Age-Related Differences in the Motivation of 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 adequately addressed the impact of worker age on factors that affect worker motivation. The study outlined in this article gathered data regarding the satisfaction and importance of motivational factors to determine if there are differences in their impact on older and younger knowledge workers.

Keywords: Older Knowledge Workers, Motivation, Satisfaction, Organizational Commitment

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Research Objectives
The objectives of this research were to (1) determine job-related differences in older and younger knowledge workers, (2) determine if factors that motivate older knowledge workers are the same as those that motivate younger knowledge workers, and (3) evaluate classical motivation theories to determine if there are age-related differences in their applicability.

Stereotypes in the characteristics of younger and older knowledge workers were identified. Recent studies regarding generational differences in the workplace and significant theories of employee motivation were 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 applied to the motivation of knowledge workers, and the differences in the applicability and degree of motivational influence of factors between the younger and older segments of the surveyed knowledge workers.

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. The premise of the study was that American workers over the age of 55 are a valuable and underutilized resource. This report identified older workers as all male and female workers age 55 and older.

In 1977, Peter Drucker observed that knowledge workers were the fastest growing segment of the work force in developed countries. He defined them as: accountants, engineers, social workers, nurses, computer experts of all kinds, teachers, and researchers (Drucker 1977). They are the people who add to a company’s products and services by applying their knowledge “represents the fastest growing segment of the workforce.” That trend is continuing. In testimony before the Senate Committee on Health, Education, Labor, and Pensions, Secretary of Labor Elaine L. Chao (2005) stated, “The fastest growing jobs of the future will need to be filled by ‘knowledge workers’ who have specialized skills and training. In fact, the demand for knowledge workers is already growing at an astonishing rate.” For the purpose of this article, knowledge workers are considered to be individuals in positions that required at least a four-year technical degree or seven years of equivalent experience in engineering, scientific, and information technology related functions.
Stereotyping is judging, reacting to, or treating another person on the basis of one’s perception of the group to which that person belongs (old, young, manager, engineer) 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.

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 were more satisfied and committed to their firms than were younger workers. Older workers demonstrated 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 70s and, as a result of learning, feel young and vibrant. 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; 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 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 andDuplaga (1997) found that in some occupations such as sales and paraprofessionals, productivity actually increased with age; however, no studies were found that investigated the extent to which individual work factors contribute to age-related differences in job satisfaction or productivity.

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) maintained that “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.” Earlier, Drucker (1992) had warned that “developed economies face economic stagnation if they do not raise the productivity of knowledge and service workers.” He goes on to say that 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). He later said that, “raising the productivity of knowledge and service workers must therefore be an economic priority for developed countries” (Drucker, 2002).

Factor Importance vs. 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

Data used in this article was collected and analyzed by Lord (2004) as part of his doctoral dissertation. It was subsequently presented to the 25th National Conference of the American Society for Engineering Management and published in the peer reviewed proceedings of that conference (Lord and Farrington, 2004). The data was collected from 248 knowledge workers. Demographics of the survey population are as follows:

- Range of respondent age: 22 to 76
  - 169 below age 55; 79 age 55 or over
  - Median age: 48 years
- 37 organizations ranging from 3 to over 10,000 employees
- Organizations: Aerospace, IT, DoD, Automotive, Medical, Government
- Respondents from eight states
- 22 non-degreed, 136 bachelors, 79 masters, 11 PhD

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) (Weiss et al., 1981). The importance of these factors to the respondent was measured using the Minnesota Importance Questionnaire (MIQ) (Rounds et al., 1981).

Organizational commitment was measured using the Meyer and Allen Organizational Commitment Survey (Meyer, Allen, and Smith, 1993). 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 is comprised of 18 statements of commitment attitudes toward the organization. The 18 statements are equally divided among the three types of commitment: 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 using 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. A statistical analysis of the data was 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 Herzberg et al. (1959).

**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 for older knowledge workers.
- Hypothesis 6: There is no difference in the level of organizational commitment younger and older knowledge workers have to their current organizations.
- Hypothesis 7: There is no correlation between the current level of job satisfaction and organizational commitment of knowledge workers.

Exhibit 1 provides a summary of the statistical results from the testing of these hypotheses.

**Hypothesis 1**
In order to test Hypothesis 1, 12 statements were included in the survey to better understand the reasons knowledge workers stay in the workforce. Of the 239 responses, 161 were from the under 55 age group and 78 were from the 55 and over age group. Statistically significant differences \( p < 0.01, \alpha = 0.05 \) were found in the reasons given by older and younger workers as to why they work.

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

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Significance Level</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: The reasons younger knowledge workers remain in the workforce are the same as those of older knowledge workers.</td>
<td>( p &lt; 0.01 )</td>
<td>Reject: The reasons given by older and younger workers differ.</td>
</tr>
<tr>
<td>2: There is no difference in the level of job satisfaction between younger and older knowledge workers in their current jobs.</td>
<td>( p = 0.06 )</td>
<td>Cannot reject.</td>
</tr>
<tr>
<td>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.</td>
<td>( p &lt; 0.05 )</td>
<td>Reject: Differences exist in six of the 20 factors tested.</td>
</tr>
<tr>
<td>4: There is no difference in the importance of job related factors between younger and older knowledge workers.</td>
<td>( p &lt; 0.01 )</td>
<td>Reject: Differences exist in the importance of job related factors.</td>
</tr>
<tr>
<td>5: Each motivational factor has the same level of importance to job satisfaction for younger knowledge workers as it does for older knowledge workers.</td>
<td>( p &lt; 0.01 )</td>
<td>Reject: Significant differences exist in four of the 20 factors tested.</td>
</tr>
<tr>
<td>6: There is no difference in the level of organizational commitment younger and older knowledge workers have to their current organizations.</td>
<td>( p = 0.01 )</td>
<td>Reject: Differences exist in the level of organizational commitment.</td>
</tr>
<tr>
<td>7: There is no correlation between the current level of job satisfaction and organizational commitment of knowledge workers.</td>
<td>( p &lt; 0.01 )</td>
<td>Reject: Positive correlation between job satisfaction and organizational commitment.</td>
</tr>
</tbody>
</table>
• “I must work to meet the basic necessities of living.” This reason for working was much more significant to the younger knowledge workers ($p < 0.01$). It is supported by the finding that 40% of the older respondents had sufficient outside income to cover basic needs compared to only 8% of the younger respondents.

• “I work to provide safety nets such as health insurance.” The differences between the two age groups was statistically significant ($p < 0.01$). 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.

• “I work because I enjoy the recognition it brings me.” Recognition appears to be a stronger factor for younger knowledge workers than for older knowledge workers ($p < 0.01$). The difference in the responses from the two age groups, however, was not as great as for the more basic needs.

• “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 ($p < 0.01$). 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 were personal or organizational goals.

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.

**Hypothesis 2**

The Minnesota Satisfaction Questionnaire (MSQ) was used to determine the relative level of satisfaction of the respondents on 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 ($p = 0.06, \alpha = 0.05$). The results indicated no statistically significant difference in the overall level of job satisfaction in older versus younger knowledge workers when considering all 20 factors.

However, statistically significant results were obtained for differences in the top five and top 10 most important factors. On a scale of 1 to 5 with 5 being very satisfied, the average satisfaction level for the five most important factors for the younger workers was 3.96, compared to 4.30 for the older workers ($p < 0.01$). The average satisfaction level for the 10 most important factors was 3.94 for the younger workers compared to 4.14 for the older workers ($p < 0.01$). This indicates that, when the importance of factors is considered, Hypothesis 2 can be rejected. Older workers were more satisfied than their younger counterparts with the way their needs were being met in the factors most important to them.

**Hypothesis 3**

The analysis revealed a statistically significant difference ($p < 0.05, \alpha = 0.05$) in satisfaction level between the two age groups on six of the 20 factors. In all six factors the older workers consistently scored 0.26 to 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:

• **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 results indicated a higher level of satisfaction in the older workers ($p < 0.01$).

• **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 results showed a higher level of satisfaction by older workers with this aspect of their job ($p = 0.03$).

• **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. Older respondents indicated a higher level of satisfaction with this aspect of their current job than did younger workers ($p = 0.01$).

• **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 results were significant with older workers indicating a higher level of satisfaction with this aspect of their current job ($p = 0.02$).

• **Do different things:** This factor addresses the range of possible activities inherent in the job. The older workers exhibited a higher level of satisfaction in this area than the younger workers ($p = 0.01$).

**Hypothesis 4**

This hypothesis looks at the overall importance placed on the 20 job-related factors as a whole by each age group. The null hypothesis was rejected ($p < 0.01$). There was a difference in the overall importance of job-related factors to younger and older knowledge workers.

**Hypothesis 5**

Hypothesis 5 analyzes the importance of each factor to each of the two age groups. Significant differences in the level of importance were found 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. There was a statistically significant difference between the responses for younger and older knowledge workers ($p < 0.01$). The younger respondents attached a higher level of importance on this job factor than did older workers. 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 difference
between the two age groups was statistically significant \((p = 0.03)\). The older respondents attached a slightly higher level of importance to independence than did the younger respondents; 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. Again, the difference between older and younger respondents was statistically significant \((p < 0.01)\). This factor was very important to the younger workers, while it was of moderate importance to the older workers. 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 younger respondents attached a slightly higher level of importance on Human Relations Ability of the Supervisor than did older workers \((p = 0.01)\).

Analysis of the data indicated that the importance of 14 of the 20 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, and the variety of their work. Again, this indicates 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, technical capability of supervisor, and working conditions.

**Hypothesis 6**
The Meyer and Allen Organizational Commitment Survey was used to gather data for this part of the analysis. The null hypothesis of no difference in organizational commitment between the two age groups was rejected \((p = 0.01)\). There was a statistically significant difference in the overall level of organizational commitment shown by older knowledge workers versus younger knowledge workers. Older workers indicated a higher degree of organizational commitment than did their younger counterparts.

Differences in responses relative to affective commitment, continuance commitment, and normative commitment were also determined.

- **Affective commitment**: The difference in the level of affective commitment shown by older versus younger knowledge workers was not statistically significant \((p = 0.50)\). This is consistent with the lack of correlation between age and overall job satisfaction found during the analysis of Hypothesis 2.

- **Continuance commitment**: The difference between continuance commitment for younger and older workers was found to be statistically significant \((p < 0.01)\). The means of four of the six responses were different \((p < 0.05)\) for older and younger knowledge workers. In all four cases the younger workers felt a stronger continuance commitment. The four statements exhibiting a difference were:
  - **Hard to leave now**: Younger workers slightly agree that it would be hard for them to leave their job now, while older workers were neutral \((p = 0.02)\).
  - **Life would be disrupted if I left now**: Younger workers agreed slightly more that their lives would be disrupted if they left their job, while older workers disagreed \((p = 0.01)\).
  - **Staying is a matter of necessity**: Younger workers indicated a slight agreement with the statement “staying is a matter of necessity,” while older workers disagreed \((p < 0.01)\).
  - **Personal sacrifice of benefits**: Younger workers agreed slightly that by leaving they would be sacrificing benefits offered by their current job, while older workers slightly disagreed \((p = 0.04)\).

- **Normative commitment**: There was a difference in the level of Normative Commitment between the two age groups \((p = 0.02)\). Older knowledge workers appear to have a higher level of normative commitment to the organization than their younger counterparts. The null hypothesis “there is no difference in the responses to “The Organization Deserves My Loyalty” was rejected \((p = 0.02)\). The mean response of both age groups indicates they agree that their organization deserves their loyalty; however, the older workers indicate a stronger loyalty to their organizations.

**Hypothesis 7**
A correlation analysis was conducted comparing the overall satisfaction of all workers. The correlation was 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 and Allen Organizational Commitment Survey. The reader should note that 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 for the sample was \(r = -0.60 \ (p < 0.01)\). This indicates 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, however, no correlation between job satisfaction and continuance commitment.

A correlation between job satisfaction and affective commitment and job satisfaction and normative commitment was expected. The measure of worker attitude and both measures of organizational commitment depend on the same positive feelings toward the job and the organization. Likewise, a negative correlation between job satisfaction and continuance commitment was expected. Continuance commitment implies a worker feels trapped in their job or organization. While such a feeling may keep an employee on the job, it does not contribute to a feeling of satisfaction with the situation.

A correlation analysis of job satisfaction and job commitment was conducted for each of the two age groups within each of the three categories of job 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. This indicates a very
There is a strong positive correlation between job satisfaction and affective commitment for both age groups.

There was a difference in the correlations relative to continuance commitment. Younger workers demonstrated essentially no correlation ($r = -0.08$, $p = 0.31$), while the older workers demonstrated a negative correlation ($r = + 0.31$, $p = 0.01$). The more satisfied the older workers, the less continuance commitment they felt toward the organization.

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. This result is consistent with the results of the correlation of job satisfaction and affective commitment.

**Conclusions**

Two general conclusions were drawn from this study regarding knowledge workers.

- There is a strong 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 a clear and concise assessment of the impact of motivation factors and needs on knowledge worker attitudes; however, data regarding organizational commitment have provided this assessment.

**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. Negative stereotypes regarding older workers are unfounded. Differences appear to increase the value of the older workers’ to the organization. These differences are:

- Although 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 with their current jobs than younger workers.
- There was a significant difference in the level of importance of job factors between younger and older workers. Younger workers place more importance on advancement, security, and how their supervisor relates to them. The older worker places more importance on independence.
- There is a 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. Conversely, older workers appeared to feel that the organization deserved their loyalty more so than did the younger workers.
- The reasons younger workers remained in the workforce were different from those of older workers. Younger workers work to provide basic necessities and safety nets for themselves and their families. Recognition also 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 job satisfaction between older and younger workers.
- 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**

There is growing evidence to support the position that engineering managers will find it increasingly difficult to find, attract, and retain qualified knowledge workers. This study has demonstrated that older knowledge workers who are now approaching retirement offer an excellent solution to this dilemma.

Engineering managers should not be reluctant to rely on the older component of the knowledge workforce. This study provides evidence that the motivation and job commitment of older workers is equal to if not higher than their younger counterparts.

This study also shows that older workers are satisfied when they get to do different things, develop and try new and innovative methods, and use their abilities. This finding provides the engineering manager with the impetus to harness the innovation and problem solving capabilities of older workers. To do so would not only allow older workers to contribute more to the organization, but would also increase their level of job satisfaction.

Overall this study provides evidence to dispel age related stereotypes. It assists the engineering manager in understanding the unique needs of older knowledge workers and, in creating a work environment where the needs of older workers can be met, thereby allows effective utilization of these valuable workers.

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