Scientists’ Expectations from their Job

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The paper ascertains aspects, which are regarded as important by Indian scientists in their jobs. The sample was drawn from scientists in a government funded research laboratory who attended a Workshop on Quality Of Work Life during December 2000. Factor analysis with Vari-Max rotation revealed five factors important for Indian scientists. These are: comfort, challenge, pay, relation with co-workers, and resources. Except for the factors – challenge and relations with co-workers, the satisfaction level on other factors, was found to be average. It was also found that scientists who have started their career in the laboratory itself are less satisfied with their jobs, compared to those who came from other organizations.

Introduction

Trust, hard work and sincere efforts of employees, help an organization achieve the goal of high productivity. Job involvement, yet another concept, induces a person to put in his best in the development of the organisation. The other side of the coin is what our employees want out of their job? This question has been answered largely in terms of generalities, such as employees’ temper, culture, ethos, and ethics. The motivational orientation of employees towards their jobs, which is equally important, has been described by a limited number of terms like ‘intrinsic orientation’, and ‘economic orientation’.

Herzberg et al.¹ have identified six factors as having emerged in several previous factor analytic studies of job satisfaction. These are: general satisfaction and morale, attitude towards immediate head, attitude towards satisfaction of aspirations, attitude towards the organization and its policies, satisfaction with intrinsic aspects of the job, and satisfaction with work conditions of the present job. Vroom², in his review, has suggested that the managers are keen to satisfy seven factors for job satisfaction. These are: (i) Attitude towards the organization and its management, (ii) Attitude towards promotional opportunities, (iii) Attitude towards job content, (iv) Attitude towards supervision, (v) Attitude towards financial rewards, (vi) Attitude towards working conditions, and (vii) Attitude towards co-workers. Smith et al.³ have concluded, “the factors which seem to emerge most consistently are a general factor, pay and material rewards, work itself, helpful supervision, and satisfaction with other workers on the job”.

Many researchers claim that money is the main motivating factor of production in the business world. Contrary of these studies, as late as 1955, Whyte⁴ has estimated that only 10 per cent of workers on the industrial production line in the US respond positively to financial incentives. The theory put forward by Lawler⁵ suggests that the amount of effort people are prepared to put in to accomplish a task depends on three factors: expectancy, instrumentality, and valence. However the process theories emphasize the fact that the attractiveness of specific rewards varies from person to person. What is important for one person may be irrelevant for another. Secondly, although these expectancy theories concentrate on the common processes involved the contents of each individual’s motivation system are also important.

Several studies have been undertaken about the factors, which motivate workers and managers. It is difficult to compare these studies, as the methods used in collecting and analysing data have been different in each case. Most of these attempts, to answer the question, as to what motivates a worker or a manager. Further the studies related to job satisfaction indicate that there was not a great deal of empirical agreement as to what are the basic dimensions of job

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satisfaction. The studies, particularly in the developing countries, including India, have focused their attention on industrial, government or allied sectors. Scientists working in research laboratories have found limited acknowledgement in the literature. Notable exceptions for India are studies by Rahman on planning of R&D, Nagpaul on developing priorities in R&D, Dhawan on measuring performance of R&D units, Dhawan on training in R&D, Dhawan and Roy on Indian scientists and their work climate, and Dhawan on energy component in scientific circuit.

Thus, faced both with an absence of reliable factor analytic studies of scientists' importance ratings of their job facets and with a large, yet inconclusive and often contradictory array of factor analytic studies of job satisfaction rating the present study was compelled to fall back upon its own factor analysis of scientists' importance ratings of their job facets.

**Literature Review**

Scientists at all levels have to work in a horizontally decentralized operation in which people from outside the division/unit participate in its decision-making. This highlights that scientists should spend more and more time in interacting with one another and less in directing their junior colleagues. This is, in fact, true for majority of other organizations also. Helfgott has pointed out that day-by-day the R&D organization structure is becoming flatter and flatter with few layers between the top and the bottom level. As a result, therefore, the ethos of management should also shift from the traditional emphasis on the scalar chain to a more open, organic style of management. Further, Nadler and Robinson have suggested that employee involvement and expansion of the scope of their jobs are becoming increasingly important because highly automated organizations have a growing amount of integration and co-ordination at lower levels, pushing decision-making downward.

Let us now look at some of the studies and the factors that have emerged from these studies regarding job satisfaction.

A study conducted on 88 workers in a medium size Indian industry showed that work adjustment was the most significant factor. It also established that personal, work, and social adjustment factors were indispensable and important components of job satisfaction. (Personal factors include ego-strength, need-achievement, marital adjustment, income, education and length of service).

Khaleque and Choudhary have studied the factors relevant to overall job satisfaction between 35 top and 51 bottom industrial managers. The study has revealed that top managers considered the nature of work as the most important factor and fringe benefits as the least important factors for job satisfaction. On the other hand the bottom level managers considered job security as the most important factor and wage as the least important factor for job satisfaction. Overall job satisfaction of industrial managers seems to be influenced by the personal and job-related factors and the degree of satisfaction appears to depend on the satisfaction on the number of job facets as well as their importance.

Based on a sample of 47 managers, Khandelwalla et al. conducted a study on how enterprise goals affect job satisfaction at lower management levels. Results have indicated that for Indian corporate management the entrepreneurial goals of higher profitability and sales may be more important than the development goal of meeting national priorities or greater management professionalization or efficiency. Lower management reported greater satisfaction with personal growth and achievement than in meeting power and altruistic needs.

Sutaria has conducted a study on 181 textile technicians to investigate the relationship between personality and Herzberg's two-factor theory of work motivation. According to the author the tendency to derive satisfaction and dissatisfaction from job factors would depend, to a large extent, on personality development and the fulfillment of psychological and social needs.

Sharma has made an in-depth analysis of some important factors that are significantly associated with job satisfaction. The sample for the study was drawn from eight well-known industrial organizations. The finding reveals that each independent variable is positively related not only to job satisfaction but also to every one of the other independent variables. While income and occupational aspirations are not positively related to job satisfaction the recruitment policy of the firm affects it significantly.

Chirayil has made an attempt to understand the factors that motivate or demotivate the employees of a Heavy Engineering Corporation. He found that the strong motivating factors which depend upon external stimuli are: (i) Proper work organization, (ii) Opportunity for advancement, (iii) Competent supervision.
and proper guidance, (iv) Recognition, (v) Human
interest shown by supervisors, and (vi) Higher wages
and incentives.

Yet other important studies related to Indian
situation are by Parthasarathy\textsuperscript{21} who made a percep-
tive observation regarding the changes that followed
independence which affected most organizations. He
commented, “The fear of authority and control is fast
disappearing”. Several other studies on motivation
have revealed that employees look for many other
incentives in the job other than material rewards.
Moule and Ganguli\textsuperscript{22} Narain\textsuperscript{23} Sinha\textsuperscript{24} Ganguly\textsuperscript{25}
and Menon\textsuperscript{26} have argued that they are unable to test their
skills and make use of their experiences. Further, they
perceive that their jobs do not allow them sufficient
freedom to take decisions. Menon and Shamanna\textsuperscript{27}
have indicated that the inter-personal relationships
that prevail within an organization are influenced by
the nature of the workflow in that organization. Other
studies on socio-technical system have indicated that
the technical system can affect inter-personal factors
such as co-operation, communication, and influence
in a work situation.\textsuperscript{28} Inter-personal relationships can
affect productivity and this can modify the satis
faction an employee derives from his job. Sometime
back a report published in the newspaper, The
Statesman, August 15, 1990 highlighted that personal
clashes are the root causes of conflicts in Indian sci

tific establishments, and “personal factors rather
than technical concerns” dominate decision-making
in science.

**Methodology**

Data were collected from 62 scientists
representing various levels and different divisions of
a research laboratory (run by government funding). A
questionnaire containing twenty-five items\textsuperscript{29} was used
to collect information regarding ‘what scientists want
from their job’. The questionnaire was distributed to
scientists who attended a workshop on ‘Quality of
Work Life (QWL) organised by the authors in their
laboratory. Each question was on five-point scale
with representing ‘to a very little extent’ and 5 re p r e­


ting ‘to a very great extent’. Scientists were asked
to rate each item in terms of how important each
question was to them in their job.

Factor analysis with Vari-Max rotation was used
to identify the factors and their loading. In determin-
ing factors, 0.5 was taken as the cut-off limit of factor
loading to include an item in the factor. If there are
more than one items showing factor loading more
than 0.5, that item was considered in the factor with
the highest factor loading. Means and standard deviations
were calculated to see the impor-
tance/satisfaction of each factor and also to know
what scientists wants from their job (in order of pre
ferences). These factors were then compared with the
background data of the respondents. This helped us to
know how different groups of scientists in terms of
age, level, service record, etc., perceive these factors.

**Results**

The background information of the respondents,
presented in Table 1 shows that the scientists who had
participated in the study are middle-aged and are
fairly experienced in service. It was also found that
a large majority of scientists have started their career
in the laboratory itself. As such, we also compared the
two groups, first, those who have started their career
in the present laboratory and those who have joined
the laboratory from other organizations. We are,
therefore, dealing with a sample whose perception on
various issues facing them within and outside their
workplace reflects their work climate and their im-
mediate social environment.

Comparing the two groups of respondents, we
find that scientists who had joined this laboratory
from other organizations are slightly older in age and
are working at a slightly lower level than those scien-
tists who have started their career in the laboratory
itself.

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<th>Table 1 – Background information of the respondents</th>
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Note: T = S means scientists who have started their career in
the laboratory itself, whereas T # S means scientists who have
come from other organizations.
The factor analysis of the twenty-five items showed five significant factors with eigen value more than one and factor loading as 0.5 or more, as described in the methodology. These, in order of preference, are: Comfort, Challenge, Pay, Relations with co-workers, and Resources. The factors are not completely independent and are partially overlapping one another. It signifies that a few of the issues, which comprise a particular factor, also influence other factors, though to a smaller extent.

The different factors are defined as follows:
Factor-1 the 'comfort' factor describes a scientist's desire for a job which provides solid creature comfort and which presents no problems for him. There is no indication that a scientist endorsing the items on this factor wishes his job to be exciting, interesting or challenging and only serene and easy, in short, a 'soft' job. Since this represents the first factor of the analysis, we can conclude that 'comfort' is the top most priority in the job which scientists desire. Factor-2 'challenge' reflects the scientist's desire to be stimulated and challenged by his job and to be able to exercise his acquired expertise and skills in his work. This factor corresponds to what in other factor analytic studies of job satisfaction has been identified as a 'type of work' factor. Factors 1 and 2, viewed in opposition to each other, correspond in some degree to the conceptual distinction between extrinsic and intrinsic sources of job satisfaction. The challenge factor is certainly akin to intrinsic satisfaction, comfort, however, is not another name for extrinsic satisfaction, since it excludes such variables as pay, fringe benefits, and job security, all of which are traditionally regarded as extrinsic characteristics. Pay, fringe benefits, and job security comprise factors 3, the pay factor which is orthogonal to the comfort factor. Factor 4 contains only two items, both of which concern relations with co-workers. This factor has appeared frequently in factor analysis of job satisfaction in other studies. The fifth and final factor, 'resources' represents scientist's wish for adequate resources with which to do the job well — equipment, information, and competent leadership.

Mean scores to the five factors of job satisfaction (Table 2) showed that responses to relations with co-workers' are most powerful. It signifies that the scientists are happy to work with their colleagues and this means that their satisfaction with the work group is fairly high. In one of earlier work also the authors had found a similar response — satisfaction of the scientists with their group-related variables like confidence, trust, motivated to achieve objectives etc. among group members were found to be much higher than their scoring on organization-related variables. Thus, scientists exhibit a great deal of team spirit and are highly motivated to achieve objectives and have sufficient amount of confidence and trust in their team members. In the same study, while analysing the value system of scientists, it was found that co-workers had received a high priority in the factor 'group of people'.

Response to the challenge factor has also been on the higher side. This is in line with the attitude of scientists who are working on innovative ideas and projects towards factors like challenge, initiative, and creativity. In the study by authors mentioned earlier, a few of the personal goals like success, achievement, creativity and dignity were rated high in importance in the value system of scientists. These are in conformity with the scientist's perception of himself as a creative individual.

However, closely following challenge, the respondents have also rated the comfort factor high. Scientific community forms a part of a larger society, and is perhaps not immune to societal aspirations and values. The pay factor has received average rating, which goes well with the perception that the scientists...
are neither paid too well nor too badly, and that the scientists themselves have taken it in their stride and are not unduly worried about it. What is of concern is the fact that the resources factor has also received an average rating. Are the resources available just about adequate to meet the routine requirements of the laboratory, if this is indeed the case, it could undermine scientific productivity, especially in the frontier areas of research.

We also compared the mean scores of the five factors for two groups of scientists separately—those who have started their career in the laboratory itself and those who have not (Table 2). The results are found to be similar to those obtained for the total sample in so far as overall responses to the factors are concerned. Relation with co-workers still commands highest rating, followed by challenge, comfort, resources, and pay in that order. Even the two groups of scientists display a similar set of ratings except for the comfort factor. Scientists who had started their career in the laboratory itself, whereas high rating has been given by scientists belonging to the other category have given average rating for comfort.

While relating background information of the respondents with the five factors of job satisfaction (Table 3), we find following results. Perceptions on pay and resources are found to significantly increase with age, total length of service, and service in the organization. Further, perception on challenge is found to significantly increase with total service and service in the laboratory/organization. It appears that though resource endowment has not been perceived as too great just as in the case of pay, with increase in age and long years of stay in the organization, they get accustomed to the situation as it is, and are converging to the set culture of the organization. At the same time, the organization seems to be offering more opportunities to the scientists to work on challenging assignments and projects.

To probe into the matter in greater depth, correlation coefficients were calculated between age and the five factors grouped separately—for scientists who had started their career in the laboratory itself and for other scientists (Table 4). Satisfaction level with pay is found to increase significantly with age for scientists who had started their career in the laboratory itself. Pay scale of the R&D organization in question compares favourably with those in other central government organizations, and the scientists are not unduly concerned about it. For scientists who have come from other organizations perceived satisfaction with comfort, challenge, relations with co-workers and resources, which is positively related to age.

Discussions

The pivotal factor analysis, based upon data obtained from 60 scientists of a R&D laboratory indicated that the twenty-five facets of jobs that had been rated by scientists in terms of their importance to them, could be represented adequately by five dimensions. The five orthogonal factors that emerged in this analysis were readily interpretable and were provisionally designated as referring to comfort, challenge, financial rewards, relation with co-workers, and resources.

The number and content of the factors identified in this study differed in several respects from that report in previous factor analytic studies. Several theories viewed work related motivation or satisfaction in terms of dichotomies; perhaps an overly literal application of any of these discussions or "two-factor" approaches to the present study's factor analysis might have predicted that the analysis would have
uncovered only two factors corresponding to the terms of the dichotomy. Instead, the analysis disclosed five factors. The present study was not the only study in this regard, since previous factor analytic studies of job satisfaction have never, to the best of our knowledge, yielded any such neat "two-factor" brace of dimension corresponding to the two terms of any of these dichotomies. Nor should any factor analysis be expected to do so. These dichotomies, at times, it is argued, correspond to "higher-order" levels of organization of work motivation and job satisfaction. The existence of, or at least the conceptual utility of, such dichotomous principles does not, according to some, require justification through factor analytic techniques.

Several points of correspondence were nevertheless recognizable between the importance factors identified in this study and those identified in previous factor analytic studies of job satisfaction. The clear replication of previously identified factors occurred with reference to this study's financial rewards factor the factors most successfully repeated from previous studies appeared to have been those concerning opportunities for advancement and attitudes toward supervision. Since only one question about promotional opportunities was asked in the present study the emergence of a promotional opportunities factor was unlikely, and it did in fact fail to appear in the analysis of importance ratings. Herzberg et al., Vroom and Smith et al. have also reported the existence of factors that they described respectively as satisfaction with intrinsic aspects of the job, "attitudes toward job content", and "attitudes concerning the work itself". The challenge factor was clearly in the same category as these factors. At the same time, both the comfort and resources factors also touched upon aspects of the work itself.

Conclusions

There exists hardly any study, which has focused on job satisfaction of research scientists working in government-funded laboratories. Menon and N R De have carried out some work in this direction in India, but their efforts were concentrated around industrial and allied sectors. The findings reported here have presented several unique features of research laboratories and people working in them. At this stage, we do neither wish to go in for generalization nor should this study be taken as representing the situation prevailing among scientific community. It is a pioneering work that opens up a new area with scope for further research that should be considered before talking about scientific temper, ethos or culture.

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