AN EXAMINATION OF GENDER EFFECTS ON CAREER SUCCESS OF INFORMATION SYSTEMS EMPLOYEES

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ABSTRACT

In this paper we examined the differences and similarities in the human capital variables of male and female information systems (IS) workers and the affect these differences had on job outcomes. The human capital variables studied included: age, education, organizational and job tenure, and number of years in the IS occupation. We found that, even when controlling for the differences in human capital variables, women in IS still tended to be employed at lower levels of the organization, made less money, and had greater intentions to leave the organization.

KEY WORDS AND PHRASES:
Gender differences, IS career, career success, human capital.
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The number of women entering the workforce has grown considerably in recent years. It has been projected that by the year 2000 approximately 47 percent of the workforce will be female and 61 percent of all women of working age will have jobs [28]. Women are also expected to comprise about three fifths of the new entrants into the labor force in this decade. However, women are, and continue to be underrepresented in the information systems field, especially in positions of power and responsibility. Women make up 30 percent of computer scientists and comprise only 32 percent of systems analysts, 35 percent of computer programmers, 10 percent of IS directors, 18 percent of project leaders, and 14 percent of applications development managers [16, 17, 26].

There are two related concerns regarding the under representation of women in computing [44]. First, the restricted participation of women in the field of computing may indicate that practices within the field discourage or prevent women from entering or remaining in the profession. These barriers may include male-biased educational programs and a male-dominated computer "culture". In these cases, and others, women are directed away from the computer industry. Second, the projected demographic shifts in the workforce may produce a severe shortage of computer personnel, unless the participation of women and other underrepresented groups, such as blacks, in the occupation increases significantly.

Although research has identified work and individual factors contributing or impeding the participation and career success of minorities in the computing field [24, 26, 27, 32, 38, 39, 50], there is little specific empirical research on the obstacles faced by women in the computing field. A number of studies have suggested that minorities, including women, do not fit into the conventional "organizational mold," and as such experience less favorable work outcomes and lower quality of worklife than white males [15, 24, 30]. It was reported that women and minority groups may be differentially treated in some of the tangible work experiences, such as promotion, salary raises, termination, and layoffs [25]. Some of these experiences may affect their performance and productivity, satisfaction, loyalty, and their decision to stay or leave
the organization. Beyond the issue of equality and social justice, if women in IS occupations are being treated differently from their male counterparts and this causes them to leave an organization or affects their performance then this is a serious problem which must be addressed.

Most of the research in the MIS field examining IS personnel has tended to view study populations as homogeneous entities in which distinctions of gender are either ignored or considered irrelevant [2, 19, 23]. The potential problems raised by the lack of affirmative action, the historical patterns of discrimination against women and minorities, and the projected demographic changes in the workforce have been discussed within the professional literature [14, 26, 27, 32, 36, 38, 45]. In most instances, this work has been based upon subjective and anecdotal accounts rather than empirical analysis.

While there is considerable research in the organizational and management literatures focusing on career success variables (these have been defined to include job satisfaction, organizational commitment, intention to stay, salary, organization level, promotability etc.) and while we are aware of the role that gender plays within organizational systems, there is very little known about gender differences in career success and the importance of the human capital variables and occupational characteristics in these differences. Specifically, the primary purpose of this study is to examine the role gender plays in career success within the IS occupation.

**GENDER DIFFERENCE THEORETICAL PERSPECTIVES**

Research based in economics and sociology has proposed that wage inequalities and career success outcomes result from differences: in men and women’s human capital, the industrial sectors and the type of firms women are employed in, the predomination of women in certain occupational categories and jobs, and other contextual factors [1, 34]. The human capital and sociological paradigms tend to focus on individual characteristics and assume that the labor market is rational (See Figure 1). They argue that women are less successful and earn less money than men because women have lower skills and educational levels as well as less experience and training. This paper attempts to explain gender differences by emphasizing differences in voluntary decisions of individuals or in access or treatment discrimination. In this paper we will use the sociological paradigm to frame our
argument for why gender differences in career success exist. While, the sociological paradigm argues that salary differences between men and women do exist due to occupational characteristics, the human capital paradigm argues that there are no salary differences between men and women when human capital variables (age, seniority, and education) are controlled for. We will use the human capital paradigm (drawn from the economics literature) to generate the factors which must be controlled for before we can attribute differences in organizational outcomes to differential treatment of personnel due to gender.

Insert Figure 1 about here

The sociological paradigm highlights the role that industry and labor market conditions play in the allocation of wages to men and women [1]. It is suggested that men and women tend to be employed in different occupations, with women heavily concentrated in the lower paying administrative support, staff (including clerical) and service occupations. Men, on the other hand, are heavily represented in executive, administrative, and managerial positions. It was also found that when women do enter male-dominated positions and make it into middle management and beyond, this is most likely to occur in female-dominated industries, such as health care, education, or personnel/labor relations. These categories of firms pay less than the large, private, productive, profitable, capital intensive corporations [21, 51].

This paradigm also employs the dual labor market concept. This concept suggests that the job market consists of a set of better, or primary, jobs and a set of worse, or secondary, jobs. Since firms tend to attach wage rates to occupational categories rather than to individuals, employers can pay women less only by assigning them to lower-paid (secondary) job categories and/or by assigning lower values to predominantly female jobs. From research we know women and minorities are disproportionately employed in lower levels or in staff (vs. line) functions that are lower-paying, lower status, less lucrative specialties, out of the mainstream of the business and which don't lead to top management positions [29, 33, 47].

This second paradigm attempts to explain continued gender and racial discrimination by suggesting that individuals are rewarded in their current jobs for their investment in education and job training [8]. Specifically, it is assumed that women accumulate less human capital (i.e., knowledge and skills derived from on-the-job
training and continuous work experience) than men which accounts for most of the disparity in outcomes. The paradigm suggests that women choose not to invest in accumulating as much human capital (e.g., by investing in less education and/or focusing on less demanding jobs) because they anticipate a lower return on their investment due to career interruptions (due primarily to family and child care responsibilities). Therefore, the human capital explanation focuses on the voluntary choices made by individuals in allocating investments, such as time and effort, to work and family and assumes that investment pays off equally regardless of race or gender. However, recent studies suggest that investment yields greater returns for white men than for women and minorities, irrespective of work efforts and skills. It was reported that discrepancies in organizational level and pay of women and minority groups could not be fully explained by education [8, 9, 34, 37]. Thus, while some of the inequality can be explained as a consequence of the differences in human capital formation, the remaining discrepancies may be attributed to other factors, including treatment discrimination and other discriminatory practices [42]. What this paradigm does, it provides us with a list of factors other than gender which must be controlled for before we can attribute differences to gender effects. These variables include: age, education, and experience.

PROPOSED RELATIONSHIPS AND EFFECTS

The Relationship of Gender and Demographics

Since women have tended to withdraw from the educational pipeline earlier than men [44] and entered the IS field in large numbers only in the 1980s, women in the IS workplace are likely to be much younger, less educated, and have a shorter tenure in the technology field, the job, and the organization than men. Empirical studies reported that women were less educated than men in most countries including Japan, Latin America, Switzerland, Sweden and others [7]. Therefore we expect:

H1: Women in IS will be younger than men on average.

H2: Women in IS will have, on average, lower levels of education than men.

H3: Women in IS will have, on average, less organizational tenure than men.
H4: Women in IS will have, on average, less job tenure than men.

H5: Women in IS will have, on average, fewer years in the IS field than men.

The Impact of Gender on Career Success Variables

The sociological paradigm attempts to explain gender differences in job characteristics using the dual labor market concept, where women are mostly associated with the secondary labor market which consists largely of professional and non-managerial positions. Empirical data regarding the IS workforce from the Department of Labor [26, 27, 51] indicates that women are overrepresented in some types of lower-level jobs (e.g., programmers, operators) and underrepresented in higher-level jobs (e.g., project leaders and IS managers). Research has also suggested that women who are managers aspire to positions lower in the managerial hierarchy than men. It was also reported that women are less likely to reach top positions mainly because of a lack of experience and due to a concentration in areas that don’t lead to top positions [14, 45]. According to the human capital paradigm women are likely to receive fewer promotions because they possess less human capital. Other research suggests that women encounter a “glass ceiling” that prevents them from reaching upper levels of management in their organization [40]. The glass ceiling has been used “to describe a barrier so subtle that it is transparent, yet so strong that it prevents women and minorities from moving up the management hierarchy” (39, p. 200). Reports in trade journals in the IS field [6, 26, 32, 38] have confirmed the existence of such a barrier in the computing field. It is reported that while women make up about 20 percent of the IS workforce overall, they still represent less than seven percent of top IS executives [6, 16, 17, 26, 38].

Based on the sociological paradigm, there are different sociological factors contributing to the glass ceiling phenomenon. Since the majority of top executives are males, women are segregated into “women’s work” which are jobs with lower status, with lower earnings and limited advancement opportunities. Women who do make it to upper management are often perceived as “tokens” by their male counterparts and therefore they feel more isolated, have difficulty gaining the trust of their male peers, have less access to mentors and sponsors, and are excluded from informal networks. These factors have an impact on women’s upward mobility and success. Since women are more often in the outgroup, they are more likely to miss early job challenge
opportunities, promotions and greater salary increases. Additionally, the sociological paradigm attempts to explain gender differences in advancement opportunities in terms of a marketplace which consists of a set of better or primary jobs, including top level positions and a set of worse, or secondary, jobs at lower levels, with little mobility between the two [33]. According to this theory, women usually occupy secondary jobs which are typically out of the mainstream of the business and don't lead to top management positions [29, 33, 47]. However, to determine if these differences are a result of human capital differences we will need to control for age, education, organizational tenure, job tenure, and number of years in IS field. Therefore, we hypothesize:

**H6:** Women in IS, on average will hold lower-level positions than men even when controlling for age, education, organizational tenure, job tenure, and number of years in the IS field.

**H7:** Women in IS, on average will report fewer opportunities for promotion than men even when controlling for age, education, organizational tenure, job tenure, and number of years in the IS field.

Recent research has confirmed the importance of career experiences - salary and promotability- in promoting high levels of career success. Igbaria and Greenhaus [23] found that salary and promotability are positively related to satisfaction, commitment, and intention to stay with the company. According to the human capital paradigm, men generally have more work experience, education and job training, and fewer career interruptions than women, thereby accruing higher returns in their investment. Further, the sociological paradigm suggest that because of social roles, women tend to occupy positions with lower earnings, reduced job training, and less value and status. Other studies also pointed out that individuals within an organization, including executives, middle managers, professionals, and even customers, have discriminatory preferences for white men in the workplace[3, 4, 5]. Therefore, it was pointed out that an organization hires women only at a wage discount large enough to compensate for the loss of utility or level of discomfort associated with employing them [8, 39]. Additionally, empirical data indicated that women consistently earn lower salaries across all occupational groups in managerial and professional positions [12,
26, 51]. The human capital theory assumes that investment pays off equally for all
groups, but recent studies suggests that investment yields higher returns for men than
for women [10, 35, 37]. Drazin and Auster [13] found substantial wage differences
between men and women in managerial positions: Nelton and Berney [41] also
reported that "women at the vice presidential levels and above earn 42% less than
their male peers" (p. 27). Computerworld [11] also reported that women in IS earned
only 72 percent of their male counterparts in 1992. Again, it will be necessary to
control for differences in human capital variables. We hypothesize:

H8: Women in IS, on average, receive lower salaries than men even when
controlling for age, education, organizational tenure, job tenure, and
number of years in the IS field.

We also examined the extent of boundary spanning activities involved in their
jobs, that is, the opportunity to interact with peers in other departments and
organizations. Boundary spanning activities can be a significant source of job power,
impact individual's career growth and success, and enhance one's influence and
visibility in the organization [22]. It is also reported that without opportunities to take
challenging assignments, women may fall behind men in terms of visibility, social
contacts, and knowledge and skill development, or they may internalize negative
evaluations and stereotypes and engage in "self-limiting behaviors" - for example,
refusing a challenging job assignment or declining an opportunity for additional
training and development programs[25, 39]. Based on the sociological paradigm, it
was suggested that mentors and sponsors play an important role in individual's career
success and tend to choose proteges who are similar to themselves in social
background and with whom they can more readily identify. Since women may be less
likely than men to have access to mentors and sponsors, and since sponsors and
mentors may use their influence to enable their proteges to interact with other groups
within the organization and could alleviate most of the barriers and obstacles facing
their proteges, women have less opportunities for extra and intraorganizational
interactions. Additionally, since women have often settled into the lower paying and
lower productivity positions [49] and into staff or support positions which require little
contact, interaction, and organizational communication, they are not assigned in the
mainstream of the organization and are excluded from formal and informal networks of
the corporation's primary operations [25, 30]. Thus, we expected that women have less opportunities to interact with peers and other members within and outside the organization than men.

**H9:** Women in IS will have, on average, less opportunities to interact with peers and other members within and outside the organization than men even when controlling for age, education, organizational tenure, job tenure, and number of years in the IS field.

We anticipate that women will be less satisfied with their jobs, less committed to their organizations, and have fewer intentions to stay with their organizations than their male counterparts. These expectations are mainly based on the sociological paradigm, where self-ratings of job satisfaction and commitment are typically higher and turnover is lower for ingroup members (men) than for outgroup members (women). Further, women are more likely to quit work in high technology fields due to their greater uncertainty regarding their appropriateness to nontraditional jobs. For example, it was reported that turnover among female engineers was twice as high as among men [14]. It was also suggested that educated women are more likely to quit their jobs than men, perhaps because of the greater uncertainties associated with jobs traditionally held by men [52]. It is also suggested that women are more likely to quit because they often leave the labor market to bear and raise children. It is possible that those women who do marry and have children interrupt their careers and quit their jobs [48]. Moreover, the economic paradigm suggests that since wives typically earn lower pay than their spouses do and serve as secondary earners, they enter the workforce during periods of temporary economic needs and leave thereafter. Since women are more likely to relocate to accommodate their careers to their spouse's, they are less likely to be loyal to their organization and to stay with the organization. Thus, it is expected that women will report lower career success. Again, before we can attribute outcome differences to gender we must first control for the human capital variables. We hypothesize that:

**H10:** Women in IS will be, on average, less satisfied with their job than men even when controlling for age, education, organizational tenure, job tenure, and number of years in the IS field.
H11: Women in IS will be, on average, less committed to their job than men even when controlling for age, education, organizational tenure, job tenure, and number of years in the IS field.

H12: Women in IS will have, on average, more intentions to leave their job than men even when controlling for age, education, organizational tenure, job tenure, and number of years in the IS field.

METHOD

Sample and Procedure

In early 1990, a sample copy of an MIS Career Attitude Survey was mailed to the presidents of 20 Mid-Atlantic chapters of the Data Processing Management Association (DPMA). Seven of these chapters agreed to participate in this research project. Each chapter provided the authors with membership mailing lists and a copy of the survey was mailed to each member. The survey was accompanied by a cover letter from the president of the local chapter strongly encouraging participation in the study. A postage-paid envelope was enclosed in which respondents returned their completed surveys directly to the researchers at their university address. Participation was strictly voluntary, and members were assured that individual responses to the anonymous survey would be treated confidentially.

Surveys were mailed to 1,152 DPMA members. Thirty one were returned by the postal service because of incorrect addresses. Four hundred and fourteen completed surveys were received by the researchers for a 36.9% response rate. The elimination of surveys with missing data as well as surveys from respondents in non-MIS positions resulted in a final sample of 348 IS employees representing a broad cross-section of DPMA chapters in the Mid Atlantic Region.

Measures

Demographic items were included in the background information section of the survey. Gender was assessed with a fixed-response item (1 = male; 2 = female). Participants indicated their job titles in an open-ended item. Organizational level consisted of two levels: (1) professionals; or (2) supervisors and managers.
Education consisted of six levels from (1) some high school to (6) graduate or professional degree. Age, organizational tenure, job tenure, and tenure in the IS field were all measured in years.

**Boundary spanning activities.** A three-item scale was developed to assess boundary spanning activities, the degree to which employees interact and communicate with others outside of their departments. Each item (e.g., "assist other units in determining appropriate uses of information technology;" "recommend new applications of information technology to top management") was scored on a five-point scale ranging from (1) not part of my job to (5) a very significant part of my job. The three items were averaged to create the boundary spanning activities score (alpha = .89).

**Career experiences.** Salary and promotability were each measured by one item. The measure of salary was based on annual salary in the current position. Categories ranged from (1) below $25,000 to (6) $65,000 or above. In order to assess promotability, participants were asked to respond to the following item: "How would you rate your chances for promotion to a higher position sometime during your career with the company?" Responses to this item were made on a three-point scale with the following anchors: (1) slight chance for promotion; (2) good chance for promotion; and (3) very good chance for promotion.

**Job satisfaction.** Job satisfaction refers to the emotional reactions of individuals to their jobs and their job experiences. Job satisfaction was assessed with a three-item scale [20] reflecting overall satisfaction with the job. Each item (e.g., "Generally speaking I am satisfied with my job") required the respondents to indicate their agreement or disagreement on a five point scale ranging from (1) strongly disagree to (5) strongly agree. Responses to the three items were averaged to produce a total job satisfaction score (alpha = .70).

**Organizational commitment.** This variable, defined as the identification with a particular organization and the desire to maintain membership in that organization, was measured by an abbreviated version of the Organizational Commitment Questionnaire (OCQ) developed by Porter, Crampon, and Smith [46]. The shorter version of the scale used in this study represents a more "pure" measure of the affective dimensions of commitment to the employing organization. Sample items are "I really care about the fate of my organization;" and "I feel very little loyalty to my
organization." The response options to the items ranged from (1) strongly disagree to (5) strongly agree. The items were coded such that high scores reflected greater commitment to the organization. The coefficient of reliability of this measure was .88.

**Intention to stay.** This was measured by a single item: "Given everything you know about the company in which you are employed and the type of work you like to do, how long do you think you will continue to work at this company?" The response options were anchored on a time-linked five-point scale ranging from (1) one year or less to (5) eleven years or more or until retirement. The item was scored such that high scores reflected stronger intentions to stay with the organization. Kraut [31], Parasuraman [43], and others have attested to the efficacy of a single-item measure of turnover intention or the intention to stay.

**Data Analyses**

To determine if the demographic variables differed as a function of gender, analysis of variance (ANOVA) and chi-square tests of independence were used. ANOVA was used with the variables measuring age, organizational tenure, job tenure and number of years in the IS field. Chi-square was used to test for differences in educational levels. These analyses will allow us to evaluate hypotheses 1 thorough 5.

To determine if the career success variables varied as a result of gender it is necessary to control for differences in human capital variables in all analyses so that conclusions regarding gender differences were not confounded by differences in human capital variables. Gender differences in the set of career success variables were examined using analysis of covariance (ANCOVA). In each of the ANCOVA analyses conducted, gender was the independent variable and the human capital variables (i.e., age, organizational tenure, job tenure, years in the IS field, and education) were the covariance variables. The dependent variables were career activities and success; job satisfaction, organizational commitment, intention to stay, career advancement, organizational level, boundary spanning activities, and salary. These ANCOVA will allow us to test H6 through H12.

**RESULTS**

Table 1 show that there are no differences among men and women with regard to education. However, gender differences are observed for all other human capital
variables (age, organizational tenure, job tenure and IS tenure). The data revealed that female IS employees in the study were younger (Women = 37.33 vs. Men = 43.08, F = 28.25, p ≤ .001) and had less tenure in the organization (Women = 7.56 vs. Men = 10.22, F = 6.44, p ≤ .05), less tenure in their current job (Women = 3.58 vs. Men = 4.87, F = 5.62, p ≤ .05), and in the IS field (Women = 10.93 vs. Men = 17.22, F = 37.65, p ≤ .001). These results confirm hypotheses 1, 2, 3, 4, and 5.

Insert Table 1 About Here

Results of the Chi-Square showed a significant relationship between gender and organizational level (X² = 15.89, p ≤ .001), salary (X² = 33.58, p ≤ .001), job type (X² = 21.15, p ≤ .001), and job classification (X² = 19.78, p ≤ .001). As noted earlier, positions were classified as either professional or managerial in nature. Table 1b shows that men were predominantly in managerial positions, whereas women were mostly in professional -nonmanagerial positions (54.65 percent). Further, Table 2 shows that men were more likely than women to be project leaders, IS managers, and consultants. On the other hand, women were more likely than men to be programmers and systems analysts. We also classified positions as either technical, managerial or consulting. Table 2 indicates that women were more likely to hold technical jobs, whereas men were more likely to hold managerial jobs. The data in Table 4 reveal that, consistent with Hypothesis 6, the initial gender differences in organizational level remained significant even after controlling for the human capital variables.

Insert Table 2 About Here

Table 3 shows that there was no difference in the number of promotions of women and men during their time with their current organization. In order to assess the promotion rate of men and women, the number of years spent in the current organization was divided by the number of promotions received in the organizations, yielding an index of “average time to promotion.” As Table 3 indicates, women had a greater promotion rate than men. However, the initial gender differences was no longer significant after controlling for age or other human capital variables. It should also be recalled that, inconsistent with Hypothesis 6a, women and men held similar
perceptions regarding their promotability chances (Tables 3 and 4).

**Insert Tables 3 and 4 About Here**

The ANOVA results reported in Table 3 and the Chi-square analysis (Table 1B) showed that men reported a significantly higher salary than women. In order to determine the possible reasons for the gender differences in salary, we re-examined the relationships between gender and salary, controlling for the human capital variables (age, organizational tenure, job tenure, education, and number of years in the IS field). Although these factors did explain a portion of gender differences in current salary, consistent with Hypothesis 8, the salary differential favoring men remained significant even after controlling for the human capital variables. Additionally, the gender effect on salary remained significant ($F = 7.89, p \leq .01$) after controlling for the human capital variables and organizational level, indicating that the initial gender differences in salary could not be attributed to individual characteristics and organizational level of males and females.

Table 4 also shows that there was a significant difference in boundary spanning activities. It is noted that women are less likely than men to interact with individuals outside their departmental boundaries. In support of Hypothesis 9, gender differences remained after controlling for the human capital variables ($F = 8.14, p \leq .01$). These differences may be understandable to some extent, given the small portion of women who held managerial positions and their very limited presence in roles such as project leaders, IS managers and consultants. However, the differences remained significant ($F = 3.52, p \leq .06$) even after controlling for organizational level. This may suggest that women do not pursue opportunities for boundary spanning activities as aggressively as men. The sociological paradigm suggests that women may have less access to networking and mentoring activities. In fact, it is recommended that women must take the initiative to expand their networking activities in order to increase their visibility and their career opportunities [27].

Tables 3 and 4 present the results of the ANOVA and ANCOVA of satisfaction, commitment, and intention to stay. Inconsistent with Hypotheses 10 and 11, neither satisfaction nor commitment was related to gender. There was, however, a significant gender difference in intention to stay, in which women were more likely to stay with the organization than men. Table 4 also reveals that, inconsistent with Hypothesis 12, the
significant difference in intention to stay remained significant even after controlling for the human capital variables. Table 5 shows the intercorrelations among the career success variables. Table 6 summarizes the results of our hypotheses. Seven of the 12 hypotheses were supported.

Insert Tables 5 and 6 About Here

DISCUSSION

The results of this study provided support for the prediction that women differ from men in human capital variables and some of the career success and activities variables. Consistent with five of the first six hypotheses, gender differences were found for five of the six human capital variables examined. Inconsistent with Hypothesis 2, education in our sample was similar for men and women. On the other hand, consistent with Hypotheses 1, 3, 4, and 5, men were on average much older than women. Men also reported significantly longer tenure in the organization and in the current job than women. Moreover, men also averaged about 6.5 years more tenure in the IS field than women. However, an additional analyses indicated, these tenure differences were largely attributed to the younger age of women (37.33 years) compared to the men (43.08). These findings are also consistent with the human capital and sociological paradigms.

Therefore, it is important to ask why the women in the present sample were younger and less experienced than men. One possible explanation is an age bias in the response rate of men and women. That is, younger women and older men may have been most likely to respond to the survey. However, it is also possible that the age and experience differences observed in this sample parallel the differences in the IS field as a whole. The tremendous influx of women into the “male domain” of computers, braving societal and psychological barriers, occurred largely in the 1980's; hence, the relative youth of the women in this study, and their shorter experience in the computing field is not surprising.

Consistent with Hypothesis 6, women are reported to hold lower-level positions than men. The present findings suggest that the limited representation of women in managerial jobs is partially a function of their relative youth and limited period of work
experience within the IS field. Since both women and men reported similar perceptions of the likelihood of further advancement in the organization (Table 4), it appears that they do not perceive any gender bias in promotion decisions. This may suggest equal opportunities for advancement in the IS field, although it is also possible that women perceived and interpreted the short time spent by them within each position in the organization as "advancement." However, it is possible that due to family-related constraints on mobility and/or feelings of misplaced loyalty to their current employer, some women have not pursued opportunities for managerial positions in another organization [26].

It is noted that the human capital variables have not fully accounted for gender differences in organizational level. This indicates that education and work experiences yield low returns in advancement to managerial positions. Thus, the human capital theory cannot adequately explain differential treatment in management; other factors must also be considered. The poor advancement opportunities for women may also be attributed to the corporate culture of short-term profits, the failure to invest in training for the long term, the reluctance of corporations to invest in employment training, and employers’ preference for selecting candidates with a particular skill profile who readily fits the job description. Moreover, the women who have succeeded in attaining high level managerial positions in IS are likely to have had business training, and emphasize their business skills over technical expertise. Thus, women interested in managerial positions in IS without a business background must strengthen their management skills through part-time education, and also seek out opportunities for line experience. It is equally important for organizations to monitor their practices related to the placement and job assignments of women on an ongoing basis to ensure that women gain varied experience in both technical and managerial positions.

The need for vigilant monitoring is highlighted by the restricted opportunities for boundary spanning activities reported by the women in our sample. Since participation in boundary spanning activities can enhance visibility in the organization and provide an opportunity to develop critical interpersonal and communication skills, women's restricted activities in this area should be a source of concern. Supervisors of information technology employees should use boundary spanning assignments as developmental experiences for their subordinates.
Since our measure of annual salary was based on salary ranges rather than raw dollar figures, it is impossible to determine the exact discrepancy between men and women's earnings. However, as illustrated in Table 1b, women were clearly underrepresented in the two highest salary categories ($55,000-$64,999 and $65,000 and above). Although there were gender differences in the individual characteristics and organizational level, these variables, i.e., employee age, organizational tenure, job tenure, number of years in the IS field and job status (managerial versus professional) did not fully accounted for discrepancies in salary. This refutes the human capital explanation which assumes that investment pays off equally for all groups. The lower salary of females could have resulted from supervisors bias or other biases in the evaluation process. This is disturbing, especially in light of recent reports (Business Week cited in Frenkel, [16]) that even when women start out with comparable pay, their salaries lag 25 percent below that of their male counterparts within ten years. Furthermore, Computerworld [11] also reported that women in IS earned only 72 percent of their male counterparts in 1992. This indicates the need for employers to examine salary histories and compensation decisions to identify the origin and determinants of salary discrepancies between men and women in similar positions to check for possible gender bias.

There was only marginal support for for Hypotheses 10-12, which predicted women will be less satisfied, less committed and less likely to stay their current organization than men. This paper found no significant differences in satisfaction and commitment, but a significant difference in intention to stay. Inconsistent with our prediction, a woman is more likely to estimate longer continuing employment at her firm than men. The human capital and the sociological paradigms also suggest that the most familiar economic motivation underlying potential male-female quit differences is that women often leave the labor market to bear and raise children. Future research should examine whether they can explain the gender differences in quitting by looking at other factors, such as family constraints and relocation and the presence of discriminatory practices among co-workers and/or supervisors.

CONCLUSIONS

Although the present study provided interesting findings regarding the careers of women and men in the IS field, additional research is required in a number of areas.
As an exploratory and largely descriptive study, our research limited itself to bivariate relationships of gender with human capital variables and career activities and outcomes. Future research should examine whether gender is an independent variable that directly influences the career experiences and outcomes of women and men, or operates as a moderator variable, i.e., that women and men have differential attitudinal and behavioral reactions to similar organizational experiences and practices. Further, research on the career outcomes of women and men in IS should be guided by theory as well as relevant empirical research in IS and related occupations. Such research should focus not only on variations in the level of different variables based on gender, but also on the pattern of relationships among the study variables. Future studies should examine the relative contribution of individual differences, family situation variables, organizational practices including organizational career development programs, and interactions among them to variations in the performance, career attainments and success of men and women in IS. Moreover, it is necessary to examine not only the more tangible aspects of the work situation as it relates to men and women, but also explore the possibility of more subtle gender differences in work experiences such as receiving supervisory career support, inclusion in the informal communication network, and acceptance by coworkers and the organization [18, 27]. The research agenda should include examination of the determinants of the “external career” success as well as the “internal career” success of women and men in information systems. External career success is typically assessed by such indicators as promotions, changes in job responsibilities, and increased compensation. Internal career success reflects an individual’s personal definitions of success and may include criteria such as work that is challenging and personally satisfying or congruent with one’s career orientation. To many women, and some men, it may also include the extent to which job demands and the organization’s work-family policies are conducive to maintaining a balance between work and family or personal life.

Finally, although the present research provides a “snapshot” view or balance sheet of the status of women in the IS field, it would be useful to track the experiences and accomplishments of women and men over time in order to gain a better understanding of the similarities and differences in their career paths or routes to career success. This calls for longitudinal research, which will facilitate determination
of the causal priority of variables, as well as the development of models of career development applicable to IS and related fields. Additionally, the participants in this study were members of a IS-related association, younger women and older men may have been more likely to respond to the survey. Therefore, further research encompassing a wider sample of IS managers and professionals than those represented in our sample, mainly members of DPMA, is necessary in order to assess the applicability of the findings to the general IS population.
REFERENCES


38. Marenghi, C. There are cracks, but the glass ceiling is still mostly intact. *Computerworld*, February 5 (1992), 85.


Table 1: Relationship of Gender with Demographic Variables

A) Results of ANOVA

<table>
<thead>
<tr>
<th>Variables</th>
<th>Male (N = 268)</th>
<th>Female (N = 86)</th>
<th>Univariate F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>43.08</td>
<td>37.33</td>
<td>28.25***</td>
</tr>
<tr>
<td>Organizational Tenure</td>
<td>10.22</td>
<td>7.56</td>
<td>6.44*</td>
</tr>
<tr>
<td>Job Tenure</td>
<td>4.87</td>
<td>3.58</td>
<td>5.62*</td>
</tr>
<tr>
<td>Number of Years in IS Field</td>
<td>17.22</td>
<td>10.93</td>
<td>37.65***</td>
</tr>
</tbody>
</table>

* p ≤ .05
** p ≤ .01
*** p ≤ .001
## B) Results of Chi-Square

<table>
<thead>
<tr>
<th>Variables</th>
<th>Male (N=268)</th>
<th>Female (N=86)</th>
<th>Chi-Square</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Education:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some College or less</td>
<td>90</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Bachelor's Degree</td>
<td>58</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Some Graduate School</td>
<td>45</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Graduate Degree</td>
<td>73</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td><strong>Organizational Level:</strong></td>
<td></td>
<td></td>
<td>15.89***</td>
</tr>
<tr>
<td>Professional</td>
<td>82</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>184</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td><strong>Salary</strong></td>
<td></td>
<td></td>
<td>33.58***</td>
</tr>
<tr>
<td>Below $25,000</td>
<td>9</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>$25,000 - $34,999</td>
<td>22</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>$35,000 - $44,999</td>
<td>49</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>$45,000 - $54,999</td>
<td>72</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>$55,000 - $64,999</td>
<td>47</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>$65,000 or above</td>
<td>64</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Note. The total number of cases may be fewer than 354 due to missing values.

The values presented in this table are the joint frequency distribution.

- $p \leq .01$
- $p \leq .001$
Table 2: Job Type by Gender

<table>
<thead>
<tr>
<th>Job Type</th>
<th>Male (N=268)</th>
<th>Female (N=86)</th>
<th>(X^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Percentage</td>
<td>N</td>
</tr>
<tr>
<td>Programmers (N=47)</td>
<td>28</td>
<td>10.5</td>
<td>19</td>
</tr>
<tr>
<td>Systems Analysts (N=32)</td>
<td>18</td>
<td>6.7</td>
<td>14</td>
</tr>
<tr>
<td>Project Leaders (N=26)</td>
<td>22</td>
<td>8.2</td>
<td>4</td>
</tr>
<tr>
<td>IS Managers (N=186)</td>
<td>153</td>
<td>57.1</td>
<td>33</td>
</tr>
<tr>
<td>Other MIS Jobs (N=37)</td>
<td>25</td>
<td>9.3</td>
<td>12</td>
</tr>
<tr>
<td>Consultants (N=26)</td>
<td>22</td>
<td>8.2</td>
<td>4</td>
</tr>
</tbody>
</table>

Job Classification:

<table>
<thead>
<tr>
<th>Job Type</th>
<th>Male (N=268)</th>
<th>Female (N=86)</th>
<th>(X^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical (116)</td>
<td>71</td>
<td>45</td>
<td>19.78***</td>
</tr>
<tr>
<td>Managerial (212)</td>
<td>175</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Consulting (26)</td>
<td>22</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

* The values presented in this table are the number of males or females in a job type and the percentage of each from the number of IS employees for each job type.

*** \(p \leq .001\)
Table 3: Results of ANOVA for Study Variables

<table>
<thead>
<tr>
<th>Work Variables</th>
<th>Subgroup Means</th>
<th>Univariate F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male (N=268)</td>
<td>Female (N=86)</td>
</tr>
<tr>
<td>Organizational Level†</td>
<td>1.69</td>
<td>1.45</td>
</tr>
<tr>
<td>Number of Promotion</td>
<td>3.26</td>
<td>3.18</td>
</tr>
<tr>
<td>Average Time to Promotion</td>
<td>5.09</td>
<td>3.71</td>
</tr>
<tr>
<td>Promotability</td>
<td>1.83</td>
<td>1.96</td>
</tr>
<tr>
<td>Salary</td>
<td>4.21</td>
<td>3.19</td>
</tr>
<tr>
<td>Boundary Spanning Activities</td>
<td>3.34</td>
<td>2.80</td>
</tr>
<tr>
<td>Job Satisfaction</td>
<td>3.74</td>
<td>3.64</td>
</tr>
<tr>
<td>Organizational Commitment</td>
<td>3.77</td>
<td>3.60</td>
</tr>
<tr>
<td>Intention to Stay</td>
<td>3.72</td>
<td>3.08</td>
</tr>
</tbody>
</table>

† 1 = Professionals; 2 = Management
* p ≤ .05
** p ≤ .01
*** p ≤ .001
Table 4: Results of ANCOVA for Study Variables

<table>
<thead>
<tr>
<th>Work Variables</th>
<th>Subgroup Means</th>
<th></th>
<th>Univariate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male (N=268)</td>
<td>Female (N=86)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F</td>
</tr>
<tr>
<td>Organizational Level†</td>
<td>1.68</td>
<td>1.48</td>
<td>10.23**</td>
</tr>
<tr>
<td>Number of Promotion</td>
<td>3.05</td>
<td>3.40</td>
<td>1.50</td>
</tr>
<tr>
<td>Average Time to Promotion</td>
<td>4.52</td>
<td>4.22</td>
<td>.32</td>
</tr>
<tr>
<td>Promotability</td>
<td>1.97</td>
<td>1.85</td>
<td>1.37</td>
</tr>
<tr>
<td>Salary</td>
<td>4.01</td>
<td>3.39</td>
<td>14.99**</td>
</tr>
<tr>
<td>Boundary Spanning Activities</td>
<td>3.32</td>
<td>2.86</td>
<td>8.14**</td>
</tr>
<tr>
<td>Job Satisfaction</td>
<td>3.72</td>
<td>3.67</td>
<td>.15</td>
</tr>
<tr>
<td>Organizational Commitment</td>
<td>3.76</td>
<td>3.62</td>
<td>1.61</td>
</tr>
<tr>
<td>Intention to Stay</td>
<td>3.55</td>
<td>3.25</td>
<td>2.89</td>
</tr>
</tbody>
</table>

* Means adjusted for demographic covariates (i.e., age, organizational tenure, job tenure, number of years in the IS field, and education).
+ 1 = Professionals; 2 = Management.
• p ≤ .05
** p ≤ .01
Because of pairwise deletion of missing values, N ranged from 234 to 354.

Note: The absolute value of correlations ≥ 0.9 are significant at or below 0.05 level.

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 5: The Inter-correlations Among The Study Variables
<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Tables</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1: Women will be younger than men on average</td>
<td>1</td>
<td>Accept</td>
</tr>
<tr>
<td>H2: Women will have, on average, lower levels of education than men</td>
<td>1</td>
<td>Reject</td>
</tr>
<tr>
<td>H3: Women will have, on average, less organizational tenure than men</td>
<td>1</td>
<td>Accept</td>
</tr>
<tr>
<td>H4: Women will have, on average, less job tenure than men</td>
<td>1</td>
<td>Accept</td>
</tr>
<tr>
<td>H5: Women will have, on average, fewer years in the IS field than men</td>
<td>1</td>
<td>Accept</td>
</tr>
<tr>
<td>H6: Women, on average will hold lower-level positions than men even when controlling for individual characteristics</td>
<td>4</td>
<td>Accept</td>
</tr>
<tr>
<td>H7: Women in IT, on average will report fewer opportunities for promotion than men even when controlling individual characteristics</td>
<td>4</td>
<td>Reject</td>
</tr>
<tr>
<td>H8: Women in IT, on average, receive lower salaries than men even when controlling for individual characteristics</td>
<td>4</td>
<td>Accept</td>
</tr>
<tr>
<td>H9: Women in IT will have, on average, less opportunities to interact with peers and other members within and outside the organization than men even when individual characteristics</td>
<td>4</td>
<td>Accept</td>
</tr>
<tr>
<td>H10: Women in IT will be, on average, less satisfied with their job than men even when controlling for individual characteristics</td>
<td>4</td>
<td>Reject</td>
</tr>
<tr>
<td>H11: Women in IT will be, on average, less committed with their job than men even when controlling for individual characteristics</td>
<td>4</td>
<td>Reject</td>
</tr>
<tr>
<td>H12: Women in IT will have, on average, more intentions to leave their job than men even when controlling for individual characteristics</td>
<td>4</td>
<td>Reject</td>
</tr>
</tbody>
</table>
FIGURE 1
Gender Difference Theoretical Perspectives: Two Paradigms

1. Human Capital/Status Attainment

   Individual Characteristics
   Education
   Experience
   Skills/Training
   Seniority
   Age

   Wage inequality
   Between
   men and women

2. Occupationalists

   Individual Characteristics
   Education
   Experience
   Skills/Training
   Seniority
   Age
   Gender
   Race

   Occupational
   Characteristics
   Male dominated/
   female dominated

   Wage inequality
   Between
   men and women