QUALITY MANAGEMENT SYSTEMS AS A "TOOL" FOR INCREASING COMPETITIVENESS OF LOGISTIC SERVICES PROVIDERS IN CORONAVIRUS ECONOMIC RECESSION

Libor Šimek, University of Pardubice
Václav Cempírek, University of Pardubice

ABSTRACT

The paper aims to answer the question whether – and to what extent – providers of logistic services can benefit from implementing and maintaining a quality management system (QMS), increasing their competitiveness, especially at a time of market competitive pressure. The study hypothesizes that over the 2008-2009 economic crises there was an increase in the number of companies that – in their selection process of logistic services providers – required and/or preferred these candidates to have a QMS implemented. This is verified on a sample of 277 companies, by comparing the situation in the year shortly preceding (2007) with the year shortly following (2010) the crisis. The conclusions derived are then analogically applied to the 2020 "coronavirus crisis", giving the logistic services provider's guidelines on formulating their QMS policy and identification of a suitable target customer segment, enhancing their competitiveness in a period of the present COVID macroeconomic instability.

Keywords: Quality Management System, Outsourcing, Competition, Economic Crisis.

JEL Classification: D83, D61.

INTRODUCTION

Just as any other entity involved in the market system, in order to ensure their economic success, the corporate entities (further only *"companies"*) must continually make a wide range of crucial decisions (Šimek, 2020b). Considering the commercial, i.e. profit-oriented orientation of their operations, this specifically applies to the composition of their product and/or service portfolio, product/service quality management and hence the closely related definition of the target market segment (Tynan & Drayton, 1987). At a time of intense competition triggered by a market recession – or macroeconomic climate volatility in general – this need is imperative and it sometimes escalates to the necessity to ensure their *"continued existence"*. If the companies are to survive in an economically dynamic market, it does not suffice for them to respond only in a *"reactive"* manner to the new conditions (Chimhanzi, 2004), but they must foresee them and take proactive action (Ritchie et al., 2011) to utilize new chances and minimize arising risks. Thus, it is important to change from the concept of a conventional, classical or *"inertial"* organization (Child, 1973), which is only capable of reacting to such a situation, but not drawing *"lessons"*, to a learning organization, which has this capacity (Hong & Kuo, 1999).

Šimek (2020a) mentions that the entrepreneurial climate gets highly competitive due to the intensified economic competition during the time of macroeconomic uncertainty, with the most important effect on the for-profit sector (Uslaner, 2010). This trend is also inevitably be

mirrored in the field of the company procurement, among other things in the purchasing *"habits"* formalized into procedures. This occurs in two aspects (Yanova, 2015). Firstly, it is a price (cost) aspect, which means a pressure to lower the market prices of the products/services (Dibb & Simkin, 2010). Secondly it is also a quality (qualitative) aspect (Yanova, 2015), meaning a pressure on the requirements for compliance of the products/services with highly specific requirements of a given corporate customer (company), which is specifically reflected in compliance with quality management systems.

The explanation for the presence of the two facets and also their interweaving connection is the commitment of the company (Kjeldgaard & Askegaard, 2006) to insure that the value of the product/service (its quality and usability) purchased outweigh the costs of obtaining it in conditions of extreme competitive market.

Šimek (2020b) also points out the fact that, although the price element – i.e. *"cost"* component from the viewpoint of the company as a customer – is dealt with by a variety of papers Slater et al. (2010); Klaas et al. (1999); Karat (2005), the qualitative element (product/service quality dimension) lies beyond the field of analysis focus and has not yet been granted due consideration. Man can speculate that the cause of this state is that it is considerably easier to quantitatively catch and then evaluate precisely the cost impact (price-reduction pressure) than the quality aspect (quality-enhancement pressure) (Slater & Olson, 2001). The reason is that in the former case it is very straightforward to measure the related financial costs in the context of monetary units, while a measurement of the product/service qualitative dimension is an issue. Perhaps from this reason, many analyses have already been carried out on the financial (cost) effects of the time of macroeconomic instability (United Nations World Tourism Organisation, 2020), (Dhameja, 2010), in particular the recession of 2008-2009, which – unlike the 2020 crisis – was strikingly financial in nature (Helleiner, 2011).

Nevertheless the problem about capturing the quality product/service aspect can be tackled by e.g. introducing a presumption (Šimek, 2020a) – like this research does – that the emphasis on better product/service quality shall be mirrored - in the normal practice of economic existence-in higher requirements on quality in selecting the providers (manufacturers, distributors, dealers). These more strict requirements shall then be expressed in increasing number of the corporate customers requiring the logistic services providers to have an implemented quality management system (Jharkharia & Shankar, 2007), and therefore in the expanded number of the corporate customers implementing this criterion in the course of the logistic services provider selection procedure (purchasing audit, logistic services procurement) (Aghazadeh, 2003). And this is an element which can be readily identified and quantitatively evaluated.

Yet, there is a shortage of studies on the qualitative dimension of the pressure exerted by the business climate in periods of macroeconomic instability. Šimek (2020a) responds to the above lack of qualitative-focused researches on the competition environment intensification, by developing practical guidelines allowing the educational service providers to optimize decision-making processes in formulating their portfolio of services with a special view of inclusion tools for evaluating their educational efficiency and the related identification of appropriate target segment of their potential business customers (users of these services). In another paper on qualitative aspect of macroeconomic instability, Šimek (2020b) presents a 5-criterial decision model to support the logistic service providers in optimizing their decision-making processes within formulating their EMS (Environment Management Systems) policy. However, the afore-mentioned studies treat the problem of capturing the qualitative aspect rather specifically, which

means that they assess the quality through a *"prism"* of the tools for evaluating the educational efficiency (2020a) and the EMS implemented (2020b). Thus, a generalized concept of quality evaluation still is missing.

Nonetheless, it is obvious that this is a very actual problem for the providers, especially if their products or services are designed for corporate customers engaging in logistics operations, as it is precisely in this field where the negative effects of economic crisis of 2020 was most apparent (Ivanov, 2020). It is attributed to the extremely pandemic scope of the *"coronavirus epidemic"*, which involved a vast range of international interventions to avoid the dissemination of the infectious disease and which inevitably has the most extreme effects on the areas dealing with huge-scale human and material flows (Fetzer et al., 2020). Therefore this inevitably had to be mirrored in the area of business logistics, where maximizing operational efficiency thus becomes an economic necessity (Šimek, 2020b). It is clear that analysis of the aspect of quality management system implementation and its application as a criterion in the provider selection process could valuably contribute to the providers´ understanding of the customer requirements, thereby also contributing to their competitiveness in an economic instability period (Domingues et al., 2015).

Formulating the Problem

The present research reacts to the aforementioned shortcomings and attempts to develop realistic guidance for the logistic service providers (transport, storage, distribution – further also only *"providers"* or *"logistic providers"*) to improve decision-making processes in formulating their quality management system policy (QMS policy) (Kanji, 2002) and identifying the most suitable target segment of their potential corporate customers (logistic services users, further also only *"corporate customers"* or *"customers"* or *"companies")* (Kilibarda et al., 2012). In view of QMS, the focus is given primarily to the appropriateness of its implementation within the provider´s organization structures (Lari, 2002), irrespective of the QMS type, which comprises the dominant ČSN EN ISO 9000:2005 – Quality Management System – Basic Provisions, Principles and Vocabulary, which is stipulated by the standard ČSN EN ISO 9001:2008 – Quality Management System – Requirements, and the supplemental standard ČSN EN ISO 9004:2000 – Quality Management System – Directive for Quality Improvement. However, the compliance of the logistic service provider with the environmentally focused standards (QMS: ČSN EN ISO 14001:2005, ČSN EN ISO 14004:2005) and safety and health protection at work (ČSN OHSAS 18001:2008) is omitted by the research because there is no direct relation to and interconnection with the customer-focused scope of problems, as specified above (Tricker, 2019); moreover the environmental and safety-at-work aspect are a subject of a separate research, which is being carried on by the author of this paper.

The study is focused solely on the corporate customers who – with the goal of realization of their main entrepreneurial activities – outsource logistics activities. This focus arises from the premise that the most adverse effect of the 2020 economic crisis – owing to its global character – was observed just in the field of logistics as mentioned above (Šimek, 2020a).

The analysis comes out from the assumption stated in the introductory section, which is a general effect of macroeconomic environment instability on competitive market intensification. It speculates that this effect contributes to a rise in the level of logistic services quality standards required by the customers, which would then be mirrored in a more enhanced sophistication of the logistic services quality criteria (Gimenez-Espin et al., 2013) when these customers select their the logistic services providers. The research presumes that it will also contribute to an

increased number of customers requiring their logistic services providers to have a QMS implemented on their side (Tricker, 2019; Gimenez-Espin et al., 2013), and also using this criterion (further only also *"QMS implementation criterion"* or *"QMS criterion"*) in their provider selection procedure.

Having respect to the above-mentioned intensity of requirements regarding the QMS implementations, the study architecture takes into account two aspects which the logistic services provider has the ability to implement in his decision-making process (Šimek, 2020b), namely:

- The strength of the corporate customer requirements on the QMS implementation (static aspect),
- The hypothetical impact on this intensity exerted by the economic instability (dynamic aspect), while the latter element – hypothetically presumed – is given particular attention due to the need to enhance the competitive position of the logistic services providers at a time when the competitive environment is more intensive.

The research is based on the same design as the author´s previous studies Šimek (2020a &b), which consists in analyzing the situation in the economic crisis of 2008-2009 and then applying the findings taken from this past period to the present period of economic coronavirus recession of 2020 with a view of achieving the meritorious aim. Initially – on a data set of 277 companies with the registered office address in the Czech Republic, with more than 2000 employees – the research ascertains to what extent they applied the QMS criterion in the process of their selecting logistic services providers. Depending on the application of the above-mentioned 2 decision alternatives, the research involves not only the static aspect already stated, which ignores advancement over time, but involves also the purely hypothetically assumed dynamic aspect, which takes into account development in this area due to the economic destabilization. Through comparing the given situation in the period shortly before the crisis (2007) and the period shortly after its peak (2010), the dynamic aspect is verified. In a generalized form, the conclusions obtained are then transferred to the circumstances of the 2020 coronavirus global recession. This provides a basis for drawing up realistic recommendations which enable the logistic services providers to refine their decision-making processes in formulating their QMS policy and determining a suitable target segment of prospective corporate customers.

METHODOLOGY

Collecting the Data

Analogically to the author´s previous researches on a related topic (Šimek 2020 a & b), the utmost priority in selecting the methodology for collecting data was put to ensuring that the obtained samples of the respondents would be of maximum size. This is because it is a pre-condition of the reliability of the realized statistical tests and the conclusions derived. The selected method considers the respondent´s psychology, presuming that his readiness for providing the required information will decrease as the number and the complexity of the questions put to him will increase (Félix-Brasdefer, 2010).

Consequently, the information collection approach was adapted as per the beneath given rules. The most significant of them is application of the rule that the majority of the data is to be gained from external sources (Grove & Fisk, 1992), independent from the respondent (for example the database for the choice of the respondents, see beneath). Likewise, telephone calls were selected as the type of communication (De Leeuw et al., 1996), which (contrasted with the

"conventional" questionnaire data collection) was believed to give a higher data yield (Hawthorne, 2003). Also, the telephone communication secured a closer contact with the respondent, which increased his readiness to provide information data (particularly if the information was sensitive) (Burnard, 1994). Another reason was that a telephone call is less tedious for the respondent (De Leeuw, 1992). Besides, all communication was conducted so that the very first contact was centered straightforwardly to the employee or human resources department who was in the position to communicate the required data (Grove & Fisk, 1992). This approach made it also possible to reduce the undesired time losses, which may potentially lower the readiness of the respondent to provide the required information (De Leeuw et al., 1996).

The questions asked to potential respondents were also given considerable attention to, which resulted in a significant reduction of their number and a high degree of their clarity (Šimek, 2020b). In terms of their substance, the specific questions were intertwined so that, on the basis of their conditional answering (where the answer of each question was conditioned by the positive response to the previous query), further reduction of the overall count of the questions posed could be attained, depending on the given respondent (De Leeuw et al., 1996). The questions were given to the respondents in an informatively condensed manner (also because of the telephone mode of their communication) (Grove & Fisk, 1992). In order to ensure the full precision as mentions Šimek (2020a), the questions were developed solely in the form of survey queries, restricted to only 2 possible alternative responses (No/Yes).

The commercial database *"Firemní databáze Albertina – firemní monitor"* (Rauchová, 2008) has been used as data point for the identification of possible respondents (corporate customers). Their filtering was achieved using an automated search tool (Šimek, 2020a) so that the selected entities satisfied these criteria:

- Only legal entities (the legal form of business ignored)
- Registered Office in the Czech Republic
- Profit-oriented (budgetary and contributory organizations excluded, but entrepreneurial field disregarded)
- 2000 and more employees (elimination of *"small"* companies, which are generally supposed to put little emphasis on the QMS aspect of their activities because they belittle the importance of environmental image with their clients as states Tricker (2019))

A list of 396 companies (potential respondents) was obtained based on the application of the above requirements. These were approached with a request to provide the respective answers. This count secures sufficient sample size for the sake of the performed statistical analysis, and guarantees sufficient reliability of the observations made (Myers et al., 2010).

The questions specified below were asked to the respondents, which were done in the following sequence due to their entanglement in content. The introduction of each question was determined by a positive response to the preceding query (except for Question 5, for which the answer to Question 2 was critical). Each of the questions offers only 2 alternatives of response (No/Yes).

- Question 1: Had your company – both in 2007 and 2010 – a registered office in the Czech Republic; was your company profit-oriented and had your company 2000 employees or more? [the purpose of this question was to verify actuality of the Commercial Registry record on the given company]
- Question 2: Did your company – both in 2007 and 2010 – utilize logistic services of an external provider?

[the purpose of this question was to ascertain whether the given company is a potential customer for a logistic service provider]

- Question 3: In 2007, did your company apply – in selecting the provider of logistic services – the criterion whether the evaluated provider has a quality management system implemented?
- Question 4: In 2007, was the fulfillment of this criterion a pre-condition for the evaluated provider of logistic services to succeed in the selection process?
- Question 5: In 2010, did your company apply – in selecting the provider of logistic services – the criterion whether the evaluated provider has a quality management system implemented?
- Question 6: In 2010, was the fulfillment of this criterion a pre-condition for the evaluated provider of logistic services to succeed in the selection process?

In his previous research Šimek states (2020b) that more refining of the questions is problematic and therefore the questions were left in this simplified type resulting from the need to guarantee their *"absolute"* applicability to all possible respondents (Šimek, 2020a). Various internal and external circumstances and associated information may be anticipated for the respondents which – otherwise – might have precluded them from addressing many questions. The researcher also did not find it necessary to extend the range of information requested (e.g. type of the QMS system), mostly because the fairly small number of questions enhances the ability of the respondent to provide replies. This permits a great extent of generalization (and hence a high probability of their dissemination, as stated above, to the broadest range of potential respondents) (De Leeuw, 1992). Also a very important reason is the fact that from the research viewpoint objective its meritorious aim, further information is irrelevant because QMS type is ignored in order to achieve maximum information response and thereby analyzed sample sizes.

It was possible to collect the details within 17 working days (June 2-19, 2020) due to the reasonably small time requirements. The length of a telephone call needed for the knowledge extraction of one respondent was around 4 minutes only.

Application of Statistical Tests

In selecting statistical techniques, the concept of statistical multi-instrumentality was applied as suggests Šimek (2020a). This implies that not only one statistical test or procedure is used to verify one hypothesis, but a whole set of these in order to get maximum reliability of the tests and thus the research findings gathered (Dixon & Massey Jr, 1951).

The analysis of the hypothesized effect of the 2008-2009 economic recession on the strength of the QMS implementation criterion was carried out in a statistically reliable manner by means of a year-on-year comparison (2007 compared to 2010) of the count of companies which used the given criterion in the provider selection process. As the situation of the same company in 2 periods is compared, it implies a statistical comparison of 2 identical (paired/correlated) samples (Bowker, 1948). Since the basis analysis takes into account 3 alternatives of the criterion application (No/Partial/Yes), it is a comparison of 2 dependent trinomial selections. Recognizing the multi-instrumentality principle, a pair analysis for table 3x3 (Craddock, 1966) involves an implementation of the relevant mathematical methods in the form of two tests: McNemar-Bowker Chi2 (extended McNemar) (Zar, 1989) and Stuart-Maxwell Chi2 (Maxwell, 1977). Because on the opposite the post-hoc study (Ireland et al., 1969) considered only 2 alternatives of the criterion application (No/Yes), it implies a comparison of 2 dependent binomial ratios (Haber, 1987) and thus a paired test was applied for table 2x2 (Okamoto & Ishii, 1961). The analyses were carried in a two-sided mutation, at the conventional statistical level of significance (α=0.05).

Analyzing the Problem

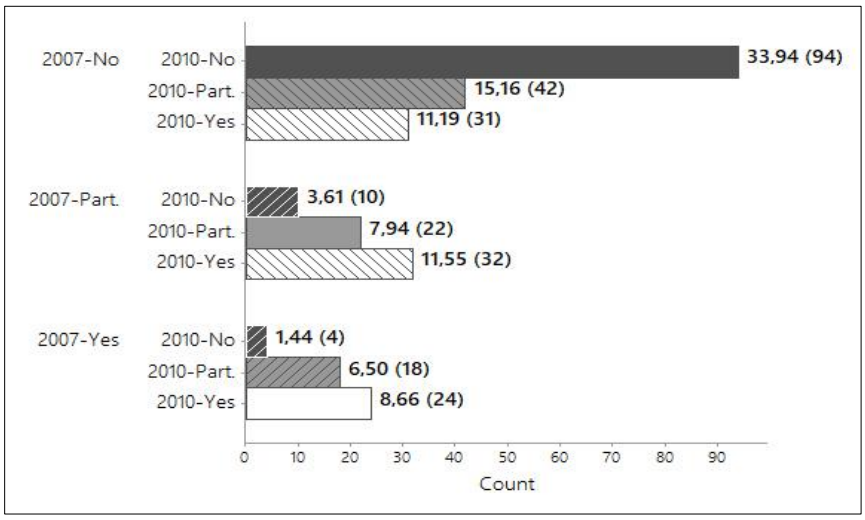
Data processing

With respect to the conditional nature of the questions posed to the respondents as specified in the section of methodology, their replies have been processed based on the same procedure as Šimek (2020 a & b) carried out in his previous related researches:

(a) Respondents who replied the questions 1 or 2 in the negative were omitted from the further analysis because they did not fall within the parameters of the meritorious research goal.
(b) The rest of the respondents, which means those who replied both the questions 1 and 2 in the affirmative, then entered into an analysis of the intensity of the QMS implementation criteria – both from a static and dynamic point of view. Its aim was to check the hypothesized impact of the 2008-2009 global crises in this field. These respondents were classified into three explicitly disjunctive groups, based on the degree in which the QMS criterion was applied by them.

The significance of the individual alternative response (No/Partly/Yes) resulting from their disjunctive character is described as follows:

- No – the company did not apply the criterion at all when choosing logistic services providers;
- Partially – the company implemented the criterion, but only as an supplementary criterion, whose not fulfillment did not exclude the potential provider from further selection process
- Yes – the company implemented the criterion as a crucial requirement.



Note: count expressed as percentage of the target companies (absolute count subjoined in brackets)
Left-to-right hatching shows a change towards a higher degree of application (and vice versa)
Source: Author's research [Contingency Graph]

FIGURE 1
APPLICATION OF CRITERION YEAR 2007 VS 2010

On the base of dividing the respondents into 3 categories as described above, a categorical variable has been established which reflects the degree of implementation of the QMS criterion and which can therefore take 3 values (No/Partially/Yes) (Šimek, 2020b). It is thus a categorical trinomial variable that enables individual respondents to convey details of the circumstances and (in comparison to the binomial variable, which requires only two alternate

responses) to more sensitively catch the progression of incremental developments across the time under examination.

The sample sizes of the respondents collected on the basis of the criterion application as described above and the corresponding composition of year-on-year differences are represented in the contingency graph (FIGURE 1).

Analyzing the Statistical Data

The null hypothesis was evaluated in the basic analysis presuming there is no difference in the degree of the application of the QMS criterion between the years 2007 and 2010. A paired test was carried for table 3x3, in its 2 variants as specified lower. The null hypothesis was rejected for both the tests (McNemar-Bowker Chi2 test [p-value: 0.0238]; Stuart-Maxwell Chi2 test [0.0146]), which implies that the difference discovered based on the year-on-year in respondents' answers to Questions 3 to 6 is statistically significant.

By means of the post-hoc analysis, which aimed at clarifying the differences detected in the basic analysis as defines Šimek (2020a), the null hypothesis was checked on the assumption that there is no difference between the two options of the application of the criterion between the years 2007 and 2010. A paired test for the 2x2 table (McNemar's exact binomial test) (Ireland et al., 1969) was conducted, one unique test independently for each of the three possible combinations of alternatives for the criterion application that were created on the basis of step-by-step excluding one of the response alternatives. Only in the case of a combination No vs. Yes alternatives, the null hypothesis was rejected, which implies that the difference observed in the basic analysis consists entirely in the difference between the number of respondents (companies) who did not use the criterion at all and those who used it as a crucial criterion (Table **Error! Reference source not found.**).

Table 1
POST-HOC TESTS ON APPLICATION OF CRITERION – YEAR 2007 VS. 2010 [MCNEMAR'S EXACT BINOMIAL TEST]

Compared alternatives of criterion application	Count of respondents	Exact obs. significance (both-sided) [p-value Bonf.]*	Reject H0 at $\alpha = 0.05$? (Is there a difference?)
Partly vs. Yes	96	0.8649	no
No vs. Yes	153	0.0397	yes
No vs. Partly	168	0.7839	no

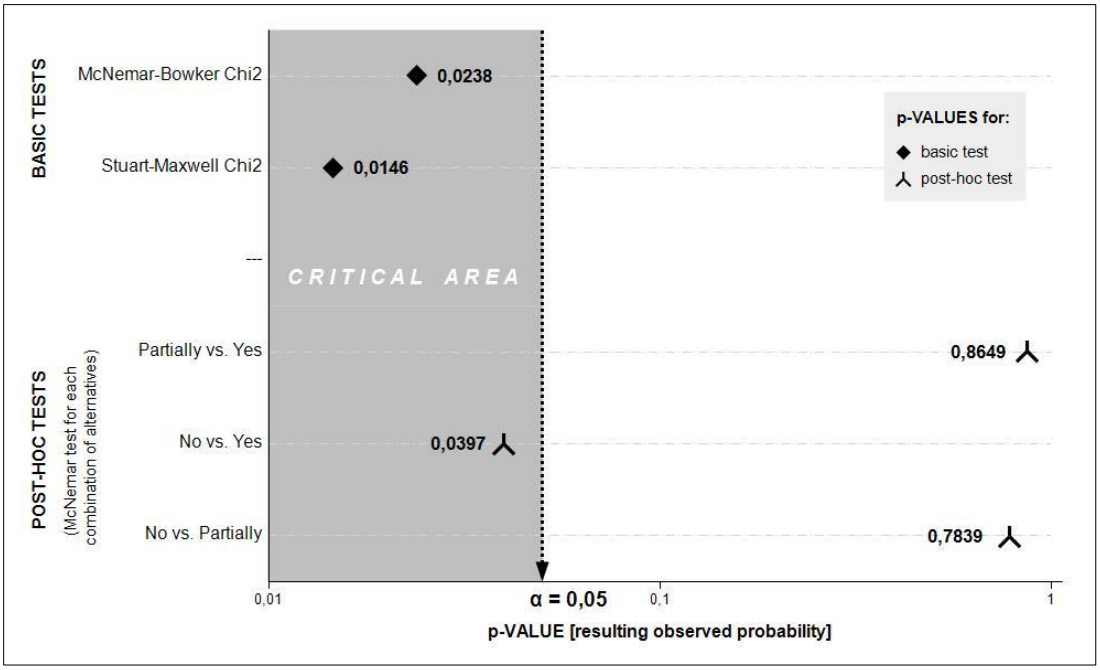
Note: * Applied binomial distribution. Values following Bonferroni modification (= p-value multiplied by 3)
Source: Author's research

The findings of the basic as well as post-hoc statistical analyses are presented graphically in FIGURE 2 using the obtained observed probability values. The computation data of the statistical research program STATA 13.0 and IBM SPSS Statistics 25 is accessible on demand in electronic format.

CONCLUSIONS AND DISCUSSION

We can confirm the assumption introduced in the methodology part, which means that the used form of data collecting by telephone calls based on the psychological aspects on the respondents' side really signified a high information yield (rate of information return) as suggests Cosgrove et al. (1979): out of the total 396 contacted companies (i.e. the potential respondents) the answers were provided by 337 companies (responding companies) (85.10 % of the 396

contacted companies). Based on the responding companies' reactions to Question 1, it was ascertained that – in the both monitored periods, i.e. shortly before the beginning of the economic crisis of 2008-2009 (2007) and shortly after its culmination (2010) – the criteria for being entered into the study as defined in the methodology section were fulfilled by 325 companies (qualified companies) (96.44 % of the 337 responding companies), which indicates high accuracy of the Commercial Register entries. Based on the responses to Question 2, it was found out those 277 companies (target companies) (85.23 % of the 325 qualified companies) – both in 2007 and 2010 – utilized external logistic services. This relatively high proportion indicates that even "big" companies (i.e. over 2000 employees according to the study qualification criteria) with large resources enabling them to realize their logistics independently from external subjects may need outsourced support of external providers. We can only speculate that his may have its origin in the high complexity and/or specialization of the logistic needs. A closer evaluation of these findings was not carried out, as it is not covered by the research goal, both in terms of its content and scope.



Source: Author's research

FIGURE 2
BASIC AND POST-HOC TESTS OF CRITERION APPLICATION YEAR 2007 VS 2010 [P-VALUES]

As a continuation, an analysis was carried out in order to draw meritorious conclusions, which consists in determining the intensity of customer requirements on existence of a QMS at the potential provider of logistic services. This intensity was – for the purpose of its rendering in a quantitatively exact manner – transformed into the indicator of a relative number of the companies that – in selecting an external provider of logistic services – take into account as a criterion the fact whether the potential logistic services provider have a QMS implemented. Only those respondents who answered both Questions 1 and 2 in the affirmative manner were included into the following analysis, i.e. those companies who – both in 2007 and 2010 – fulfilled the

criterions for being entered into the study and also utilized logistic services of an external provider, the total number of which, as mentioned above, is 277 (target companies). The following analysis was performed on the basis of the data obtained as a response to Questions 3 to 6, focusing first only on its static aspect (Conclusion 2) and then also on the dynamic aspect (Conclusion 3 within the basic analysis and Conclusion 4 within the post-hoc analysis).

In order to explore the static aspect of the intensity of corporate customer requirements on the existence of QMS implemented at the evaluated logistic services provider, which does not take into account the dynamics of development hypothetically caused by macroeconomic instability (economic crisis), only the responses to Questions 5 and 6 were taken into the analysis, i.e. those relating to the year 2010 (period shortly following the culmination of the 2008-2009 economic crisis). The reason is the fact that 2010 is less remote than 2007, and so applicability to the actual conditions is therefore significantly higher than that of the data relating to the period shortly preceding the crisis (2007).

According to the responses to Question 5, it was found out that 169 (61.01 % of the 277 target companies) applied the QMS criterion, either fully or only partially. However, according to the responses to Question 6, it was ascertained that only 87 companies (31.41 % of 277) applied it as a critical criterion (i.e. criterion whose fulfillment was necessary for the potential logistic services provider to be successful in the selection process), which means that the remaining 82 companies (29,60 %) applied the QMS criterion only as an auxiliary criterion (i.e. failure to comply with the criterion did not automatically disqualify the evaluated logistic services provider from the selection process).

While, due to its considerable subjectivity, a thorough review of these results has not been realized, it can be concluded that the application of the QMS criterion implemented at the potential logistic services providers in the period following the end of the economic crisis (2010) was certainly not widespread, let alone regular as states Lari (2002). This leads us to the conclusion that, in general, this criterion was not of considerable decision-making significance for companies in the choice of logistic services providers, particularly if we consider the fact that only about half of them used it as a crucial criterion. This state of affairs may have its roots in the fact that companies were not adequately aware of the importance of existence of QMS implemented at their external providers as suggests Kanji (2002), which means that that they were put too little stress on the improvement of the public image of their company in the eyes of the business clients ensuing from the co-operation with an environmentally friendly logistic provider, which is in conformity with the opinion of Ingason (2015). This outcome is reasonable if one considers that co-operation with a provider with a certified quality system (QMS-certified provider) is many a time more expensive because these certified providers have usually also higher costs, which then must be added to the price of their logistic services (Hardesty & Leff, 2010).

Another explanation may be that it is very difficult for a corporate customer to determine – particularly in quantifiable form –the superiority of co-operation with a quality certified provider of logistic services – as stated in the methodology section and as confirms Bacoup et al. (2018) – and thus to assess its real financial benefits for the company.

If we project the above conclusions based on the analysis of the situation in the economic crisis of 2008-2009 into the year 2020, man can conclude that, in this area, there are a wide range of unused market opportunities for logistic services providers, provided however that they will be able to conform their marketing concept by the recommendation contained in this study, which are generally in line with Domingues (2015).

The author fears that there are very small chances and probability on the part of the company to increase business understanding of the value and advantages of preferring co-operation with QMS certified logistic services providers as suggests Slater & Olson (2001). The explanation for this apprehension is that the company choosing its provider is compelled to use the rationale of defending the costs of QMS certified provider in comparison to the economic gain (Domingues et al., 2015). We must realize that it is very difficult to quantitatively determine the financial gain, but – on the contrary – it is relatively easy to quantitatively determine the associated costs. For this reason, the argument of preferring a QMS certified logistic services provider can become highly counterproductive (Kilibarda et al., 2012), which means that this fact can even discourage the company from choosing such a provider, resulting in the opposite outcome than originally intended. Even so, it is recommended that the logistic services providers are encouraged to propagate the significant role of QMS despite the fact that this is connected with higher costs. The logistic providers should appeal to the rational behaviour of their potential corporate customers (users of external logistic services) in argumentation with the representatives of the management of the potential customer, where reasonability of decision can rightly be expected as recommends Dibb & Simkin (2010). Also, it can be recommended to the logistic services providers to argument by the fact that co-operation with a QMS-certified logistic provider will – in case of need – enable the corporate customer to perfect, advance or eventually correct his own quality management practices so that they are in a (better) correspondence with his economic goals and consequently also financial targets (Gerosa & Taisch, 2009). This will also enable the corporate customer (user of the external logistic services) to evaluate efficiency of his own quality management system and – if needed – implement corrective measures as point out Domingues et al. (2015). He argues that, the increased costs associated with a QMS-certified logistic services provider will be economically counter-balanced by the associated benefits, be that financial profit or elimination of inefficient quality management processes at the corporate customer.

For the purpose of determining the dynamic aspect of the intensity of the corporate customer requirements on the QMS certification of his providers, which takes into consideration movements caused by the volatility of the macroeconomic climate (economic crisis 2008-2009), the analyzed data comprises not only the data relating to the year 2010 (year following the crisis) but also the data relating to the year 2007 (year preceding the crisis), which was provided based on the responses to Questions 3 and 4. The data relating to the year 2010 has already been presented in Conclusion 2. The data relating to the year 2007 (based on the responses to Question 3) is the following: 110 (39.71 % of the 277 target companies) applied the QMS criterion, either fully or only partially. However, according to the responses to Question 6, it was ascertained that only 46 companies (16.61 % of 277) applied it as a critical criterion, which means that the remaining 64 companies (23.10 %) applied the QMS criterion only as an auxiliary criterion.

If we carry out a year-on-year comparison of the above data, we can see that there was a significant increase in the full application of the criterion from 46 companies (16.61 % of the target 277 companies) (2007) to 87 companies (31,41 %) (2010), as well as a small year-on-year increase in the partial application of the criterion from 64 companies (23.10 %) (2007) to 82 companies (29.60 %) (2010). Nevertheless, for an in-depth understanding of the real meaning of the data, we need to examine its structure closely, as shown the contingency graph (FIGURE 1).

A) First, the attention will be devoted to the figures on those companies for whom no year-on-year change was ascertained in the QMS criterion application. In 2007 or 2010, 94 companies (33.94 % of the

target 277 companies) did not apply the QMS criterion at all, 22 companies (7.94 %) applied it in a partial manner and, on the opposite, 24 companies (8.66 %) applied the criterion in the full manner. This means that the total count of companies for which no year-on-year change was detected and which are thus neutral in the test on the hypothesized effect of the economic crisis below and so have no influence on its result is 140 companies (50.54 %). From this we can assume that about half of the companies did not make any change to how they apply (or ignore) the QMS criterion, and also, that great majority of the companies did not apply it at all (meaning not even in an auxiliary manner). Practical conclusion is that, with a vast majority of the companies the importance of the existence of QMS implemented at their logistic service provider remained without any change if we compare the situation shortly before and after the 2008-2009 economic crises. Majority of the companies did not attach any significance to this criterion at all, which is in line with ascertainment made by Bacoup et al. (2018).

B) We continue with the data on the companies for whom – to the contrary of the companies mentioned above – a year-on-year change was ascertained in QMS criterion application, i.e. companies which have an effect on the test result as follows.

i. As the first step, we will devote ourselves to the companies with which the change in the QMS criterion application happened towards its higher degree of application, be that only partial application (as an auxiliary criterion) or full application (as a critical criterion). 31 companies (11.19 % of the target 277 companies) that did not apply the criterion at all in 2007 and 32 companies (11.55 %) that applied it only in a partial manner in 2007, commenced to apply the criterion in the full manner in 2010, while 42 companies (15.16 %) that did not apply the criterion at all in 2007 commenced to apply it at least in a partial manner in 2010. Based on this, in the case of the great majority of companies whose approach moved towards higher QMS criterion application, this happened through a single step leading directly to the full application (and not by way of its partial application). Practically speaking, we can assume from this that once the companies realized the important role of QMS criterion, most of them attached a high importance to this from the onset of this attitude change as suggests Gimenez-Espin et al. (2013). We will verify this conclusion exactly by means of the below stated statistical test within the framework of Conclusion 4. It can be supposed that this ascertainment can be ascribed to the fact that the crisis brought on a very high intensification of the competitive environment, resulting in a high pressure on the market participants (Gourinchas, 2020).

ii. As the second step, we will devote ourselves to the data concerning the companies, for whom a change in the QMS criterion application was detected like in the above case, but in the opposite direction, which means a shift towards a lower degree of application, be that a partial application (as an auxiliary criterion) or no application at all. 4 companies (1.44 % of the target 277 companies) which applied the QMS criterion in 2007 fully, and 10 companies (3,61 %) which applied it only partially in 2007, discontinued this application (completely) in 2010, while 18 companies (6.50 %) which applied it in 2007 fully, commenced to apply it only partially in 2010. So we can assume that in the case of most companies whose approach towards the criterion application changed towards lower degree of application, this happened through a shift from the full application (as a critical criterion) to only a partial application (as an auxiliary criterion). The practical conclusion is that if, in the case of some companies, the importance of QMS criterion application had decreased, a certain level of its importance remained preserved, which means that there was only a decline in the degree of importance as states Porfert (1986).

iii. In the third – final – step, we will determine the overall balance of the two above-mentioned opposite-direction movements in the QMS criterion application (i.e. i vs. ii). A year-on-year change in the criterion application was detected in 137 companies (49.46 % of the target 277 companies). From this total count, 105 companies (37.91 %) shifted their QMS criterion attitude towards full application, whereas only 32 companies (11.55 %) shifted their attitude in the opposite direction (i.e. to no application at all). By comparing these two pieces of data we find out that the count of companies that commenced to apply the QMS criterion in 2010 (be that in a partial or full manner) is by 73 (26.35 %) higher than the count of companies whose QMS application attitude changed in the opposite sense (meaning the companies which, partially or fully, discontinued the application) in 2010. We can summarize that, in 2010 (if compared with 2007) 59 companies (21,30 %) fewer did not applied the criterion at all, but on the contrary 18

company (6.50 %) more applied it partially and even 41 companies (14.80 %) more applied in the full manner. We can see that the overall balance represents a considerable shift towards the full QMS criterion application. The basic analysis confirmed in an exact manner that this difference is statistically significant. This verified the hypothesis that the extent of QMS criterion application was different (higher) in the year 2010 that the extent in 2007. Thus we come to a conclusion that, though the criterion application in 2010 was not significant (Conclusion 2, which considers the static aspect only); it was still significantly higher than the application in 2007. This means that, although from the viewpoint of the static aspect the QMS criterion application was low, the dynamic aspect (the year-on-year change) is quite significant.

This leads us to a conclusion that there exists facts indicating that the 2008-2009 economic crisis may have compelled the companies (corporate customers) to put a greater emphasis in their logistic provider selection process to the fact whether the potential provider has a QMS implemented. And, in general, this may also confirm the idea that the higher competitive pressure caused by economic crisis induces a higher intensity of requirements on quality of externally provided services (Uslaner, 2010).

Based on projecting the above conclusions drawn on the 2008-2009 economic crisis into the conditions of the 2020 coronavirus crisis, we can recommend the logistic services providers to implement and/or maintain a quality management system – be that a general form (generally applied standard as mentioned in the theoretical section) (Bacoup et al. 2018) or a field-specified form (industry-specific) (Gimenez-Espin et al., 2013). This is expected to increase their competitiveness, especially at the time of macroeconomic instability.

As regards identification of a suitable target segment of corporate customers (users of the external logistic services), we can recommend that the logistic services providers should attempt to identify those companies (potential users of the logistic services) who are expected to put emphasis on the QMS aspect in the *"eyes"* of their own business clients (business image) as suggests Hardesty & Leff (2010). We can expect that such companies will be the large ones because it is generally known that *"big"* companies are particular about their business image than *"small"* businesses as states Murray (1979). There is also an expectation that large companies will have more (financial) assets to bear the increased costs incurred in relation with QMS providers (Naidoo, 2010). As another recommendation, the providers should focus on the companies that do not have implemented their own QMS. The reason behind this is that these business – in order to improve their business image for their potential clients – may tend to compensate the absence of their own QMS by *"outsourcing"* this from their external providers (Hardesty & Leff 2010). On the opposite to the above, it can be expected that these will be mostly rather smaller businesses, for which the costs associated with implementation and/or maintenance of their own QMS would not be economically justifiable as points out Dibb & Simkin (2010). However, in case of small businesses the potential logistic services provider should keep in mind the above mentioned fact that these small business may not have sufficient assets to tolerate increased costs associated with higher cost of QMS-certified provider. From this reason, it is advisable for the providers to focus above all on those businesses that are outside the main area of active marketing attention of their competitors, for example, businesses in *"the regional parts of the country"*, where we can expect a lower intensity of competition of the logistic services providers (Slater & Olson, 2001). This means that small businesses (absence of their own QMS implemented) situated in the regions or the country´s remote parts (less intense competition by logistic services providers) should be in the focus providers' marketing interest (Murray, 1979). No matter whether big or small potential corporate customers, they should be actively sought out and approached with logistic services offer using suitable and most efficient

marketing means (especially under favorable marketing conditions), employing direct marketing (Hardesty & Leff, 2010), be that by telephone (Roach 2009), electronic mail messages (Eagle et al., 2014) or paper correspondence.

In the post-hoc analysis, we found out that the difference in QMS criterion application detected in the basic analysis (as explained above), in a statistically significant manner, consists exclusively in the difference between no application of the criterion (response alternative: No) and full application (Yes). So we can state that most companies that had changed their attitude towards QMS criterion application commenced to apply it fully without having gone through the interstage of its partial application. This conclusion is in accordance with the ascertainment stated in Conclusion 3 B i, which hereby gets verified in a statistically significant manner.

Based on this we can state that the process of changing QMS criterion application attitude happened very fast (in a single *"shift"*) rather than gradually. Expressing the outcome in a practical means, if and once a company commenced to apply the QMS criterion after the culmination of the crisis, the application was straight off to the full extent, i.e. as a critical criterion, which emphasizes its importance because fulfillment of this criterion was a pre-condition for not disqualification the potential provider from further selection process. This ascertainment makes us conclude that – in reality of business practice – the important role of the QMS criterion application became manifest without time delay following the crisis, which means that this – with high probability – happened under the competitive pressure caused by this crisis as suggests Naidoo (2010). This allows us conclude that – with high likelihood – the pressure must have been intense and the change in the QMS criterion application happened as a direct result of this crisis.

This ascertainment enhances the importance of the recommendations given within Conclusion 3 and the logistic services providers should be appealed to conform their marketing practices accordingly. The providers should do so without unnecessary time losses, with a view to the actual severity of the intensified competition brought about by the crisis and the related severity of the market situation (Murray, 1979). Eagle et al. (2014) also suggests that the providers must take the necessary marketing measures without delay at the very moment when it can be reasonable presumed that the potential corporate customer (user of the logistic services) has changed his attitude towards the QMS criterion application. Eagle et al. (2014) however warns that the providers must count with a certain rigidity of the organization structure of the potential customer, which must always be expected in case of any organization, even those in the for-profit sector (Kanji, 2002), which are well-known for their relative high flexibility (Child, 1973).

Nevertheless, in view of the fact that the suggested steps are to be implemented already immediately after the crisis culmination (maybe even during the crisis), i.e. under very intense pressure on the potential corporate customer to minimize his costs to the absolute possible degree, it must be emphasized that it is important for the logistic services provider to conceive very thoroughly their marketing plans as remind Hardesty & Leff (2010) . The marketing policy must secure that the logistic services will be offered under very advantageous terms, which especially applies to the price (Thorpe & Morgan, 2007). This recommendation is especially important if the potential corporate customer (company) is a *"small"* company as mentioned above. The reason is that the resources (assets) of small businesses are usually considerable limited, and so they crucially need to justify the increased costs incurred in relation with choosing a QMS certified provider, which can be expected in case of certified providers (Quinn & Hilmer, 1994). So, the increased costs must be clearly justified by the associated benefits in

the form of an improved image of the user of the QMS certified logistic services, which improves their competitive position and enhancing marketing opportunities as emphasizes Kilibarda et al. (2012).

Thanks to the fact that the hypothesis was confirmed on sample of respondents (corporate customers) of a statistically sufficient count, and several statistical tests were used for the verification (statistical multi-instrumentality principle), it can therefore be expected that the results of the study are characterized by high of reliability. Despite this fact there exist some limitations of the study, which should not be ignored.

First to mention, it has to be reminded that – although statistically significant) the detected change in the QMS criterion application when comparing the year before (2007) and the year after (2010) the 2008-2009 crisis culmination did not have to be caused by the crisis itself. We cannot exclude the possibility that the change had different reason(s), leastways as co-factors beside the macroeconomic instability caused by the crisis. It is possible that these factors only coincided with the crisis, leading us to a false conclusion about the impact exerted by the crisis. This problem is caused by the fact that the realized statistical testing could only detect eventual difference in the QMS criterion application; however it is quite understandable that they cannot reveal the substantiality of the changes, i.e. determine their cause and mechanism. It must be emphasized that any speculations in this sense go beyond the scope of this study. Despite all this, the main conclusion is that there exist facts suggesting that the 2008-2009 economic crises could cause – leastways as a catalyzer – changes leading to a higher importance attached by companies to QMS status of their logistic services providers.

Another limitation of the study consists in the fact that – although statistically verified – the detected difference in the degree of QMS criterion application before and after the crisis may not – under certain circumstances – demonstrate the real degree of the change in the QMS behaviour. This is due to the fact that the both year-on-year compared samples of companies contained the same subjects, which means companies that existed both in the pre-crisis (2007) and post-crisis (2010) period. For this reason, we cannot exclude a possible influence of the above mentioned organization rigidity of these companies pointed out by Jaques (2010), which could prevent them from changing their QMS criterion habits or – leastways – reduce the intensity of these changes. Such internal organization rigidity is more or less typical for any organization and is generally expected to increase with the organization size (Gorla et al., 2010). Logically, we can expect that if the post-crisis sample (2010) contained exclusively those companies established after the crisis culmination, the organizational rigidity would be eliminated and/or minimized (Aldrich & Herker 1977), and we could logically expect that the ascertained difference in QMS criterion application would be (considerably) more significant than in the case of this study where – as mentioned – both the compared company samples were identical. This analysis design consisting in comparison of 2 disjunctive company samples (pre-crisis sample versus post-crisis sample) eliminating the organization rigidity could more precisely reveal the real extent of the hypothesized influence of the crisis on the company QMS practices.

Despite the above limitations, the study may represent a contribution for better understanding of the *"crisis"* behaviour of market participants in the field of logistic services outsourcing, suggesting new areas of follow-up research attention.

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