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AUTHOR Arvey, Richard D.; Fossum, John A.
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ABSTRACT

It has been suggested that older workers may be particularly vulnerable to the obsolescence process. One definition of obsolescence directly implies that the obsolescence construct is a function of two elements, the job and the person. New technologies, new products, and new methods and procedures can result in job changes which in turn can compel changes in worker requirements. Workers may engage in updating behaviors to maintain their evolving jobs. Organizational, job, individual, and motivational factors may all work to affect these updating behaviors and person changes. The few studies that exist on the topic of age and obsolescence suggest that older workers tend to be more prone to obsolescence than do younger workers. This finding may be due to motivational elements in contrast to ability differentials between age cohorts. If age differences in obsolescence are due to motivational factors, there are several organizational interventions which might be helpful: (1) insure that updating and skill acquisition opportunities are available to employees; (2) inform workers of expected job requirement changes; (3) help to minimize risk factors in updating; (4) help to maximize rewards for skill acquisition; and (5) view skill acquisition from a long-term perspective. If these strategies are followed, age-obsolesence relationships due to motivational factors might be reduced or eliminated. (NRB)

Age and Obsolescence: A Review and Discussion

Richard D. Arvey and John A. Fossum

Industrial Relations Center

University of Minnesota

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A frequently heard claim is that older employees are the most likely candidates for becoming obsolete in their jobs. That is that older workers may be particularly vulnerable to the obsolescence process. Given the rapid pace of change in our industrial society and the dramatic change in jobs, the potential ramifications of age related processes in obsolescence are tremendous. Do older employees not keep pace with changes in their jobs and professions? And if so, why not?

The purpose of the present paper will be to focus on the suggested relationship between age and obsolescence. We will do three things in this paper: First, we will present a model of obsolescence and outline some of the major variables which may contribute to the obsolescence process. We present a congruency model where the knowledge, skill, and ability (KSA) talent bank of employees are compared to the KSA requirements of jobs.

Second, we review the empirical literature concerning the relationship between age and obsclescence. A number of empirical pieces exist which shed some light on the relationship.

Third, we discuss and interpret the research literature and offer ideas concerning other possible variables which may influence any observed relationship. Our attention is directed toward dispelling any myths concerning age and obsolescence and to focus on motivational variables which may well underlie any observed relationships.

A Model of Obsolescence

Elsewhere, we have presented a dynamic view of obsolescence (Arvey Fossum, Robbins, and Paradise, 1984; Fossum, Arvey, Paradise, and Robbins in press) and will review here an abbreviated version of this model.

First, organizations configures jobs as having certain person requirements. That is, there are certain knowledges, skills, and abilities required for effective performance of jobs within an organization. Similarly, individuals bring to a job the KSO's needed for job performance. At any one point in time, it is reasonable to assume that the KSO requirements of a job is congruent with the KSA talent bank mixture brought to the job by the individual.

Given this discussion, we define obsolescence as follows:

> Obsolescence exists when the person requirements of a job demanded by its tasks, duties, responsibilities, and behaviors, become incongruent with the present stock of knowledges, skills, abilities, and other behaviors currently possessed by the individual when these knowledges, skills, and abilities were once appropriate during previous time periods.

This definition directly implies that the obsolescence construct is a function of two major elements: the job and the person. Any efforts to deal with obsolescence must direct attention to both the nature and degree of changes in job requirements and the factors responsible for such features as well as the rate of growth, decline, or change in individual employee KSA's. The point being made is that both the job and person are inextricably entwined in the obsolescence concept.

What are the contributing elements to changes in job requirements? Moreover, what are the factors and influences which contribute to changes in employee talents? Figure 1 offers our conceptualization of the obsolescence process. This figure illustrates that jobs can change as a function of various external factors and thus compel corresponding changes in person requirements at time 2 compared to time 1. New technologies, new products, and new methods and procedures are the driving forces behind job changes. Also depicted in Figure 1 is the other element involved in the obsolescence process--the individual. Over time, individuals may engage in

various behaviors to maintain or increase their KSA's as job requirements evolve. The term most typically used to represent these types of behaviors is "updating" (Dubin, 1972).

Factors which might affect potential person changes on KSA's are included in Figure 1: Organizational influences, job factors, individual factors, and motivational factors.

Age and Obsolescence

One of the individual difference variables or factors which has been suggested as related to the obsolescence process is age. The usual form of the relationship is that older employees are particularly vulnerable to the obsolescence process. There are several possible mechanisms which may be responsible for such a phenomenon, if indeed it is true. These mechanisms include the following:

1. Older employees have been in mainstream employment longer than relatively younger individuals. Thus, there has been a greater opportunity for the erosion of their existing stock of knowledges, skills, and abilities over time.
2. Older workers may be less "trainable". That is, they may be less able to acquire the needed KSA's for effective job performance at time 2 compared to younger individuals.
3. Job changes make the existing KSA talent bank of older employees more incongruent with present job needs than more recently-hired persons in the same job. That is, even if the existing talent bank of older workers have not eroded, job changes may make the needed stock of KSA's incongruent with the "pre-existing" stock of KSA's of older workers.

4. It may be that older employees see a more weak relationship between acquiring KSA's and obtaining valued rewards than younger individuals and thus, don't exert effort into updating their KSA's.

Note that these explanations typically involve the substitution of age as a proxy for other variables, such as tenure, motivation, etc. While age may be correlated with obsolescence, the obsolescence process may actually be due to other variables which are correlated or confounded with age.

The literature concerning age and obsolescence is somewhat clouded. Some studies show that age is negatively associated with obsolescence. Shearer and Steger (1975) found a significant curvilinear relationship between age and obsolescence among managers and officers working in the military. In a well known and often cited article, Dalton and Thompson (1971) presented evidence that age was associated with accelerating obsolescence. Several studies (e.g. Lehman, 1963; Mali, 1969) have also reported lower productivity associated with older workers. Doering, Rhodes, and Schuster (1983) recently reviewed 28 studies concerning the age-performance relationship which has been conducted over the last 30 years. Decreases in performance with age were found in 15 studies, increases were found in 4 studies, and no significant relationship was found in the others. They indicate that "The balance of the studies showing a decline in performance revealed essentially an inverted U-relationship between age and performance of scholars, engineers, and scientists." (p.63) It should be noted that these are studies of the age-performance relationship and <u>not</u> the age-obsolescence relationship of direct interest here. Another important element to point out is that even

if there is a reliable relationship demonstrated between age and obsolescence (as well as age and performance), there is likely wide variability among employees within specific age groupings with regard to obsolescence. That is, for a specific age level (e.g. 60) there is likely to be a wide degree of variability with regard to obsolescence among these employees.

In essence, there is very little direct literature concerning the age-obsolescence relationship. However, there are some data concerning age differences in abilities which are relevant for our discussion. In general, the evidence suggests that decrements in broad general abilities as a function of the aging process are relatively small (e.g. Baltes and Schaie, 1974). With regard to specific abilities, there seems to be a rather broad consensus that intellectual tasks with require a speed component usually tend to show some age decrements (Birre, Cunningham, and Yamamoto, 1983). However, there appears to be wide variations among individuals among individuals in terms of ability losses making generalizations difficult to make. What is important for this discussion is that if there is any relationship between age and obsolescence, it probably depends on the particular knowledge, skills, and ability configurations involved. More research is needed to establish any such variables and linkages.

Other Variables

One needs to by quite careful about drawing any immediate conclusion that older workers are obsolescence prone. Another mechanism might be at work. Decision-makers may withhold opportunities for training and development for older employees based on the rationale that the potential outcomes associated with training older workers may be less than those

derived from training younger employees. As evidence of this bias, Rosen and Jerdee (1976) found that older workers were less likely to receive support for retraining efforts compared to equally qualified younger individuals. The point we are making is important: Any relationship observed between age and obsolescence may be confounded due to other organizational decision-making processes. It should also be noted that the use of age as a variable on which to make employment decisions is a violation of the Age Discrimination in Employment Act.

Another factor which needs greater expansion here is the possible role of motivational factors in the posited age-obsolescence relationship. One motivation model which helps understand individual decisions to devote effort toward skills acquisition is Expectancy-Valence theory. Expectancy theory postulations suggest that individuals will acquire the KSA' they believe will be instrumental in attaining valued rewards. If the acquisition of KSA's never or seldom result in any tangible or indirect benefits, expectancy theory predictions are that KSA acquisition will not occur (Porter, 1971; Harel and Conen, 1982). Similarly, if individuals perceive that the benefits are greater to expend effort in their present positions in contrast to preparing for future job and work roles, little KSA acquisition can be expected. Only a few studies have related the obsolescence issue within the framework of expectancy theory. Arvey and Neel (1976) and Koppleman (1977) studied several expectancy formulations and found some age-related differences on these variables. If older employees have either different expectancies or different reward orientations than younger employees, different orientations and dispositions towards updating would likely occur.

An economic theory useful in this context is human capital theory. The theory of human capital suggests that persons will invest in acquiring KSA's by purchasing or participating in training and possibly foregoing earnings if the stream of future benefits (earnings) exceeds the financial costs necessary to gain entry into a particular occupation. Just as in expectancy theory, the investment decision is made in the belief that it will yield maximum future earnings over alternatives. Human capital theory is useful in that it helps us to understand why some employees may choose to invest in updating when compared with others. For example, individuals may differ in their willingness to invest in training and KSA acquisition as a function of age. Older individuals may be less willing to invest in updating because of shorter stream of payoffs. There should be little difference, however, among persons of different ages if the payoff period associated with the training is within their anticipated remaining work lives and expected risks are similar across age groups.

The idea behind these two models is that individuals have various utility matrices concerning updating efforts and expected payoffs. Older individuals may simply see a lower stream of payoffs for updating and consequently slip into obsolescence. An observed age-obsolescence relationship may be due to motivational elements or factors, rather than some kind of posited ability differences or the inability for older workers to "adapt".

Interestingly, the models are also predictive in terms of managerial decision making. The heuristic suggests that investments such as training will not be made by managers, unless the managers believe that the benefits by training will be recouped during the employees' tenure within departments.

Another body of literature which examines longitudinal patterns involves the concepts of career stages and career "plateaus". For example, in a well popularized book, Levinson, et. al. (1978) discussed the "changes in a man's life" calling attention to different developmental stages in adult life. Their model suggested that there are career "peaks" and "maintenance" periods for individuals. In light of our discussion concerning expectancy and human capital theory, it may be that there are developmental or age changes in what individuals desire for job outcomes, and the believed "stream" of costs and rewards for updating. For example, Hill and Miller (1981) used a life-stage approach to examine career events and found that interest in improving KSA's seemed to be high or increase through the 30's and subsequently declined through the remaining years in a career. A fascinating recent article by Mumford (1984) suggests that compared to younger individuals who employ adaptive and accommodating cognitive and behavioral styles, older individuals operate using a more realistic and controlling style which tends to facilitate minor contributions and achievements in professional careers.

While the term plateau typically means "lack of movement" or upward mobility, we might speak of KSA "plateaus". That is, the tendency on the part of individuals to remain relatively fixed in their KSA talent bank. Again, individuals may not invest in the acquisition of new or expanded KSA's unless they see desirable outcomes resulting. As they move towards the end of their career, they may believe the "stream" of rewards not worth the relative costs of achieving new KSA's. It is even possible that organizational efforts to "motivate" individuals through training efforts, increased challenge in jobs, job redesign, etc. may be met with resistance and even hostility by older employees.

They may perceive these interventions as demanding increased effort and energy on their part, but having reduced or negligible payoffs.

Conclusions

We have suggested a particular framework for reviewing the age-obsolescence relationship. The number of studies which shed evidence on the relationship between age and obsolescence is quite limited. The few that do exist suggest that older individuals tend to be more prone to obsolescence than younger employees, a finding which is consistent with the speculation about the relationship. We have suggested that, if such a phenomenon is reliable, it may be due to motivational elements in contrast to ability differentials between age cohorts. The implication of this suggestion is important. If age differences in obsolescence are due to motivational factors, there are a number of important organizational interventions which might be useful. If the differences are ability based, organizational interventions may be fruitless.

We have previously outlined several strategies which organizations may wish to do to "combat" obsolescence among its employee base (Arvey Fossum, Robbins, and Paradise, 1984). These include the following:

a. Insure that the opportunities for updating and skill acquisition are available to employees, through either internal or external sources.

b. Inform individuals regarding expected job requirement changes which will require new or enhanced KSA's.

c. Help minimize risk factors in updating. That is, provide training opportunities at low or no costs, insure that employees are compensated at similar or higher rates while updating, etc.

d. Help maximize rewards for skill acquisition by providing desired

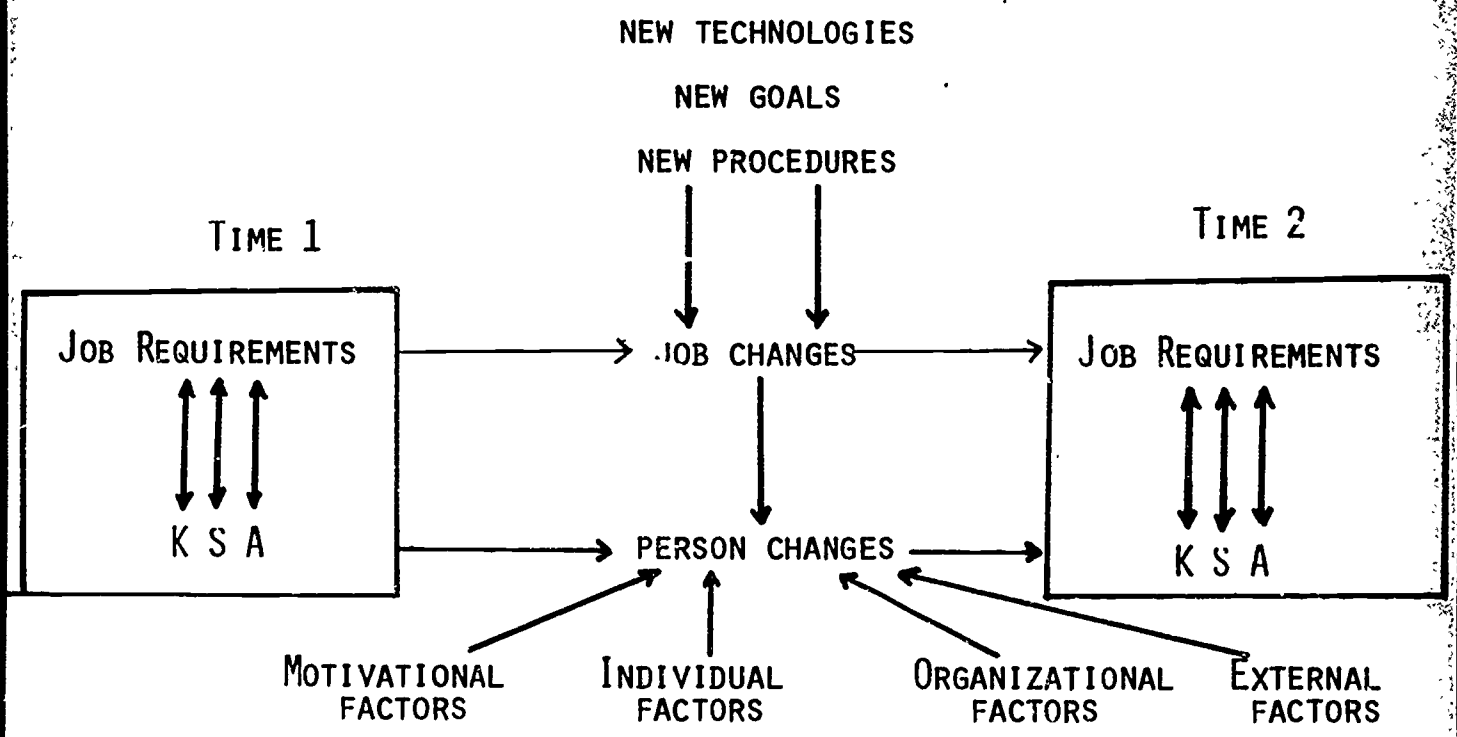
outcomes for employees. This might include more interesting and challenging assignments, greater monetary rewards, additional promotional opportunities, etc.

e. View skill acquisition from a long term perspective in that the outcomes for the organization may accrue over a longer time period instead of having immediate payoffs.

If these kinds of strategies are followed, it may be that any age-obsolescence relationship might be reduced or eliminated.

Figure 1

Factors Involved in Skills Obsolescence



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