The impact of quality management systems on financial liquidity in companies in group purchasing organizations

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Abstract: - Financial liquidity is currently the most important area of business management. Its lack is the first step towards bankruptcy of a company, Therefore, small and medium-sized enterprises work together as part of multi-stakeholder organizations to improve the level of financial liquidity. In general, financial liquidity management is considered in terms of profitability and liquidity. Liquidity management is short-term management which is based on a systematic control of individual elements affecting its level. The introduction of standardized quality management systems should be a great facilitation for the liquidity management control process. Literature often includes information on the impact of quality on the production process and on the financial performance of manufacturing companies. Information on the impact of quality management on the functioning of commercial enterprises operating in branch group purchasing organizations is not often found. The aim of this paper is to present the impact of quality management on the level of financial liquidity of SMEs operating in group purchasing organizations.

Key-Words: - financial liquidity, quality, group purchasing organization
JEL Classification: G30;G33;L15

1 Introduction

Literature often includes articles related to the impact of quality management systems on the cost management process, sales, profitability or, in general, the financial results of production companies [1,2]. There are many studies that also deal with quality issues and its role in logistics and supply chain management [3,4,5,6,7]. However, there are not many publications whose subject matter concerns the impact of quality management systems on the financial security of commercial enterprises. This may be due to the fact that the process of managing financial liquidity is very complicated because it concerns the management of current assets and current liabilities. Separate strategies are used for individual elements affecting financial liquidity, which later combine into the target liquidity management strategy. Logistics is closely related to inventories, i.e. an element whose share in the structure of current assets is very often the largest, so it has a significant impact on the management of financial liquidity.

In the paper the authors examined the impact of quality management systems on the financial liquidity of enterprises operating in branch group purchasing organizations (GPOs). GPOs are a form of multi-entity organization, and studies carried out so far have shown that small and medium-sized enterprises operating in such organizations obtain high financial liquidity results. Joint activities within purchase groups allow using certain methods and tools that improve the level of financial liquidity [8].

2 Literature Review

The global economic crisis caused by the banking crisis in 2008 was a serious event that particularly affected small and medium-sized enterprises [9]. The financial crisis cast a shadow over the finances of SMEs. This is confirmed by insolvency statistics: over 99% of the 30.200 companies that declared bankruptcy in 2011, namely SMEs [10]. Currently, where there are US-China economic conflicts, and the risk of an economic slowdown in the world, managers of enterprises, especially those belonging to SMEs, should seek solutions for improving liquidity. The confirmation of this is an increase in cash reserves held by American companies that has significantly increased over the past few decades [11]. According to Huang et al. (2013) non-financial companies increased their cash and liquid assets to a record $ 2 trillion in 2011 [12]. Managers, therefore, try to secure funds for debt service and future investments as well as unexpected occasional purchases. It is commonly believed that managers accumulate cash to ease shortages in future cash flows [13,14] or to finance growth [15]. The company goes bankrupt if it cannot handle its debts, which is caused by the low level of equity in small and medium enterprises and the resulting lack of opportunities to obtain foreign sources of financing [16].

It should be remembered that many authors claim that shortcomings in business management are the cause of business bankruptcies [17]. Baldwin confirms that the weakness of management was the main reason for bankruptcies of enterprises in Canada [18]. Other authors also believe that the way of business management has a big influence on the risk of losing financial liquidity [19]. Therefore, the introduction of appropriate methods of management and the resulting transparency will allow SMEs to provide the necessary financial liquidity to maintain enterprises [20]. In the case of small and medium-sized enterprises, a separate management model should be created rather than using the general model [21]. Since small and medium-sized enterprises are forced to compete for a contractor, cooperation and an attempt to increase its purchasing power and its position in negotiations with the supplier are a good solution. Such opportunities for small and medium-sized entities give operation within purchasing groups.

There are some possibilities to improve financial liquidity in the case of joining purchasing groups. Working together and using the economies of scale, joint purchases, benchmarking, mutual transactions certainly allow optimizing the level of financial liquidity [22] and minimizing the risk of the inability to settle current liabilities. An additional factor that should limit the errors occurring in the area of financial liquidity management is the introduction of standardized quality management systems that can exert a positive influence on receivables from customers, inventories and current liabilities. The most important elements that shape the level of financial liquidity. The idea of standardized quality management systems is to increase the effectiveness and efficiency of the company operations by implementing process management, standardizing activities to minimize errors, reduce costs, optimize logistics operations and more control over key processes [23,24,25,26].Quality management systems should, therefore, have a positive effect on financial liquidity. The purpose of the article is to determine the impact of quality management systems on the financial liquidity of companies operating in purchasing groups. The research was carried out on a group of 38 Polish commercial enterprises operating in the purchasing group operating in the construction industry. The research period covered the years 2014-2016.

3 Research methodology

The research was carried out using appropriate statistical methods. The research group included 38 enterprises operating in two Polish branch group purchasing organizations. GPOs of ABG Group and Instal Konsorcjum are two groups of trading enterprises operating in the construction industry. These are the only branch purchasing groups operating in this industry in Poland. There are many other GPOs associated with this industry, but they also include units from other industries. These types of groups are referred to as multi-branch groups. There are major differences in the management of enterprises that operate in such groups, therefore, multi-industry purchasing groups have not been included in the conducted research. The analyzed enterprises were divided into units that implemented standardized quality management systems (mainly according to ISO 9001), it is a group of 10 enterprises. The second group consists

of 28 companies that have not decided to use quality management systems. Using the appropriate financial measures derived from the ratio analysis and appropriate statistical methods, the level of financial liquidity in units using quality management systems and non-users was assessed. In order to refine the research, the impact of quality management systems on the most important elements shaping the financial liquidity of entities operating in purchasing groups was analyzed. On the basis of the conducted research, those elements were identified which are significantly affected by quality management systems. The areas in which quality management systems have no impact are also presented. The analysis was made on the basis of financial data for the years 2014-2016.

4 Results

The basic measure of financial liquidity according to the ratio analysis is the current financial liquidity ratio. In addition, the analysis was extended to the results of the fast financial liquidity ratio. The details are presented in Table 1 and 2 below. Table 1 presents the average results for current financial liquidity ratios (Group A - Enterprises that do not use quality management systems, Group B - Enterprises that use quality management systems).

Table 1 Average results for current financial liquidity ratios

Current liquidity ratio-Group A	$\bar{x}$	Me	s	min	max	p
2014	3.62	1.85	3.21	0.13	12.0	
2015	3.65	1.90	3.29	1.20	15.0	
2016	3.55	1.90	2.89	1.20	11.0	
Current liquidity ratio-Group B	$\bar{x}$	Me	s	min	max	
2014	2.78	2.80	0.88	1.30	4.1	0.5241
2015	3.10	3.30	0.87	1.20	4.2	0.5029
2016	3.02	2.40	1.65	1.20	7.0	0.5901

Source: author's own study

The companies using quality management systems achieve definitely higher results here. The second step was to analyze the fast liquidity ratio. The detailed results are presented in Table 2.

Table 2 Average results for quick ratios.

Quick ratio-Group A	$\bar{x}$	Me	s	min	max	p
2014	1.95	1.00	1.82	0.20	6.80	
2015	1.92	1.10	1.79	0.30	8.20	
2016	1.88	1.00	1.57	0.20	6.00	
Quick ratio-Group B	$\bar{x}$	Me	s	min	max	
2014	1.12	1.10	0.51	0.15	1.70	0.7075
2015	1.39	1.45	0.54	0.40	2.10	0.9092
2016	1.21	1.15	0.53	0.40	2.00	0.6595

Source: author's own study

In the case of the fast liquidity ratio, also the units using quality management systems obtain higher results. Therefore, inventories that have been excluded from the ratio discussed in Table 2 are not the element that generates significant differences in the management of financial liquidity.

In the group of enterprises that do not use quality management systems, there are very large deviations between the individual results of the ratios. The large fluctuations in the results indicate a weak control of individual elements affecting the level of financial liquidity in the analyzed enterprises.

The further part of the analysis was to answer the question whether the introduction of quality management systems had a significant impact on the basic elements shaping the level of financial liquidity. In the tables of descriptive statistics characterizing the distribution of ratios in both groups in particular years there were such measures as: average, standard deviation, median and minimum and maximum. Interpreting the results, it is worth noting only the average level of ratios in the compared groups, but also the median. The results for the rotation ratio of receivables in 2015 and 2016 were higher in group A. The difference between the two groups was close to the level of statistical significance (p = 0.0879 for 2015 and p = 0.0759 for 2016). The detailed results are presented in Table 3.

Table 3 Average results for receivables turnover ratios in days.

Receivables turnover ratios in days - Group A	$\bar{x}$	Me	*s*	min	max	p
2014	69.4	72	22.3	18	122	
2015	69.9	75	22.1	14	113	
2016	73.3	74.5	23.1	11	132	
Receivables turnover ratios in days - Group B	$\bar{x}$	Me	*s*	min	max	
2014	59.7	64	14.8	32	83	0.2054
2015	57.4	62.5	19.5	25	88	0.0879
2016	57.9	62.5	20.5	27	83	0.0759

Source: author's own study

When assessing the receivables turnover, it can be seen that the higher results are obtained by entities that do not use quality management systems. Figure1 clearly shows that the average value of the receivables ratio is lower in group B (the position of the center point). Below, in figure 1, the distribution of receivables turnover in days is presented in a graphic form.

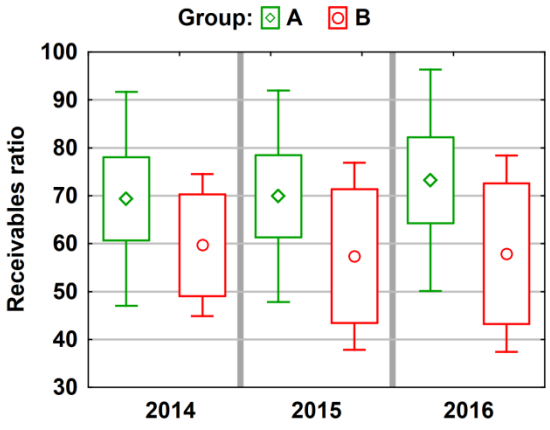

Fig. 1. Comparison of the ratio of the receivables ratio in both groups in particular years (mean, 95% confidence interval and typical variability range)

In companies using standardized quality management systems, a faster collection process was noted. This is positive information because it means a shorter lending period for receivers and a faster cash inflow to the account. Optimization in the field of credit management facilitates liquidity management. This is confirmed by the study of many authors who recognize that the trade credit reduces the probability of difficulties in the ongoing financing of enterprises [27,28,29,30,31].
Merchant loans are considered the primary source of financing for SMEs [32,33,34,35], which is why it is so important to construct a receivables management strategy that will reduce delays in the cash inflow from the buyers.

Next, the share of receivables in current assets was examined, as well as the ratio of receivables share in assets. In 2015 and 2016 - in both periods there were significantly higher values in group A (p = 0.0086 ** and p = 0.0258 *). Differences in the average level of share between groups A and B were statistically significant in 2015 and 2016. The index in companies with ISO was - on average - about 0.10 lower in group B. The detailed results are presented in table 4.

Table 4 Average results for the share of receivables in current assets.

The share of receivables in current assets Group A	$\bar{x}$	Me	*s*	min	max	p
2014	0.47	0.50	0.14	0.14	0.74	
2015	0.48	0.49	0.14	0.13	0.71	
2016	0.46	0.50	0,.5	0.09	0.70	
The share of receivables in current assets - Group B	$\bar{x}$	Me	*s*	min	max	
2014	0.43	0.43	0.08	0.33	0.54	0.1014
2015	0.38	0.40	0.09	0.24	0.50	0.0086**
2016	0.38	0.40	0.10	0.24	0.50	0.0258*

Source: author's own study

The figure 2 presents clear differences for both groups of enterprises.

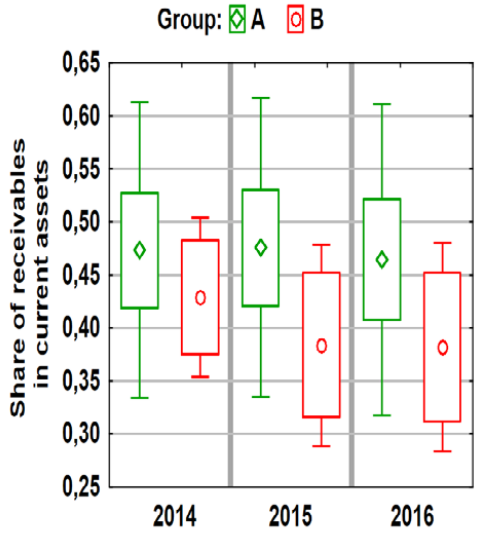

Fig. 2. Comparison of the share of receivables in current assets in both groups in particular years (mean, 95% confidence interval and typical variability range)

Large differences in the level of averages were observed in the case of the ratio of short-term liabilities in days. However, the presented results may suggest that the introduction of quality management systems allows reducing the level of liabilities turnover in days to the volumes guaranteeing high liquidity. The details are presented in Table 5.

Table 5 Average results for the liabilities rotation ratio in days.

Liabilities rotation ratio in days Group A	$\bar{x}$	Me	*s*	min	max	p
2014	64.7	65.0	38.5	11	156	
2015	63.9	61.5	34.6	10	128	
2016	67.0	67.0	36.0	16	127	
Liabilities rotation ratio in days Group B	$\bar{x}$	Me	*s*	min	max	
2014	49.1	49.0	11.5	33	67	0.3505
2015	45.5	43.5	18	18	83	0.2304
2016	57.5	55.5	18.4	36	83	0.5901

Source: author's own study

Inventories were the last of the analyzed items directly affecting financial liquidity. In the case of inventory turnover in days, no statistically significant differences were observed. The detailed results are presented in Table 6.

Table 6 Average results for the inventory turnover ratio in days.

Inventory turnover ratio in days Group A	$\bar{x}$	Me	*s*	min	max	p
2014	66.4	62.	18.0	42	122	
2015	66	60.5	17.3	41	117	
2016	70.7	68.5	18.1	44	129	
Inventory turnover ratio in days - Group B	$\bar{x}$	Me	*s*	min	max	
2014	68.9	70	15.8	47	103	0.5456
2015	74.2	70	22.2	49	128	0.4040
2016	76.6	68	22.4	46	124	0.6360

Source: author's own study

The next step to determine the impact of quality management systems on the financial liquidity of enterprises was to examine the correlation between individual ratios. The details are presented in the table 7.

Table 7 Correlation analysis between individual ratios in 2016

Financial ratio	Debt rotation ratio in days	Share of receivables in current assets	Current financial liquidity	Debt turnover ratio on days	Inventory turnover ratio in days	Quick ratio
Debt rotation ratio in days	1	**0.76***	-0.10	**0.27**	**-0.32**	0.22
Share of receivables in current assets	**0.76***	1	**-0.47***	**0.48***	**-0.68***	-0.09
Current financial liquidity	-0.10	**-0.47***	1	**-0,94***	**0.43***	**0.90***
Debt turnover ratio on days	**0.27**	**0.48***	**-0.94***	1	**-0.35***	**-0.82***
Inventory turnover ratio in days	**-0.32**	**-0.68***	**0.43***	**-0.35***	1	0.18
Quick ratio	0.22	-0.09	**0.90***	**-0.82***	0.18	1

Source: author's own study

The analysis was carried out for data from 2016. The Spearman rank correlation coefficient matrix between pairs of ratios was determined. The table shows the values of correlation coefficients, statistically significant by the symbol "*". Here are the most important conclusions from the analysis:

- financial liquidity is very strongly connected with the level of liabilities (R = -0.94), and the Quick ratio (R = 0.90) - of course, the negative sign of the first coefficient results from the negative significance of the level of liabilities. In the face of such a strong correlation, it can be concluded that the ranking of companies' financial standing in relation to liquidity is almost identical as in terms of liabilities or the Quick ratio - these measures can be used interchangeably with liquidity;
- the receivables ratio is quite strongly related to the participation ratio, the share ratio is related to the inventory ratio;
- there is also a strong correlation between the liabilities ratio and Quick ratio.

The receivables ratio does not affect the level of liquidity, the inventory ratio is small (R = 0.43), and - as already mentioned - the liquidity is very much determined by the level of liabilities.

5 Conclusion

The conducted analysis showed that in the analyzed period, higher financial liquidity was obtained by enterprises that implemented standardized quality management systems. In the group of companies that did not use such systems, the results were average higher but there were very large fluctuations in individual years and individual units. Therefore, in this case it is worth analyzing the results calculated for the median, where the higher scores are obtained by the entities using the quality management systems.

The conducted research also indicated that enterprises that had decided to implement the requirements of standardized quality management systems obtained lower results for the receivables turnover ratios in days, and what is strongly associated with it, lower results of the share of receivables in current assets. These results indicate a higher efficiency in managing receivables from customers, which positively affects the level of financial liquidity.

The surveys also showed that the most important ratios of financial liquidity were the liabilities turnover in days, and the inventory turnover ratios in days to a small extent.

In conclusion, it can be stated that in units that have implemented the requirements of standardized quality management systems, lower results are visible for the receivables turnover ratio in days and the share of receivables in current assets. These are statistically significant differences. Therefore, the introduction of quality management systems made it possible to manage receivables more efficiently. The research also showed that the results for receivables turnover ratios were not related to the financial liquidity results. The improvement of the efficiency of receivables management, shortening the time of collection of receivables did not have a negative impact on the level of financial liquidity. There was also an improvement of real financial liquidity, because cash appears in the cash register and on the bank account. Enterprise shortens the period of crediting its suppliers, which positively affects the level of costs in the company.

The analysis showed a large impact of the liabilities turnover ratio in days on the financial liquidity results. And here it is important to note that much lower results appear more often in the case of units that have implemented quality management systems. This is due to the fact that as a result of a more effective policy of managing receivables, free cash appears in this group of enterprises. Enterprises operating in GPOs often take advantage of additional discounts for early payment of liabilities. Companies using quality management systems are, therefore, benefiting from such an offer. They have free cash, they pay in advance, which will definitely have a positive effect on the financial results of the units.

Summing up the introduction of quality management systems allows speeding up the process of debt collection, which allows obtaining funds from which they are repaid before the commitment date. Therefore, the turnover ratios for this group of enterprises are at a low level. This management policy does not adversely affect the level of financial liquidity because the results of both current and quick liquidity ratios are maintained at a high level.

It may be worrying that the introduction of quality management systems in commercial enterprises operating in branch group purchasing organizations has no impact on inventory management. Inventory rotation ratios in days in both groups are at a similar level. The analysis showed that inventory management affects the level of financial liquidity. It is worth, however, tightening the inventory management process by introducing additional procedures required by the ISO 9001 standard, compliance and improvement of which may improve the efficiency of inventory management. This will later be reflected in the results of liquidity ratios, the results of which will be closer to the optimal values.

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