Quality and work organisation in Portuguese industry

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ABSTRACT

The present communication analyses the relationships between work organisation and quality systems. The analysis is based on results from a study funded by the "Specific Programme for the Development of Portuguese Industry" (PEDIP). The main issues which have been currently associated with work organisation and quality control in the Portuguese industry are characterized. Critical features related to the implementation of quality systems and new methods of work organisation for industrial development are also discussed. A few recommendations are given in order to promote appropriate methods of work organisation for quality improvement within Portuguese industry.

INTRODUCTION

The increasing market competitiveness felt all over the world has been perceived by Portuguese economic forces as a serious threat in the near future. The general belief is that, to become more competitive, Portuguese products and services have to be improved with regard to quality and productivity [1]. To tackle with the problem, a few initiatives have been carried out throughout the country, both at central and regional levels. Among them, one can cite the organisation of awareness seminars, the creation of infrastructures such as quality control laboratories and technological sectoral centres, the funding of new industrial equipment, the promotion of a national quality campaign and several other activities related to quality and productivity improvement.

As a result, there has been a slight change in managerial attitude and some firms have started the development of new management systems towards a total quality and productivity culture, which also imply new forms of work organisation. It is felt, however, that much more has to be done and achieved, especially with regard to small and medium-sized enterprises which form the great majority of Portuguese industry.

In this piece of work, an analysis was performed on the responses of questionnaires sent to a sample of Portuguese industrial firms, mainly with regard to features related to quality control activities and work organisation. Among them, special attention was given to companies objectives, critical issues within firms, new technologies, quality methods and production strategies introduced in the last few years, definition of task planning and assignment and type of autonomy given to work teams. The main conclusions of the survey and expectations for future development are outlined.

METHODOLOGY

As mentioned before, the present analysis is based on recent studies and results obtained from a survey which was undertaken in 1992 in Portuguese industrial firms. The survey was funded by the Ministry of Industry in the field of PEDIP [2]. About a thousand questionnaires were sent and 120 responses were received, 111 of which were analysed. This sample will be thereafter considered as A1 (sample 1).

Sample 2 (A2) is composed by 51 firms (46% of sample 1), in which some type of quality control activity was found. After this sample was analysed, it was concluded that only 12 of the firms, corresponding to 10.8% of sample A1, had either implemented (5 firms) or are planning to develop integrated quality systems (7). These last seven companies have some sort of quality activities and equipment but they want to improve

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them towards a total quality system. In this paper the sample formed by the above mentioned 12 firms will be designated as A3.

DATA ANALYSIS

As can be seen in Table 1, the majority of firms that fulfilled the questionnaire were private. The companies distribution according to the type of investment corresponds, in both samples, to the national distribution of industrial firms:

Table 1: Type of firms analysed

Type of firms	A2 (%)	A1 (%)
Public (+ than 50% of the investment is public)	4.0	7.2
Participated (public investment to 50%)	1.5	0.9
Private (mainly national private investment)	71.0	72.1
Trans-national (mainly foreign private investment)	22.0	17.1
Cooperative	1.5	2.7
Total	51	111

Table 2 shows the companies size according to the number of workers, both for sample A1 and A2. It has to be noted that the percentage of A2 firms with less than 50 workers is smaller than the corresponding percentage in A3, while the reverse occurs as the number of workers increases. This is to be expected since there is a greater tendency to improve quality in medium and large companies than in small ones.

Table 2 Dimension of firms

Number of workers	Survey (%)	
	A2	A1
< 50	13.5	29.0
50-499	55.0	47.0
500-1000	18.0	13.0
> 1000	13.5	11.0

The sectoral distribution of sample A2 is presented in table 3. The results show that the electrical and electronic sector is more advanced with regard to the implementation of some sort of quality activities (23.5%). Metal equipment industry (moulds, machines, etc.) is second (21.6%); this might only reflect, however, the existence of 3D measuring machines which were specifically mentioned in the questionnaire. Food and chemical industry follow in the list. Nevertheless, control laboratories are compulsory for these sectors and, as a result, data might hide a real lack of quality systems implementation.

Table 3 Sectoral distribution

Sector	A2 (%)
Mining	2.0
Food Industry	11.9
Textile and garment Industry	13.7
Wood and cork Industry	2.0
Chemical Industry	7.8
Non-metallic Mineral Industry	3.9
Metallurgy Industry	3.9
Metal equipment Industry (machines, moulds)	21.6
Automobile Industry	3.9
Shipbuilding and repairs	2.0
Electric and electronic Industry	23.5
Metal products Industry	3.9
Total	100.0

In fact, the detailed analysis of results also showed that only two companies have true quality systems. One of them belongs to the automobile industrial sector, and the other one manufactures electronic equipment for automobile industry. A third company has implemented Statistical Process Control (SPC). A few large companies, particularly within the electronic sector, are at an intermediate stage between the simple

inspection of finished product and a total quality system. Summarizing, it could be concluded that about 42.3% of sample A1 have some sort of control but this is mainly related to measurement equipment and/or quality control laboratories.

Portuguese firms seem to be really concerned with quality and productivity improvement, as Table 4 shows. In fact, these two features come first, in a scale from 1 to 5, among the objectives mentioned in the questionnaire. Results also show that, with the exception of working conditions improvement, firms of A2 sample are more worried with quality, productivity and human resources than those of A1.

Table 4 Firms objectives

Firms objectives	A2	A1
Increase of productivity	4.9	4.4
Quality improvement	4.8	4.4
Improvement of working conditions	3.2	3.4
Development of human resources	4.0	3.3
Improvement of Management Quality	4.3	3.8

As regards critical issues, work organisation is one of main concerns (Table 5). Lack of motivated and qualified workforce seems to be of great importance for firms in which a few quality control activities have been implemented (A2), than for those in which these activities do not exist at all, or those in which integrated quality systems already exist (or are intended to be implemented), which is perfectly understandable.

Table 5 Critical issues

Critical issues	Value	(scale 1-5)	
	A3	A2	A1
Existing organisation of labour	3.6	3.6	3.5
Lack of personnel motivation	2.7	2.8	2.9
Lack of skilled personnel	3.3	3.5	3.4

Another important feature, since the late 80s, has been a more intensive use of new technologies within Portuguese industry. A sociological survey conducted in 1986 and interviews carried out in 1987-88 [3] showed that about 21% of industrial firms used some sort of advanced technological system (CAD, CAD/CAM, PPC, etc.). Computers were mainly used in administrative and financial management (37%), and in production management (12%). Use of CNC machine-tools or manipulators and robots was quite limited (2.5%). The same happened with the use of new quality and R&D techniques (4%).

Recent results from the 1992 survey [2] show that the diffusion of new technologies has increased, especially in the late 80s, in the following areas:

- Administrative and financial management computerisation,
- Computer aided design,
- Quality control,
- Machining.

As far as quality is concerned, results from sample A2 indicate that more than 43% of firms intended either to buy more equipment (when they already have some) or to acquire it for the first time. In this group, however, only 27.3% of enterprises want to develop total quality management (TQM) systems, which represents 5.4% of A1 sample!

Data also shows that there is a change in production strategies. In fact, for the past five years, companies have been directed towards new markets and specialisation in few products. In the mid term companies plan to be even more directed to new markets but, at the same time, they plan to introduce new products (table 6).

On the other hand, priority given to the specialisation in few products decreased. This is true both for A3 and A1 samples, the two extremes of available data. It is logical that to consider new markets and products as priorities will imply the development of appropriate quality systems.

Table 6 Production strategies

Production strategies	A3		A1	
	In the last 5 years	For the next 5 years	In the last 5 years	For the next 5 years
Specialization in few products	19	16	20	15
Market specialisation	26	18	18	16
Product diversification	22	16	17	11
Penetration in new market	19	24	22	30
Introduction of new products	15	21	16	20
Integration in networks	0	5	4	6
Others	0	0	2	2
Total of choices	100	100	100	100

Table 6 also shows that the integration in networks starts to be important for Portuguese industrial firms. One can then expect organisational aspects to improve, although quite slowly, due to the greater development of relationships between firms (including subcontract links).

As far as work organisation is concerned, it could be concluded that Taylor principles still exist in many of industrial enterprises. In fact in more than 50% of A1 and in 67% of A3 firms, supervisors have as main function the control of orders execution.

Table 7 Characteristics of work organisation

Characteristics of work organisation	In all sectors %		In some sectors %		Do not exist %	
	A3	A1	A3	A1	A3	A1
Workers do simple tasks easily performed	41.7	27.9	58.3	61.3	0.0	4.5
Repetition of the same task by the same worker exists	41.7	32.4	41.7	51.4	16.6	10.8
Attribution of a job to each person	33.3	34.2	8.3	37.8	58.3	23.4
Each task has a pre-determined time and way to do it	58.3	41.4	25.0	32.4	16.7	19.8
Supervisors have as main function the control of orders execution	66.7	53.1	8.3	23.4	25.0	15.3
Only management and supervisors are responsible for the design and/or preparation and job control; workers do not take decisions about issues related to their job	16.7	27.0	33.3	40.5	50.0	26.1
Work is performed individually and not in group	16.7	29.7	33.3	46.8	50.0	18.9
Total of firms	12	111	12	111	12	111

There is, however, an important segment in which work organisation does not follow the classical principles (as shown above). It has to be noted that in none of A3 firms simple tasks are easily performed by workers. On the other hand, there is a significant difference between the two samples as far as work planning and control and teamwork are concerned. As can be seen, there are less cases in A3 in which "only management and supervisors are responsible for the design and/or preparation of job control" or in which "work is individually performed and teamwork does not exist".

It can be concluded that the tendency for flexible and multi-skilled working methods also increases, when concern about quality matters grows, which is according to the theory of TQM. In fact, as the broad literature on the matter can show, Taylor model of organisation has been one of the main obstacles to the implementation of appropriate quality systems.

Results on the work place where quality control is performed seem to confirm these remarks, as showed in the next table.

Table 8 Location of quality control

Quality control	A1 %	A2 %
In each job by the operator	37.8	74.5
By specialists	36.9	70.6
Materials control (laboratory)	54.1	60.8
Final product control (laboratory)	47.7	70.6

In sample A1, only about 54% and 48% of firms carry out the raw materials and finished product quality control, respectively, while in sample A2 these figures increase to 60.8% and 70.6%. Quality self-control (i.e., control by operators) is visible in 37.8% of A1 sample, and 74.5% of A2 sample. This data shows once again that there is, in A2 sample, a greater motivation towards a total quality philosophy and new methods of work organisation than in A1.

Still related to work organisation, one can see in Table 9 that the most common forms have been multi-skilled working groups and job rotation..

Table 9 New forms of work organisation

Forms of work organisation	A2 %	A3 %
Job Rotation	56.9	66.7
Multi-skilled Working Groups	60.8	58.3
Self-managing Work Teams or production cells	13.8	50.0

Self-managing work teams, i.e. groups of workers who can plan, execute and control their work, thus contrasting with the traditional Taylor system, have no significant expression, both in samples A2 and A3. In fact, although data showed that team work existed in a great majority of companies, there was no autonomy for them to define and execute their tasks (table 10).

Table 10 Definition of the task execution and planning

Who defines task execution and planning	A1 %	A2 %	A3 %
Planning and Methods Department	49	39	58
Shop floor supervisors	86	55	67
Working Teams	21	14	50

As can be seen, this role has been assigned to supervisors and to Planning and Methods Department. Once again, major advances are found in A3 sample.

As regards participation and representation of work force in problem solving, it can be concluded that legal representatives, such as trade unions, have been dominant (table 11). It is believed, however, that participation of unions and quality circles (or similar types of quality teams) will tend to grow in the near future.

Table 11 Participation instances

Participation/representation instances at firms	A1 (%)	A2 (%)	A3 (%)
Workers Committees	26	18	25
Union leaders/Union Committee	54	51	50
Committee for Working and Safety Conditions	50	51	58
Quality Circles, Progress Groups, Suggestions Systems	29	26	50

In Portugal, more than in other European countries, modernisation of companies is done without direct or indirect involvement of work force. Thus new technologies, mainly in SME's, are introduced without union or any other workers representatives intervention [4]. This can lead to conflicts and difficulties in the implementation of new methods.

CONCLUSIONS AND RECOMMENDATIONS

Portuguese industrial firms still present serious deficiencies related to quality improvement. Not only quality systems, understood as a powerful management tool, still have to be implemented in the great majority of firms, but also quality control has been absent in 54 % of them.

There is, however, an important part (11%) in which new methods of organisation towards quality improvement are visible. Data showed that these firms export a great percentage of their products and, therefore, they need to be competitive in order to survive.

Results from this study also showed that there is a straight relationship between advanced forms of work organisation and participation and efficient quality management systems. In fact, as companies move towards a total quality system, the need for implementing flexible models of organisation and autonomous working groups also grows.

The fact that work organisation has been pointed out as a major critical issue might reveal a certain "open mind" to new methods. It is crucial, however, that a few initiatives are taken with Government participation and commitment.

Promotion of innovating experiences and discussion of their results can play an important role in achieving a change in attitudes. There has been, for the past few years, a great concern about acquisition of new equipment. This is not enough. In order to become more competitive, Portuguese industry must have organisational structures that allow and motivate workers to contribute for quality and productivity improvement.

To change attitudes, education and training will be essential. The inclusion, in training and educational programmes, of new forms of work organisation, employees participation and quality management will certainly contribute for a quicker development. These programmes should not be confined to technicians and engineers, but must also be extended to upper and middle management and shop-floor workers.

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