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## **TOTAL QUALITY MANAGEMENT AND ISO QUALITY STANDARDS IN THE LEADING INDUSTRIES IN POLAND. SURVEY RESULTS**

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Quality has been identified as a key competitive weapon in the global market. Polish firms are making considerable efforts in implementing quality management in order to gain global competitiveness. The purpose of this study is to determine the most typical quality management practices in the leading manufacturing enterprises in Poland. The main finding is that only enterprises with ISO certificates are quite well advanced in quality programs. This study explores in detail basic parts of quality programs: customer focus, process improvement, ISO 9000 certificates and total involvement in Polish enterprises at the end of the 1990s.

### **INTRODUCTION**

Free-market economy and global competition have forced Polish manufacturing firms to operate on the basis of not only cost efficiency, but also superior quality to improve their global competitiveness through customer satisfaction. To meet this challenge, many Polish enterprises are striving to implement TQM with new pertinent manufacturing strategies and technologies in the hope of gaining a competitive edge in global markets. Investment in quality management is expected to increase as quality becomes more critical for them to survive in today's competitive markets. Poland must move away from its low-cost and low-quality based strategy to a new competitive edge strategy. A sound quality strategy complements and directs quality efforts by ensuring that customer needs are served and satisfied. As stressed by Obert and Spencer (1996), quality management creates new strategies by improving skills and developing resources that allow firms to take advantage of opportunities and avoid risks. Moreover, as quality management improves organizational performance, new opportunities and eventually new strategies are likely to emerge. This means

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that there exists a relationship between quality management and strategies, and consequently business practices and performance.

The strategic implications of quality and quality management practices are gaining recognition, as discussed by Ahire, Landeros, and Golhar (1995). Quality is a key competitive weapon in the marketplace. Quality engenders competitive advantage by providing products that meet or exceed customer needs and expectations. Many organizations have found that quality management can enhance their ability to compete in the marketplace (Anderson et al. 1994). Quality products and services are essential for firms seeking to compete globally. Companies that improve quality acquire a competitive advantage through quality-induced product differentiation (Shetty 1993).

Manufacturing strategy is viewed as the effective use of manufacturing strengths as a competition weapon to achieve organizational goals (Roth and Miller 1990). When manufacturing strategy is well formulated and implemented, competitive advantage can be obtained through the best and conscious use of the uniqueness of the manufacturing function, such as low-cost manufacturing, high-quality production, and manufacturing flexibility, etc. Many studies, Obert and Spencer (1996) and Spitzer (1993), have found that there is a relationship between strategy and quality management practices in organizations. Companies pursuing different strategies should emphasize different quality management practices. Firms stressing innovation, for example, are likely to implement different quality practices than those emphasizing efficiency and low cost (Obert and Spencer 1996).

Chron (1991) suggested that quality management practices, like other management programs, are contingent on strategy. He insisted that total quality management methods should be very useful for strategies emphasizing incremental or continuous improvement for their products and processes, but less attractive to fast-moving organizations whose strategies require innovation, or radical changes in a short period of time.

Krishnan, Shani, Grant, and Baer (1993) made a similar statement that quality management programs are likely to be most effective when a company in a stable strategic position wishes to enhance its competitive position through long term improvements in product performance and customer satisfaction. They indicated that quality programs are less beneficial for companies whose strategies involve radical restructuring or competitive repositioning.

Spitzer (1993) described TQM as the source of competitive advantage. He showed how quality management can help a company build generic lead

time, leverage competitive asymmetries, and create preemption potential, all of which are crucial to sustainable competitive advantage. The implication is that quality management can create these sources of competitive advantage and that companies should build strategies around them.

Organizations that are not ready to undertake the full implementation of total quality but want to move in that direction can use the criteria of several different award and certification programs as a starting point. Goetsch and Davies (1997) recommend ISO 9000 as a starting point. According to them, if an organization has not yet committed to total quality, but is in a business that could benefit from ISO 9000 registration, going through the preparation steps will automatically provide a start into total quality. Although ISO 9000 and total quality are not the same, any total quality organization should apply the kinds of procedures, checks and management involvement required by ISO 9000. It is important to notice that ISO does not set any specifications for quality. It is rather a set of requirements for the assurance of quality and for management's involvement. The stress is on defect prevention rather than inspection and rework.

Many researchers indicate that there is still insufficient empirical investigation on the relationships among quality management, manufacturing strategy and business performance. This review essentially indicates the need for empirical study on quality management and its impact on manufacturing strategy and business and it will contribute to the empirical studies on quality management in Polish industries.

The purpose of our paper is to provide quantifiable measurements of the experiences of enterprises implementing and using TQM programs and ISO quality standards. The major results of the survey are:

- Determining the degree of understanding TQM principles and tools by quality managers in Poland and their role in creating new quality culture
- Determining the most typical steps when planning and applying for ISO certificates
- Learning on the level of employee involvement in quality programs

This paper is composed of 4 parts: introduction, survey methodology, research findings and finally the discussion of the findings in comparison to other empirical research results.

## 1. SURVEY METHODOLOGY

A survey questionnaire was developed to provide a baseline for the examination of quality management, ISO 9000 certification and the level of understanding on the part of quality managers the need for improvement in leading Polish enterprises. The questionnaire was divided into six parts:

1. Firm's characteristics
2. Customer focus
3. Process improvement
4. ISO certification
5. Total employee and management involvement
6. Respondent matrix

The respondents were allowed to circle more than one answer and they also had an option of providing their own answer not listed as one of the choices.

The survey was conducted at the end of the 1990s, among 606 quality professionals employed in the leading manufacturing enterprises in Poland. These enterprises were characterized by a high volume of economic potential and were either going through the transformation process or were after the transformation process from a state owned firm to a privately owned firm. More than 50% of these firms were ISO certified. About 20% of respondents were on the list of the 500 largest companies in Poland in 1997, created by the Institute of Economic Sciences of the Polish Academy of Sciences (*Życie Gospodarcze*, May 1998). One of our respondents was FiatAutoPoland S.A. with an annual revenue of 6,235,787.4 thousands PLN in 1997.

The return rate was 14 percent and after deleting incomplete questionnaires the sample was composed of 58 questionnaires. Among those 58 enterprises 86% were ISO certified. This increases the rate of returned answers to 20% taking into the consideration that 300 surveyed local firms (50% of sample population) were ISO certified.

## 2. RESEARCH FINDINGS

The respondents were managers and directors for quality assurance, department managers, and product designers. Our sample was composed of 40 male and 18 female managers. Only 7 managers did not have a university degree. Their tenure in the same company was from 1 to 45 years. The

largest group was composed of managers who were 50 years and older. The distribution of age groups is presented in Table 1.

Table 1

## Managers' age

Age in years	%
20–30	15.5
30–40	17.2
40–50	29.3
50 and older	37.9

Thus, 67.2% respondents were older than 40 years. The average age of the management group was about 46 years while the average age of all employees was 40 years. Statistically speaking there was a significant difference in the average age of managers and the average age of employees (t-test at the 5% level of significance was applied).

Respondents were engaged in the chemical, electro-machinery, metallurgical and apparel businesses. Some notable information about the organizations that have participated in the survey so far includes:

- small to medium-sized enterprises (less than 300 employees) accounted for 15%
- large enterprises (300 to 1000 employees) accounted for 57% of responses
- very large enterprises with more than 1000 employees accounted for 28% of responses

About 86% firms were owned by shareholders.

All products were made for domestic clients, however 34% firms also sold their products abroad.

## 2.1. Definitions, measurements, and decisions on quality

Quality has been defined in various ways. In the past, stronger products were considered to be high quality products. We will briefly present three definitions of quality provided by the main gurus of quality: Deming, Juran, and Crosby.

Dr. W. Edwards Deming (1986) called 'the father of quality management', has formulated a management theory centered around system improvement, the reduction of variation to meet customer needs, and

humane and intelligent management people. In his “chain reaction model”, improving quality leads to fewer defective products, less material wastes, reduced production costs, improved deliveries, increased productivity, more markets and more jobs.

Juran defines (1992) a high quality product as one that satisfies customer expectations. “Juran’s Trilogy” is an approach to cross-functional management that is composed of three managerial processes: planning, control, and improvement.

Crosby (1979), the Vice-President of the International Telephone and Telegraph (ITT), proved that quality is free, and stressed that quality is understood as obeying standards and requirements for a specific product.

The respondents were given four options on quality notion to choose from. The results are presented in Table 2.

Table 2

## Quality definition

Quality definition	%
Set of characteristics for customer satisfaction	82.7
Obeying the norms and standards	36.2
Offering products of the highest international standard	22.4
Exceeding customer expectations	17.2

Respondents were allowed to use more than one answer, so the sum in the last column of Table 2 does not add up to 100%. In the majority of tables we arranged the results in decreasing order of percentage (as in the Pareto diagram). These results indicate that investigated firms are on the right direction toward quality improvement.

The next question was: “Who is in charge of quality in your firm?”

Answers to this question are summarized in Table 3. Almost 80% of respondents said that quality is everybody’s business and only 5% of firms do not have quality departments, but they have special quality improvement teams.

Table 3

## Quality responsibility

Responsible for quality	%
Each employee	79.3
General management	36.0
Special quality department	17.2
Special quality improvement teams	5.0

Another important issue was when and at what stage firms decide on the quality of their products or services. The results are summarized in Table 4.

Table 4  
Making quality decisions

Making quality decisions	%
During product design stage	67
During the production process	48
During the final inspection	12

This table provides us with the evidence that quality has been designed into the product at the very early stages of product development. Thus, these enterprises are following the ideas of TQM identified by us in section 3.1.

The next question was on methods and ways of measuring product/service quality. In Table 5, the results on quality measures are summarized.

Table 5  
Quality measures

Measures	%
Random sampling of final product	48
Statistical process control	31
Mass inspection	31
Cost of manufacturing non-conforming items	14

Obviously, some firms use more than one measure. It is interesting to notice that the lowest proportion (14%) is for the cost of manufacturing non-conforming products. It is quite typical for enterprises during the transformation period that the quality costing was not a main managerial tool. This and the indication of practicing mass inspection (31%) reflect the old way of thinking.

## 2.2. Customer Focus

Understanding and monitoring customer needs and satisfaction are crucial requirements for quality management. Different approaches are taken for analyzing customer satisfaction. Many organizations collect frequent customer satisfaction data over time using customer surveys. Based on these

surveys, special indexes are constructed. For example, Toyota, in addition to various customer satisfaction indices, also use process control charts. However, as presented in Wardell and Candia (1996), special adaptation of control charts for grouped data is required.

Other authors suggest using quality improvement matrix as a customer satisfaction measure. This approach allows a supplier and their customers to maintain the high performance of a product or service.

Our study reveals that all firms manufactured products for external customers and only 24% have both internal and external customers. About 36% firms provided from 90% to 100% production to the domestic market and 12% of firms had contracts with foreign markets for 70% to 97.3% of their production. This may have some impact on the next question on customers expectations. Table 6 summarizes our results on the ways of identifying customer expectations.

Table 6

## Identifying customer expectations

Time of Identification	%
During placing an order	81
Filling customer satisfaction forms	34
After accepting orders	1.7

Almost every firm had some tools and measurements for customer satisfaction. Table 7 summarizes all the results on typical measures of customers satisfaction.

Table 7

## Typical measures of customer satisfaction

Type of Measure	%
Number of complaints	72.4
Proportion of repair costs to the total revenue	48.3
Time needed to complete claim and satisfy the customer	26.0
Delays in delivery	22.0

### 2.3. Quality Process Improvement

The main problem is how to measure quality performance of the enterprise. In Japan Deming's Quality Award was established, while in the



United States during Reagan's government the Malcolm Baldrige National Quality Award was introduced. Only few enterprises each year are the recipients of quality awards. There are a certain amount of points in each category, and the applicant must obtain the highest score in each category to receive the award. The European Quality Award takes care of rewarding quality achievers in Europe (Hardjono et al. 1997). Thus, not only being rewarded, but also obtaining a high score against the criteria of quality award, is one of the best measures of quality excellence.

In our survey, respondents were asked to indicate the most useful tools and methods helpful in quality improvement. In many enterprises ISO certification was the first exposure to quality, thus respondents indicated the fact of obtaining the ISO certificate as one of the ways leading to quality improvement. In Table 8 we provide the list of ways leading to quality improvement in decreasing order of importance, according to our respondents.

Table 8  
Effective quality programs

Quality Programs	%
ISO 9000 certification	69
Employee training	27.5
Preparations before receiving ISO 9000 certification	26
Nominating a person responsible for quality issues	15.5
Applying TQM procedures	12

Firms with the ISO 9000 registration were involved in at least two or more of the above programs.

A separate question was asked on quality circles as effective quality programs. In the United States, quality circles were practiced for a limited period of time, and they were very helpful in building quality culture in the enterprise. However, they were abandoned and criticized as non-effective. In Poland, about half of the respondents do not use quality circles at all, but 34% of firms used quality circles in the past.

While TQM played an important role in helping U. S. companies regain their technological lead, for example in Xerox and Motorola, only 12% of respondents in our survey indicated the use of TQM tools.

The next part of the questionnaire was on specific quality tools, methods, and quality attitudes of managers in surveyed companies.

TQM consists of two basic elements. The first element is the use of statistical tools such as flowcharting, the Pareto chart, cause-and-effect

diagrams, and statistical process control. The second element is a change in managers' behaviour: going from managers who direct, make isolated decisions, rely on rules and organizational hierarchy to managers who lead, guide, collaborate, focus on the process, view people as assets, and promote diversity, flexibility, openness, and involvement. In the majority of situations, both TQM elements are implemented with one main goal of meeting customers' needs. However, technologists often find it hard to relate to the concept of customer satisfaction, since most of them do not have contact with customers at all. Recently, these things are changing and some of the new tools of TQM repair this deficiency.

Deming's philosophy, including his 14 points, is also listed as one of the components of quality management improvement.

The most useful approaches in the quality improvement reported by Polish firms are summarized in Table 9 (in decreasing order of importance).

Table 9  
Process improvement (ways and concepts)

Tool	%
Pareto chart	43
Brainstorming	38
Process flow chart	35
Histograms	34.5
Control charts (x-bar chart and R- chart)	31
FMEA (Failure Mode Effects Analysis)	27.5
Benchmarking	26
Cause-effect diagram (fishbone diagram)	22.4
Deming's wheel (PDCA)	19
The capability index	15.5
Deming's 14 management points	10.3
Scatter diagram	5
Self assessment (using the European Quality Award Criteria)	5
Poka-yoke	3.4
Correlation matrix	3
The House of Quality	0

There is no surprise that the Pareto chart (43%) and brainstorming (38%) are the most popular tools. They are simple and easy to use, and they serve the main purpose of determining the non-conforming products that need to be corrected or eliminated. Other tools used by more than 30% firms were: brainstorming, process flow charts, histograms, and statistical process

control charts. The last tool, House of Quality, a part of the Quality Function Deployment was not marked at all. The self assessment approach, like using quality awards criteria was practiced by only 5% of firms. Only 3 respondents indicated the need for applying the criteria of the European Quality Award.

This is yet another proof of a low quality profile of Polish managers as well as the confirmation of the lack of proper training. Some of the respondents perceived Deming's 14 management points as a quality tool rather than a quality philosophy.

## 2.4. ISO 9000 Certificates

Obtaining an ISO certificate is a big milestone on the way to total quality improvement (Trybus, Kumar, 1989). There is however misunderstanding of a role of ISO quality standards in the total quality management. But obtaining an ISO certificate does not necessarily mean that the product or practices are the best. It means only that the enterprise is on the way to improve and that the enterprise has written documentation on policies and procedures, which in turn leads to better understanding of functions, processes and operations.

Out of 58 respondents, 34 obtained ISO 9001 certificates and 18 obtained ISO 9002 certificates. There were two firms that received both certificates. About 50% of the firms indicated customer demand as the main reason for certification, while 70.6% indicated a need for better product marketability as the main reason (38% indicated both reasons). About 29% of firms indicated that receiving the certificate was also a tool for improving their quality.

More than half of the firms (53.4%) in the survey required their suppliers to be ISO certified. The rest did not require ISO certification from their suppliers, mainly due to the following reasons:

- a. they had full trust in suppliers' product quality (12%),
- b. they conducted quality control on the supplier's shop floor (12.06%)
- c. they had only one supplier (20.7%)
- d. the supplier had very good prices (8.6%)

The number of suppliers varied from 3 to 1000 and the most typical (mode value) was 100 suppliers. This number was highly correlated with the type of business or product. For example, more suppliers were in the automotive and electro-machinery businesses, fewer in steel mills.

The time from applying for to the ISO certificate varied from firm to firm and ranged from 1 to 18 months.

About 38% of firms used a consultant help, while 48% were able to make these preparations by themselves. In 70.6% of the surveyed firms personnel training was conducted by a consultant hired externally and in 34.5% by a manager responsible for quality issues. In 26% of firms training was conducted by both a consultant and a quality manager. One respondent indicated that training was conducted by a representative from the certification agency.

In 48.3% of the firms, a quality manual was prepared by one person, who was in charge of quality issues, and in 7% by a team composed of managers. In many firms, a special task team was built, and this was done in 29.3% of the firms.

Internal auditing took from 1 day to 2 years, and was conducted according to the plan in 8.6% of firms. The number of auditors varied from 2 to 60, with the most typical being 8 or 10 auditors.

The time needed to perform corrective actions after internal auditing varied from 2 weeks to 1 year, with the most typical value being 2 to 3 months.

There is always a great need for communication between management, quality professionals and employees when applying for ISO 9000 registration. The management team and employees must be contacted on the progress of certification process, on understanding policies and procedures, as well as on the steps needed for corrective action. In 53.4% of firms, in addition to frequent meetings, written policies were issued and distributed among the employees as well as in the special bulletin.

## **2.5. Management commitment and employee involvement**

This part of the questionnaire required answers on teamwork, management commitment and employee involvement. In addition to these three basic issues we were able to obtain information about the desired characteristics of a quality employee as well as information on quality culture.

*Team work.* Teams and very often interdisciplinary teams were created temporarily to perform specific tasks as indicated by 91% of the firms.

In the area of quality management, in 74% of firms special teams were called for quality system and tools implementation. 24% of respondents stated that the results of quality teams were much better than the results of other teams in the firm, and 26% of respondents stated that the results of quality teams were similar to those of other teams. In 31 % of firms the top management evaluated team performance. Some firms (14% of surveyed firms) provided team members with rewards. Thus, employees were motivated to perform well on the team. In addition to this, in 79% (46 out of

58 respondents) of the firms, respondents said that recommendations provided by a quality team were taken under consideration in promotion decisions made by the top management.

*Worker's empowerment* was analyzed by asking questions about making decisions without checking them with their supervisor. About 40% of respondents said they can make their own decisions very often and 29% occasionally. These numbers indicate that firms are on the right direction toward worker empowerment.

*Employee involvement* and its importance were raised by more than 50% of respondents, and 53% of firms indicated that all employees were involved in preparations to be ISO certified. In 27.6% of firms the middle and top management was totally involved in this process.

We tested our research hypothesis that the age of a manager and his/her evaluation of employee involvement in quality issues are independent.

In order to perform this test, our respondents were divided into two age groups: below 40 years (younger) and above 40 years (older). There was no statistical evidence that the age of a manager and the evaluation of employee involvement are dependent. The test statistic was 0.008 and the critical value at 5% significance level was 3.84.

*The most desirable employee characteristics.* We also analyzed the most desirable employee characteristics by asking questions on punctuality, professionalism, creativity, responsibility, knowledge, self-criticism, involvement and social skills. The characteristics are listed in Table 10 in the order of the most desirable to the least desirable.

Table 10  
The most desirable employee characteristics

Characteristics	%
Professional knowledge	72
Responsibility	58.6
Team work	55
Involvement	53
Creativity	48
Ability to make decisions	46.6
Communication skills	40
Punctuality and ability to meet deadline	34
Professional and social competency	34
Following boss's orders	20.7
Self criticism	12

The presented list of characteristics indicates that the most valued are: professional knowledge, responsibility, ability to work in teams and employee's involvement. We tested a hypothesis that the evaluation of ability to work in a team and the age of manager are statistically independent.

Other characteristics, for example, communication skills are not as important as in the United States, a non-homogeneous country. One can explain this as dealing with employees using the same native language, having at least a high school education, etc.

***Creating quality culture.*** Quality issues are relatively new in post-communist countries, especially when the manufactured products were not competing with world class products, since they were delivered only to the domestic market. Building a new culture in each firm is the main issue for quality managers. Our study reveals that 72.4% of firms understood that the quality of their work and products depends on building a quality culture, increasing workers' responsibility, improving their involvement, and looking for their innovation and creativity. 51.7% of respondents indicated that quality depends on the quality system implemented in their firm, and 41 % emphasized the need for creating a better working environment and atmosphere for quality improvement. Only 5% of respondents indicated that product quality may be increased if the proper force and penalties will be introduced.

We tested a hypothesis on the relationship of the management age and the issue of building quality culture. There is evidence that age is insignificant and young managers (40 years and below) tend to understand the need for creating a quality culture in their firms to the same degree as the older managers (the calculated  $\chi^2$  statistics is 0.226 and the critical value at the 5% significance level is 3.84).

An interesting issue was the motivation to participate in the quality team. 36.2% of respondents indicated that this is a road to becoming more knowledgeable and confident, and 43.1 % of respondents expected rewards for being on the quality team.

Building a quality culture in the firm is done by a series of training sessions on quality improvement. Among 51.7% of firms, all employees participated in this type of training. And in 10.3% of firms 90% of workers received a quality training. Still there were 10 firms (17%) in which less than 10% workers received training on quality issues.

Finally, the respondents were asked to indicate methods to improve quality culture in their firms. The list of practices (in order from most to least popular) is presented below:

1. Everybody knows "Who is responsible for the quality of my work?" (91.4%).
2. Employees visit their customers in order to better understand their needs and the way of using a specific product or part (79.3%).
3. Each employee receives the quality manual or some other quality booklet (34.5%).
4. The firm organizes so called "open days" for its workers families (24.1%).
5. In the production departments there are boards for workers to display their suggestions for quality improvement (19%).
6. There are annual rewards for the best suggestions on quality improvement (19%).
7. There is a competition for the best ideas on quality and safety improvement (13.8%).
8. The company president visits each month the department with the highest quality achievements (5%).

When checking separately 8 enterprises without ISO 9000 certificate, we found that quality programs were practically non-existent, for example 3 out of 8 were in the process of formulating quality policies and strategies, another three were in the process of finding quality manager and two were in the process of planning for ISO 9000 application. None of these 8 firms formed quality circles or quality teams. They were still using mass inspection as the main tool for quality. None of the modern quality improvement tools were adopted in non-ISO certified firms.

## **CONCLUSIONS AND THE DISCUSSION OF THE RESEARCH RESULTS**

In our opinion it is difficult to evaluate the effects of implementing TQM strategies and methods at the present stage of their implementation in Polish enterprises (though such attempts have been undertaken – cf Karaszewski 1999c). First of all, it is difficult to separate those which are the results of implementation and certification of quality system or undergoing ownership-organizational restructuring of an enterprise. Moreover, in its nature, TQM strategy, based on continuous but

incremental changes, demands a broader time horizon for observing the results of such changes.

Undoubtedly, the progression of adapting TQM concepts in the conditions of Polish enterprises can be proved by the presence of some characteristic processes, mechanisms, practices and management methods and also manifestations of quality culture which could be identified within the group of examined enterprises. The image of quality orientation presented by Polish enterprises allows to formulate some conclusions of a more general nature. Collected statistical material and its analysis provide in our opinion, basics for distinguishing the following tendencies of TQM concept development in Polish enterprises:

1. The challenge to increase competitiveness of products and processes by increasing quality has been undertaken only by some domestic enterprises.

2. Engaging into quality-oriented actions has been forced by, first of all, pressure from the part of enterprises' clients and environment.

3. Actions undertaken for increasing quality of products and processes are usually limited to creating quality systems compatible with the ISO 9000 norms, and then (almost always) its certification.

4. The process of quality system's building and its certification only partially contribute to introducing good management practices and methods verified in the TQM concepts implementation (e.g. functioning of quality circles).

5. Negative aspects of certification process (documentation and audition costs among others), and, first of all, lack of expected benefits of implementing and certifying quality systems, undoubtedly weaken enterprises' motivation to develop their quality systems and adapt other innovations related to the TQM philosophy and strategy.

6. An important obstacle in implementing quality management in Polish enterprises is insufficient training (knowledge) and engagement (leadership) of managerial staff, regardless of their age.

7. One of the consequences of a conservative attitude of managerial staff is poor utilization of methods and tools for developing product and process quality. This is especially visible at the stage of designing products, though the majority of enterprises make critical decisions concerning quality at this particular stage.

8. Generally, systems of continuous monitoring and measuring the effectiveness of introduced changes and implemented improvements in key areas of quality creation do not function in Polish enterprises. The method



of diagnostic self-evaluation by means of the criteria of the Polish and European Quality Reward is applied only incidentally. Quality cost calculation systems also introduce a new stage of building infrastructure and culture quality in domestic enterprises.

9. A visible change of consciousness concerning the role and significance of quality and basic values and roles constituting quality culture in an organization, such as: orientation towards customers and their needs, common responsibility for quality and shaping quality-oriented attitudes of the employees as the most efficient system guaranteeing quality, has been taking place in those enterprises which undertook any quality-oriented actions.

10. The presented description of quality orientation of Polish enterprises shows their situation at the end of the 1990's. The increasing economic crisis in the following period did certainly not facilitate accomplishing some of their goals related to implementing the TQM strategy after the year 2000.

In the light of the conducted research, how representative are the identified regularities? We will answer this question indirectly, attempting to state to what degree the formulated conclusions of our research are proved by the results and conclusions of other empirical research studies conducted at the same time within the group of domestic enterprises.

At the beginning, it has to be stated that the research output from cross-sectional research on the TQM implementation in Polish enterprises at the end of the 1990's is very scarce. The most important to mention are the studies by Karaszewski (1999a, 1999b, 1999c) and by Lisiecka and Papaj (2000), both conducted in the period analogous to our research, and also the research by Durok (2000) and Lewandowska (2001), conducted a year later. All these studies focused on those enterprises which had certificates of quality system compatible with the ISO 9000 norm, and the research issues concentrated mainly on:

- certification motivation,
- problems of quality system implementation,
- the effect of certification on organization functioning (external and internal advantages),
- the applied tools of quality improvement.

The degree of advancing into implementing quality management according to the TQM concept was (except for Karaszewski's studies) a minor issue, usually reduced to collecting respondents' declarations on their intention to implement the TQM strategy.

We can find a high convergence of final conclusions as to the conservative behaviour of enterprises in the respect of implementing quality-oriented strategy according to the TQM concept in Lisiecka and Papaj (2000). Report on the results of the research conducted also in 1998 among the certified Polish enterprises (the key for selecting enterprises was the fact of possessing by them the certificate from RWTŪW, the initiative organization of the research conducted in Germany and Poland). The research aim was to establish whether the enterprises certified according to the demands of the selected ISO norm of the 9000 series are interested in improving their quality system within the frames of the ISO 9000 Plus which develops a series of activities in an enterprise in accordance with the TQM concept and methodology (such as examining customer satisfaction level, quality planning, quality cost calculation). The authors of the paper, in the conclusion summing up the analysis of research results obtained in Polish enterprises, state that however "enterprises search for possibilities of developing business, very few firms have taken up the realization of the TQM strategy programme or have applied its rules and tools" (Lisiecka, Papaj 2000, p. 8). Certification of quality system according to the ISO 9000 norms is, in the opinion of the majority of enterprises, fully sufficient, despite the fact that the same group of examined enterprises expressed their disappointment as to the real effects of the certification. Not only the lack of visible increase of competitive advantage (1/3 of respondents), but also the lack of continuous quality improvement (over 25% of respondents) are the disappointment factors, which, in our opinion, demotivate further efforts for quality. Both phenomena at first glance seem strongly correlated for domestic enterprises. Unfulfilled expectations for strengthening the competitive advantage after certification also concern European enterprises (Added Value... 1997, Lisiecka and Papaj 2000), and American firms (Ragothaman and Korte 1999; Trybuś and Kumar 1998). However, those inner certification effects (including continuous quality improvement) are always stressed, which in the long term should bring the effect of competitive advantage.

In Polish enterprises, even when the evaluation of the certification effects is relatively high and, as can be seen in a research from 1999 by Lewandowska (2001) as many as 70 per 100 examined firms perceived obtaining the ISO certificate as an important competitive advantage (though only 35 regarded it as a lasting advantage), only 9% (12% in our research) of the enterprises admitted implementing the TQM rules, and as many as 31% of firms declare explicitly that they are not going to

implement the TQM rules (Lewandowska 2001). Characteristically, mainly the large and the largest companies implemented the TQM rules (a similar result in our research). This shows the tendency observed in European enterprises.

A more optimistic picture of advancing Polish firms in implementing the TQM rules, methods and tools is presented by Karaszewski (1999a). Within the group examined by the author (only those firms which obtained the compatibility of systems ensuring agreement with the norm ISO 9000) “nearly 57% either are introducing or are much advanced in TQM implementation, and only 8% are not going to consider this concept” (Karaszewski 1999b). This relatively high percentage of enterprises engaged in the TQM processes in comparison to the research results by Lisiecka and Papaj, and Lewandowska, and also our results, can be explained for instance by the different structure of the examined population, taking into consideration smaller firms (private persons, limited liability companies, civil partnerships), employing up to 50 people (this segment of firms was absent in our research). It is within this group, that the author of the research identified the highest percentage of enterprises (67%) in which the engagement of the managerial staff in implementing TQM was described as full, their participation as active, and their knowledge of the TQM problems as extensive. Among the enterprises divided according to the number of employees, the lowest degree of understanding the problems of quality management is characteristic for the firms with over 1000 employees, which clearly differs from the research results discussed above.

The degree of advancing enterprises in TQM strategy implementation (and the degree of engaging senior management) in the reported research has been evaluated mainly on the basis of the respondents’ declarations. We will not find here (by analogy to our research) an attempt to evaluate the practising of the more important quality management rules: customer orientation, participation of the employees in management, continuously improving the processes and serving methods and systems of measurements of quality in the organization interpreted in a complex way. One of the TQM concept’s element which showed up relatively often in the research conducted in Polish enterprises were the tools of improving quality. In this case the research by Lisiecka and Papaj is also convergent with ours. Among the list of current problems in the area of quality management, the highest percentage (60%) of the examined enterprises indicates poor usage of quality tools in the areas of creating quality

(Lisiecka, Papaj 2000). On the other hand, from Karaszewski's study (1999b) we learn that "out of the five selected best known TQM tools, the SPC (Statistic Process Control) took the first place in respect to effecting enterprise's operation. The subsequent places were occupied by: Just in Time, Benchmarking, Quality Function Deployment and Taguchi method" (Karaszewski 1999b, p. 24). The first position of SPC (despite the number of employees) – analogously to our research – is not surprising, but enumerating QFD and Taguchi's methods is surprising, as they had zero frequency in our research, with the complete exclusion of the Failure Method and Effects Analysis and their effects (in our research applied more frequently than benchmarking). The discrepancy of the results can be partially explained by the different structure of the examined group of enterprises (QFD method was second in the group of smallest enterprises, employing up to 50 workers; such firms were not included in our research).

The use of statistical methods as a tool for improving quality in Polish enterprises was one of the research aims conducted by Durok (2000) on a sample of 100 enterprises that had been certified before 1999. The author, however, limited the scope of the research to statistical methods classified as so-called basic quality tools: histogram, control chart, Pareto chart, cause-effects diagram and scatter diagram. From this list of tools the highest percentage (28%) of enterprises apply histograms (34.5% in our research), and then control charts (10%) and scatter diagrams (4%) (5% in our research). Strikingly low, in comparison to the results of our research and the research conducted among American enterprises (cf Trybuś and Johnson 1995), percentage of enterprises (3%) applied Pareto chart (43% in our research), and the cause-effect diagram – only 2% – 22.4% in our research.

To sum up this review of the more essential results of empirical research, it has to be stated that, despite some discrepancies concerning quantitative evaluation of the examined phenomenon, the quality diagnosis is corresponding: the concept of quality management is gradually, though with some obstacles, being implemented into the practice of Polish enterprises. The Polish model of TQM implementation is definitely leading through the stage of creating quality system compatible with the ISO 9000 norm (firstly, the version from 1994, presently, the 2000 version). This stage can be called the stage of quality infrastructure building, and it is based mainly on formal procedures. The next stage is that of creating and developing quality culture. The rules and values of TQM cannot be introduced in a formalized way, but this does not mean that such a process

does not have to be planned, organized, motivated or controlled, to put it briefly: managed. As we can see from the experience of numerous European firms (cf Hardjono 1997) and some (still very few) Polish enterprises, a tool which supports and highly structures the processes of implementing the TQM philosophy, is the EFQM Business Excellence, and the model of Polish Quality Award based on it. Such a benchmark-making example in the group included in our research is Zakłady Elektrod Węglowych SA (Carbon Electrode Company) in Racibórz.

ZEW SA in Racibórz is one of the oldest plants of electrode-producing sector in the world (established in 1985, cf Bugdol 1998), and a joint-stock company since 1997. In the same year, it was the winner of the third edition of the Polish Quality Award Competition. Earlier, in the first edition of this competition in 1995, it got an honourable mention. Participation in the first edition of the competition is regarded as the key element organizing the efforts of the management and staff to build quality culture according to the TQM concept. Simultaneously, a quality infrastructure was built by creating as early as 1992, and then implementing a quality system according to the ISO 9002 model (PCBC and TÜV-Cert Essen certificates obtained in 1994) and the ISO 9001 model (PCBC and TÜV-Cert Essen certificates obtained in 1995). It seems that during this process the optimal variant of combining the quality infrastructure stage with a creating quality culture stage was selected here. The quality-ensuring system, implemented during three years in ZEW SA was from the beginning an element of a greater whole – a complex implementation of total quality management. The process of implementing TQM, according to Bugdol (1998, p. 40), embraced:

1. The team for quality policy appointing by the board (after conducting a detailed analysis of management system, the team chose those elements which should be changed or modified).

2. Conducting self-assessment of the managerial staff (success in introducing changes depends on the direct involvement of managerial staff).

3. Training of the whole staff in the area of TQM and socio-psychological working environment (apart from common training in the area of quality systems).

4. Promoting the TQM policy outside and inside the enterprise (by press articles, conferences, symposia, direct meetings etc.).

5. Announcing a contest for the most interesting solutions from the TQM area.

6. Establishing quality circles and working out the methodology of their functioning (on the basis of voluntary employees' decisions).

7. Making a self-assessment of the enterprise (within the boundaries of contest participation).

8. Passing over informative material concerning TQM to all people interested.

We can add to that a systematic survey of employees' satisfaction and their attitudes towards the TQM concept. The TQM philosophy for the employees of ZEW SA means striving for perfection in all enterprises systems: economic, organizational, technical, and, first of all, in human terms and caring for relations between the enterprise and its socio-economic environment. The fact that every member of 1500-people workers who wishes to improve their qualification level gets full financial aid is quite significant.

The Carbon Electrode Company in Racibórz is an example that market success in a strongly competitive international environment can be achieved only with the help of quality strategy, and not only by a low price strategy. ZEW as a certified supplier of cathode blocks for one of the biggest aluminium concerns ALCAN, has the biggest profits among all the competitors from this segment. The firm received numerous rewards for its export activity. It is a prize-winner of the Teraz Polska competition, and twice the winner of the gold medal of the International Poznań Trade Fair. One of the most prestigious honourable mentions is its membership in the European Foundation for Quality Management.

## REFERENCES

- Ahire, S. L., Landeros, R., Y. D. Golhar (1995), "Total Quality Management: A Literature Review and Agenda for Future Research", *Production and Operations Management*, 4 (3)
- Anderson, J. C., Rungtusanatham, M., Schroeder, R. G. (1994), "A Theory of Quality Management Underlying the Deming Management Method", *Academy of Management Journal*, 19(3)
- Bugdol M. (1998): *Polityka TQM w Zakładach Elektrod Węglowych SA w Raciborzu [TQM Policy in the Racibórz Carbon Electrode Company]*. "Problemy Jakości" nr 6, p. 35-42.
- Bureau of Business Practice, (1992), ISO 9000: *Handbook of Quality Standards and Compliance*, Allyn and Bacon.
- Chron, N. H. (1991), "Total Quality Management: Panacea or Pitfall?", *International Journal of Physical Distribution and Logistics Management*, 21 ( 8)
- Crosby, P.B. (1979), *Quality is Free*, Mentor/New American Library, New York.

- Deming, W. E., (1986), *Out of the Crisis*, Massachusetts Institute of Technology, Cambridge, Mass.
- Durand, I., Cormaci, A., (1997), "The Future of the ISO 9000 Standards", *The ISO 9000 Handbook*, edit. Peach, R. W., Irwin, pp. 468-469.
- Durok A. (2000): *Zarządzanie przez jakość w polskich firmach [Quality Management in Polish Firms]*. "Problemy Jakości" nr 12, p. 12-16.
- Goetsch, D. L., Davis, S. B. (1997), *Introduction to Total Quality: Quality Management for Production, Processing, and Services*, Prentice Hall, New Jersey
- Hardjono, T. W., ten Have, S., ten Have, D., (1997) *The European Way to Excellence*, Directorate General III Industry, European Commission
- Juran, J. M. (1992) *Juran on Quality by Design: The New Steps for Planning Quality into Goods and Services*, The Free Press, New York.
- Karaszewski R. (1999): *Stopień zaangażowania polskich przedsiębiorstw we wprowadzaniu zarządzania przez jakość [The Degree of Involvement of Polish Enterprises in Implementing Quality Management]*. "Problemy Jakości" nr 5, pp. 18-20.
- Karaszewski R. (1999a): *Uwarunkowania wprowadzania TQM w polskich przedsiębiorstwach [The Conditions of TQM Implementation in Polish Enterprises]*. "Problemy Jakości" nr 6, p. 12-14.
- Karaszewski R. (1999b): *Narzędzia TQM stosowane w polskich przedsiębiorstwach [TQM Tools Applied in Polish Enterprises]*. "Problemy Jakości" nr 6, p. 24-26.
- Karaszewski R. (1999c): *Efekty wprowadzania TQM w polskich przedsiębiorstwach [The Effects of TQM Implementation in Polish Enterprises]*. "Problemy Jakości" nr 9, p. 6-9.
- Karaszewski R. (1999d): *Efekty wprowadzania norm ISO serii 9000 w polskich przedsiębiorstwach [The Effects of Introducing ISO Norms of the 9000 Series in Polish Enterprises]*. "Problemy Jakości" nr 12, p. 18-20.
- Karaszewski R., Karaszewski W. (2001): *Usprawnianie jakości podejmowane przez spółki z udziałem kapitału zagranicznego w Polsce [Quality Improvement Undertaken by Foreign Capital Share Companies in Poland]*. "Problemy Jakości" nr 1, p. 16-20.
- Krishnan, R. Shani, A.B., Grant, R.M., Baer, R., (1993) "In Search of Quality Improvement: Problems of Design and Implementation", *Academy of Manag. Executive*, 7 (4)
- Lewandowska M. (2001): *Normy ISO w praktyce [ISO Norms in Practice]*. "Problemy Jakości" nr 2, p. 18-22.
- Lisiecka K., Papaj T. (2000): *Doskonalenie systemu jakości przez ISO 9000 Plus: analiza porównawcza wyników badań przeprowadzonych w Niemczech i w Polsce [Improving Quality System by Means of ISO 9000 Plus: A Comparative Analysis of the Research Results Conducted in Germany and Poland]*. "Problemy Jakości" nr 6, p. 6-9.
- Obert, T. L., Spencer, B. A., (1996) "An Exploratory Study of the Link Between Strategic Types and Quality Implementation", *Journal of Business Strategies*, 13
- Ragothaman S., Korte L. (1999): *The ISO 9000 International Quality Registration: An Empirical Analysis of Implications for Business Firms. International Journal of Applied Quality Management*, Vol. 2, No 1, p. 59-73.
- Roth, A., Miller, J., (1990) "Manufacturing Strategy, Manufacturing Strength, Managerial Success, and Economic Outcomes" in J. E. Ettlie, M.C. Burstein and A. Feigenbaum (Eds.), *Manufacturing Strategy*, Kluwer Academic Publishers
- Shetty, Y. K., (1993), "The Quest for Excellence: Lessons from The Malcolm Baldrige Quality Award", *SAM Advanced Management Journal*, 58

- Spitzer, R. D. (1993), "TQM: The Only Source of Sustainable Competitive Advantage", *Quality Progress*, June
- The Added Value and Credibility of Third Party Certification of Quality Systems in the European Union* (1997). Quality Series nr 5, Directorate General III Industry, European Commission.
- Trybuś E.K., Johnson G.D. (1995): *Total Quality Management in Practice*. Southern California Study
- Trybuś E.K., Kumar A. (1998): Critical Success Factors for ISO 9000 Registration. *Journal of Academy of Business Administration JABA*, Vol. 3, No 1, p. 17-26.
- Wardell, D. G., Candia, M. R. (1996), *Quality Management Journal*, Vol. 3, No. 4

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