



The ICFAI Journal of Organizational Behavior

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ISSN: 0972-687X

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Subscription Rates (Inclusive of Postage)

	India Rs.	US \$
1 year	625	32
3 years	1650	90
5 years	2000	125

Payment to be made by crossed Demand Draft drawn in favor of "The ICFAI University Press", Hyderabad. Visa and MasterCard holders can subscribe online or fax their subscription order indicating their credit card number, name, amount, expiry date and signature.

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Quantification of Quality of Work-life in Machining Industry in Indian Scenario

Sarang S Bhola*

This article is the outcome of an exploratory research, carried out to quantify the quality of work-life in the machining industry in India. A quantification model has been developed which can be easily understood and implemented by entrepreneurs. The basic concept of Quality of Work-Life (QWL)—a methodology adopted for quantification—has been discussed in detail. The article concludes with the explanation of the model used to implement QWL in an organization.

Introduction

The quantification of Quality of Work-Life (QWL) is a Herculean task. It has always remained a challenge before the scholars in social sciences to quantify the qualitative factors. Very few efforts have been made to quantify the QWL in India and no comprehensive attempt has been made to develop a model of quantification—a model which can be easily understood and implemented by entrepreneurs. The present study has been undertaken with the objective to quantify QWL in a selected industry and to develop a model to implement QWL in an organization.

Methodology and Sample

The study is based on primary data, which is quantitative and qualitative in nature. Nearly 71 machine shop units were selected, which constitute 11.25% of the total machine shop units in the said industry through proportionate stratified random sampling and study. The stratification is done according to the ownership of the organization, i.e., Public Limited (Pub.), Private Limited (P. Ltd.), Proprietary (Prop.) and partnership concerns. The sample units were taken from the Kolhapur District of Maharashtra, India. The said geography is renowned in foundry and machine shop industry. The foundry job process is followed by machining of jobs. Generally, every foundry job requires some sort of machining operation on it. Thus, foundry and machining units go hand in hand in the production process. The process of industrialization of foundry and machine shops took almost four decades in which the industry geared up well. All the necessary momentum is available at Kolhapur as far as the said industry is concerned. Nevertheless, the location of Kolhapur is ideal to study foundry and the machining industry from any perspective. The present study has concentrated on samples from the machine shop industry in Kolhapur.

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71 executives and 82 workers from 71 machine shop units were interviewed with the help of a structured questionnaire. Four questionnaires were raised to know the situation of QWL in the industry. Document I was for the office bearers to know the general information regarding the organization, Document II was for the top officials, Document III was for the workers and Document IV was natured as an observiour (observation sheet) which was handled exclusively by the researcher to note down researchers' perception regarding a few QWL parameters in the sample unit.

The data collected has been presented in simple tables and percentage has been used for the analysis.

The outcome of the quantification of QWL gave adequate insight to the researcher regarding the areas in which the sample units were lacking and in which they had scope to improve their QWL. This forced the researcher to develop a model to improve QWL in that industry. The study also narrates other notable findings and limitations of the research.

Contents of Quality of Work-life

During the last 30 years, the term QWL has frequently occurred in discussions as an interdisciplinary field of inquiry and action of industrial engineering, organization theory and development, motivation, leadership, industrial relations and about techniques for facilitating change, reducing stress and evaluating the nature of the working environment. However, it is often difficult to determine exactly what the term means.

QWL has been defined by various scholars and management practitioners, but a unanimous approach towards the definition was not found. On the examination of the definition, we find both narrow as well as broader concepts of QWL. The narrow concept of QWL explains workers' participation in the management or support localized activities and experiments to increase employees' participation, etc. Whereas, Richard E Walton, states a much broader concept of QWL proposing eight conceptual categories viz., adequate and fair compensation, safe and healthy working conditions, opportunity to use and develop human capacities, future opportunity for continued growth and security, social integration in the work place, social relevance of work and balanced role of work in the total life space, etc. It is rare to find work-life situations that satisfy all eight of Walton's criteria. We can view these eight features as goals to aim for.

But, one shall need to define QWL in different economic scenarios.

There are two facets of thinking as far as the implementation of QWL program is concerned. Experts opine that QWL variables are not different variables, they are just used in the organization under different labels. But critics counter that the QWL program is much more than just implementing either of the variables or any concept. It is a system or program which not only motivates people, but also leads organizational effectiveness.

Introduction to Quantification of QWL

"A state of Statistical Control is not a natural state for a process; it is an achievement."

– W E Deming¹

"You have to be able to mathematically compute Quality."

– Frederick W Smith, Federal Express Corporation²

Professor Subrathesh Ghosh, (1993) has explained some tools for measurement or evaluation of QWL raised scores for the factors reflecting QWL activities. The maximum score allotted is 30 for 15 categories reflected in QWL activities. The score then converted into qualitative grades as follows:

Marks Scored	Grade Obtained
21 and above	A (High)
20 to 15	B (Medium)
14 to 11	C (Low)
10 or less	D (Very Low)

On the basis of the analysis of data, the scores and grades are allotted. This may be the first effort made in the Indian insight to quantify QWL objectively.

For the quantification of QWL presented in this paper, Prof. Subrathesh Ghosh developed a scale vis-à-vis grading of eating-houses brought in use as a guiding aspect.

The Municipal Corporation of Greater Mumbai and rather every municipal corporation has developed a grading system for eating houses using the score; we called this as point scale method or Weightage.

The grading system works as follows—Maximum number of marks to be given to an eating house is 100. Out of these 100 marks, 60 marks have been allotted for observance of the conditions of licenses as per the attached copy of the license form. And remaining 40 marks are reserved for special arrangement—viz., 20 marks have been allotted for special arrangements for maintaining an eating house, maintaining clean and sanitary conditions; 5 marks each allotted for arrangement of natural light, ventilation and provision of electricity or gas oven in the kitchen, arrangement for preserving food items such as refrigerator, cold room, etc.; 10 marks have been reserved for medical examination of all servants employed in an eating house. A few conditions, which are quite intolerable carry minus marks.

The grades allotted to eating-houses on the basis of the marks obtained are mentioned below.

Marks	Grade
81 and Above	I
between 51 and 80	II
between 35 and 50	III

¹ Logothetis N, *'Managing For Total Quality'*, Prentice Hall of India Pvt.Ltd., New Delhi, 1997. Page No. 227.

² Ibid; Page No. 229.

Eating houses failing to obtain any of the three grades are subject to repeated prosecution even by withholding or revoking the license and the action is continued till either the trade is vacated or at least Grade III is obtained.

Prof. Ghosh has given scores to different parameters, as seen in the grading of eating-houses. The common things in both the systems are, scores have been defined for factors reflecting particular aspects and total scores are then converted into grades. The factors reflecting QWL and quality parameters in eating-houses are qualitative. But researchers must develop the tool or method to quantify such qualitative factors.

Besides the quantification of QWL, the following advantages are obtained through this quantification effort.

- The present status of QWL in an organization is known.
- Strengths and weaknesses are identified.
- It can be used as a self-assessment criterion.
- It can set the benchmark.
- Quality strategy can be integrated with business strategy.

Tool Adopted for Quantification

After referring to the above stated aspects, researchers found it beneficial to use score 'Weightage' to each aspect which reflected QWL.

Scores assigned to the factors reflecting QWL activities are shown in Table 1.

Sr.	Categories	Maximum Marks	Minus Marks
1	2	3	4
A	National and International Quality Award	2	-
B	Adequate and Fair Compensation	13	9
C	Safe and Healthy Working Conditions	22	5
D	Immediate Opportunity to Use and Develop Human Capability	16	1
E	Future Opportunity for Continued Growth and Security	6	1
F	Social Integration In the Work Organization	9	-
G	Constitution in the Work Organization	9	2
H	Balanced Role of Work in the Total Life Span	4	-
I	Social Relevance of Work	4	-
J	Management Perception	4	-
K	Collective Agreement Signed on Terms of Work	11	-
	Total	100	18

Every category mentioned above has its own variables (refer Annexure - I). The independent variables were developed and weighted crudely on the basis of pilot testing. The marks were allotted to every variable under the category, which reflected the QWL. In the developed quantification model, the 94 variable carries 100 marks, i.e., weight.

The assignment of scores based on observation and response from executives and workers to the factors reflect QWL.

Non existence of such activities carried no marks for the particular factor or category and the same was for the absence of the management's perception about the QWL factors.

In the observiour, the researcher facilitated more than two options to answer or note down the response to the question. In that case complete positive response has been considered to assign the score because the complete positive response only is the true representation of the QWL factor. Besides assignment of score, there is a scheme for negative marking also. These negative marks applied only on those factors which are basic things—the needs of an employee in the work. Non-existence of activity or any unsatisfied conditions carry a negative score.

Every sample machine shop unit has been rated with the help of this developed quantification method; the actual scores are then converted into qualitative grades according to the following ranges of total scores obtained.

Marks Scored	Grade Obtained
70 and above	A (High)
between 50 to 69	B (Medium)
between 36 to 49	C (Low)
35 or below	D (Poor)

The total score of each sample unit has been calculated and converted into qualitative grades as explained above. The researcher further went into details of each category to see the qualitative effect. The 100 points are bifurcated throughout 11 categories. The final score obtained by the unit is the sum of the scores obtained by each category. So to analyze in detail, it is important to study each category.

Findings of the Research

Quantification was made of each sample unit with the help of the developed quantification model and the results were then converted into grades as shown in Table 2.

Sr.	Score Grading	Ltd.	%	P. Ltd.	%	Prop.	%	Total	%
1	A – Above 70 Score	1	50	1	20	0	0	2	2.82
2	B – Between 50 to 69 Score	1	50	1	20	4	6.25	6	8.45
3	C – Between 36 to 49 Score	0	0	3	60	12	18.75	15	21.13
4	D – 35 and below	0	0	0	0	48	75	48	67.60
	Total	2	100	5	100	64	100	71	100

Table 2 explains the measured grading of QWL for sample machine shop units. 50% public limited, 20% private limited units fall in A grade QWL, 50% public limited units, 20% private limited and 6.25% proprietary units fall in B grade QWL. 60% private limited units and 18.75% proprietary units fall under C grade whereas 75% proprietary machine shop units fall under D grade.

The public limited units fell under only A and B grades of QWL. Majority of total units, i.e., 21.13% and 67.60% obtained C and D grades respectively.

Half of the limited machine shop units obtained A and B grades. Private limited units were found in all the grades except grade D. No proprietary units obtained A grade but they were found in rest of all grades. A majority of proprietary units obtained D grade, which represents poor QWL.

From the above details, it can be said that the level of QWL does not depend upon the nature of ownership. Public limited, private limited and proprietary units may have good or poor QWL. It has been observed that most of the proprietary units existed in D grade, which was only because their investment in QWL programs was less compared to public and private limited units. QWL programs need some sort of investment, which they could not do. The QWL depends upon factors affecting it, i.e., independent variables of QWL.

Category Wise Analysis

The researcher felt it necessary to do a detail analysis of each category. In the present model, the final score represents the sum of the score obtained in each category by sample units. So for further analysis of the categories, the researcher converted the score allotted to each category into qualitative grading, i.e., for A grade 70% and above of the total score, for B grade 50% to 69%, for C grade 36% to 49% and for D grade 35% and below. For example, section B, i.e., adequate and fair compensation carries 13 marks, so in the category wise analysis these marks bifurcated according to the percentage allotted to qualitative grades. It means the 13 marks bifurcated as shown in Table 3.

Marks	Marks Scored	Grade Obtained
13	9.1 and above	A
	Between 6.5 to 8.97	B
	Between 4.68 to 6.37	C
	4.55 or below	D
	Zero	E
	Minus/negative	F

Thus, the scores for each category have been calculated and the data has been analyzed accordingly. This will help the management of the organization to decide the course of action to improve QWL. The detailed category wise analysis is shown in Annexure-II. The table shown in Annexure II reveals the following points:

1. Quality Award Recipient

All public limited units are the recipients of quality awards. 60% private limited and 92.19% proprietary machine shop units did not go for such awards. In today's scenario, on the magnitude of economic reforms, which paves globalization, the whole world is the market. If an organization's product is not a quality product, it may ruin. The important parameter to recognize the product as a quality product is holding such awards. These awards got a few variables of human resource management and are the improving agents for QWL also.

2. Adequate and Fair Compensation

It is evident that all public limited units attained A grade as far as adequate compensation was concerned. 80% private limited and 3.13% proprietary machine shop units attained A grade. 67.19% and 4.69% proprietary machine shop units attained minus and zero score respectively. Proprietary units were found in all grades. Most proprietary units exist in negative grading.

3. Safe and Healthy Working Conditions

It has been seen that most of the units exist in A to D grade in this category. 51.56% proprietary machine shop units obtained D grade; these units should improve their safety and healthy working conditions.

4. Immediate Opportunity to Use and Develop Human Capability

29.58% and 38.03% of total sample units in machine shops attained C and D grades respectively. 32.81% and 35.94% proprietary units obtained C and D grades respectively which signifies monotony in the work and lack of opportunity to develop human capability.

5. Opportunity for Continued Growth and Security

Only one private limited unit attained A grade. All the public limited units attained B grade and 32.81%, 31.25% and 34.38% proprietary units attained D, zero and minus grades respectively.

Opportunity for continuous growth and security carried low grades in all the constitution. This was only because most of the employees did not receive training facilities, there was improper policy arrangement for employment security and career planning.

6. Social Integration in the Work Organization

From the table (Annexure II), it is seen that social integration in the work organization was not the problem with machine shop units since majority of units fall in A, B and C grades.

7. Constitution in Work Organization

In constitutional provisions, units were lacking except the public limited units. 20% private limited machine shop units attained minus grade whereas 17.19%, 18.57% and 57.81% proprietary machine shop units obtained D, Zero and minus grades respectively. In all, the private limited and proprietary units were lacking much in constitutional provisions.

8. Balanced Role of Work in Total Life Span

This carries a good grading of 83.10% of machine shop units and attained A grade.

9. Social Relevance of Work

This category has satisfactory grading for the units which obtained either A or B grade.

10. Management Perception Regarding QWL

The researcher interrogates CEOs and promoters regarding the effect of the QWL program on productivity, sales, profit and quality of product. Most of the respondents had a positive perception for QWL programs. This perception acted as a motive to implement the QWL program.

11. Collective Agreement Signed on Terms or Work

In the Indian industrial scenario, the collective agreement is always associated with unions. A very important thing that the researcher observed was that, most of the CEOs and promoters take precautions for non-formation of union in units. At a few places, workers formed unions but the management did not give formal acceptance to the same. Because of management's hurdles, workers face problem to form the union and attain collective bargaining. Workers are suppressed under the pressure of management.

94.37% units in the machine shop have not signed on any independent variable of QWL. This happened because of the absence of trade union in the unit.

Other Notable Findings of Research

The researcher noted down some general observations at the time of data collection. These observations one or the other way relate to the status of quality of work-life in sample units. These are the general statements mentioned without any support of data, but with due observations and discussions taking place thereon while collecting data from the top management or proprietors and workers.

- It has found more literate workers employed in sample machine shop units. The physical work is less.
- The employees in sample machine shop units were less unionized having less bargaining power.
- The allegation strongly found between the employer and employees was that, the employer opined that workers are more conscious about their rights and not responsibilities and vice-versa.
- Provisions in labor laws have been a headache for the employers and at some units it is found that employers obeyed minimum guidelines of labor laws, to escape from the eyes of the concerned authority.
- The machine shop units in the industry of Kolhapur have helped the individual owners to grow, as far as individual economy is concerned. The quality of life of owners has improved much as compared to the quality of life of its employees and the work-life of units.

- Units having their own products with design, processes, quality control and marketing have attained a good quality of work-life, than the firms who have indulged only in job work.
- Except a handful, no unit was found to be involved in direct marketing efforts.
- The units situated in Kolhapur and Ichalkaranji City were observed to be very congested whereas units in the industrial estate and the co-operative industrial estate were more disciplined and decent.
- The units in the machine shop industry can be categorized in the following way.
 - Product manufactured, products with own design and manufacturing, OEM i.e., original equipment manufacturers, sub contracting, repairs.

The units can also be classified on the basis of 'segment caters' viz., automobile components, agricultural implements, projects, i.e., chemical and other plants, defense work, etc., maintenance, i.e., sugar and other plants.

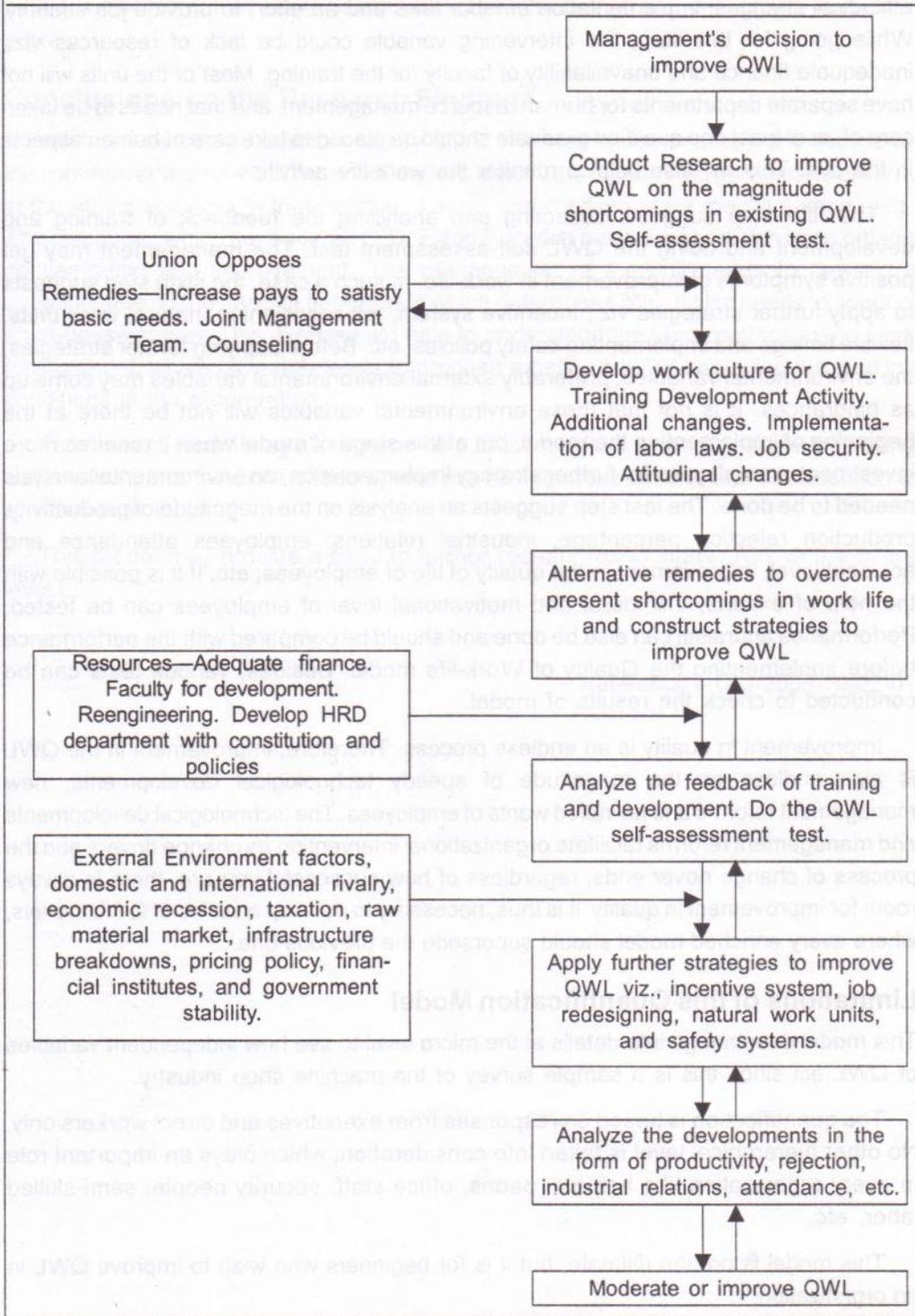
Model to Implement QWL

The data and analysis made on the basis of the quantification model gave adequate insights to the researcher regarding the areas in which the sample units were lacking, (See Table 3) and regarding their scope to improve their QWL. As mentioned previously in the article, this forced the researcher to develop a model to improve QWL in the industry.

The researcher suggested a simple way to improve QWL. The model is presented in Figure 1 in a flow chart. Certainly every new reform requires some sort of investment in it. QWL programs too require investment in the employees to improve the working conditions.

The model to be used for the implementation of QWL in the unit, as shown in Figure 1 recommends certain steps. It begins from the management's decision to improve QWL, which reveals its willingness to implement the QWL program in the organization with some specific goals. The second step is to conduct a research to improve QWL on the magnitude of shortcomings in the present work-life situation. It is suggested to have a self-assessment test. The questionnaire can be prepared taking into account the contents of QWL variables or parameters determining QWL. Opinions should be taken from all employees, i.e., workers, supervisors, office bearers and the managerial staff. This exercise is to find out the shortcomings in the present work-life. The third step is to find out the remedies to overcome the present shortcomings in the work environment. The model also exhibits some intervening aspects. While doing this exercise, employees may notice some changes in the management's attitude, which may have a negative impact on the workers and they may oppose. Any step taken by the top management may now create a suspicion in the mind of employees or union, though the activity is beneficial for the employees. So removing the suspicion from the mind of employees is very important. A few remedies can be suggested like, increase in emoluments to satisfy the basic needs of employees, establishment of joint management committees, etc. At this stage, the management gets an opportunity to counsel its employees on QWL.

Figure 1: Model Used for the Implementation of Quality of Work-life (QWL)



The fourth step suggests constructing strategies to develop and improve the work culture for QWL, training and development activity for the awareness of the concept and attitudinal changes; implementation of labor laws and an effort to provide job security. While going for this step, the intervening variable could be lack of resources viz., inadequate finance and unavailability of faculty for the training. Most of the units will not have separate departments for human resource management, and that needs to be taken care of, or at least one qualified graduate should be placed to take care of human aspects in the unit. This will also help to monitor the work-life activities.

The fifth step suggests collecting and analyzing the feedback of training and development and doing the QWL self-assessment test. The management may get positive symptoms of improvement in work-life. In such a case, the sixth step suggests to apply further strategies viz., incentive system, job redesigning, natural work units, flexible timings and implementing safety policies, etc. Before applying further strategies, the environmental variables, preferably external environmental variables may come up as hindrances. It is not that these environmental variables will not be there at the beginning of implementing the model, but at this stage of model when it requires more investment in employees for further strategy implementation, an environmental analysis needed to be done. The last step suggests an analysis on the magnitude of productivity, production rejection percentage, industrial relations, employees attendance and accident level, improvement in the quality of life of employees, etc. If it is possible with the help of experts, the moral and motivational level of employees can be tested. Performance appraisal can also be done and should be compared with the performance before implementing the Quality of Work-life model. Besides, various tests can be conducted to check the results of model.

Improvement in quality is an endless process. Therefore, improvement in the QWL is also endless on the magnitude of speedy technological developments, new management reforms and unlimited wants of employees. The technological developments and management reforms facilitate organizational intervention as change drivers and the process of change never ends, regardless of how successful you are, there is always room for improvement in quality. It is thus, necessary to develop a series of QWL models, where every enriched model should supersede the previous one.

Limitations of this Quantification Model

This model does not go into details at the micro level to see how independent variables of QWL act since this is a sample survey of the machine shop industry.

The quantification is based on responses from executives and direct workers only. No other hierarchical level is taken into consideration, which plays an important role in every organization like helpers, peons, office staff, security people, semi-skilled labor, etc.

This model is not the ultimate, but it is for beginners who wish to improve QWL in an organization.

The researcher perceived a few parameters, which create an unfavorable environment in the organization; for that a provision of negative marking is made. Perception and attitudes differs from person to person, hence, the level of attainment of QWL may differ slightly.

Conclusions on the Research Findings

An attempt has been made to quantify QWL in a way which is easily understood by the common entrepreneur. The model leads to identify the determining parameters of QWL in the Indian scenario, with reference to small and medium scale machine shop units. The categories which have scored C, D, E and F grades are the areas which need greater concentration and improvement. The management of the unit needs to develop a questionnaire on the basis of parameters which determine QWL. It also needs to conduct an in-house survey. This exercise will help to understand the shortcomings in the work environment, which ultimately leads to propose a better way for improving the working conditions in the organization.

The present model may be of some help to the medium and small-scale machining units in India and the units offshore, who are having cross cultural and socioeconomic similarities to India.

This model may provide a base to further researches to study QWL at the micro level. □

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Annexure – I

Variables Used for the Categories

1. Quality Award – National and international quality award viz., ISO9000, QS9000, CII, Baldrige award, Deming award etc.
2. Adequate and Fair Compensation – Organization pays workers according to Minimum Wages Act, organization pays office bearers according to Minimum Wages Act., Payment of Bonus as per Bonus Act., overtime pay at double rate, productivity-based incentive, provision of provident fund, provision of medical fund or E.S.I., any employee's welfare schemes.
3. Safe and healthy working conditions – Arrangement or scheme for employees safety, work in non-stress conditions, work in positive environment, workers do not feel work dangerous, work should not leave unimpaired in performing other tasks in life, work should not degrade humanity, adequate light arrangement, ventilation, safety limit marking, safety space between machine, safety guard on machines, safety goggles and shoes, sanitary and drainage cleanness, floor cleanness, site development, dining and rest room, drinking water, first aid box, industrial uniform, canteen facilities, formal safety training, fire fighting equipment's.
4. Immediate opportunity to use and develop human capability – Top officials perception, redesigning job appeals to workers, management practiced redesigning, management evaluated effects of redesigning, management diagnose job before redesigning, management consult workers before redesigning, workers participation in decision making, existence of quality circles, employees feel job challenging, assign task to job get meaningful at redesigning, workers know the use of product, workers know the importance of use of product, workers require multiple skill to do the job, workers perform complete job, regular feedback about work to employees, workers enjoys autonomy at work, moderate delegation of authority to workers.
5. Future opportunity for continued growth and security – Career planning system/policy, arrangement for employment security, availability of raining and development program internal, availability of training and development program external, employed job rotation system, suggestion scheme.
6. Social integration in the work organization – Existence of natural work units, executives interaction with other organization, top executives meeting, workers meeting, top executives involved in socio-cultural activities, workers receive humanized treatment, workers meeting with top officials, workers meetings with owners/directors, joint management committee.
7. Constitution in the work organization – Recruitment procedure, promotion policy, disciplinary procedure, grievance procedure, training and development policy, performance appraisal policy, provision for decision-making, documented work assignments, documented job description system.
8. Balanced role of work in the total life space – Equality in work, work is commensurable with qualification, skill and pay, worker spare time for family balancing his work, worker spare time for society balancing his work.
9. Social relevance of work – Employees enjoy weekly off, employees avail Government declared holidays, and employees enjoy pay leaves, communication facility for employees.
10. Management perception – Perception about impact of QWL on productivity, perception about impact of QWL on sales, perception about impact of QWL on profit, perception about impact of QWL on quality of product.
11. Collective agreement signed on terms of work – Salary or wages, incentive, welfare activities, promotion policy, recruitment policy, grievance policy, medical claim, bonus, hours of work, productivity based incentive, and working conditions.