whether they are adequate work tools. The climate for innovation and risk measure serves as an indication of the extent to which the technical employee perceives the work to be cutting edge and innovative. The five items measure the extent to which innovation and risk taking is encouraged and takes place.

Because many of the scales for the predictor variables were developed for purposes of this study, factor analyses were conducted to examine whether the scales were distinct. A principal components analysis using the eigenvalue criterion with an oblique rotation was conducted. The results of these factor analyses are presented in Table 3. The items for computer resources, a climate for

innovation and risk, pay for individual performance, and satisfaction with career advancement loaded exactly as specified. One item for technical skill development, learning about more aspects of the organization, loaded with the career advancement factor. We dropped this item from the scale to avoid conceptual ambiguity. The other items for technical skill development loaded as expected. One item for pay for organizational performance (pay depends on the success of the team) loaded with pay for individual performance. We also dropped this item to avoid conceptual ambiguity. The rest of the pay for organizational performance items loaded as expected. The single items for satisfaction with job security and satisfaction with balance both loaded onto a single factor. However, because they are not extremely highly correlated (r=.20), we retain them as separate items for further analysis so that we can test their effects on commitment separately. All scales achieved good levels of reliability.

Insert Table 3 about here

Dependent variables. The affective commitment items were adapted from the Organizational Commitment Questionnaire from Mowday, Steers and Porter (1979). The six items have to do with the affective attachment of the employee to the organization. Von Glinow and Mohrman (1990) used this version in a study of the commitment of technical production workers. We measure continuance commitment with four items indicating a willingness to leave the organization. Here we deviate a bit from the literature in that we are not focusing directly on whether the employee has sunk costs or side-bets as an indicator of continuance commitment; rather, we are looking at the concept of an individual's willingness to leave a company, similar to the "dependable continuance" concept used by Tsui, et al. (1997). In this way, we avoid having to ask questions such as about sunk costs that are by definition

correlated with length of service, leaving open the possibility of detecting factors relating to continuance commitment that are different those that relate to sunk costs.

Control variables. A number of demographic variables were used as control variables because we would expect the relationships being tested might vary for different demographic groups. The first four -- age, organization tenure, education level, and status as manager or individual contributor -- were gathered through questions on the survey. Status as scientist or engineer, was a dummy variable that was based on a survey question about technical discipline. These control variables are described below:

To create groups of employees in different life stages, we parceled the age variable into three groups: (1) 30 and under, (2) 31-50, and (3) over 50. In this way, the first category included individuals in their first 1-8 years of employment, which we considered to be early career and which constitutes the cohort that has entered the workforce since the change in the employment relationship began in the early 1990's. Education level was also controlled because years of education can be expected to relate to the extent to which an employee possesses valuable and hard to develop skills that may be in demand in the marketplace. Respondents indicated whether their highest degree was less than a Bachelor's degree, a Bachelor's degree, a Master's Degree, or a Ph.D. The number of years of tenure with the organization is controlled because previous literature on commitment indicates that commitment increases with tenure (Meyer & Allen, 1984).

Previous literature also indicates that patterns of commitment for managers may be different than for individual contributors (Morrow, McElroy, & Blum, 1988); thus we created a dummy variable with a score of 1 if the respondent was an individual contributor and a score of zero otherwise. Because prior literature indicates that scientists and engineers may value different aspects of the work

setting (Shepard, 1956; Von Glinow, 1988), we control for whether the respondent is a scientist. A dummy variable was created with a score of one if the respondent was a scientist and zero if an engineer. Because we also expected that there might be company differences, we also controlled for company membership. Five dummy variables, one for each company, were created. The items had a score of 1 if the individual was a member of that company and a score of zero otherwise.

Analyses

To examine what elements of the employment relationship were the most important drivers of commitment for individuals in the different age groups or career stages, we split the sample into the three age groups and conducted separate regressions for each. This allowed us to see what variables predicted both affective and continuance commitment for each of the different age groups. To examine whether the differences observed in these age-specific regressions represented significant differences across the different age groups, we also examined the interactions of the different age groups by each predictor variable. In the interaction analyses, we merged the data for all three age groups and conducted a single regression for affective and continuance commitment respectively. In addition to all of the control variables and predictor variables included in the age-specific regression analyses, we also added the direct effects of the age groups and the interaction terms for the product of each of the predictor variables by the age groups. We should note that either the oldest or youngest age group and its respective interaction terms were the excluded from the analysis and served as the comparison group against which all of the interactions were compared (because age was coded as a dummy variable, all three age groups cannot be entered into the equation at once to avoid perfect collinearity). Thus, 16 interaction terms were added to the regression analysis for the eight predictor variables by two of the age groups. The actual interaction analyses are not included in the paper due to space

limitations but are discussed in the results and are available from the authors on request. Because multicollinearity of the interaction terms with the main effects, it is exceedingly difficult to achieve significant interaction terms; thus, we interpret interactions up to the .10 level of significance.

RESULTS

Means, standard deviations, correlations, and reliabilities for all variables in the model are provided in Table 4. The correlations indicate that levels of multicollinearity do not appear to be problematic. The results of the regression analyses for the two dependent variables across the three age groups are provided in Tables 5a and 5b.

Insert Tables 4, 5a, and 5b about here

Hypothesis 1. Little support was found for the hypothesis that computer resources will be particularly important for garnering the commitment of younger employees. The computer resources variable was marginally related to affective commitment and not related to continuance commitment for younger employees. Computer resources were significantly related to affective commitment for both the middle and later career groups. The interaction analyses indicates that there were no significant differences across the three age groups in terms of their importance in predicting affective and continuance commitment.

Hypothesis 2. Support was found for the hypothesis that a climate for innovation and risk will be important for all groups. A climate for innovation and risk was significantly related to affective commitment for all three age groups and to continuance commitment for the two younger age groups.

There is support for the sub-hypothesis that this sort of climate will be more important for younger technical employees – a climate for innovation was not significantly related to continuance commitment for the oldest age group. Furthermore, the interaction analysis indicated that a climate for innovation is significantly ($p<.08$) more important for continuance commitment for the youngest age group than the oldest group.

Hypothesis 3. Some support was found for the hypothesis that career advancement is more important for mid career technical employees in comparison to younger technical employees. It appears that career advancement is important not only for middle career technical employees but also for their more senior colleagues. Career advancement was found to be significantly related to affective commitment for the two older age groups and just marginally so for the youngest age group. Furthermore, career advancement was related to continuance commitment in the two older age groups but not for the youngest group. The interaction analysis provides further support. Career advancement results in significantly more continuance commitment for the middle ($p<.01$) and later ($p<.06$) career stage workers in comparison to those in the earliest career stage.

Hypothesis 4. Support was found for the hypothesis that job security will be more important for the commitment of older technical workers. Satisfaction with job security was significantly related to affective commitment for the middle and older age groups but not for the youngest age group. Furthermore, satisfaction with job security was related to continuance commitment for the oldest technical employees. The interaction analysis indicates that for older workers, the relationship between job security and commitment was significantly stronger than for earlier ($p<.08$) or middle ($p<.01$) career workers.

Hypothesis 5. Some support was found for the hypothesis that the development of technical skills will be important to commitment for all three age groups. Satisfaction with technical skills was significantly related to affective commitment for the two younger age groups and marginally related for the oldest age group. Furthermore, satisfaction with technical skills was related to continuance commitment for the middle group and marginally so for the youngest group. It was not related to continuance commitment for the oldest group. The sub-hypothesis that the development of technical skills will be particularly important for the commitment of younger technical employees is supported by the interaction analysis which indicates that satisfaction with technical skills is significantly more important for achieving affective commitment for the youngest ($p<.07$) and middle ($p<.07$) groups in comparison to the oldest age group. Furthermore, the development of technical skills resulted in significantly ($p<.10$) more continuance commitment for the youngest group as compared to the oldest group.

Hypothesis 6. Little support was found for the hypothesis that work/non-work balance is important for the commitment of all age groups. There was some support for the sub-hypothesis that work/non-work balance will be more important for the middle group. Work/non-work balance was significantly related to affective commitment for the middle group, and only marginally so for the older group and not at all for the younger group. For continuance commitment, work/non-work balance was only significantly related for the middle group. However, no significant differences were found across the three age groups on work/non-work balance in the interaction analysis.

Hypothesis 7. Some support was found for the hypothesis that pay for individual performance is important for the younger age group. Pay for individual performance was significantly related to affective commitment for the two younger age groups but not for the oldest age group. Pay

for individual performance was related to continuance commitment for only the middle group. The interaction analysis also provided support for this hypothesis. The relationship between pay for individual performance and affective commitment was found to be stronger for the youngest age group ($p<.07$) as compared to the oldest age group.

Hypothesis 8. Support was found for the hypothesis that pay for organizational performance is important for all of the age groups. The relationship between pay for organizational performance and affective commitment was significant for all three age groups. Furthermore, the relationship between pay for organizational performance and continuance commitment was significant for all three age groups, though just marginally for the oldest age group. The interaction analysis also indicates that there are no significant differences across the groups.

DISCUSSION

On balance, the findings support the notions in the literature on the new employment relationship overall, and they illustrate that there are career stage differences in the key drivers of commitment. Some of these differences fit with the stereotype of Generation x, the generation whose values are aid to have been transformed by the ongoing change in the employment relationship.

Job Security. One area in which younger workers differ from the other two groups is that their satisfaction with job security does not relate to either their affective or continuance commitment. This fits with the popular literature that suggests that this generation is not expecting job security and that it may be irrelevant because of their tendency to switch jobs readily. For mid-career employees, satisfaction with job security is important to affective commitment, but does not impact their continuance commitment. They continue to be willing to change jobs, even if they are satisfied with job

security. For older workers, job security is related to continuance and affective commitment. These results indicate that older workers may be particularly vulnerable to the inevitable job insecurity that comes amidst organizational downsizing. In contrast, the commitment of younger workers appears to be disconnected to the job security. Other things are important to them.

Technical Skills Development. Concern with staying state of the art and with ongoing skill development is a traditional concern of technical professionals; however, the career stage literature would have predicted that it would be most important to early and mid career stage employees. The notion of a Protean Career is that in today's world, employees will continually have developmental challenges at all stages of their careers. Our findings suggest that all of these things are at work. The affective commitment of all three groups is impacted by technical skill development; however only for the early and mid-career employees is continuance commitment impacted by technical skill development. The continuance commitment of these groups is predicated on these opportunities, as was indicated by some of the interviewees. One new hire said, "The attraction here is the level of learning. The pay is average, but 10 years from now there are many places we can go to make a lot more money. The experience and development you get here makes you very marketable." Another in the same focus group responds "I agree completely. We don't see this as a career like those who joined 20 years ago. We now treat our own careers like firms making an investment. We go where we can maximize our earnings in the long term." The concern with marketability is predominant in the early stages. Interestingly, as the quotes above show, this "investment" orientation of these new employees goes well beyond employability. These individuals are clearly aware of the market value of skills and knowledge, and are concerned with long term earnings potential. This has implications for the role of reward systems for individual commitment.

Rewards. Pay for individual performance relates to the affective commitment of both early and mid-career employees, but it only relates to continuance commitment of mid-career employees. This is the career group that has established a set of marketable skills and is looking to optimize pay, perhaps because of the many pressures they are feeling at their particular life stage. Pay for individual performance doesn't relate to the affective or continuance commitment of older employees. This may be in large part because under traditional merit systems, their salaries already reflect the largesse of an earlier era and their own individual performance from previous periods. In fact, many of these individuals have "topped out" in their individual pay. For this group, pay for organizational performance may be the only way to increase earnings.

Pay for organizational performance relates to both affective and continuance commitment at all three career stages. For younger employees this may be a reflection of the new employment relationship and expectations of having a piece of the action. For the late career employees this may be the only way to increase earnings. For all employees, pay for organizational performance may be part of a basic formula of equity: as performance pressures increase, and job security decreases, sharing the gains when individuals work to help the organization improve performance creates a new kind of equity and may foster the necessary identification with the company that is required to sustain the high levels of effort.

Work/Non-Work Balance. Satisfaction with work-life balance leads to more affective and continuance commitment for the mid-career group, the group that is in a life stage where they are experiencing the most pressing issues of balance. Though work-life balance is marginally related to affective commitment for the oldest group, it generally has little effect for the youngest and oldest groups. This may be because work plays an important role, dwarfing issues of balance with other

aspects of life except for those most directly feeling the tension. For the late-career generation, the "company man" ethic may still predominate, and may be a stronger force in shaping attitudes and behaviors than the need to reorient toward other life aspects in preparation for retirement. Early career stage employees may see establishment in their career as their primary life-stage task, so there may not be a large balancing task. Finally, because we are examining primarily people in large corporations, we may be studying a self-selected group who have chosen a more traditional employment situation and have more traditional expectations about work-life balance.

Climate for Innovation. As the literature on technical employees predicts, a climate that fosters innovation relates to the affective commitment of individuals at all three career stages. Doing cutting edge work continues to be strongly related to commitment throughout all career stages. On the other hand, it relates to the continuance commitment of only the early and mid-stage career employees. In contrast with the other groups, the continuance commitment of late career stage employees is related primarily to bread and butter issues of job security and pay, and not to the aspects of the employment relationship that are more concerned with development and challenge.

Computer Resources. Surprisingly few generational differences were evident in the area of computer resources. This variable does not relate to continuance commitment, and shows only a relatively weak relationship with affective attachment for all three groups. This may reflect the fact that computers have rapidly become such an integral part of the way that all technical employees function in today's global corporations, that there is no differentiation by age. Meeting the minimum expectations for providing state of the art computer tools is necessary to secure the affective attachment of technical employees, but it will not help retain them, when they can expect that similar tools will be available in other organizations.

Career Advancement. A generational difference is also evident for career advancement. Career advancement is found to be more important for middle and later career stage employees, less so for younger, earlier stage technical workers. The interaction analysis suggests that this is particularly the case for continuance commitment. While opportunities for career advancement within the company may be important for retaining middle and later career stage technical employees, other things such as technical skill development and a climate for innovation are more important for retaining younger employees. It may be that with the flatter structures popular in today's organizations, there is less room available for the advancement of younger employees. Thus, internal labor markets may play a less salient role in building the commitment of younger, early career stage employees than providing them with the skills and tools to manage their own careers.

In summary, the results are supportive of the Protean Career concept that providing the factors that ensure employability is central to today's workforce and important if a company is to maintain a committed employee base. At the same time, the factors traditionally important to the technical population—development of technical skills, a climate that encourages innovation, and computer resources—continue to relate to the commitment of this workforce. Furthermore, the importance of pay variables to commitment may reflect the transactional nature of today's employment relationship, and the changing expectations especially with respect to pay for organizational performance.

However, while there are some similarities across the three age groups, differences in career stage are evident. Job security is less important to the generation that entered the workforce after the global disruption to the traditional employment relationship. We don't know whether that would have been equally true of early career employees in previous generations. Perhaps the predictors of continuance commitment say the most about career stage and generational differences. While the

continuance commitment of the mid-career employees is affected by a broad range of variables, including work-life balance, the early and late career-stage employees are more focused. Continuance commitment for early stage employees is a function of satisfaction with the development of technical skills, a climate for innovation and risk, and pay for organizational performance. For late career employees, continuance commitment only relates to job security and pay for organizational performance.

Limitations of the Data and Future Research Implications

The sample and methods used in our research limit the generalizability of the findings. While our study included a larger number of employees and more varied set of organizations and age groups than much of the research on commitment (which has often been based on a single organization or sector), the generalizability of our findings is still limited. First, we concentrated on degreed-level scientists and engineers, a crucial part of the knowledge workforce, but by no means all-inclusive. This group is likely to have much stronger professional identity and need for autonomy then other less educated knowledge workers. It would be interesting to test whether similar findings emerge for other categories of knowledge workers who have had different professional identities, such as the growing ranks of doctors, lawyers and financial service professionals.

Second, the study consisted solely of large organizations that are heavy investors in and users of technology. This group of firms are very distinct from the smaller, high technology start-ups in areas like the Silicon Valley that are often portrayed as emblematic of the new networked organization. Product life cycles in most of our organizations ranged from 4-20 or more years, a stark contrast with the "internet time" that operates in Silicon Valley, where new products may have a life of 18 months or less. And the rates of employee turnover are much lower; while many of the organizations were

struggling with losing key young performers who had received a great deal of training and were highly marketable, the average tenure in our organizations was 13.8 years, a much higher level of employment stability than is found in high technology start-ups. There is also almost certainly a process of self-selection occurring among those technical workers who elect to join these larger organizations compared to their peers who are attracted by the higher risk environments of new ventures. It would thus be very interesting to attempt to replicate this research on the key drivers of commitment for knowledge workers in high technology start ups and other smaller organizations.

The cross-sectional design of the study also places some limits on the interpretation of our findings. Although the project will be continuing for another two years, we were unable to identify individuals in the survey and thus will not be able to trace changes in their levels or key drivers of commitment over time. Nevertheless, the study contributes the organizational commitment literature that has neglected the study of differences in employee attachment for individuals in different career stages or age groups. The high correlation between career stage, job tenure and generational effects, however, makes it difficult, even with controls included in our analysis for job level and tenure, to separate out which of these dimensions may be affecting employee commitment. Are the youngest workers in these organizations placing more emphasis on skill development and individual rewards and less on job security because they are at the initial stage of their careers or because they are members of a generation with different expectations about the employment relationship that are likely to remain more stable as they grow older? Only a longitudinal analysis of Generation X employees as they mature within the workplace can help resolve this issue. Such a longitudinal analysis would also be useful in helping to identify whether organizations which adopt some of the new employment practices we've identified are effective in raising levels of commitment in their existing workforce.

Implications for Practice

Organizations in general, and large companies in particular, face a major challenge in attracting, motivating and retaining knowledge workers. Our research suggests some concrete steps that firms operating under the constraints of increased global competition and reduced capacity to offer job security can take to build employee commitment. These lessons fall under two main headings: those general practices that appear to be important for creating a new form balanced employment relationship that can increase the attachment of all technical employees, and those that are more specific to a given age group. One key element for fostering higher levels of affective commitment in all technical employees is tying individual rewards more closely to the performance of the organization, through such mechanisms as widespread distribution of stock options, or some form of gain-sharing or profit-sharing plan. Another is creating a climate that encourages innovation and risk-taking by recognizing those people willing to try out new ideas and discouraging a "not invented here" syndrome. A third key feature of the new employment relationship is providing support for ongoing skill development for individuals throughout their careers. Organizations appear to have less direct impact on the willingness of people to remain with the company, but the same sets of policies – paying for organization performance, encouraging innovation and developing technical skills – seem to have the most positive effect.

In summary, the results are supportive of the Protean Career concept that providing the factors that ensure employability is central to today's workforce and important if a company is to maintain a committed employee base. At the same time, the factors traditionally important to the technical population—development of technical skills, a climate that encourages innovation, and computer resources—continue to relate to the commitment of this workforce. Furthermore, the importance of

pay variables to commitment may reflect the transactional nature of today's employment relationship, and the changing expectations especially with respect to pay for organizational performance.

In closing, this paper begins to address a key challenge for managers in the new millenium – how to gain the commitment of technical workers amidst a changing, global context. A key learning from these generational/career stage differences is that the employment relationship must be tailored to the different needs of different groups of employees in order to build high levels of commitment.

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APPENDIX

Survey Scales and Reliabilities

Variables	Items
Technical Skill Development	Satisfaction with: Broadening my technical competencies Staying up to date on technical developments in my field Maintaining marketable skills and knowledge Your opportunity to learn new things Interesting technical work
Computer Information Systems	We have excellent computer systems for coordinating with each other We have easy computer access to the information we need to do our jobs Our information and computer systems are flexible We have state of the art computer tools Our computer tools help people from multiple functions to work together effectively Our electronic systems offer us easy access to company knowledge and know-how The info available on our computer systems gives us a broad view on what's happening in our unit Our electronic systems overly constrain the way we work [a]
Pay for Organizational Performance	I share in the financial gains of the company When this organization is successful, I share in the benefits How much pay I receive depends on the success of our business
Innovation and Risk	There is a willingness to try out new ideas New and different ideas are always being tried out There is very little risk-taking in this organization [a] Little value is placed on ideas and approaches that are "not invented here" [a] Finding a better way to do things is valued
Pay for Individual Performance	My pay level is determined by my knowledge and competencies My pay level is determined by my individual work performance My pay reflects the value I have helped create for the organization
Job Security	Satisfaction with: Your job security
Balance Personal & Work Life	Satisfaction with: The ability to balance your personal life and work life
Career Advancement	Satisfaction with: Advancing in a technical career. Advancing through managerial positions. Your opportunity for career growth.
Affective Commitment	I am proud to tell others that I am part of this company. I talk up this company to my friends as a great company to work for. I find that my values and the organization's values are very similar. This organization really inspires the best in me in the way of job performance.
Continuance Commitment	I'll stick with the company as long as it keeps its commitments. I have a real stake in improving the performance of the company. It would be very difficult for me to change companies at this time. I would be willing to change companies for career advancement now. [a] My loyalty is to my own career, not to a particular company. [a] I would be willing to change companies for more money. [a]

[a] Item was reverse coded

TABLE 1

Relationship of Hypotheses to the Literature

Hypothesized Relationships to Commitment for Technical Professionals	Technical Profess-ionals	Career Stage	New Employment Relationship	Generational Differences
1) Computers are more important for younger employees	X			X
2) Innovative setting is important for all employees, but is greater for younger employees	X			X
3) Career advancement is more importance for mid-career employees		X		X
4) Job security is more important for older employees. Job security is not important for younger employees (i.e., Gen X)		X	X	X
6) Skill development is important for all employees, but is greater for younger (GenX)	X	X	X	X
7) Work-life balance is important for all employees, but is greater for the middle career group		X	X	X
9) Individual pay for performance is more important for younger employees (GenX)			X	X
10) Pay for organization performance is important for all employees			X	X

X = Support for hypothesis from that literature

TABLE 2

Mean Differences Across the Three Groups

Variable	30 and Under	31-50	Over 50	Differences
Sample Size	274	1223	410	N/a
Demographics				
Organization Tenure	3.54	12.40	24.75	643.28*** 1<2,3; 2<3
Education [a]	3.93	4.15	4.14	No differences
Proportion Scientists	10%	12%	11%	No differences
Proportion Individual Contributors	89%	57%	54%	55.61*** 1>2,3
Dependent Variables				
Affective Commitment	3.44	3.38	3.43	No differences
Continuance Commitment	2.59	2.85	3.35	94.88***, 1>2,3; 2>3

[a] For education, a score of 3 is an associate's degree and a score of 4 is having graduated from a 4-year college, and a score of 5 means having an advanced degree.

TABLE 3

Factor Analysis of Items for Predictor Variables

Variable	Techn. Skill	Pay for Org. Perf.	Computer Resource	Innovate / Risk	Pay for Ind. Perf.	Job Security/ Balance	Career Advance
Broaden technical competencies	**.83**	-.04	.01	-.01	-.02	-.05	-.02
Up-to-date on technical development	**.79**	.03	.02	.02	-.05	-.06	-.06
Maintaining marketable skills	**.68**	.03	.03	.00	.04	-.02	-.17
Opportunity to learn new things	**.63**	.05	-.05	-.16	-.02	-.02	.11
Interesting technical work	**.57**	-.02	.02	-.09	.07	-.03	-.23
Coordinating using computer systems	-.02	**.82**	-.05	-.03	-.06	.02	.00
Flexible information & computer systems	-.10	**.73**	-.04	-.06	-.01	-.07	.08
Easy computer access to information	.14	**.73**	-.04	.06	.-07	.06	.05
State-of-the-art computer tools	-.02	**.71**	-.06	.00	-.10	-.19	.00
Electronic access to company knowledge	.05	**.66**	.15	-.04	.06	.06	.06
Computer tools /function work together	.04	**.66**	.09	-.07	-.02	.04	.04
Info on computer view happen in unit	.19	**.50**	.17	-.04	.02	.07	.08
Electronic system overly constrain	.17	**-.49**	-.10	-.03	-.09	.19	.17
Financial gain of company is shared	.00	.03	**.89**	.00	.04	-.04	-.05
Benefits of org. success are shared	.00	.03	**.88**	-.02	.00	-.01	-.05
Pay based on success of business	.00	-.03	**.60**	.00	-.28	-.05	.06
Willingness to try new ideas	.11	.00	-.06	**-.73**	-.07	-.06	.05
New & different ideas are tried out	.14	.06	-.07	**-.70**	-.07	.00	.05
Little risk-taking in organization	.09	-.02	-.08	**.66**	-.09	-.25	.14
Little value on ideas "not invented here"	.06	.05	-.09	**.62**	-.07	.28	-.03
Value on finding better ways to do things	.08	.10	.02	**-.54**	-.18	.02	.03
Pay determined by knowledge/comp.	-.02	.05	-.05	-.03	**-.83**	-.20	-.08
Pay level determined by ind. performance	-.06	.03	.04	-.09	**-.82**	-.03	-.06
Pay reflects value I helped create	.01	.03	.12	.00	**-.70**	-.05	-.11
Pay depends on success of team	.03	.00	.39	.00	**-.45**	.09	.00
Job security	-.04	-.07	.05	-.09	-.07	**-.71**	-.16
Balance personal & work life	.24	.10	.03	.05	-.05	**-.68**	.16
Advance through managerial positions	.04	.00	.06	.04	-.08	.01	**-.75**
Advance in a technical career	.23	-.02	-.02	-.05	-.19	.00	**-.64**
Opportunity for career growth	.15	.06	-.06	-.04	-.26	-.02	**-.63**
Learning more aspects of the organization	.26	.05	-.05	-.06	.07	-.01	**-.45**

TABLE 4
Means, Standard Deviations, and Correlations Among the Predictor and Dependent Variables in the Model

Variable	Mean	Std.Dev.	1	2	3	4	5	6	7	8	9	
1. Satisfaction with Job Security	3.51	.97		n/a								
2. Work/Non-Work Balance	3.43	.98	.20	n/a								
3. Technical Skill Development	3.42	.71		.22	.23	(.83)						
4. Pay for Organization Performance	2.94	.90	.19	.13	.24	(.81)						
5. Pay for Individual Performance	2.84	.90		.20	.11	.33	.40	(.84)				
6. Computer Resources	3.22	.65		.11	.18	.28	.26	.25	(.83)			
7. Climate for Innovation	3.22	.64		.19	.12	.43	.29	.33	.30	(.72)		
8. Career Advancement	2.89	.86		.25	.14	.54	.34	.50	.22	.37	(.79)	
9. Affective Commitment	3.39	.60	.31	.24	.47	.44	.44	.35	.48	.45	(.76)	
10. Continuance Commitment (.67)	2.92	.80		.12	.16	.25	.29	.27	.18	.22	.28	.36

Cronbach alpha reliability in parentheses.

TABLE 5a

Regression Analyses for Affective Commitment

Independent Variables	30 and Under	31-50	Over 50
Controls			
Company 1[a]	-.03[b]	-.10**	-.21**
Company 2	.05	.01	-.01
Company 3	.06	.07*	-.07
Company 4	.16*	.06+	-.03
Organization Tenure	-.02	.01	.03
Education	.01	-.05	.01
Scientist	-.14*	-.03	.01
Individual Contributor	.03	-.06*	-.05
Independent Variables			
Satisfaction with Job Security	.08	.09***	.10*
Work/Non-Work Balance	.05	.06**	.08+
Technical Skill Development	.25***	.21***	.10+
Pay for Organizational Performance	.14*	.16***	.23***
Pay for Individual Performance	.16**	.11***	.05
Computer Resources	.11+	.12***	.10*
Climate for Innovation and Risk	.19***	.20***	.29***
Satisfaction with Career Advancement	.12+	.07*	.14**
F	12.49***	50.68***	20.77***
R^2	.48	.44	.51

[a] Company 5 is the omitted company dummy variable
[b] Beta coefficients are presented

***** for p<.001**
**** for p<.01**
*** for p<.05**
+ for p<.10

TABLE 5b

Regression Analyses for Continuance Commitment

Independent Variables	30 and Under	31-50	Over 50
Controls			
Company 1[a]	-.24*[b]	-.03	.14
Company 2	-.20*	-.01	.04
Company 3	-.00	.07*	.14*
Company 4	.15	.11**	.16+
Organization Tenure	-.03	.24***	.13*
Education	-.04	-.04	-.03
Scientist	-.11	-.04	-.10
Individual Contributor	.03	.07*	.04
Independent Variables			
Satisfaction with Job Security	-.03	.01	.17**
Work/Non-Work Balance	-.02	.09*	.07
Technical Skill Development	.15+	.07*	.02
Pay for Organizational Performance	.17*	.10**	.13+
Pay for Individual Performance	.07	.07*	-.01
Computer Resources	.08	-.01	.05
Climate for Innovation and Risk	.16*	-08*	.01
Satisfaction with Career Advancement	.06	.19***	.14*
F	4.50***	20.23***	4.85***
R^2	.25	.24	.20

[a] Company 5 is the omitted company dummy variable
[b] Beta coefficients are presented

***** for p<.001**
**** for p<.01**
*** for p<.05**
+ for p<.10