

QUALITY AND PERFORMANCE OF THE COMPANY IN THE CZECH REPUBLIC

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Abstract

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Quality management contributes to increasing the performance of an enterprise through the application of such working procedures which ensure in the end the output required by customers. It also ensures the realization of revenues and profit for the enterprise. Quality is usually studied separately, whereas this analysis is focused on the elimination of conflicts and the resulting costs and inefficiencies in the company. Quality can also be seen in the narrower sense as a quality product which focuses on satisfying customer requirements. It is clear that quality management in the enterprise must lead to a quality product and customer satisfaction. Performance is also usually examined separately using the tools of financial analysis (mainly ratios). What is lacking in research to date is the clear and conclusive interconnection of quality and performance and its parameters. The subject of this paper is the analysis of quality (with emphasis on product quality) and its influence on business performance (represented by selected financial ratios). The aim of this article is to find the level of product quality in a company and identify those quality factors affecting a company's performance. The resulting interconnection of the parameters of quality and performance should guarantee that the influence (selected parameters) will be reflected in the quality of business performance possible through the simultaneous management of quality control and influence on future business performance.

quality, performance, financial analysis, cluster analysis, customer satisfaction

A number of authors deal with the quality and business performance of a company; however, their interpretation of quality in terms of a company is very comprehensive (for example Kaplan and Norton, 1992 or Madu, Kuei, Jacob, 1996). Other authors analyze the quality of a company through customer satisfaction, but they do not provide any quality concept within the company despite the fact that the connection with a performance is rather loose in this case (for example Parasuraman, Zeithaml, Berry, 1988). Our research focuses on examining product quality and customer satisfaction in a company product. We associate the observed level of quality with the performance of a company. This enables us to identify those quality factors directly affecting a company's performance.

The aim of this article is to find the level of product quality in a company and to identify those quality factors that affect a company's performance. The

sample data we use come from Czech companies. Specialized studies of a similar kind which would examine the relationship between quality and performance are very rare in the Czech Republic; our research therefore aims to contribute to fill in the gap.

The presented analysis is an output of the ongoing research of the research team. Previous results illustrated that most companies in the Czech Republic consider the quality of their products or services as superior. At the same time, these companies are aware of the positive impact of the superior quality of their products on the efficiency of their company (see Blažek *et al.*, 2009 or Špalek, Částek, 2010, for further information). However, these conclusions do not provide evidence concerning other aspects of company performances which could even reflect quality management.

1 THEORETICAL FRAMEWORK

Company performance can be measured in many different ways. A usual approach is to evaluate the performance through financial ratios such as return on investment (Duchesneau and Gartner, 1990; Smith, Bracker and Miner, 1987), return on sales (Kean *et al.*, 1998), or return on equity (Richard, 2000; Barney, 1991). In the case of a new company without a profit history, we can use the current amount of revenues or more commonly the number of employees (Orser, Hogarth, Riding, 2000; Mohr, Spekman, 1994; Robinson, Sexton, 1994; Srinivasan, Woo, Cooper, 1994; Loscocco, Leicht, 1993; Davidson, 1991; O'Farrel, 1986). Moreover, there are other opportunities of how to evaluate company performance: dynamic variables such as improvement in ROI over time (Miller, Wilson, Adams, 1988), other financial ratios such as revenues/income per worker (Johannison, 1993; Bade, 1986), or liquidity and sale volume (Deng, Dart, 1994).

While defining the term quality, it is necessary to note that a single correct definition of what quality exactly is does not exist. For example, Garvin (Garvin, 1987; Garvin, 1984) defines five basic building blocks of quality together with its eight dimensions, whose meeting is critical for considering production quality or even the quality of a company itself. When empirically verifying the relationships between the application of quality management and company performance, we have to take into account the fact that when looking for causal relationships, it is necessary to work with quality perception and not with its objective operationalization. The reason is the customers' subjective quality assessment as their opinion is the basis for their decision to buy, which is the basic building block of financial indicators. The best way to increase company performance is therefore to increase quality, which is a result of a well-realized business strategy.

According to Japanese philosophy, quality is a zero defect – doing it right the first time (Parasuraman, Zeithaml, Berry, 1985). Crosby defines quality as conformance to requirements (Crosby, 1979 reference from Parasuraman, Zeithaml, Berry, 1985). This concept of quality makes a core of the definition of quality according to ISO 9001 (compare with ČSN EN ISO 9001 ed. 2, 2010). Companies operating in industry perceive quality in accordance with this aforementioned, generally accepted definition, as a degree of meeting requirements by a set of inherent traits.

Existing models of quality assessment are not directly associated with performance, or they are not directly linked to business performance indicators. An exception in this respect is Everett, who conducted extensive research with his team on the approaches to quality improvement including business performance. It was found that the financial indicator of business performance measured by

ROA depends on three factors: knowledge of quality, senior management involvement, and employee compensation and recognition (Everest *et al.*, 1997).

These factors stem from a generally recognized quality model in which the authors agree on eight fundamental quality factors: the role of top management leadership, the role of the quality department, training, product or service design, supplier quality management, process management, quality data and reporting, and employee relations (Saraph, Benson, Schroeder, 1989). Quality data and reporting is understood as monitoring costs associated with quality measuring, an information system, and methods aimed at determining the level of quality; however, the last factor does not directly include indicators of company performance.

Given the fact that this model focuses only on the quality of management, it was extended to include product and process factors (rate of product/process change, degree of manufacturing content, proportion of product/service purchased by an outsider, extent of batch vs. continuous process, product complexity) as well as factors related to the market (the degree of competition, the extent of barriers to entry into the industry, the extent of quality demands by customers, the extent of government quality regulation) (Saraph, Benson, Schroeder, 1991). Even here, however, the standard indicators of business performance are not mentioned.

2 METHODOLOGY

The research is based on primary data obtained from a survey using a structured questionnaire. Respondents were asked to enter specific data from a balance sheet and profit and loss account. The primary purpose of collecting the data was to construct certain indicators evaluating the financial performance of a company. The questionnaire consisted of two parts. The first – general – part comprised questions relating to monitoring quality and the relationship between the quality and competitive ability of a company in addition to the usually examined corporate characteristics (closer identification and classification of a company). The second – major – part of the questionnaire consisted of sixteen closed questions: six of them in the form of a ten-degree scale and the remaining ten questions mapping selected parameters (characteristics) of quality management of a company.

The answers collected were processed with the basic tools of statistical analysis. This involved mainly the methods of univariate and bivariate analyses. First, the frequency of occurrence of individual answers was examined, as well as the mean value answers of respondents. To be able to articulate and subsequently identify relative correlations of answers to questions (of the questionnaire), this primary analysis will serve as a basis for the secondary, bivariate analysis. With respect to a relatively low number of respondents,

the results stated below are mostly based on a variety of contingency tables, i.e. on the identification of varying occurrence of the phenomena controlled for the groups (clusters) of companies in the research. The figures show percentages of respondents' answers for both of the clusters.

To examine the financial situation of companies (i.e. performance), a method of a financial analysis, specifically a ratio indicator analysis, is to be applied. Indicators were selected to allow for the assessment of all key areas of an enterprise, i.e. profitability, activity, indebtedness and liquidity, which are the factors that make it possible to determine a complex financial situation of a company. The construction of the selected indicators is grounded in the authors' previous research (see e.g. Suchánek, Špalek, Sedláček, 2010, for further information).

To divide companies into a high performing group and a low performing group, a cluster analysis is used. The clustering uses the method of a K-means cluster analysis. Based on the input financial indicators, companies are divided into two disjunctive and relatively homogenous groups (clusters). The guideline in this case is a minimum inter-cluster distance between individual members of a cluster. The selected method is the minimum distance method. It is derived from the Euclidean metric, i.e. the minimum sum of squares. The groups (clusters) are thus formed by the companies which demonstrate the biggest concordance with the selected (financial) indicators. Since more than one financial indicator is used, the shortest distance is determined by the shortest scalar distance of vectors of the financial indicators. To guarantee full comparability of the financial indicators (since their units and relative values differ), it is necessary to standardize the individual coordinates (indicators) before carrying out the cluster analysis itself. So called z-scores are used for the standardizations.

To achieve maximum objectivity in dividing individual companies into clusters, a retrospective progression of data of a financial indicator combination is used. The analysis is fed with the data of a five-year period, from 2006–2010. Respondents were selected at random from the basic sample of 143,573 companies in 2011. The research sample includes 144 companies mainly from the manufacturing industry.

The resulting groups (clusters) of high performing (cluster A), medium performing (cluster B), and low performing (cluster C) companies are contrasted with the above-mentioned characteristics of quality collected by the questionnaire. We are mainly interested in comparing how the values correspond to or differ from the mean values of the given indicators with respect either to different types of answers or corporate characteristics.

2.1 Characteristics of the Research Sample

As mentioned above, the basic sample contains 143,573 enterprises; subsequently 144 companies from the manufacturing industry were randomly

selected from this sample. In terms of the number of employees, the distribution of companies was even, as it contained 37.1% of small companies (up to 49 employees), 30.5% of medium-sized enterprises (50–249 employees), and again 30.5% of large enterprises (over 250 employees).

In terms of legal form, the sample was restricted to public limited companies and private limited companies (as these companies are legally obliged to publish their financial statements in the Commercial Register). The sample included 44.5% of public and 55.5% of private limited companies, i.e. the representation of both types of companies was almost even.

In terms of the existence of a specialized quality control department in a company (or a specialized employee dealing with quality), it was found that 64% of companies have this department whereas 35.4% of enterprises do not (0.6% of companies did not provide this information). In addition, 76.2% of companies own a certificate of quality (the most – 65.9% of companies – own an ISO 9001 certificate).

Regarding the location of the companies, most were in the South Moravian Region (36.8% of enterprises), fewer from the Pardubice Region (11.1% of companies), the Vysočina Region (10.4% of enterprises), the Zlín Region and Moravian-Silesian regions (both 8.3% of enterprises), Prague and the Olomouc Region (both 7.6% of enterprises), and the fewest from the Hradec Králové Region (4.9% of companies), the Central Bohemian Region (2.1% of companies), South Bohemia and the region of Liberec (both 1.4% enterprises). The regions of Plzeň, Karlovy Vary and Ústí were not represented by any enterprise.

3 RESULTS OF THE QUALITY AND PERFORMANCE OF COMPANIES

In this section, we present the results of a cluster analysis: based on the regularly used and constructed ratios (identified from the accounting statements of enterprises), three clusters of enterprises with a (statistically significant) difference in performance were created. Subsequently, parameters and quality characteristics (identified in the questionnaire survey of enterprises) were identified for these clusters. Statistically significant differences in these parameters and statistics between individual clusters were primarily looked for and found.

3.1 Results of the Cluster Analysis

Based on the results of a cluster analysis, companies were divided into three groups: excellent companies (cluster A), average companies (cluster B), and below-average companies (cluster C). In the end, the companies were divided into the clusters based on ROA and ROE indicators due to the best results of the cluster analysis (the cluster analysis was conducted with various combinations of ROA, ROE, asset turnover, third-degree liquidity, and indebtedness indicators). Average values of

I: Average Values of ROA and ROE Indicators for Individual Clusters

| | | Cluster A | Cluster B | Cluster C |
|-----|------|-----------|-----------|-----------|
| ROA | 2006 | 0.225 | 0.095 | 0.014 |
| | 2007 | 0.257 | 0.110 | 0.004 |
| | 2008 | 0.213 | 0.094 | -0.012 |
| | 2009 | 0.208 | 0.069 | -0.031 |
| | 2010 | 0.218 | 0.052 | 0.011 |
| ROE | 2006 | 0.367 | 0.167 | -0.023 |
| | 2007 | 0.391 | 0.184 | -0.016 |
| | 2008 | 0.341 | 0.145 | -0.060 |
| | 2009 | 0.326 | 0.101 | -0.102 |
| | 2010 | 0.386 | 0.083 | -0.004 |

Source: Authors' calculations

both the indicators in individual years are shown in Tab. I, while average values of the other indicators of business performance are shown in Tab. II.

Tab. I shows that the profitability of all the three groups (clusters) of the companies is significantly different. Cluster A of excellent companies maintains ROA above 20%, though the value of the indicator fluctuated in a rather negative trend in individual years. The ROA indicator of average companies is significantly lower, and the indicator value fell more significantly with these companies in the researched years. The value of the ROA indicator with below-average companies fluctuated around zero, with the fluctuations being more significant than in the two previous groups of enterprises.

Differences in the values of the ROE indicator are even more significant in this respect between the clusters, as excellent companies experienced a significant growth in the indicator in the last researched year in comparison to average companies. On the other hand, below-average

companies also showed a slight increase in the indicator in the last year, but in all the years, the values of the indicator were negative.

Tab. II shows that the differences in the other indicators were not as clear and unambiguous as in the case of ROA and ROE indicators. The most significant differences exist in asset turnover, which is significantly higher in the case of the excellent companies in cluster A in all the years than in the other two clusters. It is interesting that this indicator in cluster A rose in the crisis years of 2008 and 2009 and sharply decreased in 2007 (when the economy was most efficient in the Czech Republic) as well as 2010. In contrast, the other two clusters exhibited a downward trend of the indicator (from 2007) while in cluster C a slight increase in the indicator repeated in 2010.

The quota of equity, measuring a company's indebtedness, shows that the indebtedness of enterprises was in all the clusters within the recommended values, i.e. around 50%. Differences

II: Average Values of Asset Turnover, Quota of Equity, and Long-Term Liquidity Indicators for Individual Clusters

| | | Cluster A | Cluster B | Cluster C |
|---------------------|------|-----------|-----------|-----------|
| Asset Turnover | 2006 | 2.539 | 1.800 | 1.383 |
| | 2007 | 2.436 | 1.897 | 1.394 |
| | 2008 | 2.446 | 1.653 | 1.323 |
| | 2009 | 2.468 | 1.552 | 1.082 |
| | 2010 | 2.342 | 1.373 | 1.222 |
| Quota of Equity | 2006 | 0.509 | 0.442 | 0.553 |
| | 2007 | 0.551 | 0.483 | 0.572 |
| | 2008 | 0.523 | 0.497 | 0.597 |
| | 2009 | 0.537 | 0.535 | 0.591 |
| | 2010 | 0.507 | 0.536 | 0.589 |
| Long-Term Liquidity | 2006 | 2.396 | 2.262 | 2.827 |
| | 2007 | 2.729 | 2.308 | 2.521 |
| | 2008 | 3.283 | 2.201 | 2.577 |
| | 2009 | 3.014 | 2.621 | 2.406 |
| | 2010 | 3.673 | 2.573 | 2.536 |

Source: Authors' calculations

III: Average Values of Indicators in Manufacturing Enterprises in Different Years

| | 2006 | 2007 | 2008 | 2009 | 2010 |
|---------------------|-------|-------|-------|-------|-------|
| ROE | 0.126 | 0.151 | 0.109 | 0.062 | 0.113 |
| ROA | 0.097 | 0.116 | 0.088 | 0.050 | 0.072 |
| Asset Turnover | 1.550 | 1.400 | 1.390 | 1.220 | 1.340 |
| Quota of Equity | 0.498 | 0.522 | 0.521 | 0.526 | 0.514 |
| Long-Term Liquidity | 1.450 | 1.460 | 1.420 | 1.540 | 1.580 |

Source: Authors, Based on <http://www.mpo.cz/cz/ministr-a-ministerstvo/analyticke-materialy/#category238>

IV: Product Evaluation in Terms of Quality (Response Rate in %)

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------------------|-----|-----|-----|-----|-----|------|------|------|------|------|
| Cluster A | 0.0 | 3.4 | 0.0 | 3.4 | 0.0 | 10.3 | 13.8 | 24.1 | 24.1 | 20.7 |
| Cluster B | 0.0 | 0.0 | 0.0 | 1.2 | 0.0 | 4.7 | 5.8 | 19.8 | 31.4 | 37.2 |
| Cluster C | 3.4 | 3.4 | 6.9 | 0.0 | 0.0 | 0.0 | 10.3 | 31.0 | 17.2 | 27.6 |

Source: Authors' calculations

between the clusters are small for this indicator, though they do exist. For cluster A, indebtedness fluctuated with a negative trend in the years, and in 2010 it was almost the same as in 2006. The indebtedness of cluster B was slightly higher than in cluster A, but it continuously decreased in the years (to lower values than in cluster A). Cluster C was the best in terms of indebtedness, i.e. this indicator was the highest in the years (it fluctuated with a growth trend).

In the case of long-term liquidity, the differences between the clusters are the smallest. This indicator is slightly above-average for all three of the clusters (compared to the recommended values of 2–2.5). In the case of cluster A, this indicator grew with a positive trend, while in cluster B it first declined (years 2007 and 2008), and after an increase in 2009 dropped again in 2010. Cluster C showed fluctuations with a slightly negative trend.

When comparing the clusters with the average values of the manufacturing industry for the indicators (manufacturing industry averages are shown in Tab. III), it is possible to observe the following: cluster A shows highly above-average ROE, ROA and asset turnover indicators in all the years. The indebtedness of companies in the cluster is around the average values of the industry and their long-term liquidity is much higher. These results clearly show that cluster A represents highly

efficient enterprises of the manufacturing industry in terms of their performance.

Cluster B is characterized by ROE and ROA values that are around the sector average (usually above it) and asset turnover that is slightly above average in the surveyed years. On the contrary, the indebtedness of cluster B enterprises is usually slightly higher than the industry average. However, long-term liquidity is highly above-average, though it does not exceed the values of cluster A (with one exception). In terms of performance, these are average-efficient companies.

Cluster C is characterized by values of ROA and ROE indicators that are considerably below average (ROE being negative during the whole surveyed period). The asset turnover indicator is slightly below average, while the indebtedness of companies in the cluster is slightly lower than the sector average. Long-term liquidity is, however, highly above-average. In terms of performance, these are below-average companies. Nevertheless, in regards to their indebtedness and liquidity, the situation of the companies may not be as critical as it may seem from the profitability indicators.

3.2 Results of the Quality Analysis of the Companies

Individual responses to questions regarding the quality of enterprises were subsequently

V: Reasons Prompting a Company to Monitor Customer Satisfaction

| | Cluster A | Cluster B | Cluster C |
|---------------------------------------|-----------|-----------|-----------|
| Improving product (service) quality | 67.9% | 82.9% | 60.7% |
| Feedback | 82.1% | 74.4% | 75.0% |
| Effort to retain customers | 75.0% | 78.0% | 71.4% |
| Certification | 39.3% | 30.5% | 35.7% |
| Economic recession (financial crisis) | 3.6% | 7.3% | 7.1% |
| Competition | 7.1% | 46.3% | 25.0% |
| Others | 0.0% | 1.2% | 3.6% |

Source: Authors' calculations

compared and statistically evaluated within the created clusters. The boundary of the statistical significance of answers was set to a standard level of 10%. The following tables and text relate primarily to statistically significant results (if the results were statistically insignificant, it is explicitly stated by them); however, it is necessary to admit that there were only 23% of them in regards to the number of questions in the questionnaire.

Tab. IV gives an evaluation of the product in terms of quality, and this evaluation was subjective, i.e. was conducted by the companies alone. Evaluations were made with a scale ranging from 1 (very low quality) to 10 (very high quality). The table shows that most companies across the clusters assess their product quality as above-average. The results, however, differ in a degree of the above-average assessment.

Most companies of cluster A evaluate the quality of their products with marks 8 and 9 (both 24.1% of enterprises) and the highest mark of 10 (20.7% of companies). Fewer companies then evaluate the quality of their products with marks 7 (13.8% of enterprises) and 6 (10.3% of companies). On the contrary, average companies assess the quality of their products primarily with marks 10 (37.2% of enterprises) and 9 (31.4% of companies), and to a lesser degree with mark 8 (19.8% of companies). Enterprises of cluster C most frequently evaluate the quality of their products with marks 8 (31% of enterprises), 10 (27.6% of enterprises), and to a lesser degree with marks 9 (17.2% of enterprises) and 7 (10.3% of companies).

Another question focused on whether companies pursue customer satisfaction (results were not statistically significant). It was found that the majority of companies in the clusters monitor customer satisfaction (specifically, 96.6% of enterprises in cluster A, 90.7% of enterprises in cluster B, and 96.6% of enterprises in cluster C). The reasons prompting the company to monitor customer satisfaction represented another research factor; the results are summarized in Tab. V. The table shows that companies in the clusters reported different causes that made them monitor customer satisfaction.

Efficient companies of cluster A reported feedback (82.1% of companies) followed by efforts to retain customers (75% of companies) and improve product quality (67.9% of companies) as the most common

cause making them monitor customer satisfaction. Only to a lesser extent did they report certification (39.3% of companies) and almost none of the other causes. The average companies of cluster B often cited the same causes, but in a different order. The most common cause of monitoring customer satisfaction in these companies was improving product quality (82.9% of companies), followed by efforts to retain customers (78% of companies), feedback (74.4% of companies), and to a lesser degree competition (46.3% of enterprises), and certification (30.5% of companies). For below-average companies, the most common cause was feedback (75% of companies), an effort to retain customers (71.4% of companies), improving product quality (60.7% of companies), and to a lesser degree certification (35.7% of enterprises) and competition (25% of companies).

The authors also investigated whether the companies monitor the number of complaints in a company (the results were not statistically significant), and it was found that the majority of the companies monitor this indicator (specifically, in the case of cluster A, 89.7% of enterprises monitor the number of complaints, in the case of cluster B 89.4% of companies, and in the case of cluster C 82.8% of enterprises). In the case when the companies stated that they monitor the number of complaints in the company, they were further asked about the number of complaints per 100 products. The results are summarized in Tab. VI.

In complaints per 100 products, there are once again certain disproportions between clusters. The most efficient companies of cluster A reported the number of complaints mostly between 2–3% (38.5% of companies), between 0–1% (30.8% of enterprises) and, to a lesser degree, between 4–5% and 6–7% (both 11.5% of companies). On the contrary, average companies most frequently reported the number of complaints between 0–1% (57.9% of enterprises), 2–3% (31.6% of companies) and, to a lesser degree, between 4–5% (9.2% of companies). Below-average companies assessed the situation of complaints similarly, i.e. the most frequent number of complaints was between 0–1% (58.3% of companies), between 2–3% (29.2% of companies) and, to a lesser degree, between 4–5%. It is interesting that a higher number of complaints declines as business (cluster) performance decreases.

VI: Number of Complaints per 100 Products According to Individual Clusters

| Number of Complaints per 100 Products | Cluster A | Cluster B | Cluster C |
|---------------------------------------|-----------|-----------|-----------|
| 0–1% | 30.8% | 57.9% | 58.3% |
| 2–3% | 38.5% | 31.6% | 29.2% |
| 4–5% | 11.5% | 9.2% | 12.5% |
| 6–7% | 11.5% | 0.0% | 0.0% |
| 8–10% | 3.8% | 1.3% | 0.0% |
| 25% and more | 3.8% | 0.0% | 0.0% |

Source: Authors' calculations

Another parameter surveyed was whether a company systematically controls the quality of a product in the company. The results are summarized in Tab. VII and show that the quality is most frequently systematically controlled in the average companies of cluster B (96.5% of enterprises), to a lesser degree in the most efficient enterprises of cluster A (89.7% of enterprises), and to the least degree below-average companies of cluster C (82.8% of companies).

VII: *The Company Systematically Controls Quality*

| | Cluster A | Cluster B | Cluster C |
|------------|-----------|-----------|-----------|
| No | 10.3% | 3.5% | 17.2% |
| Yes | 89.7% | 96.5% | 82.8% |

Source: Authors' calculations

The authors were also interested in which performance indicators the companies monitor and whether the companies associate the indicators with quality (and if so, which). The results are summarized in Tab. VIII. The left side of the table shows the frequency of individual factors in clusters and the right side shows the number of individual enterprises that associate these factors with quality within each of the clusters.

Tab. VIII clearly shows that cluster A companies use most the qualitative indicator of customer satisfaction, and only then follow the financial indicator of (absolute) sales, and a further financial indicator – costs – is preceded by complaints. These are followed by other financial indicators, i.e. financial results, and to a lesser degree use of capacity or productivity. The least used indicators include profitability and liquidity. The factors most often associated with quality are financial results, use of capacity (productivity), employee register, and costs. On the contrary, customer satisfaction and sales are least associated with quality.

Cluster B companies prefer monitoring sales, followed by customer satisfaction, complaints, financial results, costs and, to a lesser degree, use of capacity (productivity). The factors most often associated with quality include employee register, liquidity, profitability, financial results, use of capacity (productivity), and costs. In this case, the frequency distribution is more even than in cluster A.

In the case of cluster C, the most commonly used performance factors are customer satisfaction, sales, complaints and, to a lesser degree, financial results, costs, and use of capacity (productivity). The factors most associated with quality include employee register, costs, liquidity, use of capacity (productivity), and, to a lesser degree, profitability, financial results, and sales.

The final statistically significant finding were disadvantages (weaknesses) reported by the companies in relation to their competitors. The results are summarized in Tab. IX. The results show that the excellent companies of cluster A perceive weaknesses mainly in company size and the range of services provided (both 59.1% of enterprises), to a lesser degree their location (31.8% of companies), costs of operation (27.3% of companies), and funding opportunities (22.7% of companies). On the contrary, the average companies see the biggest problems in the costs of operation (50% of companies), company

IX: *Disadvantages of a Company with Respect to its Competitors*

| | Cluster A | Cluster B | Cluster C |
|----------------------------|-----------|-----------|-----------|
| Funding opportunities | 22.7% | 22.6% | 31.8% |
| Company size | 59.1% | 46.8% | 22.7% |
| Costs of operation | 27.3% | 50.0% | 45.5% |
| Range of provided services | 59.1% | 24.2% | 13.6% |
| Location | 31.8% | 29.0% | 18.2% |
| Others | 4.5% | 6.5% | 4.5% |

Source: Authors' calculations

VIII: *Monitored Performance Indicators and Their Association with Quality*

| | Frequency of Factors | | | Frequency of Factors in Association with Quality | | |
|---|----------------------|-----------|-----------|--|-----------|-----------|
| | Cluster A | Cluster B | Cluster C | Cluster A | Cluster B | Cluster C |
| Sales | 79.3% | 74.4% | 65.5% | 13.8% | 16.3% | 31.0% |
| Financial results | 48.3% | 59.3% | 48.3% | 41.4% | 23.3% | 34.5% |
| Costs | 51.7% | 59.3% | 44.8% | 27.6% | 22.1% | 48.3% |
| Use of capacity, productivity, volume of production | 37.9% | 40.7% | 34.5% | 37.9% | 23.3% | 41.4% |
| Added value | 31.0% | 25.6% | 27.6% | 10.3% | 19.8% | 34.5% |
| Profitability | 17.2% | 26.7% | 17.2% | 17.2% | 25.6% | 37.9% |
| Liquidity | 3.4% | 14.0% | 10.3% | 24.1% | 29.1% | 44.8% |
| Complaints | 55.2% | 66.3% | 58.6% | 3.4% | 4.7% | 13.8% |
| Employee register | 6.9% | 22.1% | 17.2% | 31.0% | 32.6% | 51.7% |
| Customer satisfaction | 82.8% | 70.9% | 69.0% | 10.3% | 12.8% | 27.6% |

Source: Authors' calculations

size (46.8% of companies) and to a lesser degree in their location (29%), the range of provided services (24.2% of enterprises), and funding opportunities (22.6% of companies).

The below-average enterprises of cluster C also see the biggest weaknesses in costs of operation (45.5% of companies), funding opportunities (31.8% of companies), and to a lesser degree in company size (22.7% of enterprises), location (18.2% of companies), and the range of provided services (13.6% of companies). It is also clear that the excellent and average enterprises more frequently reported a higher number of disadvantages than below-average companies.

4 DISCUSSION

The evaluation of product quality offers a rather surprising finding that although the most efficient companies of cluster A assess their quality as high, they do not see it as the highest. On the contrary, the average companies received the highest marks for product quality. Even inefficient firms assess their product quality as very high, though the results are more fragmented here (compared to the remaining two clusters).

Since it was a subjective quality assessment, an explanation can be made that the companies did not assess the quality of their products objectively enough (in particular regarding cluster C), and it can thus be hypothesized that as the level of business performance declines, the objectivity of product quality evaluation decreases. Such a hypothesis, however, can be confirmed only in a survey of consumer satisfaction with the quality of production of the researched enterprises, which the authors plan to conduct in the second phase of the research on the relationship of quality and efficiency in the fall of 2012.

Another possible explanation is the lack of communication with customers due to an incorrectly set marketing mix or even a wrong marketing strategy (or its complete absence in a company). In this case, it would be of course possible that an otherwise quality product would not make it to a customer at all, or a customer would not learn about it. However, in this respect we could possibly talk about the lack of quality or low quality of an enterprise as a whole (as understood by Kaplan and Norton, 1992). It would then be necessary to examine the internal processes of a company, or possibly its marketing strategy including the tools used within the marketing mix, market segment, on which the company focuses its product, etc.

To ensure high production quality, it seems necessary to monitor customer satisfaction (which stems not only from the authors' own research). It is clear, however, that it is important to determine what made companies monitor this satisfaction. The most important aspects in this regard (with respect to the performance) include feedback and an effort to retain customers. Improving product quality is in

third place in this respect, despite the fact that it is closely related to an effort to retain customers.

It seems that the motives that make companies monitor customer satisfaction are related to (or anticipate) the way of monitoring customer satisfaction as well as its further use in a business (especially in improving product quality). It is obvious that particularly inefficient companies do not fully realize these links. On the other hand, average companies seem to realize these links, but they respond rather to stimulations coming from competition, which means that their actions (reactions) come delayed (or late).

It is possible to hypothesize that the high performance of a company is associated with high levels of customer satisfaction. At the same time, it has to be true, however, that customer satisfaction is not only monitored, but that these findings are also actively used by companies to improve the quality of their products. It seems that average or below-average companies monitor customer satisfaction formally or (with respect to the way of operating and managing an enterprise) inappropriately, and they fail (or do not want) to work further with the acquired information and project it to the way of running their business. The problem can also be a distrust of this information, or unwillingness to changes (i.e. waiting for a response of competition).

In this context, it is interesting and paradoxical that the vast majority of companies across clusters indicated that the acquired information concerning customer satisfaction is reflected in the form of innovation in their products (the results were not statistically significant, though). In the case of below-average enterprises, it was even 100% of the companies. It is therefore another argument supporting the claim that below-average companies do not evaluate their situation objectively.

The research shows that even the rate of product complaints in an enterprise is essential for the relationship between quality and performance. It is interesting that in the case of the highly efficient companies of cluster A, the most frequent complaint rate is between 2–3%, while it varies between 0–1% in the remaining firms (average and below-average companies). Unless we want to accept the hypothesis of the decreasing objectivity of assessing the number of complaints in relation to performance, one can again think about the way of identifying complaints and further working with them. The low rate of complaints can be related to an unwillingness to accept a complaint or settle it in a positive way; however, this ultimately leads to frustration, customer dissatisfaction, and often also a loss of customers. This relationship can be (and will be) examined in the second phase of the research into customer satisfaction of the surveyed companies.

The issue of complaints was followed by the issue focusing on product defects (whether they are monitored, where they are found, and who determines them). Although the results were not

statistically significant, they are important for the clarification of the complaint issues. As in the case of complaints, product defects are monitored across companies (even a little more than complaints). Somewhat surprising is that the high rate of customer complaints revealed (approximately 50%) that the most common defects were found in production (in approximately 80% of cases). This finding therefore does not correspond with the claims of a low number of complaints in below-average and average companies; on the contrary, it enhances the hypothesis of lower objectivity of these respondents. The hypothesis of lower customer satisfaction in clusters B and C supports by contrast the finding that defects were more frequently found by customers themselves in these companies (42.3% of enterprises in cluster C and 40.2% of enterprises in cluster B, compared with 29.6% of enterprises in cluster A). This finding is not changed even by the fact that in other cases, the defects are most commonly revealed by specialized workers (73.2% of enterprises in cluster B, 59.3% of enterprises in cluster A, and 53.8% of enterprises in cluster C).

It seems that systematic quality management is not crucial for high business performance. On the other hand, considering the large number of companies that check quality systematically across the clusters, it is clear that systematic quality control is important. Thus, the question is what the term systematic quality control includes, i.e. what is the way (quality) of this control in individual enterprises. It can be hypothesized that it is substandard in below-average companies and outstanding in above-average ones.

With regard to a follow-up question, which examined what made companies check quality systematically, a significantly higher percentage of companies in clusters B and C (compared to cluster A) indicated certification and legislation. It can be inferred that these companies understand quality control primarily as certification, which constitutes only a basis, or the lowest possible level of quality (setting the processes and management systems). However, it is fair to mention that these results were not statistically significant and that even average and below-average companies reported (similarly to highly efficient companies) mainly the pursuit of quality and customer requirements as an incentive to control quality. Nevertheless, they reported these two indicators less often than highly efficient companies (in the case of the pursuit of quality, the difference was about 10%).

The monitored performance indicators suggest a surprising finding that companies prefer non-financial indicators of customer satisfaction and complaints, between which only one financial indicator – sales – was placed. The companies continue monitoring other financial indicators, though the majority of the most frequently used financial indicators is absolute (except for productivity). Ratios preferred and recommended by financial analysts are minimally used. It

therefore raises the question to what extent are companies well and properly informed about their performance, and how are they able to compare this performance with their competitors. In this sense, we can ask the question whether the companies make a comparison with competitors (in terms of performance) at all, since it can be inferred from the results that they do it only minimally. Absolute indicators are inappropriate for such a comparison.

It is surprising that despite the claimed emphasis on customer satisfaction and production quality (including the connection of production quality with this satisfaction), only an absolute minimum of companies associate these indicators with performance. Surprisingly, below-average companies in cluster C realize this connection more often, but on the other hand, they monitor these indicators less frequently than the companies in the other two clusters. Therefore what is important for the production quality (of a company) in terms of performance indicators is the absolute financial indicators (basic, i.e. costs, sales, profit), supplemented with productivity and the only non-financial indicator – employee register (which is not frequently used otherwise).

It thus seems that the efficient companies in cluster A associate the level of customer satisfaction with the level of performance, and they do it more often than less efficient companies in clusters B and C. However, they do not associate this satisfaction with quality very much. Nevertheless, this is contrary to the previous findings. It can be hypothesized that companies (across clusters) are still little aware of the connection between customer satisfaction, quality and business performance; it is true, to a lesser degree, as business performance declines, this awareness grows. On the other hand, it seems that less efficient companies do not go any further beyond realizing this connection, i.e. it can be hypothesized that less efficient companies are less able to project customer satisfaction to the quality of their products, no matter what they think or say about it (especially how high it is). Again, we return to the hypothesis of the lower objectivity of respondents coming from less successful companies.

It is obvious that the problems of excellent enterprises in cluster A are different from those in the other two clusters. These companies have a problem with the size, and it can be expected (also thanks to the composition of the sample) that they considered themselves to be (relatively) small, or smaller, respectively, and with a smaller range of provided services. Therefore, it seems that an effort to satisfy a customer is higher here than in the other two clusters, or that cluster A companies understand this effort as a problem to solve.

On the contrary, below-average companies have a problem with the cost of operation, which implies a lower degree of efficiency, and as a consequence also of a lower level of quality of an enterprise (or at least of the way it is managed). However, these

enterprises also perceive size as a problem, and in this respect we can probably say about them the same as about the excellent companies in cluster A.

The below-average companies in cluster C also have the biggest problem with the cost of operation, i.e. they can be characterized in this sense similarly to companies in cluster C. The second biggest problem for them is the funding possibility, which is obviously related to their below-average performance. The problem with the company size is a common problem to all the clusters. Based on these findings, we can accept the hypothesis that a higher level of the quality of an enterprise (or at least of the way it is managed) leads to a higher level of business performance.

CONCLUSION

In terms of business performance, the authors work in fact only with profitability indicators (namely ROA) in connection with quality. This indicator (along with ROE) was also crucial for the division of enterprises into performance-based clusters. The research results, however, show that significant deviations can be found even in the activity indicator (asset turnover). This is not very surprising, as activity indicators (and in particular it is asset turnover) are very closely related to ROA and ROE indicators. It can be argued that the quantity of the asset turnover indicator proportionally affects the quantity of ROA and ROE indicators. Significant (but smaller) differences can be found in the liquidity indicator where the difference between excellent companies (cluster A) and enterprises from the other two clusters is particularly apparent. In the case of the indebtedness indicator, the results do not vary significantly at first sight; however, it is impossible to overlook the negative impact of financial leverage in cluster C below-average companies whose financial results and ROE are driven even further into the red by the (otherwise optimal) indebtedness. On the contrary, excellent and average enterprises increase their financial results and ROE within their optimal indebtedness.

In terms of assessing product quality, it is clear that companies consider it very high. The research suggests that the relationship of product quality to performance is inversely proportional, i.e. higher product quality leads to a lower level of performance as average and below-average companies assess the quality of their products higher than efficient companies. It should be noted, however, that this evaluation is subjective and was conducted by the companies themselves. It is therefore possible that less efficient companies reported the quality of their products less objectively. This hypothesis will be subject to yet another part of the research when these results will be confronted with customers' opinions. Thus, an objective assessment of production quality

will be possible through additional research among the customers of the surveyed companies.

The fact that the objectivity of the respondents could be a serious problem of the research was reflected even in the evaluation of complaints and the systematic approach to quality. The systematic approach to quality also raises the question of how the respondents understand it. It seems that many respondents (especially from the less efficient companies) perceive the systematic management being only to gain a certificate and establish a quality control department. However, this is obviously not enough, i.e. the follow-up research will have to determine whether companies use any of the quality management systems, such as EFQM Excellence, TQM, etc.

On the contrary, the level of company quality and quality control methods revealed the cause of monitoring customer satisfaction when more efficient companies concentrated more often on feedback and improving product quality (as one without the other is difficult to implement). On the other hand, the less efficient companies were pushed to monitor customer satisfaction more frequently by the competition.

Weaknesses of companies also revealed pressing problems and suggested which companies can focus on product quality more than others. While the below-average companies solve problems with the costs of operation as well as how and from whom they could obtain financial resources, more efficient companies can address the range of services provided, how better to satisfy customers, and thus the quality of their products. Therefore, it seems that the basis of an efficient business is quality business, i.e. quality management and a management system, which will introduce rules into a company and set the efficiency of resources used by the company, at a high level. It then forms the basis for product quality and customer satisfaction, which will project to high business performance.

As for the factors affecting quality, the research shows that they include the following factors: the way of understanding quality, including its objective evaluation. The second factor is the monitoring of customer satisfaction, including the causes that led to this monitoring. This factor is obviously associated with the third factor, which is a quality control system, or its level and sophistication, including its actual use in an enterprise, respectively. The fourth factor includes complaints and their monitoring, which must be as objective as possible, and the fifth factor is the method of monitoring performance, including the interconnection of the respective indicators with product quality. Within the fifth factor, a very important indicator seems to be customer satisfaction, the number of complaints, sales, costs, and profits (or better indicators of profitability).

SUMMARY

The subject of this paper is the analysis of quality (with emphasis on product quality) and its influence on business performance (represented by the selected financial ratios). The aim of this article is to find the level of product quality in a company and to identify those quality factors that affect a company's performance. The research is based on primary data obtained from a survey using a structured questionnaire. Respondents were asked to enter specific data from a balance sheet and profit and loss account. To examine the financial situation of companies (i.e. performance), a method of financial analysis, specifically a ratio indicator analysis, is to be applied. To divide companies into a high performing group and a low performing group, a cluster analysis is used. To achieve maximum objectivity in dividing individual companies into clusters, a retrospective progression of data (five-year period of 2006–2010) of a financial indicator combination is used. Respondents are selected at random from the basic sample of 143,573 companies in 2011. The research sample includes 144 companies mainly from the manufacturing industry. The resulting groups (clusters) of high performing (cluster A), medium performing (cluster B), and low performing (cluster C) companies are contrasted with the above-mentioned characteristics of quality collected with the questionnaire. We are mainly interested in comparing how the values correspond to or differ from the mean values of the given indicators with respect to either different types of answers or corporate characteristics. The answers collected were processed with basic tools of statistical analysis. This involved mainly the methods of univariate and bivariate analyses. For the distribution of companies to clusters, two indicators (ROA and ROE) were relevant. Significant deviations can be found even in the activity indicator (asset turnover), smaller differences can be found in the liquidity indicator. As for the factors affecting quality, the research shows that they include the following factors: the way of understanding quality (including its objective evaluation), the monitoring of customer satisfaction (including the causes that led to this monitoring), a quality control system (or its level and sophistication, including its actual use in an enterprise, respectively), complaints and their monitoring, and the method of monitoring performance (including the interconnection of the respective indicators with product quality).

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