

EMPIRICAL EVALUATION OF AGE RELATED DIFFERENCES IN THE MOTIVATION OF OLDER KNOWLEDGE WORKERS

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Abstract

With the impending retirement of the Baby Boom Generation, retention of older knowledge workers, defined as engineers, scientists, and information technologists, has become important to engineering managers. Traditional theories of worker motivation have not offered management help in understanding and effectively utilizing this valuable resource. The study outlined in this paper gathered data regarding the satisfaction and importance of needs to determine the differences in older and younger workers.

Introduction

Since World War II, early retirement has become the norm. In 1900, almost 70 percent of American men age 65 or older were working. By 1950 the percentage had fallen to 46 percent, and by 1980 it had fallen to just over 19 percent (Mor-Barak and Tynan 1993). However, this trend began reversing in the early 1990's. Since 1990, the number of men working beyond the traditional retirement age of 65 has increased 34 percent. Almost 60 percent of current workers ages 19 and older expect to work past the age of 65 (Sullivan and Duplaga 1997).

Description of the Problem.

In order to meet the demands of the 21st century, companies must attract and retain a cadre of productive knowledge workers older than 55 years. Some prominent theorists in human behavior contend that retention and productivity of workers is a function of how well the individual is motivated. Herzberg, Mausner, and Snyderman (1959, 7) contended "a demonstration of the relationship between measures of attitudes and resulting behaviors is of the first importance." Their research focused on "factors in job attitudes," relating to workers without regard to age. Little research has been focused on the factors contributing to retention and motivation of older workers. Considering the reality and urgency of the need for motivation and retention of the older worker in the workforce, the quantity of research, studies, and publications is inadequate (Forte and Hansvick 1999).

Research Objectives.

The objectives of this research were (1) to determine job related differences in older and younger knowledge workers; (2) to determine if factors that

motivate older knowledge workers are the same as those that motivate younger knowledge workers; and (3) to evaluate classical motivation theories with respect to older knowledge workers.

A literature review identified stereotypical differences in the characteristics of younger and older knowledge workers. Recent studies regarding generational differences in the workplace were reviewed. Significant theories of employee motivation were also reviewed. Survey instruments were used to collect data regarding demographic characteristics of a segment of the workforce referred to as knowledge workers. This data was used to determine differences between the younger and older segments of the knowledge worker population. The extent to which factors identified in the motivation theories apply to knowledge workers was determined. From the survey data, differences in the applicability and degree of motivational influence of factors between the younger and older segments of the surveyed knowledge workers were determined.

The Older Knowledge Worker

The Final Report of the Americans Over 55 at Work Program, sponsored by the Commonwealth Fund (1993) focused on workers over the age of 55 as older workers. The premise of the study was that American workers over the age of 55 are valuable and underutilized resources. This paper considers all male and female workers age 55 and older as older workers.

According to Drucker (1977), knowledge workers are the fastest growing segment of the workforce in developed countries. He defined them as "accountants, engineers, social workers, nurses, computer experts of all kinds, teachers and researchers" (Drucker 1977, 271). They are the people who add to a company's products and services by applying their knowledge (Drucker 1993). For the purpose of this paper, knowledge workers were considered to be those in positions that required at least a four-year technical degree or seven years of equivalent experience. They were personnel primarily engaged in engineering, scientific, and information technology related functions.

Stereotypes Regarding Older Workers.

Stereotyping is the act of judging, reacting to, or treating another person on the basis of one's perception of the group (old, young, manager, engineer) to which that person belongs or in which they have been placed (Robbins 2001). The terms old or older describe a group of people to which certain characteristics are assigned. These may include positive traits such as experience, good judgment, strong work ethic, and a commitment to quality. In a more negative vein, older workers have been characterized as lacking flexibility, resistant to new technology, unwilling or unable to learn new skills, and unable to change or adapt. Many people attribute high absenteeism and high job turnover to the older population due to the stereotype of a physically and mentally declining individual.

Truths Regarding Older Workers.

Research has dispelled many of these stereotypes. Smith and Hoy (1992) found that the turnover rate for older workers is less than that of younger workers. They also found that job satisfaction and organizational commitment are important determinants of turnover rate. Rhodes (1983) found that older workers are more satisfied and committed to their firms than are younger workers. Older workers demonstrate lower rates of avoidable absenteeism, but higher rates of unavoidable absenteeism.

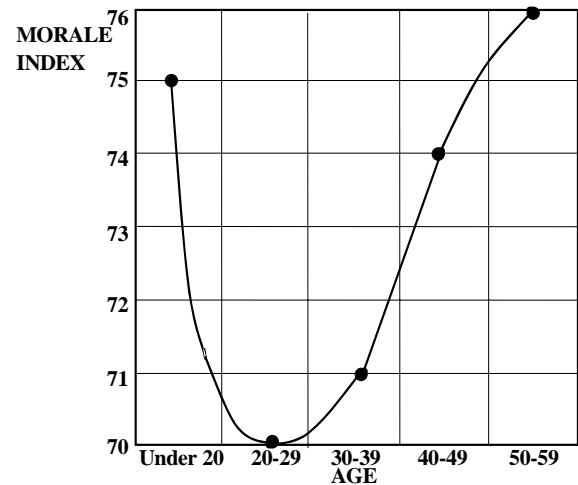
Older workers want to learn and are just as capable of learning as younger workers. Sullivan and Duplaga (1997) found that most people retain their ability to learn well into their 70's and, as a result of learning, feel young and vibrant. However, older workers are often overlooked for training and career development due to management's belief that they cannot or will not learn, the investment in training may not be warranted due to too few remaining years of service, or they are not interested in further development of a career. A study sponsored by AARP found that only three out of ten companies included older workers in their training programs (Capowski 1994). In a study conducted by Roper Starch Worldwide for Randstad North America (2001), the oldest generation participating in the survey indicated that *trying new things* was their highest work priority.

In a study relating age to performance evaluations and promotions, Siegel (1993) found no significant difference between the performance evaluations of older managers and younger managers. However, older managers were less likely to be promoted. Sullivan and Duplaga (1997) found that in some occupations such as sales and

paraprofessionals, productivity actually increased with age.

Benge and Copell (1947) indicated morale (job satisfaction) is high among younger, entry-level workers. During the first few years of employment, morale declined. It reached the low point at about age 30, or about ten years into their career. Morale increased steadily after age 30. This relationship of morale to age is shown in Exhibit 1. Rhodes (1983) cited 22 studies that indicate that job satisfaction is positively associated with age.

Exhibit 1. Worker morale as a function of age.



However, no studies were found that investigated the extent to which individual work factors contribute to job satisfaction and age related differences in the potency of work related factors in influencing job satisfaction.

Need for Greater Productivity

In order to realize growth and profit objectives, organizations must maximize the return they get on their investment in the resources required for them to conduct their chosen commerce. They must do this better than the majority of their competitors. Drucker (2002, 76 - 77) maintained "leadership can be obtained and maintained by innovation. In an established industry, however, what differentiates the leading company is almost always outstanding productivity of capital. Knowledge-based businesses need to be similarly focused on the productivity of their capital – that is, the productivity of knowledge workers." Drucker (1992, 108) warned "developed economies face economic stagnation if they do not raise the productivity of knowledge and service workers." Drucker (2002, 108) later said that, "raising the productivity of knowledge and service

workers must therefore be an *economic* priority for developed countries.” According to Drucker, in dealing with knowledge and service jobs, quality and quantity together usually constitute performance. “In knowledge and service work, partnership with the responsible worker is the *only* way; nothing else will work at all” (Drucker 1992, 107).

Motivation Theory

Based on their research, Herzberg, Mausner, and Snyderman (1959) theorized the existence of specific job factors relating to job attitudes. Through empirical studies, Herzberg and his associates identified and classified job factors into two groups, motivators and hygienes. Motivator factors result in job satisfaction and are intrinsic in nature. Motivation comes from the desire or need of workers to be and do the very best that is in them. The company can only facilitate this process by allowing workers to perform tasks in a work environment that will allow them to do or be the very best that is within them.

Hygienes are considered to be dissatisfiers, and are extrinsic in nature. Factors classified as dissatisfiers meet the needs of workers to avoid unpleasant or threatening situations or unpleasant physical environments. These factors are not a part of the job itself, but a part of the physical job environment. Satisfaction of hygiene factors can only lead to the prevention of job dissatisfaction. They cannot aid in worker satisfaction nor motivate workers to achieve their very best. In the absence of satisfiers, workers demand greater satisfaction of hygiene factors such as pay, physical environment, or job perks. The cost of this approach increases with a decrease in the presence of satisfiers.

Factor Importance versus Satisfaction

Satisfaction is the correspondence of the individual's needs (factor importance) and the ability of the job environment to meet those needs (factor satisfaction). In comparing the levels of satisfaction of the two age groups with a particular job related factor, it is important to know the extent to which the groups have the same expectations or place the same level of importance on that factor. For example, in determining the relative satisfaction with the extent to which a job allows the participant to exercise their judgment, we must know the level at which the groups want or need to exercise judgment. One group may want to exercise their own judgment in all aspects of their job while another wants no decision-making responsibility at all. Both groups could indicate a high degree of satisfaction with this aspect of their job. This would mean that one group was given the opportunity to make independent decisions

while the other was not required to do so. Therefore, no conclusions can be drawn with respect to the actual importance of being able to make independent decisions to either group, only the extent to which their individual needs are being met. The importance of a factor may influence how the respondent scores their level of satisfaction with that factor.

Data Collection and Analysis Techniques

In the data-gathering phase of this study, the level of worker satisfaction with individual motivational factors was identified using the Minnesota Satisfaction Questionnaire (MSQ). The importance of these factors to the respondent was measured using the Minnesota Importance Questionnaire (MIQ). In order to relate the results of the surveys to the motivation theories, factors in the surveys were correlated with Herzberg's factors and Maslow's needs.

Organizational commitment was measured using the Meyer and Allen Organizational Commitment Survey. Organizational commitment is an attitude that is shaped by the myriad of independent variables present in the work. The Meyer and Allen Organizational Commitment Survey comprises 18 statements of commitment attitudes toward the organization. The 18 statements are equally divided among the three commitment components: Affective, Continuance, and Normative. Affective commitment is based on emotional feelings toward the organization. Continuance commitment is based on dependence on the salary and benefits provided by the organization. Normative commitment is based on a sense of obligation to the organization.

The data collected by these surveys was used to rank vocational needs by their importance to the worker and the degree to which they are being satisfied in their current job. Using data from the demographic section of the surveys, the respondents were divided into two age groups, those under the age of 55 and those age 55 and older. Tests of the data were conducted to determine differences in potency of vocational needs between older and younger workers, differences in job satisfaction between older and younger workers, and differences in organizational commitment between older and younger workers. The results of these tests were compared to results predicted by the motivation theories discussed above.

Hypotheses

The following hypotheses were tested.

- Hypothesis 1: The reasons younger knowledge workers remain in the workforce are the same as those of older knowledge workers.

- Hypothesis 2: There is no difference in the level of job satisfaction between younger and older knowledge workers in their current jobs.
- Hypothesis 3: Satisfaction derived from each motivational factor is the same for younger knowledge workers as it is for older knowledge workers in their current jobs.
- Hypothesis 4: There is no difference in the importance of job related factors between younger and older knowledge workers.
- Hypothesis 5: Each motivational factor has the same level of importance to job satisfaction for younger knowledge workers as it does to that for older knowledge workers.
- Hypothesis 6: There is no difference in the level of organizational commitment between younger and older knowledge workers to their current organizations.
- Hypothesis 7: There is no correlation between the current level of job satisfaction and organizational commitment of knowledge workers.

Hypothesis 1.

In order to test Hypothesis 1, twelve statements were included in this survey to better understand the reasons knowledge workers stay in the workforce and to determine if there were age related differences in their responses. Of the 239 responses used, 161 were from the under 55-age group and 78 were from the 55 and over age group. The null hypothesis was rejected ($p < 0.01$, $\alpha = 0.05$). There were statistically significant differences in the reasons given by older and younger workers as to why they work.

The most significant finding was not in the differences, but in the similarity of one of the responses. Both age groups ranked the statement “*I enjoy and take pride in my work*” in their top two reasons for working. This is a strong indicator that older workers are just as engaged in their work as their younger counterparts.

Four reasons for working were identified that differentiate the older from the younger knowledge workers.

- **“I must work to meet the basic necessities of living.”** This reason for working was much more significant to the younger knowledge workers than to the older knowledge workers. This was supported by the finding that 40% of the older respondents have sufficient outside income to cover basic needs compared to only 8% of the younger respondents. The hypothesis “There is no difference in the extent to which the statement *I Must Work* applies to younger workers and older workers” was rejected ($p < 0.01$, $F = 64.02$).

- **“I work to provide safety nets such as health insurance”** The responses to this statement were similar to those of the first statement, and are also consistent with the finding that 40% of the older respondents have sufficient outside income compared to only 8% of the younger respondents. Additionally, older workers are more likely to have insurance coverage from the government or as a part of a retirement plan from a prior job. The hypothesis “There is no difference in the extent to which the statement *I Work to Provide Safety Nets* applies to younger workers and older workers” was rejected ($p < 0.01$, $F = 31.92$).

- **“I work because I enjoy the recognition it brings me.”** Recognition appeared to be a stronger factor for younger knowledge workers than for older knowledge workers. The difference in the responses from the two age groups, however, was not as great as for the more basic needs. The hypothesis “There is no difference in the extent to which the statement *I Enjoy Recognition* applies to younger workers and older workers” was rejected ($p < 0.01$, $F = 8.98$).

- **“I work to attain goals I have not yet reached in my professional career.”** The response indicated that, in the workplace, younger workers are much more goal oriented than older workers. The degree to which this statement applied to the older knowledge workers was the lowest of all twelve statements. It could not be determined if the goals are personal or organizational goals. The hypothesis “There is no difference in the extent to which the statement *I Work to Attain Goals* applies to younger workers and older workers” was rejected ($p < 0.01$, $F = 60.97$).

Hypothesis 2.

The Minnesota Satisfaction Questionnaire (MSQ) was used to determine the relative level of satisfaction of the respondents with 20 work related factors in their current job. Possible responses to the MSQ survey ranged from 1 (Very Dissatisfied) to 5 (Very Satisfied). Hypothesis 2 states, “There is no difference in the level of job satisfaction between younger knowledge workers and older knowledge workers.” The null hypothesis could not be rejected ($p = 0.06$, $\alpha = 0.05$). There appears to be no statistically significant difference in the overall level of job satisfaction in older versus younger knowledge workers when considering all 20 factors. However, it can be rejected ($p < 0.01$, $F = 15.33$) if the hypothesis is tested for the ten factors most important to each age group.

The average satisfaction level for the five most important factors for the younger workers was 3.96, and for the ten most important factors it was 3.94. The average satisfaction level for the five most important factors for the older workers was 4.30, and for the ten most important factors it was 4.14. This indicated that, when the importance of factors is considered, hypothesis 2 could be rejected. Older workers were more satisfied than their younger counterparts with the way their needs are being met in the factors most important to them.

Hypothesis 3.

Hypothesis 3, “Satisfaction derived from each motivational factor is the same for younger knowledge workers as it is for older knowledge workers” was rejected. The analysis revealed a statistically significant ($p < 0.05$, $\alpha = 0.05$) difference in satisfaction level between the two age groups in six of the factors. In all six factors the older workers consistently scored between 0.26 and 0.34 points higher than the younger workers in the mean level of satisfaction, indicating a higher level of satisfaction with these factors. These six factors were analyzed as follows.

- *Feeling of accomplishment* - This factor addressed the degree to which the work environment is one in which employees’ tasks are broad enough to allow them to feel that they were able to start and complete the entire task, and therefore look back on it with a sense of accomplishing something tangible. The null hypothesis “there is no difference between the two age group in the mean level of satisfaction with the *feeling of accomplishment* they received from their work” was rejected ($p = 0.01$, $F = 7.37$). Older respondents indicated a higher level of satisfaction (mean response = 4.25) with this aspect of their job than did younger workers (mean response = 3.92).
- *Co-workers get along* – This factor addresses the degree to which the work environment is one in which employees are interested in and responsive to friendly interpersonal gestures and relationships. The null hypothesis “there is no difference between the two age group in the mean level of satisfaction with the way their *Co-workers get along* with each other” was rejected ($p = 0.03$, $F = 4.76$). Older respondents indicated a higher level of satisfaction (mean response = 4.21) with this aspect of their job than did younger workers (mean response = 3.95).
- *Chance to try my own methods* – This factor addresses the degree to which job related tasks allow for innovations that are independently conceived and performed by the worker. The null hypothesis “there is no difference between the two age group in the mean level of satisfaction with

their *chance to try their own methods*” was rejected ($p = 0.01$, $F = 7.07$). Older respondents indicated a higher level of satisfaction (mean response = 4.31) with this aspect of their current job than did younger workers (mean response = 4.01).

- *Freedom to use my judgment* – This factor addresses the degree to which job related tasks allow the worker to make job related decisions, be independent, and be held accountable for decisions they make. The null hypothesis “there is no difference between the two age group in the mean level of satisfaction with their *freedom to use their own judgment*” was rejected ($p = 0.03$, $F = 5.10$). Older respondents indicated a higher level of satisfaction (mean response = 4.32) with this aspect of their current job than did younger workers (mean response = 4.06).
- *Make use of my abilities* – This factor addresses the degree to which job related tasks allow the worker to exercise self-perceived skills and talents. The null hypothesis “there is no difference between the two age group in the mean satisfaction with the way their job *makes use of their abilities*” was rejected ($p = 0.02$, $F = 5.78$). Older respondents indicated a higher level of satisfaction (mean response = 4.32) with this aspect of their job than did younger workers (mean response = 3.98).
- *Do different things* – This factor addresses the range of possible activities inherent in the job. The null hypothesis “there is no difference between the two age group in the mean level of satisfaction with ability to *do different things*” was rejected ($p = 0.01$, $F = 6.70$). Older respondents indicated a higher level of satisfaction (mean response = 4.42) with this aspect of their current job than did younger workers (mean response = 4.11).

Hypothesis 4.

Hypothesis 4 states “there is no difference in the importance of job related factors between younger knowledge workers and older knowledge workers.” The null hypothesis was rejected ($p < 0.01$). There was a difference in the importance of job related factors between younger knowledge workers and older knowledge workers. Differences will be discussed under hypothesis 5.

Hypothesis 5:

Hypothesis 5 states, “Each motivational factor has the same level of importance to job satisfaction of younger knowledge workers as it does to that of older knowledge workers.” Significant differences exist in four of the 20 factors tested.

- *Advancement* – This factor addressed the degree to which there is an opportunity for fair evaluation of and consequent advancement for work-related

excellence. The null hypothesis “there is no difference between the two age group in the mean level of importance of *advancement*” was rejected ($p < 0.01$, $F = 20.97$). The younger respondents attached a higher level of importance (mean response = 1.19) with this job factor than did older workers (mean response = 0.65). Since this scale ranges from - 1.0 (unimportant) to 0.00 (neutral) to + 3.0 (important), the responses indicated that *advancement* is not very important to the older workers, while it was moderately important to the younger workers.

- *Independence* – This factor addressed the degree to which the individual is able to make decisions. The null hypothesis “there is no difference between the two age group in the mean level of importance of *independence*” was rejected ($p = 0.03$, $F = 4.71$). The older respondents attached a slightly higher level of importance (mean response = 0.23) on independence than did younger workers (mean response = - 0.06). However, the responses indicated that *independence* is not very important to either age group.
- *Security* – This factor addressed the degree to which the work environment promises continuity of employment and compensation to the individual. The null hypothesis “there is no difference between the two age group in the mean level of importance of *security*” was rejected ($p < 0.01$, $F = 9.65$). This factor was very important to the younger workers (mean response = 1.42), while it was of moderate importance to the older workers (mean response = 1.02). This was the largest difference in factor importance observed between the responses of the two age groups
- *Human Relations Ability of Supervisor* – This factor addressed the degree to which the supervisor creates and maintains an atmosphere of mutual respect and personal investment among subordinates and superiors. The null hypothesis “there is no difference in the mean level of importance attached by the two age groups to the way the *supervisor relates to employees*” was rejected ($p = 0.01$, $F = 6.85$). The younger respondents attached a slightly higher level of importance (mean response = 0.72) on Human Relations Ability of the Supervisor than did older workers (mean response = 0.46).

Analysis of the data indicated that the importance of fourteen of the twenty factors did not differ between the two age groups ($p \geq 0.05$). These similarities are as important as the differences. There were no statistically significant differences in the importance of factors such as *utilization of their ability*, *opportunity to feel a sense of achievement*, *level of activity (keeping busy)*, ability to use their

creativity, receiving *recognition*, the level or amount of *responsibility* they have, and the *variety of their work*. This indicated that the older worker is just as engaged in their work as are their younger co-workers. Similarities were also evident in their responses regarding the lack of importance of hygiene factors such as *company practices*, *social environment with co-workers*, *social status*, level of *authority* they have, *technical capability of supervisor*, and *working conditions*.

Hypothesis 6.

Hypothesis 6 states, “there is no difference in the level of organizational commitment between younger knowledge workers and older knowledge workers.” The Meyer and Allen Organizational Commitment Survey was used to gather data for this part of the analysis. The null hypothesis was rejected ($p = 0.01$). There is a statistically significant difference in the overall level of organizational commitment shown by older knowledge workers versus younger knowledge workers. Differences in responses relative to Affective commitment; Continuance commitment; and Normative commitment were also determined.

- *Affective Commitment* - The null hypothesis “there is no difference in the mean Affective commitment between younger and older knowledge workers” could not be rejected ($p = 0.50$, $\alpha = 0.05$). There was no statistically significant difference in the level of Affective commitment shown by older versus younger knowledge workers. This is consistent with the lack of correlation between age and overall job satisfaction found during the analysis of Hypothesis 2.
- *Continuance Commitment* - The null hypothesis “there is no difference in the mean Continuance commitment between younger and older knowledge workers” was rejected ($p < 0.01$). The means of four of the six responses were statistically different ($p < 0.05$) between older and younger knowledge workers. In all four cases the younger workers felt a stronger Continuance commitment. The four statements are:
 - *Hard to Leave Now* –The null hypothesis “there is no difference in the mean level of agreement with the statement *it would be hard to leave now* between the two age groups” was rejected ($p = 0.02$, $F = 5.14$). Younger workers slightly agree that *it would be hard for them to leave* their job now, while older workers were neutral.
 - *Life would be disrupted if I left now* – The null hypothesis “there is no difference in the mean level of agreement with the statement *life would be disrupted* between the two age groups” was rejected ($p = 0.01$, $F = 6.61$). Younger workers agreed slightly more that their *lives would be*

disrupted if they left their job, while older workers disagreed.

- *Staying is a Matter of Necessity* –The null hypothesis “there is no difference in the mean level of agreement with the statement *staying is a matter of necessity* between the two age groups” was rejected ($p < 0.01$, $F = 16.60$). Younger workers indicated a slight agreement with the statement *staying is a matter of necessity*, while older workers disagreed with the statement.
- *Personal Sacrifice of Benefits* – The null hypothesis “there is no difference in the mean level of agreement with the statement *leaving would result in a personal sacrifice of benefits* was rejected ($p = 0.04$, $F = 4.45$). Younger workers agreed slightly that by leaving they would be sacrificing benefits offered by their current job, while older workers slightly disagreed with the statement.
- *Normative Commitment* - The null hypothesis “there is no difference in the mean Normative commitment between younger and older knowledge workers” was rejected ($p = 0.03$). The mean of the response to only one of the six statements under Normative commitment was statistically different between the two age groups at the $\alpha = 0.05$ significance level. The null hypothesis “there is no difference in the mean level of agreement with the statement *the organization deserves my loyalty* between younger and older knowledge workers” was rejected ($p = 0.04$, $F = 3.56$). The mean response of both age groups indicates they agree that the organization deserved their loyalty. The results indicated a stronger loyalty in the older workers.

Hypothesis 7.

Hypothesis 7 states, “There is no correlation between job satisfaction and organizational commitment.” A correlation analysis was conducted comparing the overall satisfaction of all workers, calculated by taking the average of the individual responses to the 20 MSQ job satisfaction factors, and the average organizational commitment responses, calculated by taking the average of the individual responses to the 18 comments in the Meyer & Allen Organizational Commitment Survey. Since higher satisfaction is represented by higher scores and higher commitment is represented by lower scores, a negative coefficient of correlation indicates a positive correlation between the two variables. The Pearson Coefficient of Correlation was $r = - 0.60$ ($p < 0.01$). This indicated a positive correlation between job satisfaction and organizational commitment. Overall job satisfaction

was also correlated with each of the three categories of organizational commitment. In two of the three categories, a strong positive correlation was found. Job satisfaction correlated with Affective commitment ($r = - 0.71$, $p < 0.01$), and Normative commitment ($r = - 0.59$, $p < 0.01$). There was no correlation between job satisfaction and Continuance commitment. Correlation of job satisfaction with Affective and Normative commitment was expected, since they imply positive feelings toward the job and the organization. Likewise, a negative correlation between job satisfaction and Continuance commitment was expected since Continuance commitment implies a worker feels they are trapped in their jobs. A correlation analysis was conducted for each of the two age groups comparing overall average job satisfaction with overall average commitment. The results were similar for both age groups.

A correlation analysis was conducted for each of the two age groups within each of the three categories of commitment. The results for Affective commitment were $r = - 0.71$ ($p < 0.01$) for younger workers and $r = - 0.73$ ($p < 0.01$) for older workers. There was a difference in the correlations relative to Continuance commitment. Younger workers demonstrated essentially no correlation ($r = - 0.08$, $p = .31$), while the older workers demonstrated a significant negative correlation ($r = + 0.31$, $p = 0.01$). The more satisfied the older workers, the less Continuance commitment they felt toward the organization. The job satisfaction of both age groups correlated positively with Normative commitment, with a Pearson Correlation Coefficient of $r = - 0.63$ ($p < 0.01$) for the younger workers and $r = - 0.49$ ($p < 0.01$) for older workers.

Conclusions

Three general conclusions were drawn from this study regarding older knowledge workers, i.e., those engaged in engineering, scientific, and information technology pursuits.

- There is a positive correlation between job satisfaction and overall organizational commitment. The strong link between attention to motivators and the strength of the intrinsic components of organizational commitment is a key finding.
- Organizational Commitment may be a better measure of knowledge worker attitude than job satisfaction. Data on the level of job satisfaction of knowledge workers have not provided clear and concise information on the impact of motivation factors and needs on attitudes. Data regarding organizational commitment have provided this information.

- Negative stereotypes regarding older workers are unfounded. Older workers have been characterized as lacking flexibility, being resistant to new technology, being unwilling or unable to learn new skills, and unable to change or adapt. The results of this study have shown the opposite to be true.

Differences Between Younger and Older Knowledge Workers.

This study found differences between the younger and older knowledge worker. However, these differences do not necessarily conform to the stereotypes that are common in the workplace. In many cases, the differences increase the older workers' value to the organization. These differences are

- While there is no statistically significant difference in the overall level of satisfaction of older and younger knowledge workers, there were differences in satisfaction levels at the individual job factor level. Considering only the ten most important job factors of each age group, it has been shown that older workers were more satisfied than younger workers.
- There was a difference in the overall mean level of importance of job factors between younger and older workers. At the job factor level, there were significant differences between younger and older workers. Younger workers place more importance on *Advancement, Compensation, Security, and how their Supervisor relates to them*. The older worker places more importance on *Independence* and their *Ability to Do Things for Others*.
- There was no difference in the overall level of commitment to the organization between older and younger workers. In general, the younger workers found it harder to leave the organization from a personal material loss point of view than did older workers. Older workers appeared to feel that the organization deserves their loyalty more so than do the younger workers.
- The reasons younger workers remained in the workforce are different from those of older workers. Younger workers work to provide basic necessities and safety nets for themselves and their families. Recognition appears to be a stronger factor for younger knowledge workers than for older knowledge workers. The primary reason older workers remain in the workforce is that they enjoy working and take pride in what they do.

Similarities in Younger and Older Knowledge Workers.

The most significant results from this study may be the identification of the similarities between older and younger workers. In most cases these similarities

contradict stereotypes held by employers and co-workers concerning older workers. Similarities include

- Considering all job factors, there is no difference in the overall level of satisfaction between older and younger workers.
- There is a statistically significant difference in the overall importance of job factors between older and younger workers. However, the list of factors ordered from the most important to the least important is very similar between the two age groups.
- There appears to be no difference in the overall level of organizational commitment between younger and older workers.
- A strong intrinsic motivator for both age groups is the fact that they *enjoy and take pride in the job they do*.

Implications to Engineering Managers

Engineering managers will find it increasingly difficult to find, attract, and retain qualified knowledge workers to meet their needs. An important solution to this problem lies in the large number of older engineers, scientists, and information technologists currently reaching retirement age. Dispelling age related stereotypes, understanding the needs unique to older knowledge workers, and creating a work environment where those needs can be met will assist engineering managers in effectively utilizing these valuable workers.

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