EMgt 520/620 Management of engineering and technology
Professor Dundar F. Kocaoglu

1996-F-520-18-1

Edouard G. OYER

Research Paper

"The impact of technological change in a service organization"

Shlomo Globerson, Iris Shalev and Oded Shenkar
IEEE transaction on engineering management
Vol.42, No.4, November 1995

In this article the authors have studied the impact of the technological change and its perception by the employee in several levels of an organizational structure.

This study has been achieved in a service organization, where by definition there is no yields of goods. The study has been administrated through surveys in a significant part of the Israeli branches of a large international bank. In this organization three levels of the work structure have participated :

- the line employees, at the lowest level of the organization,
- the staff, which has a little authority,
- the management, which has the whole responsibility of the branch performance.

The findings are that the technological change may affect the satisfaction level of the employee depending of their level in the organization.

In this service based organization, the technological change was performed with the modification of the existing job content of the line employees. This change was decided by the top management. The modification of the line employees' job content consisted in the introduction of a new package software for the financial transaction. This package being able to give a full range of service from each workstation, the line employees' task diversity was boarded by this modification. The first concept is that employees who have been exposed to the change will report an increase in job satisfaction and motivation.

The second concept tackled is the employees' reaction to change regarding to their level in the organization structure. This concept is introduced because of the different employees' point of view: management's and line employees' aim and tasks are not the same, hence their different reactions facing to change. In this particular case the change affects directly the line employees' work, while the managerial level work is not directly affected. The employees reaction depends to the type of the change itself. If the change gets the job diversity richer, it will be favorably welcomed. On the other hand, if the change makes the job task narrower and repetitive, it will certainly be not accepted and rejected. The reaction of the employees was gauged on two criteria: how the employees judged their job in terms of satisfaction, and how they perceived the modification of their job content.

An interesting result is that the staff perceived the change in a positive manner, while the management perceived it as having a negative impact on their autonomy and satisfaction with their personal development. This result was obtain without regarding the content of the technological change. One result of the change is despite the increase of the tasks performed by the line employees, they did not notice a change in their job dimension. Moreover, the result of a manager's survey shows that the implementation was not adequate, and incorrectly introduced.

The investigations were performed through three surveys. The first gauged the job dimension, the second the job richness and the last identified the method by which the technological change was introduced.

Two groups were used. An experimental one which undergoes the technological change and a control group which does not. The two groups were approximately the same size, not only taken as a whole, but also in each level of responsibility.

The first test was the job diagnostic survey (JDS). This survey, which quantifies the job dimensions, was administrated one month before the technological change to all the function of the organization. In a second stage, it was readministrated seven months later, an amount of time judged sufficient by the authors to be sure that the employees were more familiar with the details of the change.

The second test was the job content form (JCF), designed to identify the changes in the job content of line and staff employees. For this reason, it was not administrated to the managers. This test was administrated only during the second stage.

Finally, the managers' form was administrated during the second stage.

To build confidence in the sampling, all the branches were approached by the same investigator. The employees were informed that the objective of the study was to evaluate their attitude toward their jobs. They were informed that the results would remain anonymous also.

The fact that two JDS questionnaires were performed, one before and one after the test, allows to see the evolution of the employees' perception regarding to the job content resulting from the technological change.

To complete the data gathering, demographical data were collected during the administration of the test. Statistical analysis did not reveal a significant difference between the experimental and the control group.

The impact of technological change has been broadly tackled in the literature. According to the authors, a lot of researches has been made in the industry about technological change. However, the investigations in the service industry were not so extensive. The field of investigation of the authors is the service sector, which contrary to the manufacturing does not produce goods. A technological change in the service-based industry seems strange on a first approach. However, the introduction of computer-aided tools like spreadsheet, word processor and information system constituted a major change in this sector[D].

If the literature shows a general agreement on the impact of the technological change on the job content, the nature of the nature of the impact is a bone of contention between the researchers. Some claim that the impacts are positive while other claim that they are negative. Regarding this inconsistency, the authors suggest a multiplicity of parameters that influence the positive or negative nature of the impact of the technological change. Among those parameters, the authors have chosen two of them particularly.

The paper look at the positive aspect of the impact of technological change, when it broadens the employees' task diversity. So, the authors made one hypothesis about the correlation between technological change and satisfaction of the employees who were exposed to this change. The second hypothesis is made on the basis of the different kind of perception employee have regarding to the organizational level.

A particular finding of this work is in the result it gives about the evolution of the job satisfaction due to the introduction of the technological change. The staff was satisfied of the change while the managerial level was not. This behavior is explain by the nature of the technological change. The Software gives the possibility to the staff to gain autonomy. This autonomy was perceived as a lost of authority by the managerial level because the staff required less managerial coordination and intervention.

Finally, the manager's survey reveals that the change was not introduced properly. Actually, for each implementation step, the concerned level was ignored. During the process of implementing the managerial level was not involved, and none employee was involved in the installation of the package software.

The authors attribute the ambiguous result of the line employees' response on the previous survey to this improper implementation of the technological change. They support this assertion with the

work of Lewin[24], which proposes three phases for the technological change: unfreezing-movement-refreezing. The unfreezing phases being the introduction process of the software package, the bank spent too little time on this phase to properly make the following phases. In the introduction of the paper, the authors recall the work of Coch[7] that states the information and participation of employees in the implementation process as a critical issue in the technological change. These recommendations are made to decrease the resistance to change that employees could do. This early work is supported by Schein[35], who proposed that the employees' response to any technological change is influence by their expectation about the impact. To integrate the technological change employees have to be convinced of its necessity and advantages in term of job content and dimension.

The demographic data collected during survey administration allow to qualify the reaction to change regarding to the age. It was found that the group constituted by people above forty was more reluctant facing with the change than the group of people below forty. This finding is related in the previous works of Zeithman and Gilley[42], Kesteler *et al*[21] and Shenkar[36].

The sex was also found as a moderator of the technological change. The women were found more receptive to change than the man were. This result is in contradiction with preliminary studies [12], [27], [42], [29] and [37]. However, another researcher founds corroborates this result [17].

In summary, the authors state that the impact of the technological change is not due only to the change itself but also to intervening variables. Particularly, the management involvement which is the one most cited in the literature [6], [11], [9], [33],[26].

The authors have focused on the service sector which is an activity that does not produced goods. According to this definition office studies, accounting and, in general, all activity not directly improved in the manufacturing of goods can be include in the service sector. In all those kinds of activities, the computed aided tools have introduced a technological change. We can embrace all those activities in the same subset. Thus, the problems occurred in the banking industry could be compare with the problems found in other activity using computer aided tools.

According to thisanalogy we can cite a work done by McDermott[C] showing a closed result from the one obtained by the authors when they explain the negative reaction of the managers regarding to the expansion of the autonomy of the Staff. McDermott's findings suggest that informal CAD training methods tend to promote the restructuring of work, but tend to result in less managerial familiarity with the CAD technology, which has been show to be detrimental.

In their work the authors have declared having administrated their survey during two stages, one before the technological change and the other six months after. However, we have no information about the motivation of the duration of the delay occurred between the technological change and the second stage. The authors explained that this delay was used to be sure that the employees were familiar with the software, but they did not give information about how they knew it: did they interview employees? Management? Extrapolated from a previous work about the learning time? The choice of this interval is critical, specially when there is a lack of managerial improvement. In his work about the electronic mail, another computer based tool, Astero[A] found that the growth of use occurred when the managerial level management exercised implementation effort.

Another research could be done about the impact of the technological change. A field that has not been explored by the authors is the realization of the technological change. The work of King[B] underlines the gap between the firms' expectations and their perceived achievement. Another problem

occurs in the work of the authors is the specification of their work: they have investigated on a single company, thus the lack of management was critical for the results. So, a research must be done on a larger sample. This research will focus on the impact of the technological change on the employees satisfaction in their work regarding the achievement of a technological change that boards the employees' task diversity. The first part of this future work could investigate the management's expectation about this change and how they plan to implement it. This phase could be done through interview of top management. A second survey could ask to the employees what they expect about this change and with an instrument like a JDS questionnaire the present job dimension could be explored. Regarding to the result of the first survey an interval of time could be decided before the administration of the third survey that will include another JDS and a JCF questionnaire. This work could be performed in accounting department or another service sector. The purpose of this work is to found a correlation between the degree of achievement of the technological change and the growth of the employees satisfaction.

References

[A] Thomas Astero, "The effect of management and social interaction on the intra-firm diffusion of electronic mail systems". IEEE transaction on engineering management, Vol. 42, No. 4, November 1995 pp319-331.
[B] William R. King and K. Ramamurthy, "Do organizations achieve their objectives from Computer-Based manufacturing technologies?". IEEE transaction on engineering management, Vol. 39, No. 2, may 1992 pp129-141.
[C] Christopher M. McDermott and Ann Marucheck, "Training in CAD: An exploratory study of methods and benefits". IEEE transaction on engineering management, Vol. 42, No. 4, November 1995 pp410-418.
[D] Norton m. Bedford, "A recapitulation of technological change: its impact on accounting", *Technological change: its impact on accounting*. Edward L. Summers, Editor.

The references [6], [7], [9], [11], [12], [17], [21], [24], [26], [27], [29], [33], [36], [37] and [42] are cited by the authors.