Article

Expectations of Production Companies Operating in Poland towards Suppliers with Regards to Implementation of the Sustainability Concept

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Abstract: It can be observed that manufacturing companies (especially Original Equipment Manufacturers (OEMs)), by promoting the implementation of the sustainability concept among their suppliers, refer to the requirements included in international standards which constitute guidelines for the implementation of quality, environmental and safety management systems. The effective implementation of these guidelines of the standards are often subject to initial and periodic evaluation as well as self-evaluation by suppliers. It can be seen that OEMs not only require effective implementation of quality, environmental and security management systems, but also offer a supplier a development program to improve their processes and products. The aim of the article was to try to define the expectations of production companies towards their suppliers regarding the implementation of the sustainability concept. The study presents the results of empirical research conducted with the computer-assisted telephone interviewing (CATI) technique in medium and large manufacturing companies operating in Poland. The results of these studies indicate the important role of the requirements included in international management standards as the expectations of manufacturing companies towards suppliers. The surveyed manufacturing companies focus in particular on reducing the risk of noncompliance and limiting the negative environmental impact by suppliers on the processes and products.

Keywords: supplier requirements; sustainable expectations for suppliers; supplier development programs

1. Introduction

Production enterprises (especially Original Equipment Manufacturers (OEMs)) frequently have many of the requirements for their suppliers relating to the concept of sustainability [1–3]. The latest editions of these standards are based on the risk management concept. Many of the requirements relating to the concept of sustainability are included in the guidelines of international quality, environmental, health and safety management standards issued by the International Organization for Standardization (ISO). These guidelines focus on assuring the safety of products and processes as well as reducing the negative impact on the environment by the organization. Many companies take these requirements into account when conducting the initial and periodic assessment of suppliers.

Supplier evaluation is one of the important operational decisions of strategic importance for the success of supply chain activities and processes. An indication of the expectations that manufacturing companies have in this respect, supported by empirical research, can be a guideline and a helpful element for managers and decision makers on how to shape their business in a changing environment. The aim and main assumption of
the presented considerations was to determine the expectations of production companies, in terms of meeting the principles of sustainable development by their suppliers.

2. Literature Review

Both the selection of a supplier and its evaluation from the environmental point of view require different actions in terms of organization, strategy and management of the organization or the supply chain. The supplier selection procedure consists of many elements and steps. The selection is preceded by an extensive screening and the establishment of appropriate criteria. The most important elements of this procedure are presented in Figure 1.

Figure 1. Supplier selection procedure–sustainable criteria approach. Source: own elaboration.

The subject has been widely described in the literature; the main areas of relationships and research interest in the environmental development of suppliers have been identified [4]. The system for evaluating suppliers must be based on a balanced choice of supplier, defined as a traditional choice based on economic aspects but including in addition environmental aspects and social evaluation criteria [5]. The issue has already been
widely described in the literature, and the integration of environmental aspects in supplier assessment is gaining importance [6,7]. The problem itself is described from a theoretical point of view, considering social and environmental aspects, including different aspects in the decision-making process, complementing the managerial aspects with multi-criteria methods in the study of the phenomenon, whether to relate the issue to sustainable innovation [8–12]. The ability to apply environmental management principles is demonstrated by systems and processes that enable the organization to respond in a timely and robust manner to the environmental problems associated with their activities [13]. Actions that can be identified as supplier-related include the integration of environmental considerations into supply chain operations and processes (e.g., assessment of suppliers’ environmental performance); working with supply chain partners to reduce the ecological footprint of the supply chain employing staff trained in environmental management [14–16]. The existence of an environmental management system is undoubtedly an important element; having certificates that confirm the adoption of standard practices and measurement scales for assessing the environmental impact of the company (e.g., ISO 14001) [17]. Creating supplier development programs, including assessing them from an environmental perspective, can strengthen partners’ resources (both processes and assets), which are usually rare, unique and very valuable. This can be an element of competitive advantage and a starting point for long-term cooperation. The inclusion of additional environmental and social factors in supplier assessment is referred to in the literature as sustainable supplier assessment and selection [18–20]. A particularly important element of expectations towards suppliers regarding the implementation of the sustainability concept is to guarantee the technical quality of products. Providing technical quality of products by suppliers requires strict compliance with legal requirements relating to the safety quality of the product and processes (which are included in European Union directives and technical standards). Compliance with legal requirements by suppliers is particularly important when they are supervising operational processes (such as designing, purchasing, manufacturing, delivering the product to the customer) [21,22]. The requirements for suppliers focus on the reliability of products and their environmental performance (related to reducing the negative environmental impact of the processes of production, delivery, use, maintenance and after use, e.g., through recycling or disposal). Ensuring the safety and environmental performance of products is of particular importance in the case of new suppliers (raw materials, materials, parts or infrastructure elements). That is why new suppliers are often subjected to an extremely rigorous initial assessment. This assessment concerns the innovative capacity and the ability of suppliers to control the quality of the product (acceptance of deliveries, control of semi-finished products and manufacturing processes, control of the finished product). To increase the effectiveness of the safety and environmental performance of products, many buyers on the business-to-business (B2B) market undertake joint research and development work with their suppliers [23,24]. Unified requirements for suppliers in this area are included in the international organizational standards ISO series 14000 [25]. ISO organizational standards define important guidelines for the management of operational processes and resources (human, infrastructure, environment). Effective implementation of these guidelines by suppliers allows them to meet customer expectations in terms of product quality assurance and improvement of operational processes [26]. It can be seen that OEMs expectations towards suppliers are increasingly focused on reducing their negative impact on the environment. For this reason, in order to meet these expectations, suppliers implement an environmental management system compliant with the guidelines contained in the ISO 14001 standard. This system is based on the identification of environmental aspects. Environmental aspects are input elements to processes (such as materials, water, energy, devices) and output elements (such as waste, emissions, sewage). According to the assumptions of the sustainability concept, environmental aspects should be limited [27–34]. Increasingly, OEMs promoting the sustainability concept among their stakeholders require their partners in the supply chain to introduce a health and safety management system, compliant with ISO 45001 (which replaced the guidelines contained.
in OHSAS 18001) [35,36]. The requirements of this standard are to cover workplaces both within the company and between companies, the prioritizing of preventive measures, the management of change, purchasing, suppliers and outsourcing. The main assumption of an effectively implemented occupational health and safety management (OH&S) system is to reduce the risk of physical, chemical, biological and psychological threats [37]. These threats are related to the possibility of accidents at work and occupational diseases. The implementation of this system is based on the identification of risk and the introduction of health and safety improvement programs. The effectiveness of the implementation of these programs depends on the provision of appropriate resources (safe infrastructure and workplaces) and equipment (individual and collective protection), awareness-building as well as employee involvement in the improvement of health and safety conditions at work [38]. An important element of this system is informing employees about the risks associated with their work through training (on-the-job, periodic) and reacting during an emergency situation (e.g., training in simulated undesirable situations, i.e., explosion, fire or chemical leak). Suppliers must take special supervision over the risks such as the use of flammable liquids, compressed gases in the production processes as well as the storage and transport of dangerous products. OEMs support the activities of suppliers in the implementation of quality, environmental, health and safety management systems. This support is provided through supplier development programs through training and consulting [39–45]. The implementation of these programs is systematically assessed by analyzing the goals achieved in terms of improving the safety of products and processes, as well as limiting the negative impact on the environment [46–50].

3. Materials and Methods

The subject of the research conducted was to define the expectations of production companies towards their suppliers regarding the implementation of the sustainability concept. The research was conducted between October and November 2019 using the Computer-Assisted Telephone Interview (CATI) technique. The research covered 150 producers (employing over 49 people) who were suppliers for enterprises from the automotive, electromechanical and chemical sectors operating in the Polish B2B market. All companies participating in the study had an implemented quality management system compliant with the guidelines contained in the ISO 9001 standard. Almost half of the surveyed economic entities (47.33%) were enterprises with foreign capital (including large international concerns with global activity). The study was commissioned to a specialized research agency that conducted a targeted selection of companies registered in the Bisnode database, which is a business directory search platform. The objectives of the research were to determine the importance of expectations of companies towards their suppliers regarding the implementation of the sustainability concept such as:

- reduction of product hazard risk;
- improvement of awareness and involvement of the supplier’s personnel;
- improvement of safety at workplaces;
- improvement of product innovation;
- reduction of negative impact of processes on the environment;
- improvement of standardization;
- reduction of risk of nonconformity in operational processes;
- reduction of negative impact of products on the environment.

4. Results and Discussion

The expectations of production companies towards their suppliers regarding the implementation of the sustainability concept were assigned a rank on a scale from one (the least important criterion) to five (the most significant). The results of the calculated average (ranks) are presented in Tables 1–5. The results of the conducted research indicate that the main producers’ expectations towards their suppliers regarding the implementation of the sustainability concept were: to reduce the risk of non-compliance in operational processes,
to reduce the risk of hazards associated with the product, to limit the negative impact of products on the environment, to limit the negative impact of processes on the environment and to improve the standardization of activities. Detailed analyses of the results of the conducted research were formed by making a comparison between the segments (of the surveyed companies) depending on the capital (Polish and foreign), size (medium- and large-sized enterprises), the sector (automotive, electromechanical, chemical), and the implemented process improvement tool in the enterprise (environmental management system complies with ISO 14001, Toyota Production System, Lean Management projects). As shown in Table 1, there are no significant differences between the indications of enterprises with Polish and foreign capital. Medium-sized organizations (employing 50–250 people) pay more attention to reducing the risk of noncompliance in operational processes, limiting the negative impact of processes on the environment improving the standardization of activities as well as improving work safety. In turn, the large organizations pay more attention to reducing the risk of hazards associated with the product, limiting the negative impact of products on the environment, Increasing the awareness and involvement of staff in process improvement and improving product innovation. Detailed comparative analyses show in Table 2 that enterprises from the automotive sector expect more from suppliers than companies from other analyzed sectors: a reduction of the risk of noncompliance in operational processes, a reduction of the risk of hazards associated with the product, a limit to the negative impact of processes on the environment, an improving of the standardization of activities as well as an increase in awareness and involvement of staff in process improvement. On the other hand, enterprises from the electromechanical sector focus more than business entities in other segments on limiting the negative impact of products on the environment and improving product innovation. It can be seen that the expectations of medium-sized companies towards suppliers focus on organizational activities and limiting the negative impact of processes on the environment. On the other hand, large enterprises expect their supplier to reduce negative impact of products on the environment. It can also be seen that manufacturers from the automotive sector have the most demanding expectations towards their suppliers regarding the implementation of the sustainability concept. In this sector, expectations for safety and environmental improvement are more enforced on partners in the supply chain.

Table 1. The expectations of companies towards their suppliers regarding the implementation of the sustainability concept (general results and a comparison between the segments depending on capital and the number of employees, average).

| Expectations                                           | General n = 150 | Capital | Number of Employees |
|--------------------------------------------------------|----------------|---------|---------------------|
|                                                        |                | Polish n = 79 | Foreign n = 71 | 50–250 n = 65 | 251–850 n = 85 |
| Reducing the risk of noncompliance in operational processes | 4.41           | 4.30     | 4.21               | 4.14         | 4.07           |
| Reducing the risk of hazards associated with the product | 4.39           | 4.30     | 4.21               | 4.14         | 4.07           |
| Limiting the negative impact of products on the environment | 4.30           | 4.30     | 4.21               | 4.14         | 4.07           |
| Limiting the negative impact of processes on the environment | 4.23           | 4.24     | 4.19               | 4.07         | 4.07           |
| Improving the standardization of activities             | 4.21           | 4.24     | 4.19               | 4.07         | 4.07           |
| Increasing the awareness and involvement of staff in process improvement | 4.14           | 4.13     | 4.16               | 4.07         | 4.07           |
| Improving product innovation                            | 4.07           | 4.01     | 4.14               | 4.06         | 4.09           |
| Improving work safety                                  | 3.72           | 3.67     | 3.77               | 3.74         | 3.70           |

Source: Results of empirical study, 2019.
Table 2. The expectations of companies towards their suppliers regarding the implementation of the sustainability concept (comparison between the segments depending on sector, average).

| Expectations                                      | General $n = 150$ | Automotive $n = 63$ | Electromechanical $n = 36$ | Chemical $n = 51$ |
|--------------------------------------------------|-------------------|--------------------|--------------------------|------------------|
| Reducing the risk of noncompliance in operational processes | 4.41              | 4.53              | 4.30                     | 4.33             |
| Reducing the risk of hazards associated with the product | 4.39              | 4.47              | 4.39                     | 4.26             |
| Limiting the negative impact of products on the environment | 4.30              | 4.32              | 4.33                     | 4.24             |
| Limiting the negative impact of processes on the environment | 4.23              | 4.29              | 4.12                     | 4.24             |
| Improving the standardization of activities       | 4.21              | 4.29              | 4.12                     | 4.17             |
| Increasing the awareness and involvement of staff in process improvement | 4.14              | 4.24              | 4.21                     | 3.95             |
| Improving product innovation                      | 4.07              | 4.14              | 4.18                     | 3.90             |
| Improving work safety                             | 3.72              | 3.80              | 3.58                     | 3.71             |

Source: Results of empirical study, 2019.

Table 3. The expectations of production companies towards their suppliers regarding the implementation of the sustainability concept (general results and a comparison between the segments depending on the implemented process improvement tool in the enterprise, average).

| Expectations                                      | Implemented Process Improvement Tool in the Enterprise
|--------------------------------------------------|-----------------------------------|
|                                                  | ISO $9001$ $n = 150$ | ISO $14001$ $n = 76$ | TPS $n = 39$ | LM $n = 24$ |
| Reducing the risk of noncompliance in operational processes | 4.41              | 4.35              | 4.45 | 4.32 |
| Reducing the risk of hazards associated with the product | 4.39              | 4.39              | 4.50 | 4.64 |
| Limiting the negative impact of products on the environment | 4.30              | 4.34              | 4.41 | 4.23 |
| Limiting the negative impact of processes on the environment | 4.23              | 4.30              | 4.50 | 4.36 |
| Improving the standardization of activities       | 4.21              | 4.25              | 4.36 | 4.32 |
| Increasing the awareness and involvement of staff in process improvement | 4.14              | 4.17              | 4.50 | 4.45 |
| Improving product innovation                      | 4.07              | 4.01              | 4.32 | 4.41 |
| Improving work safety                             | 3.72              | 3.86              | 4.14 | 4.23 |

Source: Results of empirical study, 2019.
Table 4. The expectations of companies towards their suppliers regarding the implementation of the sustainability concept (general results responses of enterprises that have implemented an environmental management system compliant with the guidelines contained in ISO 14001 and a comparison between the segments depending on capital, and the number of employees; average).

| Expectations                                      | ISO 14001 | Capital | Number of Employees |
|--------------------------------------------------|-----------|---------|---------------------|
|                                                  | n = 76    | Polish  | Foreign             | 50-250 | 250-600 |
|                                                  |           | n = 36  | n = 40              |        |         |
|                                                  |           |         |                     |        |         |
| Limiting the negative impact of products on the environment | 4.58      | 4.56    | 4.60                | 4.46   | 4.64    |
| Limiting the negative impact of processes on the environment | 4.54      | 4.45    | 4.63                | 4.67   | 4.49    |
| Reducing the risk of hazards associated with the product | 4.53      | 4.51    | 4.55                | 4.46   | 4.56    |
| Reducing the risk of noncompliance in operational processes | 4.49      | 4.56    | 4.43                | 4.54   | 4.47    |
| Improving the standardization of activities      | 4.43      | 4.46    | 4.40                | 4.58   | 4.36    |
| Increasing the awareness and involvement of staff in process improvement | 4.29      | 4.26    | 4.33                | 4.21   | 4.33    |
| Improving product innovation                     | 4.14      | 4.00    | 4.28                | 3.88   | 4.25    |
| Improving work safety                            | 3.97      | 3.90    | 4.05                | 3.96   | 3.98    |

Source: Results of empirical study, 2019.

Table 5. The expectations of production companies towards their suppliers regarding the implementation of the sustainability concept (general results responses of enterprises that have implemented an environmental management system compliant with the guidelines contained in ISO 14001 and a comparison between the segments depending on sector, average).

| Expectations                                      | ISO 14001 | Sector |
|--------------------------------------------------|-----------|--------|
|                                                  | n = 76    |        |
|                                                  |           | Automotive | Electromechanical | Chemical |
|                                                  |           | n = 33   | n = 21            | n = 22   |
|                                                  |           |         |                   |         |
| Limiting the negative impact of products on the environment | 4.58      | 4.52    | 4.71               | 4.56    |
| Limiting the negative impact of processes on the environment | 4.54      | 4.55    | 4.48               | 4.60    |
| Reducing the risk of hazards associated with the product | 4.53      | 4.64    | 4.38               | 4.52    |
| Reducing the risk of noncompliance in operational processes | 4.49      | 4.58    | 4.57               | 4.32    |
| Improving the standardization of activities      | 4.43      | 4.39    | 4.52               | 4.40    |
| Increasing the awareness and involvement of staff in process improvement | 4.29      | 4.30    | 4.48               | 4.12    |
| Improving product innovation                     | 4.14      | 4.06    | 4.33               | 4.08    |
| Improving work safety                            | 3.97      | 4.03    | 3.95               | 3.92    |

Source: Results of empirical study, 2019.

When analyzing the responses of enterprises that have implemented process improvement tools, it can be seen that entities that use elements of the Toyota Production System (TPS) focus heavily on the expectations of production companies towards their suppliers regarding the implementation of the sustainability concept. The suppliers are primarily expected to reduce the risk of noncompliance in operational processes, to limit the negative impact of products on the environment, to limit the negative impact of processes on the
environment, to improve the standardization of activities as well as to increase the awareness and involvement of staff in process improvement. Furthermore, organizations that implement Lean Management (LM) projects clearly express expectations towards suppliers in terms of their reduction of the risk of hazards associated with the product and their improvement of product innovation as well as improving work safety. The use of process improvement tools (such as environmental management system compliant with ISO 14001, the Toyota Production System, Lean Management projects) has an impact on higher expectations towards their suppliers regarding the implementation of the sustainability concept. Enterprises that use these tools can therefore exert more influence over their suppliers regarding the implementation of the sustainability concept.

A more detailed analysis was conducted in the segment of companies that have implemented an environmental management system with ISO 14001, which accounted for slightly more than half of the surveyed group. Tables 4 and 5 show that, in terms of expectations towards suppliers regarding the implementation of sustainability, these companies focus in particular on limiting the negative impact of products on the environment, limiting the negative impact of processes on the environment, reducing the risk of hazards associated with the product, reducing the risk of noncompliance in operational processes, improving the standardization of activities as well as increasing the awareness and involvement of staff in process improvement. Detailed comparative analyses were conducted within this group of enterprises between the segments depending on capital (Polish and foreign), the number of employees (medium- and large-sized enterprises) and the sector (automotive, electromechanical, chemical). A detailed analysis of the responses indicates that enterprises with foreign capital that have implemented an environmental management system very clearly, in their expectations towards suppliers in terms of implementing the sustainability concept, focus on limiting the negative impact of products on the environment, limiting the negative impact of processes on the environment, reducing the risk of hazards associated with the product, increasing the awareness and involvement of staff in process improvement, improving product innovation as well as improving work safety. In turn, companies with domestic capital pay attention mainly to limiting the negative impact of product on the environment, improving the standardization of activities, reducing the risk of noncompliance in operational processes and improving the standardization of activities. Medium-sized organizations (employing 50–250 people) more than large enterprises (employing over 250 people) pay attention to limiting the negative impact of processes on the environment, reducing the risk of noncompliance in operational processes, improving the standardization of activities.

In turn, the large organizations more than medium-sized ones focus on limiting the negative impact of products on the environment, reducing the risk of hazards associated with the product, increasing the awareness and involvement of staff in process improvement, improving product innovation. Detailed comparative analyses show that enterprises from the automotive sector pay more attention than companies from other analyzed sectors to a reduction of the risk of hazards associated with the product, a reduction of the risk of noncompliance in operational processes and an improvement of work safety. On the other hand, enterprises from the electromechanical sector focus more than business entities in other segments on limiting the negative impact of products on the environment, improving the standardization of activities, increasing the awareness and involvement of staff in process improvement as well as on improving product innovation, whereas the expectations of economic entities from the chemical sector mainly concern limiting the negative impact of processes on the environment.

For analyses related to relationships between variables, a linear correlation coefficient was chosen that falls in the range $[1, -1]$, where 1 indicates a strong positive correlation (the variables react in the same direction) and $-1$ a strong negative correlation (the variables react in the opposite direction). In case of 0, it should be indicated that there is no correlation.
In order to assess the level of correlation between variables, the following ranges are assumed:
- <0.2 no dependence
- 0.2–0.4 weak correlation
- 0.4–0.7 moderate dependence
- 0.7–0.9 quite strong dependence
- >0.9 very strong dependence [51].

By examining the correlations between the variables, including compiling the data together and looking for correlations between the sector and the expectations of individual companies on the factors asked in the survey. The data in the table show that there is a lack of correlation (strong negative correlation) or weak correlation between expectations and type of capital, sector, number of employees, or implemented environmental management systems in accordance with the guidelines of ISO 14001. Moderate dependence and quite strong dependence can be seen as improving the standardization of activities and reducing the risk of non-compliance in operational processes or reducing the negative impact of products on the environment; reducing the negative impact of processes on the environment and improving the standardization of activities, or reducing the negative impact of products on the environment—but these are not strong correlations (weak correlation), they can be described as fairly strong relationships. This means that they are correlated with each other, but it cannot be concluded from the correlation that they influence each other.

Analysis of variance (ANOVA) was used to confirm the hypotheses related to the significance or lack thereof—for manufacturing companies by sector and in general in the context of the impact on the expectations studied (hypotheses and their verification Table 6). This analysis and its results allow us to determine whether there are significant differences using each of the surveyed elements; a significance level of 0.05 was adopted. Conducting a one-way variance indicates (Table 7) that only in one case a statistically significant variable was observed, which indicates that the responses of the surveyed objects differed from each other in a statistically significant manner ($p$-value < 0.05, and the largest difference between the F calculated by ANOVA and the theoretical F value from the Snedecor distribution—grey cells in Table 8). In terms of improving occupational safety at the supplier, in the chemical sector, the results of the analysis show that there were the most differences between the respondents in terms of this expectation. In the remaining studied cases, the hypotheses were verified negatively, which means that the studied subjects responded similarly in this regard.

Table 6. A study of manufacturing companies’ expectations of suppliers—statistical significance of the indicated factors.

| Sector                        | Automotive | Electromechanical | Chemical |
|-------------------------------|------------|-------------------|----------|
| H0–Expectations of manufacturing companies towards suppliers regarding the reduction of product hazard risk play an important role (sectoral breakdown). | –          | –                 | –        |
| H1–Expectations of production companies towards suppliers, concerning improvement of awareness and involvement of the supplier’s personnel, play an important role (sector split). | –          | –                 | –        |
| H3–Expectations of production companies towards suppliers concerning improvement of work safety at the supplier’s side play an important role (sector breakdown). | –          | –                 | +        |
| H4–Expectations of production companies towards suppliers concerning the improvement of safety at work play an important role (sectoral breakdown). | –          | –                 | –        |
| H5–Expectations of production companies towards suppliers concerning improvement of product innovation play an important role (sectoral breakdown). | –          | –                 | –        |
| H6–Expectations of production companies towards suppliers concerning the reduction of negative impact of processes on the environment play an important role (sectoral breakdown). | –          | –                 | –        |
Table 6. Cont.

| Sector | Hypothesis Verified–Positive (+), Negative (−) |
|--------|-----------------------------------------------|
|        | Automotive | Electromechanical | Chemical |
| H7–Expectations of production companies towards suppliers concerning improvement of standardization of activities play an important role (sectoral breakdown). | − | − | − |
| H8–Expectations of production companies towards suppliers concerning the reduction of risk of nonconformity in operational processes play an important role (sectoral breakdown). | − | − | − |
| H9–Expectations of production companies towards suppliers concerning the reduction of negative impact of products on the environment play an important role (sectoral breakdown). | − | − | − |

Source: own elaboration.

Table 7. ANOVA analysis of selected factors and expectations of manufacturing companies towards suppliers–sectoral breakdown.

| Expectations                                                                 | General | Sector | p-Value | F      | Automotive | p-Value | F      | Electromechanical | p-Value | F      | Chemical | p-Value | F      |
|----------------------------------------------------------------------------|---------|--------|---------|--------|------------|---------|--------|-------------------|---------|--------|----------|---------|--------|
| Reducing the risk of product hazards and involvement of supplier personnel  | 3.88 × 10⁻⁶⁶ | 3.874884 | 1.16 × 10⁻⁵⁶ | 3.921478 | 7.43 × 10⁻²⁶ | 3.98856 | 8.43 × 10⁻¹⁴ | 3.946876 |
| Improving workplace safety                                                  | 3.47 × 10⁻⁵⁵ | 3.874884 | 1.75 × 10⁻⁵² | 3.921478 | 6.42 × 10⁻²⁰ | 3.98856 | 1.42 × 10⁻⁸ | 3.946876 |
| Improving product innovation                                                | 1.16 × 10⁻³³ | 3.874884 | 3.27 × 10⁻³⁸ | 3.921478 | 3.56 × 10⁻¹⁸ | 3.98856 | 0.000313 | 3.946876 |
| Reducing negative impact of processes on environment                        | 4.01 × 10⁻⁴⁹ | 3.874884 | 8.22 × 10⁻⁴⁸ | 3.921478 | 1.35 × 10⁻¹⁸ | 3.98856 | 2.18 × 10⁻⁶  | 3.946876 |
| Improving standardization of activities                                      | 6.71 × 10⁻⁵² | 3.874884 | 2.5 × 10⁻⁴⁴ | 3.921478 | 1.06 × 10⁻¹⁴ | 3.98856 | 1.91 × 10⁻¹¹ | 3.950587 |
| Reducing the risk of nonconformity in the operating processes               | 2.02 × 10⁻⁵⁴ | 3.874884 | 6.87 × 10⁻⁵¹ | 3.921478 | 1.06 × 10⁻¹⁴ | 3.98856 | 2.18 × 10⁻¹¹ | 3.946876 |
| Reducing negative impact of products on environment                         | 1.38 × 10⁻⁵⁹ | 3.874884 | 2.82 × 10⁻⁵⁶ | 3.921478 | 4.07 × 10⁻¹⁷ | 3.98856 | 2 × 10⁻¹¹  | 3.946876 |
| Source: own elaboration.                                                     |         |         |         |        |            |         |        |                   |         |        |          |         |        |

Conclusions from the results of the study indicate that the expectations towards suppliers to increase the environmental performance of processes in accordance with ISO management standards show varying correlations and linkages, but they are related in their entirety to ecological requirements. These expectations towards suppliers are important for all surveyed organizations. No significant differences can be identified between the surveyed manufacturers in terms of company size, sector, origin of capital, or implemented management system in accordance with ISO international standards. The surveyed companies showed similar or the same expectations towards suppliers in terms of implementing the sustainability concept. Lack of significant differences between the researched manufacturers also results from their expectations towards suppliers in terms of implementation of management systems compliant with requirements of international standards ISO 9001 or ISO 14001. Implementation of quality and environmental management systems enables standardization of activities in the field of sustainability transparency as well as improvement of supply chain management efficiency.
Table 8. Correlation analysis of selected factors in an empirical study.

|                                | Capital | Number of Employees | ISO 14001 | Sector | Reducing the Risk of Product Hazards | Increasing Awareness and Involvement of Supplier Personnel | Improving Supplier Workplace Safety | Improving Product Innovation | Reducing Negative Impact of Processes on Environment | Improving Standardization of Activities | Reducing the Risk of Non-conformity in the Operating Processes |
|--------------------------------|---------|---------------------|-----------|--------|--------------------------------------|----------------------------------------------------------|-----------------------------------|-------------------------------|--------------------------------------|----------------------------------------|-------------------------------------------------------------|
| Capital                        | 1       |                     |           |        |                                      |                                                           |                                   |                               |                                       |                                        |                                             |
| Number of employees            | 0.238849|                     | 1         |        | 0.428755                             |                                                           |                                   |                               |                                       |                                        |                                             |
| ISO 14001                      | 0.260412|                     | 1         |        |                                      |                                                           |                                   |                               |                                       |                                        |                                             |
| Sector                         | −0.20599|                     | −0.17357  | −0.02949 | 1                                    |                                                           |                                   |                               |                                       |                                        |                                             |
| Reducing the risk of product hazards | 0.033996|                     | 0.074757  | −0.09723 | 1                                    |                                                           |                                   |                               |                                       |                                        |                                             |
| Increasing awareness and involvement of supplier personnel | 0.052551|                     | 0.028867  | −0.11795 | 0.718616                            |                                                           |                                   |                               |                                       |                                        |                                             |
| Improving supplier workplace safety | 0.089381|                     | 0.117403  | −0.03246 | 0.508398                            | 0.643311                                               |                                   |                               |                                       |                                        |                                             |
| Improving product innovation   | 0.08483 |                     | 0.014196  | −0.08448 | 0.524478                            | 0.557708                                               | 0.407735                          | 1                             |                                       |                                        |                                             |
| Reducing negative impact of processes on environment | 0.031205|                     | 0.059045  | −0.02301 | 0.519476                            | 0.58944                                               | 0.597895                          | 0.558458 | 1                             |                                       |                                        |                                             |
| Improving standardization of activities | 0.043711|                     | 0.044111  | −0.05224 | 0.58476                            | 0.702152                                               | 0.619628                          | 0.541556 | 0.777938                  |                                       |                                        |                                             |
| Reducing the risk of nonconformity in the operating processes | 0.060982|                     | 0.001378  | −0.0911  | 0.6844                              | 0.738756                                               | 0.594959                          | 0.561894 | 0.679994                  | 0.827325                  |                                        |                                             |
| Reducing negative impact of products on environment | 0.0505  |                     | 0.055634  | −0.03028 | 0.55918                             | 0.663858                                               | 0.617662                          | 0.546236 | 0.839146                  | 0.800707                  | 0.742312                  |                                             |

Source: own elaboration.
5. Conclusions

Recapitulating theoretical considerations and the results of empirical research, it should be stated that by promoting the implementation of the sustainability concept among their suppliers, referral is made to the requirements included in international standards that constitute guidelines for the implementation of quality, environmental and safety management systems. The requirements included in these standards include operational guidelines considering economic aspects (such as risk management and risk reduction), environmental aspects (limiting the negative impact on the natural environment) and social aspects (improving occupational health and safety, and thus limiting accidents and the possibility of occupational diseases). Large international concerns, especially OEMs, not only set stringent requirements on their suppliers, but increasingly offer specialized assistance through the supplier development program. Partners are allowed to jointly implement new products and processes and to improve existing ones. These programs are implemented through training and the assistance of consultants in the field of supporting the effective functioning of quality and environmental management systems, implementation of Toyota Production System elements (such as Kaizen, 5 S, Total Productive Maintenance, SMED), or joint implementation of Lean Management projects (increasingly on the elimination of the negative impact on the environment through the Green Lean concept) [52]. The results of the conducted research indicate that the requirements included in international management standards play an important role as the expectations of manufacturing companies towards suppliers. The surveyed manufacturing companies focus in particular on reducing the risk of noncompliance and limiting the negative environmental impact of both processes and products by suppliers. This is especially noticeable in the case of large enterprises and manufacturers operating in the automotive supply chains. A special role in the surveyed organizations is attached to the implementation of systemic environmental management. It is visible in particular in economic entities with foreign capital and producers operating in the supply chains of the chemical sector. When analyzing the current activities of entities that are clients on the B2B market in the field of requirements for the sustainability concept in relation to suppliers, most enterprises, especially in Poland, focus in this respect on the guidelines contained in international standards of quality, environment and safety management published by ISO or based on their requirements in the applicable supplier manuals. In Poland, not many domestic organizations have yet developed requirements for suppliers in terms of expectations regarding the implementation of the sustainability concept to a greater extent. Codes of ethical conduct towards suppliers can only be seen in the case of mainly OEMs.

The research limitation was conducting surveys in manufacturing companies operating on the Polish B2B market. However, the choice of sectors such as the automotive, electromechanical and chemical sectors may constitute preliminary and well-established diagnostics for further research. Further research to be carried out in the coming years will be extended to companies operating in Central and Eastern Europe, and then in other European Union countries. It should be noted, however, that due to the relatively high percentage share in the surveyed group of enterprises with foreign capital (47.3%) and insignificant differences in responses from enterprises with domestic capital, the expectations of producers towards suppliers in terms of the sustainability concept should be comparable.

The novelty of the considerations is the confirmation (through empirical research) that environmental aspects are increasingly being considered in the supplier evaluation system. This is a managerial implication, indicating the importance of the subject to the practical implementation of the theoretical principles of sustainable development in supplier evaluation and selection. The results of the research have shown that the expected solutions and actions do not apply to all organizations; therefore, actions should be taken—informing, training or raising awareness of the importance and significance of environmental criteria in cooperation between organizations and their supply chains.
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