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# The Role Played by Trust and Its Effect on the Competiveness of Logistics Service Providers in Hungary

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**Abstract:** This research focuses on the role of trust and the impact of its level on the revenue, earnings before tax and the degree of flexibility of logistics service providers (LSPs). More specifically, the role of the executive manager is examined in relation to the impact of business relationships (trust levels) within and between organizations. In addition, the analysis covers the development of revenue, earnings before tax and degree of flexibility of logistics service providers in the context of the role of the head manager. The data were collected from 51 logistics service providers in Hungary. The results show that the level of trust established in the organization (with the employees, co-workers etc.) has a positive impact on the earnings before tax. Furthermore, this paper confirms that the trust executive managers establish around them is an important performance factor which even consumers perceive and that it has major significance in terms of degree of flexibility. This research further increases our understanding of the role and importance of trust as a strategic success factor for LSPs.

**Keywords:** trust; trust management; logistics service providers; supply chain management; collaboration

## 1. Introduction

Companies generally outsource their logistics to external service providers in order to improve the efficiency of their core functions. How to manage their relationships with service providers is critical to the success of these outsourcing activities due to the loosely coupled nature of outsourcing relationships. In order to achieve these objectives, it is necessary to identify the management success factors which support the fundamental abilities of logistics enterprises and it is also a necessary step for the development of companies in the target group.

The emergence of logistics service providers (LSPs) started with the outsourcing phenomenon of the early 1980s. In order to concentrate on their core competences, many manufacturers or retailers have opted to outsource to specialty firms or LSPs all or part of the logistics activities previously performed in-house [1–3]. The logistics services industry demonstrated tremendous growth for decades, alongside which there has been an increasing academic interest in LSPs, especially since the 1990s [4]. According to Lukassen and Wallenburg [5] the work of LSPs has been increasingly recognized during the last few years, as has the significance of functioning supply relationships [6,7].

The main factors accounting for the failure in securing partnership between parties during outsourcing process are poor communication, lack of top-management support, lack of trust, lack of a total quality management program of the provider company and inadequate upfront planning [8–10]. Trust plays a major role in improving the relationships between parties, as trust between LSPs and logistics service buyers is a key factor in the success of logistics outsourcing relationships [11–14]. Furthermore, trust is a powerful precedent of effective collaboration and a forecaster of positive performance outcomes and competitive advantage in supply chain inter-organizational relationships [15,16].

Nowadays, trust is an important determinant of the development of modern organizations. Not only does it become an increasingly important element of the relationship between entities but, above all, it positively influences the building of the organization's intellectual capital. This capital is differently classified but always contains components that determine the potential of sustainable organizations, often in the human, social, relational, organizational and innovation dimensions. Trust is more often the key determinant of this capital [17]. Trust is an element that ties this capital with relationships in business. This has an integrated character [18]. The reason for the lack of trust is related to differing interests of supply chain partners [19]. Yet, trust was found to be a crucial factor that affects supply chain collaboration [20]. Three aspects of a supply chain network influence network-level trust in supply chains: the number of uninfluenced partners, the number of uninfluential partners and the degree of interdependence [21].

Research papers analyzing and evaluating the examination, competition and integration of LSP companies highlight the significance of trust in the success of LSP and collaborating companies. Owing to the role and weight of trust, the authors of this paper consider trust to be important in two aspects. The first is the appearance and factors of trust as a concept, as well as its impact on the establishment of enterprises as trust-based communities and their success. The second is the examination of the impact of trust-based leadership as a management tool and its factors on the success of collaborative relationships within and between enterprises.

The role and importance of trust is strongly supported by statements made by leading economists in recent years, in which the main cause of social and economic crises is the loss of trust in modern societies. Thus, following the crisis in the financial and economic world of 2008, research into confidence-building has acquired a significant role in the academic field, since, taking account of the results of studies of trust can provide preventive tools for avoiding, mitigating and managing the negative effects of cyclically-changing economic processes. An essential prerequisite for the success of logistics service providers is to build trust and to provide the necessary information for operation which can be shared among participants. Building trust requires the comprehension and acceptance of the need for transparency, openness and proactive knowledge exchange [22]. This is a primary factor in that trust also increases innovation and supply chain performance [23]. Comer et al. [24] studied how to develop a multidimensional measure of trust specifically for the sales context and found support for their division into salesperson trust, product trust and company trust. Young-Ybarra and Wiersema [25] analyzed flexibility in strategic alliances, utilizing a model drawn from transaction cost economics and social exchange theory. They found that economic constraints, the quality of communication and the existence of shared values were positively related to trust and dependence was negatively related.

The economic processes and the effectiveness of companies is determined on the basis of the organization of these companies as formed by individuals, in the same way that families made up of individuals determine the functioning of society and its norms. In the two approaches, the individual is the same, at once a social and an economic building block; the behavior, the culture and the level of trust of the economy and society are the individual values and attributes that permeate families, companies and societies and so national beliefs about trust can flow right down to the individuals that belong to the community and make up the nation and the same is true in the other direction, in that statements about trust in smaller communities can also be true of the narrower society surrounding them.

Logistics service companies are integrated companies in the supply chain, service providers offering diverse and wide-ranging value-added activities, which have gained significant roles in the competition in the supply chains in recent years. The shift in the competition of goods and services to competition in supply chains has revalued the role of logistics service providers in analyses of company activities and relationships. Economic impacts, such as globalization and natural risks, including the extraordinary effects of unexpected natural disasters, have further raised the importance of the role mentioned above and the generalization of the results obtained and thanks to their integration, the conclusions reached during the analysis of logistic service providers have also been broadly extended to the relationships between companies in the supply network.

An online survey was developed in order to collect data in the research field among Hungarian LSPs. Our online survey research revealed the social and economic impacts, changes and trends which can be observed in the Hungarian and international business environment. In addition, strategic factor correlation was established between trust, success and flexibility (trust, as in the examination of the fundamental factor of relationships within and between enterprises, while looking at the role of the manager in creating a trustful atmosphere).

The data were analyzed with the SPSS 14.0 software using different examination methods (Levene's test, Analysis of variance, Cramer's V, Phi, Eta, Eta squared index and Principal Component Analysis). As a next step, the paper describes the research methodology applied, presents the results of our empirical analyses and discusses the most significant findings. The latter effectively support LSPs in finding their management success factors which enable them to satisfy fully the demands of their customers in the supply chain. The further development of the research methodology applied is a new direction of research which enables comparison analysis of LSPs all around the world to be made, thereby exploring new findings through the examination of the target group in order to gain a clearer understanding of this field of science.

## 2. Literature Review

### 2.1. *The Role of Trust in Establishing Enterprises*

There are many definitions of trust in the literature but these are rooted in two entirely different approaches: belief [26,27] and risk [18,28]. Several terms have been used synonymously with trust and this has obfuscated the nature of trust. Among these are cooperation, confidence and predictability. The sections that follow differentiate trust from these constructs [18].

Trust exists when a firm believes its partner is being honest and benign [29]. Furthermore, trust can contribute significantly to the long-term stability of a supply chain [30,31]. In a logistics outsourcing context, a customer's trust in a third-party logistics provider refers to the customer's belief that the third-party logistics provider is knowledgeable about the services it provides and that the third-party logistics provider has intentions and motives beneficial to the customer when new conditions arise, conditions to which a commitment has not been made [32].

Fukuyama [33] examined three societies, Japan, the United States and Germany, describing trust as a regular, honorable and expected behavior ready for collaboration. A community can expect this behavior from its members based on mutual standards. Ha et al. [34] referred to the need for research that examines trust in different cultures, assessing the constructs of different cultures that can provide an additional insight into trust in supply chain management. One of the aspects highlighted by [35] in relation to trust in inter-organizational relationships is the essential element of organizational culture which is necessary for individuals to interact and share knowledge. Overall, the findings indicate that cultural similarity, effective communication, knowledge and experience, opportunism and environmental uncertainty are vital antecedents of trust and commitment [36]. Lopez-de-Silanes et al. [37] highlighted that trust should be more essential for ensuring cooperation between strangers.

Ariely [38] highlighted that in societies where the level of trust is low, business is also more difficult to run. Furthermore, that lack of honesty quickly leads to distrust and acts to the detriment of the economy. Covey et al. [39] emphasized that there is a direct and significant correlation between low levels of trust and high costs and there is a significant, direct and measurable correlation between high level of trust, high speed, low costs and higher added value.

Logistics services are often measured by business/financial performance. The literature does not agree on the nature of the features to be measured. Some analyze market share [40], others include multi-dimensional indicators such as asset-to-income ratio, equity return, revenue-to-income ratio, gross profit ratio, operating profit ratio, liquidity indicator and the indebtedness index [41], as well as the investment return ratio, revenue growth [42] and sales/sales volume [43]. The examination of trust as one of the possible success factors can be given priority, although at the same time the correlation between the two financial indicators (companies' turnover and their pre-tax profits) can be demonstrated in this context, as well. The literature describes trust as a significant factor in the establishment of enterprises with an indisputable role and effect on success.

### *2.2. The Role of Trust in the Collaboration OF Enterprises*

Ganesan and Hess [44] reinforced the idea that the most frequently examined consequence of trust is commitment to a relationship. Owing to the role of trust in enhancing relationships [45], a research paper focusing on the collaboration between enterprises should analyze the multilateral aspects of trust in depth. It is impossible to imagine a properly working business corporation and relationship without trust, as it would lead to constant organizational dysfunction in the daily life of collaborating enterprises.

Several international research projects focused on the correlation between trust and the behavior of collaborating enterprises. Sahay [45] deals with the nature of the role and key significance of trust in long-term business relationships. Two statements should be emphasized in the case of business trust, as a concept. The first highlights the impact on success and competitiveness, as stable relationships could lead to lower transaction costs. Barratt [46] considers the elements of trust and collaboration are key factors to maintain a close relationship between the participants of the supply chain and improve their performance as well as customer satisfaction. When trust is built into a business partnership, the performance of both parties can be enhanced [47].

Collaboration among partners of a supply chain strengthens long-term relationships based on personal trust, bringing benefits such as the joint creation of knowledge, sharing expertise and understanding the intentions of the partner, reducing logistics costs and creating values for a supply chain [48–52]. Kersten et al. [53] examines the advantages and disadvantages of contractual cooperation from both sides, including both companies and logistics service providers. Concentration on core activity, cost reduction and flexibility have been considered almost equally important by both companies and logistics service providers, although the most frequently mentioned cost reduction factor is not the most important factor for companies, who consider increased flexibility more important. Depending on the outcome states and prior expectations, partners may maintain trust or distrust in the network in which they are involved [54].

Flexibility has a significant impact on market profitability and a positive impact on financial profitability. Operating flexibility is the most notable factor [55]. The link between companies and logistics service providers leads to operational flexibility and increases competition orientation and market performance through the influence of logistics.

### *2.3. The Role of Logistics Providers in the Flexibility of the Supply Chain*

As a result of [56] research into the role of trust in the supply chain, timeliness emerges as one of the most important performance indicators evaluated by clients in the modern economy. The timeliness of logistics service providers is determined by the time needed to respond and offer solutions in response to customer needs, i.e., by the flexibility of the business as an organization. Golden and

Powell [57] defined flexibility as the ability to adapt along four dimensions: time, choice, purpose and focus. In their article, they also referred to the measurement of flexibility, which can be carried out in its own dimensions: efficiency, ability to react, variability and robustness. A similar definition and categorization also appear in the work of [58], where adaptability is handled as an element of flexibility and it is pointed out that in practice adaptability is used as a synonym for flexibility. The flexibility of the supply chain is the ability of companies to respond to unexpected changes in customer needs and the activities of competitors [59].

As a summary, when considering the expectations of logistics service providers, we can say that of the various sources of competitive advantage flexibility will also have an impact on the efficiency of the entire supply chain. When supply chains (not companies) compete with one another, we must create the opportunity to manage chains (or chain sections) across a company boundary.

It can be concluded that the level of trust in the society has an impact on the culture of enterprises and indirectly on the structure of the organization, institutions and the flexibility of collaboration of independent organizations.

#### *2.4. Partner Selection and Its Impact on the Success of Collaboration*

Entering a community raises the problem of the admission of individuals, while business networks established as a result of the collaboration of enterprises raise the problem of selection. Sahay [45] stated that it is important because it allows the given participant to understand the objectives of the other. Moreover, Sahay [45] found that if partner companies are not compatible with each other and there is a lack of common objectives, conflicts and compromising attitude are the inevitable consequences. A successful collaboration, however, depends on certain trustworthy behaviors partner exhibit. To that end, understanding the aspects which constitute behavioral uncertainty and mechanisms by which such aspects affect partner trust is a necessity [60].

The dynamics of globalization and business networks increasingly re-evaluate the significance of partner selection and the analysis of its impact on business networks. Tsamenyi et al. [61] concluded that cause and effect relationships can be observed between the selection of partners, the behavior of partners and network performance. The global size and location of companies have changed the national economy and the dynamics of businesses [62].

According to the relational view, collaborative strategies require trust-based mutual commitments to co-create value [63]. The relationship between value creation and inter-organizational relationships has been explored in transaction cost economics [64], resource-dependence theory [65], marketing channel theory [66–69] and relational governance [70,71]. Spekman et al. [72] estimated the failure rate of relationships to be more than 50%. Sherman [73] reports that one-third of strategic alliances failed due to lack of trust among trading partners.

It can be concluded that the selection of a business partner is an important task of the manager, since proper selection is a fundamental requirement of successful business networks. As a next step, this research focus on which factors should be taken into consideration to analyze the trust level of collaborating (business) organizations.

#### *2.5. The Factors of Trust Levels in Inter-Organizational Relationships*

Another point of divergence in trust studies is the distinction between interpersonal and inter-organizational trust. While rooted in the study of interpersonal trust, most studies of inter-firm trust have examined trust between organizations rather than between individuals. There are real problems in separating the two concepts; however, most studies have opted to use individuals' reports to assess inter-organizational trust levels [74]. Trust, which is supported by good inter-firm relationships, was found to be an important antecedent for confidence underlying the outsourcing decision [75]. As already noted, trust amongst partners is of paramount importance in establishing successful cooperation [76]. A few studies have looked at both interpersonal and inter-organizational trust in buyer-supplier relationships [77]. Trust shapes inter-firm relational embeddedness, which is

characterized as a range of integration activities reflecting close working practices between buyers and suppliers [78]. Based upon a widespread belief from the viewpoint of business people, holding positive trust relationships would potentially support and promote further business collaboration between business partners [79–81]. Trust refers to the extent to which relationship partners perceive each other as credible and benevolent. Credibility reflects the extent to which a firm in a relationship believes that the other party has the required expertise to perform the expected task effectively, while benevolence occurs when one relationship partner believes that the other party has intentions and motives that will benefit the relationship [82].

Morgan and Hunt [83] emphasizes the importance of meeting commitments, since it is the pre-requisite of trust for partners in the supply chain to meet their commitments. In addition, Hurley [84] confirms that the personality, culture and previous experience of the head manager of the enterprise has a significant impact both on the establishment of the work environment and the development of enterprise relationships and partner behaviors.

### 2.6. Trust-Based Management

Nowadays, trust-based management plays an increasingly important role in the life of enterprises. Head managers start to realize sooner that empowerment, inclusion and endowment of trust of selected co-workers is a valuable management tool in times of crisis. Hurley [84] concludes that adopting trust means that the chief executive officer is less automatic—he/she must consider such things as his/her intentions and his/her integrity.

Management must be able to adapt with flexibility to varied situations and when necessary, to change between different styles of leadership. The rapid development of the European Community and the economic integration of the member states produces a strong need for managers who can understand and adapt to cultural differences in work-related values and leadership [85]. The work of Bass and Stogdill [86] is remarkable from the perspective of the correlations between enterprise success and managerial behaviors, concluding that there is no clear-cut pattern in order to become an effective manager. They found a close correlation between intelligence and effective management activities. According to the cognitive resource theory of Fiedler and Garcia [87], it is possible to conclude on the extent of the final performance in the case of determined managers who are able to enforce their will in stress-free environments. According to several meta-analyses, the positive effect of trust in leaders on a variety of work attitudes is substantial [88–90]. Trust has significant effects on technical exchange and technology transfer [91]. Managers should focus on developing trust and formulating detailed contractual provisions [13].

Fawcett, Jones and Fawcett [49] refers to trust as the core of collaborative innovation skills. His research was based on the fact that managers do not understand the nature of trust and the dynamics of building trust. Based on these deficiencies, managers look for the concept of collaborative trust, the structure of trust-centered maturity and the competition-focused strength of trust. Covey, Link and Merrill [39] summarized the thoughts described above, i.e., the ability to establish, increase, provide and restore trust is a key managerial skill in the new, global economy, regardless of whether one is a client, business partner, investor or co-worker.

### 2.7. Synthesis and Implications

There are many definitions of trust in the literature. The six most important divisions of trust—establishing enterprises, collaboration of enterprises, flexibility of the supply chain, partner selection, inter-organizational relationships, trust-based management—and their corresponding subdivisions (*characteristics*) across different levels of trust are presented in the literature review map. The literature map can be used for further research and practice. The literature review highlights a distinct connection across the six areas—establishing enterprises, collaboration of enterprises, flexibility of the supply chain, partner selection, inter-organizational relationships and trust-based management—with plentiful research spanning the six distinct, yet inter-related blocks of trust (Figure 1).

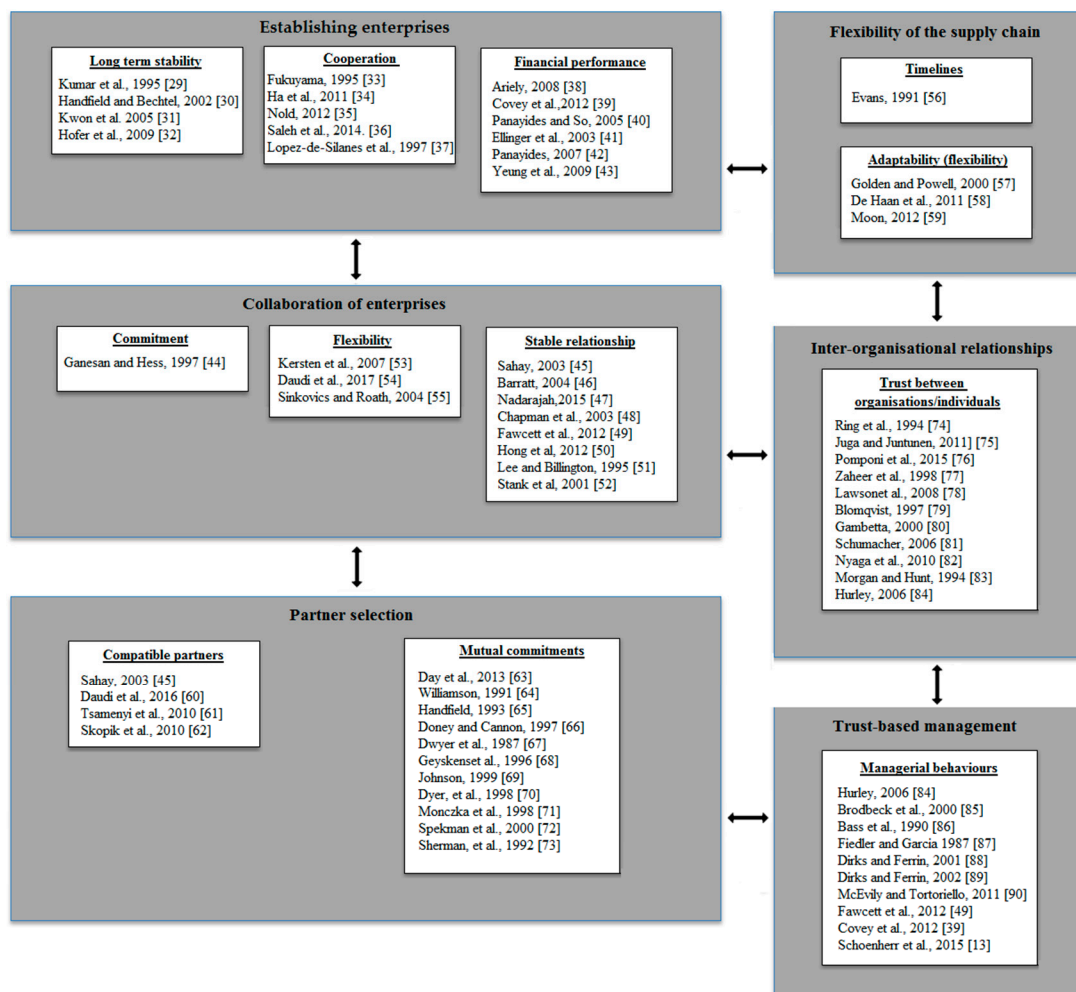


Figure 1. The impact of trust on LSPs. Source: Authors' own construction based on Roehrich et al. [92].

### 3. Materials and Methods

#### 3.1. Problem Description

Our research revealed the social and economic impacts, changes and trends which can be observed in the Hungarian and international business environment. In addition, strategic factor correlation was established between trust, success and flexibility (trust, as in the examination of the fundamental factor of relationships within and between enterprises, while looking at the role of the manager in creating a trustful atmosphere). When formulating our hypotheses, it was important to consider the key success factors which develop management (trust, success and flexibility), as well as their impact and correlation on the competitiveness of LSP. Specifically, our study addressed three hypotheses:

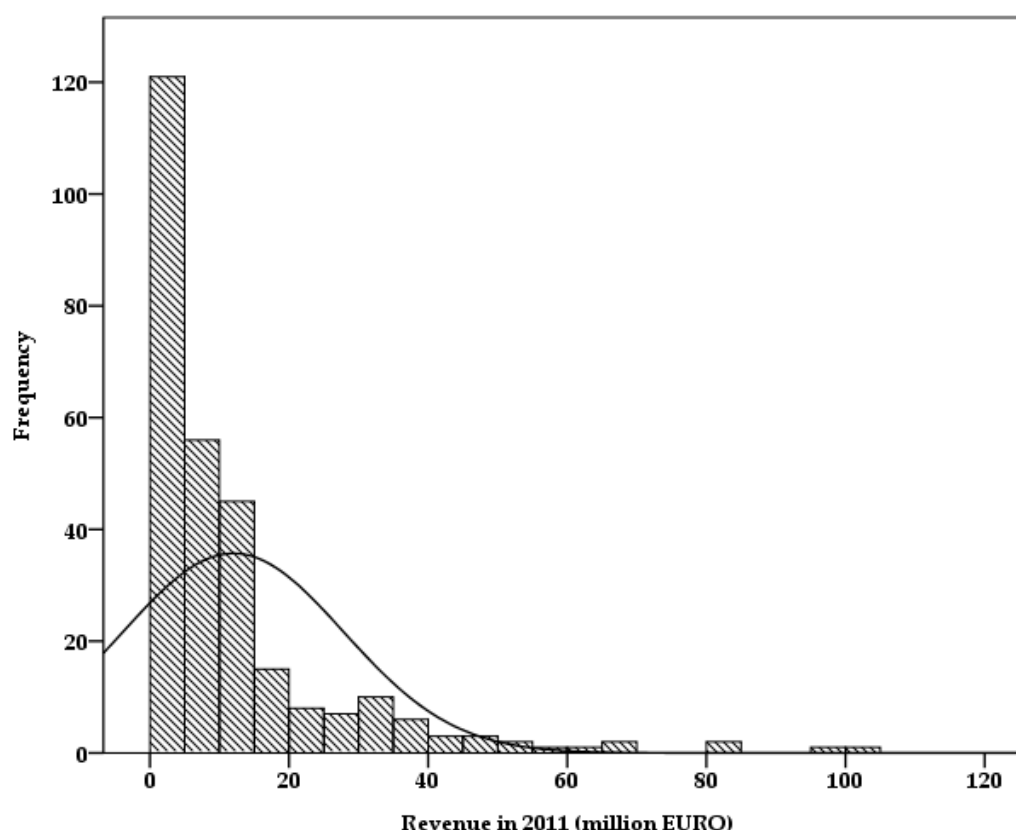
- **Hypothesis 1.** *The trust level of LSP within the enterprise influences the revenue and earnings before tax.*
- **Hypothesis 2.** *The internal trust level established by an LSP influences the flexibility of the examined logistics enterprises.*
- **Hypothesis 3.** *The trust level of the business environment created by the head manager of logistics enterprises influences the revenue and earnings before tax, as well as the flexibility of the examined enterprises.*

Hypothesis 3 examines the extent Hypothesis 1 and Hypothesis 2 can be extended beyond the boundary of the firm and the trust level of the company's external relationships in the light of the three success factors (revenue, pre-tax profit, flexibility). An analysis of the basic data processed during the

research can be carried out both on the relationship between the two financial indicators, as well as in the context of flexibility. This was made possible by the reliability of the data extracted from the sample available, so that the expansion of the first and second hypotheses in terms of their relationship and content could be realized in setting up Hypothesis 3.

### 3.2. Description of the Questionnaire and the Applied Statistical Methods

A list of around 300 Hungarian LSPs was compiled from information provided by the professional organizations contacted by us before starting the research, as well as official sources which can be accessed in the trade press. From this list, the target group was selected including enterprises with revenue (net sales) of at least EUR 100 thousand but not higher than EUR 100 million per year. This group consists of 284 LSP enterprises (Figure 2).



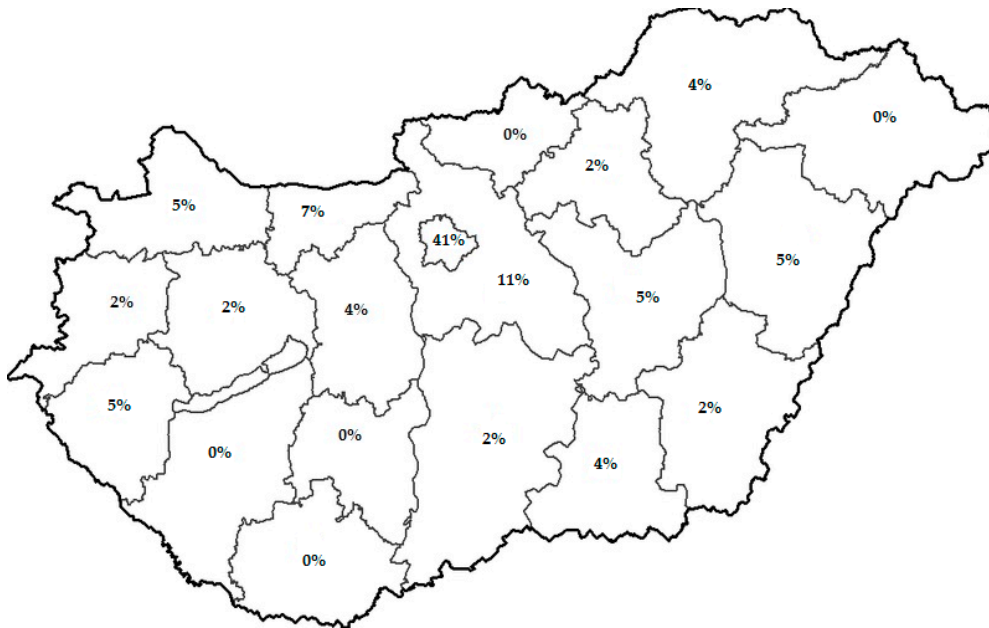
**Figure 2.** Histogram of the net revenue of companies among the Hungarian LSPs. Source: Authors' own construction.

The list of target group companies was collected from the HBI database ([www.hbi.hu](http://www.hbi.hu)), followed by the Világ gazdaság Logistics TOP 100, the Navigator Fuvarozó (Carriers) TOP 100, the Navigator Speditőr (Deliverer) TOP 100, the members of the Association of Hungarian Shipping and Logistics Providers, the member companies of the Association of Hungarian Logistics Service Centers, the member companies of the Hungarian Road Transport Association and the members of the International Carriers' Industrial Body (Figure 3). Duplications have been filtered out. The financial data has been provided by Bisnode Magyarország Kft.



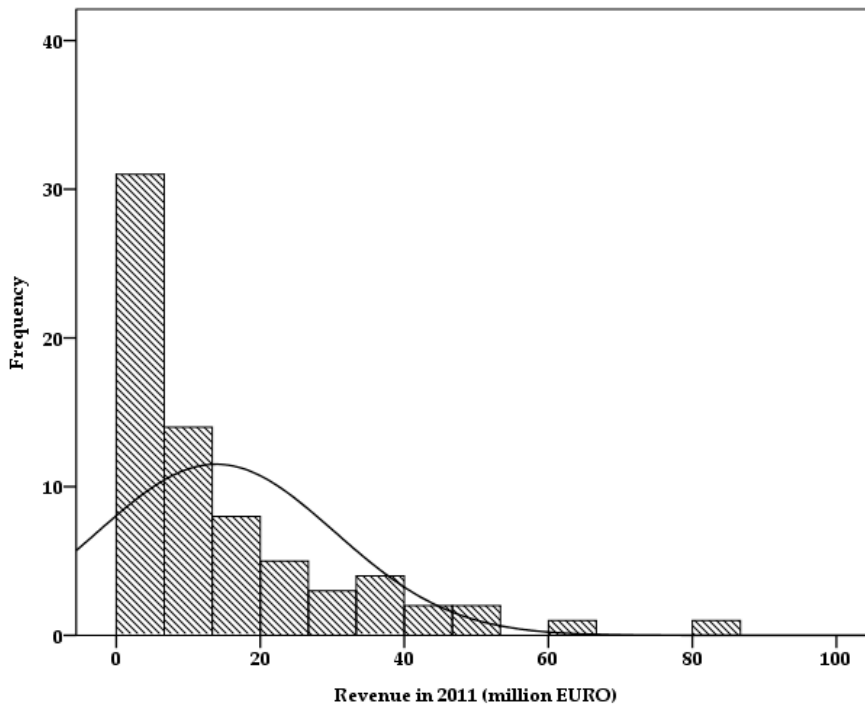


The final sample contains 51 different companies. The spatial distributions of the companies is presented in Figure 5.



**Figure 5.** Spatial distribution of company headquarters in the sample, by county (%). Source: Authors’ own construction, based on Koltai [93].

Furthermore, neither the sample-based, nor the population-based distribution can be regarded as normal (their parameters differ) but the graphic draft shows that the pointedness of both distributions are similar, bending to the left and stretching to the right (Figure 6).



**Figure 6.** Histogram of the net revenue of the companies among the sample LSPs. Source: Authors’ own construction.

Accordingly, the conclusion can be drawn that the curves of both the examined population and the sample are similar to each other (even though they deviate from the normal curve). *F* test statistics further verify similarity, since the variance of the two variables can be regarded as similar ( $F = 2.213$ ;  $p = 0.138$ ).

During the compilation of the questionnaire, we considered the need to extract the answers to the questions posed by the hypotheses. GfK Hungary Market Research Institute contributed significantly to the structure of the questionnaire, we created the professional content and the possible response forms and types were greatly influenced by the data quality and type that can be managed and expected by the evaluation SPSS software (V22.0, IBM Corporation, Armonk, NY, USA). Questionnaires were completed using the Computer Assisted Web Interviewing (CAWI) method. The internet-based questionnaire technique provided an effective research background for this target group by allowing respondents to answer questions on delicate corporate issues (financial issues, role of suppliers, etc.) more honestly, as the interviewee's response was not affected by the presence of the interviewer. In addition, it was an advantage that more precise answers could be given, as the questions were read by the interviewees themselves and they could check the accuracy of their responses. There was no time limit for answering the questions and the respondents were able to look at the precise data and to think about the questions.

A 51-question questionnaire was put together for the target group to confirm or reject our research questions. The first 14 questionnaires were related to the characteristics of the company. The following 30 questions included trust issues (business confidence 1–2, within the industrial sector 3–11, within the company 12–19, membership(s) of organizational bodies 20–23, strategy 24–30). The penultimate part dealt with the service portfolio (1–6), while the last 6 questions asked about the characteristics of the leader of the company. From the questions presented above, we would like to highlight B14 (leadership), which measures the trust level created by the main leader/manager in the business environment and B15 (management style). Two variables were used in the questionnaire to measure the trust level of the business environment established by the head manager (B14—managerial role, B15—managerial style). In question B14, the statements were numbered with Likert scales ranging from 1 to 10, where 1 indicated that the respondent had a minimal role in forming the corporate culture and the atmosphere of trust, while 10 indicated he/she played a dominant role in this process. In question B15, the respondent had to select the company leadership style which was closest to his/her style from seven predefined options (expressions).

The authors of this research pre-tested the questionnaire in ten companies representative of the different environments present in the sampled population. The main objective of this pre-test was to verify the appropriateness of the questionnaire. Hence, this analysis assessed the difficulties faced by the respondent in understanding the questions, in retrieving the required quantitative information and eventual ambiguities in the questions.

The net revenue and earnings before tax of all 51 responding LSPs for the period between 2004 and 2011 were used to examine our research hypotheses. The total revenue of the respondents was 456 million EUR in 2011, a year for which reliable statistical data were available. This value is more than 50% of the cumulated annual revenue of all Hungarian logistics enterprises in 2012. Revenue and profitability is calculated the following way: Revenue: The annual net income from services of the companies examined (income deriving from services, which does not include, for example, income from financial activities). Profitability of the enterprise: the pre-tax profit of the companies under examination divided by the annual net revenue. Profitability of each service: the pre-tax profit of the given service divided by the net revenue generated by the net income from the service provided (method: aggregated relative profitability level derived from expert estimates and data provided by leading professional organizations).

Of the 284 domestic logistics service providers, 56 responded, of which 51 were evaluated. This shows a response rate of almost 20%, which can be regarded as representative when viewed in terms of general beliefs and academic acceptance. Representativeness is further strengthened by

the market share of the respondents (50%) and the test results of the general and sample population in terms of their geographical location and distribution. Our sample represents the opinions of big companies of the sector, because of their relatively low response rate and large share of revenue in the industrial sector. At the same time, as shown above, the geographical distribution of the sample corresponded to the distribution of the population. Considering the 20% response rate and the revenue data exceeding 50%, the representativeness of our research can be confirmed.

The data were analyzed with the SPSS 14.0 software using different examination methods (Levene's test, Analysis of variance, Cramer's V, Phi, Eta, Eta squared index, Principal Component Analysis). The chi-square test is used to investigate statistical association between variables. This is done primarily by testing the null hypothesis of no association between a set of groups and outcomes for a response. For large values of  $\chi^2$ , this test rejects the null hypothesis in favor of the alternative hypothesis of general association. We use the standard 5% or 0.05 cut-off for defining what is a statistically significant difference. Therefore, an associated  $p$ -value  $< 0.05$ , means that there is significant evidence of an association between variables. The correlation ratio,  $\eta$  (eta), measures the degree of association between the two variables, the independent variable X (categorical) and the dependent variable Y (scale). The square of the correlation ratio,  $\eta^2$  (eta squared) is the differentiation ratio. It measures the proportion of the variation in Y that is associated with membership of the different groups defined by X. Eta squared measures the proportion of the total variance in a dependent variable that is associated with the membership of different groups defined by an independent variable.

#### 4. Results and Discussion

**Hypothesis 1.** *The trust level of logistics enterprises within the enterprise influences the revenue and earnings before tax.*

The first step is to examine whether there is any significant difference in terms of trust level in the categories of revenue and earnings before tax. In order to do that, the variance of each category has to be analyzed. In the case of a significant difference, it is possible to determine the existence of correlations between trust and revenue/earnings before tax. The closeness of correlations can be examined with the Eta index. The variables measuring financial indexes are the categorical variables of the change of revenue compared to the previous year (A4) and the change of earnings before tax compared to the previous year (A5). Internal trust is described with the variables of the judgement of the general trust atmosphere within the enterprise (B12) and its aspects (B13 group of variables). Since these trust variables are partially redundant and partially uncorrelated, it is necessary to group them with factor analysis. In addition, Principal Component Analysis is used with Varimax Rotation Method (KMO: 0.537; Bartlett's test  $p < 0.001$ ; total variance explained: 82.7%). The resulting two factors are shown in Table 1.

**Table 1.** Interpretation of factors.

<b>F1: General Internal Trust</b>	<b>F2: Trust in Subordinates</b>
B12: judgement of general trust	B13_1: trust in direct subordinates
B13_2: trust in the rest of co-workers	B13_3: trust of direct subordinates in the manager
B13_4: trust of direct subordinates in the rest of co-workers	

Source: Authors' own construction.

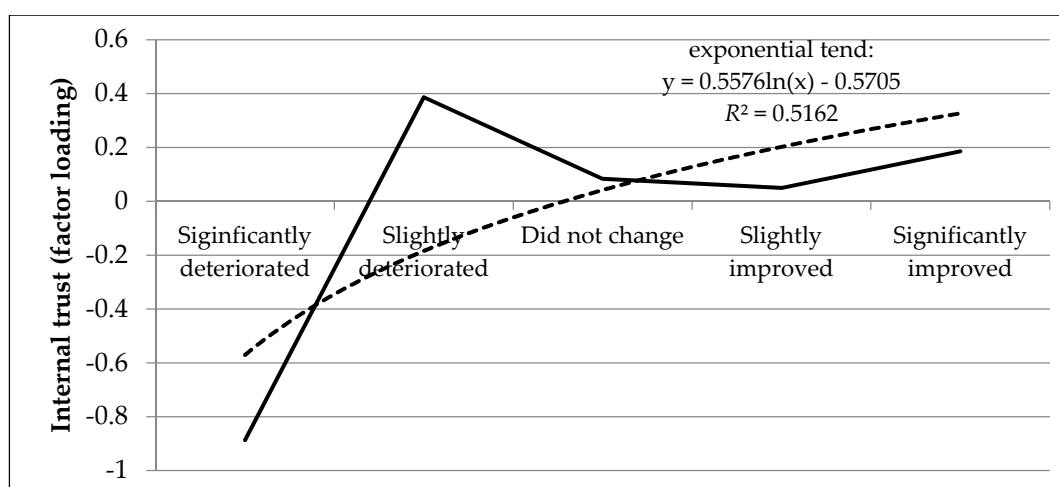
As a next step, it is necessary to see how the standard deviation of F1 (general internal trust) and F2 (trust in subordinates) changes in each category of A4 (change of revenue compared to the previous year) and A5 (the change of earnings before tax compared to the previous year). In order to that, Levene's test is performed to examine the homogeneity of factor variances in variables A4 and A5 (df1, df2—degrees of freedom) (Table 2).

**Table 2.** Results of Levene's test.

Homogeneity Analysis of F1 and F2 in A4				
	Levene's test	df1	df2	Significance
F1: general internal trust	1.581	6	49	0.173
F2: trust in subordinates	2.079	6	49	0.073
Homogeneity Analysis of F1 and F2 in A5				
	Levene's test	df1	df2	Significance
F1: general internal trust	2.281	4	51	0.073
F2: trust in subordinates	4.350	4	51	0.004

Source: Authors' own construction.

The standard deviation values of F2 (trust in subordinates) are non-homogeneous in each category. To measure the closeness of correlation between variables, the Eta index and Eta-squared index are calculated in reference to mixed correlation (correlation between nominal and scale variables). However, since the only difference in variance was observed in the case of F2 (trust in subordinates) at the intersection with A5 (the change of earnings before tax compared to the previous year), Eta is calculated also in relation to this case. The obtained value of Eta was 0.903 and that of Eta-squared was 0.816 regarding the closeness of success and the internal trust in subordinates. The Eta index shows a strong correlation between the two variables, while its square demonstrates that the change of earnings before tax compared to the previous year (A5) explains 81.6% of the variance of internal trust in subordinates (F2). Since the variance of the internal trust factor of F2 is non-homogeneous in the categories of the change of earnings before tax (A5), it is possible to analyze and demonstrate the closeness of the relationship (Figure 7).

**Figure 7.** Correlation between the change of earnings before tax (F5) and the internal trust in subordinates (F2). Source: Authors' own construction.

Based on the performed tests and calculations, the hypothesis is partially correct and the thesis can be formulated which can also be demonstrated with (Figure 7). The logarithmic trend is marked with a dashed curve and its fitting is shown by  $R^2$ .

**Thesis 1.** A higher level of trust in employees on behalf of Hungarian LSPs results in an increase in earnings before tax of these enterprises.

**Hypothesis 2.** The internal trust level established by LSP influences the flexibility of the examined logistics enterprises.

As a first step, it is necessary to observe whether there is any correlation between the level of internal trust and the flexibility of enterprises. If there is, its closeness needs to be measured and its nature observed. In order to do that, the variance of internal trust has to be examined in each flexibility category. If there is a significant difference, a correlation between trust and flexibility can be concluded to exist. The Eta index has to be calculated to measure the closeness of correlation. In order to describe internal trust, the trust factors examined in Hypothesis 1 (F1—general internal trust, F2—trust in subordinates) are used. Flexibility can be described with the variable B9 (What is the typical reaction on behalf of your enterprise if an existing client requires a new (non-routine) and unexpected order? How quickly does your enterprise react to clients' requests?). Since trust expressed with factors is measured on a metric scale and flexibility is measured on a nominal scale, the methodology used in mixed correlations is applied: the variances of trust variables have to be tested in each category of nominal variables and it has to be determined whether or not these variances are homogeneous. If they are not homogeneous, it can be concluded that there is a correlation between flexibility and trust (since variance is not the same in each category; therefore, this variance depends on the given category). In this case, the closeness of correlation can be measured easily with the Eta index used in such correlations (df1, df2—degrees of freedom) (Table 3).

**Table 3.** The results of Levene's test.

Homogeneity Analysis of the Variance of Factors F1 and F2				
	Levene's test	df1	df2	Significance
F1: general internal trust	4.699	3	52	0.006
F2: trust in subordinates	0.938	3	52	0.429

Source: Authors' own construction.

The obtained test results show that general internal trust has different variance in each flexibility category. This means that there is a significant correlation between the two variables ( $p = 0.006$ ) (Figure 8). The mean values of the index of trust in subordinates do not show any significant difference in each flexibility category (ranging in the interval of  $\pm 0.2$ ), while the general internal trust shows a significant difference between each (mainly extreme) category. The parabolic trend curve is very well fitted (98.5%) which shows that the correlation is non-linear.

Consequently, it is possible to calculate the Eta and Eta squared indexes related to the closeness of the already mentioned mixed correlation (between flexibility and general internal trust). These indexes show a strong correlation (Eta: 0.882, Eta squared: 0.777), i.e., 77.7% of the variance of the general trust factor within the enterprise is explained by the given flexibility category which the enterprise belongs to. These results show that there is a significant, strong correlation between the general internal trust established by logistics enterprises and the flexibility of enterprises. However, as was already observed, this correlation is not linear but polynomial, more specifically a parabolic correlation. Consequently, the level of general internal trust is significantly lower in extreme flexibility categories (extremely flexible and extremely inflexible) than in the case of medium-level flexibility.

**Thesis 2.** *The extreme values of flexibility (very low and very high) of Hungarian LSPs are associated with a lower level of general trust within the enterprise, while this general internal trust is higher in the case of enterprises with average level of flexibility (Figure 8).*

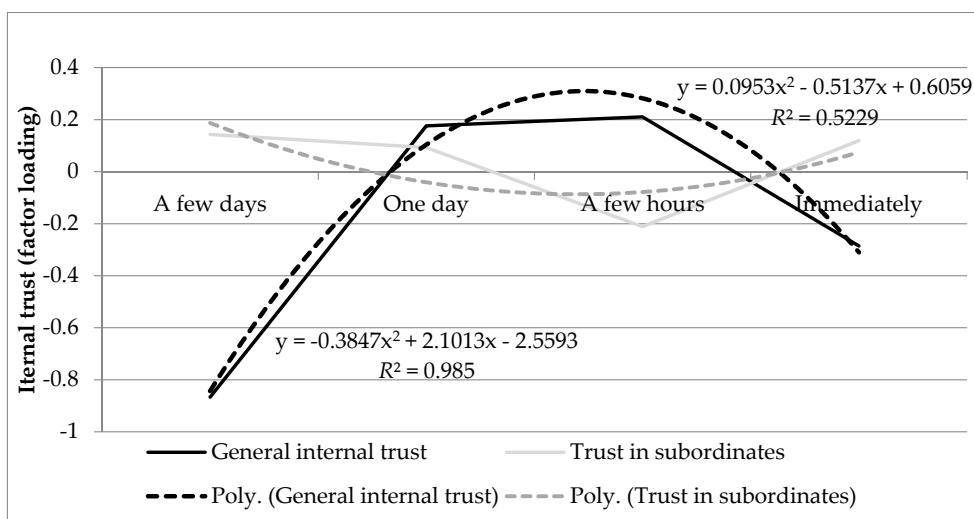


Figure 8. Trust level in each flexibility category. Source: Authors’ own construction.

**Hypothesis 3.** *The trust level of the business environment created by the head manager of logistics enterprises influences the revenue and earnings before tax, as well as the flexibility of the examined enterprises.*

As a first step, it is necessary to examine whether there is any correlation between the trust level of the business environment and the financial and flexibility indexes of enterprises. If there is, their closeness and nature should be analyzed. Two variables were used in the questionnaire to measure the trust level of the business environment established by the head manager (B14—managerial role, B15—managerial style). The variables measured on the nominal scale cannot be cumulated in any way, since they do not change together; therefore, there is no correlation between them. For this reason, these variables have to be handled independently of each other. The same refers to the variables measuring the change of revenue (A4) and the change of earnings before tax (A5) and they also have to be handled separately (Table 4). Although the correlation between these variables is significant ( $p = 0.005$ ) and moderately strong (Cramer’s V: 0.452), it is still not enough for reduction, as they are not metric variables. As with the previous hypothesis, flexibility is measured with the variable B9 (flexibility).

Table 4. The closeness of association.

		B14 (Managerial Role)	B15 (Managerial Style)
A4 (change of revenue)	Phi significance	0.450	0.920
	Cramer’s V significance	0.450	0.920
A5 (change of earnings before tax)	Phi significance	0.342	0.742
	Cramer’s V significance	0.342	0.742

Source: Authors’ own construction.

Consequently, the statement in the hypothesis has to be tested in four different aspects between A4 (change of revenue) and A5 (change of earnings before tax), as well as B14 (managerial role) and B15 (managerial style). Since all variables are measured on the nominal scale, the index numbers of the classic association closeness can be used to verify the correlation between them. The closeness indexes are not significant in any of the examined cases (Table 4); therefore, based on the responses to the questionnaire, there is no correlation between the analyzed variables.

As a conclusion, there is clearly no correlation between the indexes of earnings before tax and the level of environmental trust. As regards the correlation between flexibility and environmental

trust indexes, since the indexes measured on a metric scale were transformed into nominal ones, the existence of correlation can be examined between quality criteria (those measured on a nominal scale). As a consequence, the classic association closeness index numbers are used as a basis again. There is a close correlation between the trust level of a business environment and flexibility (Table 5). The Phi index shows a strong correlation, while Cramer's V shows a moderately strong correlation.

**Table 5.** The closeness of association between managerial style and flexibility.

		Value	Estimated Significance
Closeness of association correlation	Phi	0.847	0.048
	Cramer's V	0.489	0.048
Number of cases to be analyzed		51	

Source: Authors' own construction.

None of the indexes show significant correlation between managerial style (B15) and flexibility (B9) ( $p = 0.496$ ), (Table 6).

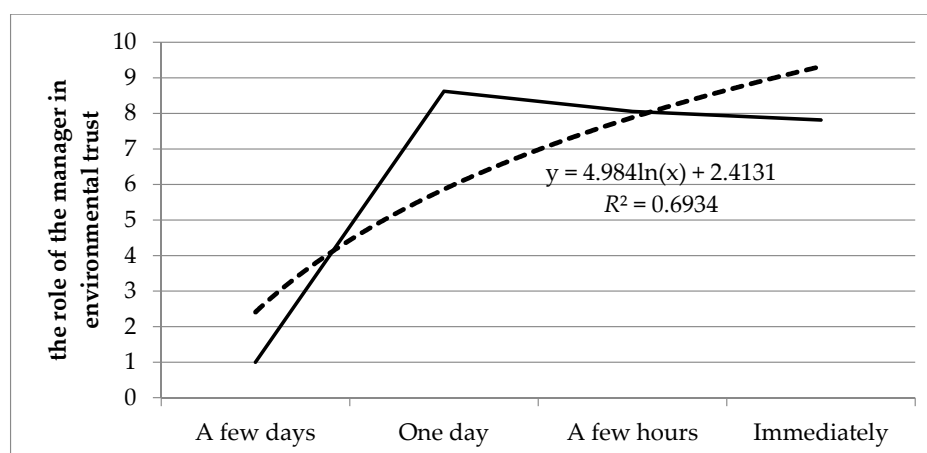
**Table 6.** The closeness of association between managerial style and flexibility.

		Value	Estimated Significance
Closeness of association correlation	Phi	0.584	0.496
	Cramer's V	0.337	0.496
Number of cases to be analyzed		51	

Source: Authors' own construction.

It can be concluded that there is no significant correlation between the trust level of the business environment established by the head manager of Hungarian logistics enterprises and the revenue and earnings before tax of the examined logistics enterprises; therefore, the first part of the hypothesis cannot be confirmed. On the contrary, a moderately strong positive correlation was found between the trust level of the business environment established by the head manager of the examined logistics enterprises and the flexibility of these enterprises. This means that the more significant the role of the head manager is in establishing a trustful atmosphere, the more flexible is the given organization (Figure 9).

**Thesis 3.** Higher level of environmental trust results in a higher level of flexibility in the case of logistics enterprises.



**Figure 9.** The role of the manager in establishing a trustful atmosphere and relationship with flexibility. Source: Authors' own construction.



Results can be summarized with the following findings. The increase in levels of trust among the employees of LSPs can contribute to an increase in the earnings before tax of the companies. The level of general trust within the enterprise has an effect on flexibility: the lower and higher categories of flexibility are related to low levels of general trust, as opposed to the mean categories of flexibility which are related to high levels of general trust. In logistics, a higher level of flexibility is associated with a higher level of environmental trust.

As a result, LSPs are expected to establish business solutions which could help them find the proper way forward in order to maintain their competitiveness and increase their market share. New findings can be achieved from the existing dataset by further developing the research methodology in order to make comparison analyses of LSPs in neighboring countries. In this way, new findings may lead to a more detailed understanding of LSPs. Nevertheless, the study is limited to respondents from Hungary, which makes it difficult to generalize findings to other countries. Replication of this study in other countries would improve the generalizability of the results. Another limitation of this research is the low response rate among LSPs. As regards the more distant future, this research, the previous research findings and the trends to be drawn lead to the conclusion that, potentially, the future of LSPs lies not only in dismantling the borders between LSPs and those using these services but even in the transformation of LSPs into 'organizations sans frontiers', to form a so-called LSP supply chain.

## 5. Conclusions

The representative, primary and empirical research conducted among the LSPs registered in Hungary confirmed that the examination of level of trust as a success factor is necessary. It can be assumed that the examined Hungarian logistics enterprises have a significant mediatory role in international logistics activities and provide vertically integrated logistics services to their partners, taking into consideration their scale and the wide spectrum of their services. As a result of the wide-ranging research on trust and the results of the literature review and the empirical research conducted among Hungarian LSPs, it was shown that the general trust level positively influences not only the relationships and collaboration of individuals in society and the management of enterprises in general but also the earnings before tax of the logistics service providers who answered the questionnaire. Moreover, of the major factors of performance perceived by the buyer [56], environmental trust also has a significant impact on flexibility. It is indisputable that the role of trust increased in importance following the global financial and economic crisis in 2008.

Higher levels of trust in employees in the examined Hungarian LSPs results in an increase in earnings before tax. As a consequence, it is important to focus on how to increase the level of trust of co-workers in the logistics enterprises, as the trust level has a direct positive influence on the earnings before tax. Based on these findings it is practical to choose the proper managerial tools (inclusion, deputation, advertising an open door program etc.) in order to increase the level of trust of employees). One possible suggestion is that, bearing in mind the appropriate company size, by measuring and maintaining (and possibly increasing) the internal level of confidence (i.e., related to staff), corporate executives can provide more efficient continuous development and growth, in accordance with the size of the client company in the market.

The extreme values of flexibility (very low and very high) of Hungarian LSP enterprises are associated with a lower level of trust within the enterprise, while this trust level is higher in enterprises with an average level of flexibility. The extreme values of flexibility (very low and very high) can probably be associated with the scale of enterprise, i.e., a small change in the staff numbers shows a higher degree of flexibility thanks to the owners engaged in the enterprise operation and the small number of enthusiastic employees. On the contrary, a very low degree of flexibility is assumed to be associated with enterprises with a large number of employees. Medium-sized enterprises have higher trust levels. Managers of service provider enterprises can establish economies of scale more effectively by measuring and increasing the level of trust within the organization.

A higher level of environmental trust results in a higher level of flexibility in the case of logistics enterprises. Striving for partnership in the relationship between a client and a logistics service provider results in more communication and closer collaboration, which usually yields win-win situations. The extent of communication, good performance, availability of LSPs and the compliance with payment conditions increase the level of trust between partners. During the establishment of a high level of trust, partners acquire comprehensive knowledge about each other's activities and procedures. The detailed knowledge of each other and the timeliness of information results in a high level of flexibility in their relationship. When making efforts to establish a partnership between clients and subcontractors, logistics enterprises should strive for detailed knowledge of each other (while they also achieve a higher level of trust), leading to a higher level of flexibility.

The results of the methods used in the underlying investigations following the hypotheses show clear and concise conclusions in the scientific publication. The results of the research carried out by the companies in the examined service sector are instructive and some of the results can be extended to the members of the supply chain, thanks to the fact that the number of enterprises in the supply chain is typical for the size of companies included in the sample and is general for both the SME sector and also for logistics service providers. Hungary is already witnessing competition between international logistics service providers.

The outcomes of the research emphasize and justify the importance of trust—in general terms, too—in the life of companies. Trust in employees (see, for example, Employer Branding, which has emerged as a new trend in recent years) and pre-tax profit, as well as trust between companies and flexibility as a success factor, have also shown positive evidence for the key role played by trust. As a suggestion in relation to the search for the appropriate size of the firm, by measuring the level of trust within the firm (related to staff) and maintaining its level (or increasing it further), the leading management of the firm can, by ensuring effective, continuous development and growth, increase the economic size of service firms.

Existing datasets can be used for the further development of the research methodology, in order to make comparison analyses of LSPs in other countries in Europe or outside Europe, leading to a more detailed understanding of LSPs. The study is limited to respondents from Hungary, which makes it difficult to generalize findings to other countries. Replication of this study in other countries would improve the generalizability of the results, preferably in a country outside Europe. Another limitation of this research is the low response rate among LSPs. As regards the more distant future, this research, the previous research findings and the trends to be drawn lead to the conclusion that, potentially, the future of LSPs lies not only in dismantling the borders between LSPs and those using these services but even in the transformation of LSPs to form a so-called LSP supply chain. The future of the LSPs will be determined by the interaction of the service provider and those using these services.

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