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Article info:

Received 28.05.2021

Accepted 15.09.2021

UDC – 346.544.4

DOI – 10.24874/IJQR15.04-04



IMPLEMENTATION OF STANDARDIZED MANAGEMENT SYSTEMS AND THE REQUIREMENTS OF PRODUCTION COMPANIES TOWARDS SUPPLIERS

Abstract: *The subject of the research conducted was to define the expectations of production companies towards their suppliers regarding the implementation of the requirements of quality, environmental, health and safety management systems (QEOH&SMS). The results of the research show that the surveyed business entities, as the most important expectations towards suppliers related to systemic quality management, environment and occupational health and safety, indicated: the status of product quality control, identification of the causes of complaints, ensuring the health and safety at work, raising the awareness and knowledge of personnel, documenting corrective actions. The expectations regarding: identification of products at various stages of its production, management of environmental aspects, evidence of validation of new products, identification of risks related to operational processes, supervision of equipment for measurement and monitoring of products and processes, the use of measures for processes, planning of operational processes (e.g. designing products, production, purchasing, sales).*

Keywords: *QMS; EMS; TPS; OH&SMS; Supply chain; Suppliers.*

1. Introduction

The quality of finished products and consumer satisfaction depend on the effective and efficient cooperation of many links in the supply chains (Liu, 2007). According to many authors (Wittstruck and Teuteberg, 2012; De Stefano and Montes-Sancho, 2018), good relations with suppliers seem to be particularly important in this context, as they have a significant impact on the proper implementation of key processes in the supply chain. The implementation of the adopted strategies in the supply chain requires coordination and cooperation between suppliers and production companies (Hua and Li, 2008; Budzik et al., 2021). As Xie (2016)

rightly points out, it is currently impossible to study the influence of manufacturing companies on any aspects without taking into account the relationships in the supply chains. Thus, manufacturing companies have an impact on other links in the supply chains and are themselves also susceptible to the impact of other links. (Baghizadeh et al., 2021). Therefore, there must be close cooperation within the supply chain that guarantees the achievement of the assumed goals (Jain et al., 2009). The implementation of the strategy depends on the ability to implement the processes of individual members of the supply chain (O'Connor, 2020). Therefore, the links in the supply chains implement management systems and concepts in order to improve the functioning of internal processes

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(Nawrocka et al., 2009; Ikram et al., 2020). In this context, standardized quality, environmental and safety management systems are very popular. (Zimon et al., 2020). According to Fernandes et al. (2021), quality management and supply chain management are considered to be one of the most important strategies approaches in business management and lead to increased competitiveness and satisfaction of external stakeholders. Sroufe and Curkovic (2008) emphasize that the implementation of the requirements of ISO 9001 has the potential to improve quality throughout the supply chain. Dellana et al. (2021) suggesting that the ISO 9001 standard improves internal processes in supply chains and contributes to risk minimization. In turn, Handfield et al., (2005) prove that environmental management systems constitute the basis for the integration of environmental issues with the strategy of supply chain management. It can also be stated that the implementation of both ISO 9001 and ISO 14001 standards has a noticeable impact on the increase in the efficiency of processes carried out in supply chains. (Zimon et al., 2021; Sampaio et al., 2012; Krivokapić and Stefanović, 2020). Toyota production system (TPS) and OHSAS are also having a positive impact on supply chain relationships. Marksberry (2012) says that TPS influences the growth of the organizational culture and the productivity of suppliers. On the other hand, Ozturkoglu et al., (2019) notes that standardized environmental and safety management systems form the foundation for safe and reliable business operations.

Based on the above considerations, it can be concluded that in the literature on the subject there are many studies on the issue of the impact of standardized management systems on the functioning of production companies and supply chains. However, there is not enough research on how the implementation of standardized management systems by manufacturing companies translates into an increase in possible requirements for suppliers. It seems that companies adhering to

the guidelines contained in management systems will be inclined to impose higher requirements on their suppliers. However, this thesis is not confirmed in the literature on the subject. The main goal of the article is therefore to examine how the implementation of system requirements by manufacturing companies affects the requirements for suppliers and whether factors such as size, companies, industry or capital affect the responses of the respondents.

2. Research methodology

The subject of the research conducted was to define the expectations of production companies towards their suppliers regarding the implementation of the requirements of quality, environmental, health and safety management systems (QEOH&SMS). The methodological apparatus in this study was set so that it was possible to fulfil the research goal based on empirical data. A questionnaire was used to verify the characteristics of the operational process after the implementation of particular managerial systems. The study was conducted in the period from October to November 2019 using the Computer Assisted Telephone Interview technique (CATI). The research covered 151 producers operating in Poland on the B2B market (employing over 49 employees) from the automotive (25,17%), metal (28,47%), chemical (19,21%) and furniture (27,15%) sectors. The study was commissioned to a specialised research agency that conducted a targeted selection of companies registered in the Bisnode database, which is a business directory search platform. The expectations of production companies towards their suppliers regarding the implementation of QEOH&SMS were assigned a rank on a scale from one (the least important criterion) to five (the most significant). Most of the business entities participating in the research (66.22%) had an implemented QMS based on the requirements of the international management standard ISO 9001. The implemented EMS was owned by 29.80% of

the surveyed producers. On the other hand, 23.84% of the surveyed enterprises had an implemented OH&SMS and 17,88% of the surveyed producers had implemented Toyota Production System tools like Kaizen, 5S, TPM.

3. Presentation of research results and discussion

The results of the research show that the surveyed business entities, as the most important expectations towards suppliers related to systemic quality management, environment and occupational health and safety, indicated: the status of product quality

control, identification of the causes of complaints, ensuring the health and safety at work, raising the awareness and knowledge of personnel, documenting corrective actions. The expectations regarding: identification of products at various stages of its production, management of environmental aspects, evidence of validation of new products, identification of risks related to operational processes, supervision of equipment for measurement and monitoring of products and processes, the use of measures for processes, planning of operational processes (e.g. designing products, production, purchasing, sales). Detailed research results are presented in Tables 1-3.

Table 1. Expectations of industrial enterprises towards suppliers related to QEOH&SMS (general and comparison between the segments of the surveyed enterprises depending on the origin of capital and the number of employees; average)

Expectations of industrial enterprises towards suppliers related to QEOH&SMS	General N=151	Capital		Number of employees	
		Polish N=92	Foreign N=59	50-250 N=105	over 250 N=46
Product quality control status	3.87	3.83	3.95	3.78	4.09
Identification of the sources of the reasons for the complaint	3.69	3.53	3.93	3.56	3.98
Ensuring health and safety at work	3.11	2.95	3.36	2.93	3.50
Increasing the awareness and knowledge of the staff	3.06	3.08	3.03	3.08	3.02
Documenting corrective actions	3.03	2.75	3.47	2.90	3.35
Product identification at various stages of its production	2.84	2.71	3.05	2.74	3.07
Management of environmental aspects	2.79	2.79	2.78	2.70	3.00
Evidence of validation of new products	2.77	2.75	2.80	2.56	3.24
Identification of threats related to operational processes	2.74	2.71	2.78	2.60	3.04
Supervising equipment for measuring and monitoring products and processes	2.72	2.65	2.83	2.66	2.87
Use of measures for processes	2.72	2.70	2.76	2.53	3.15
Planning operational processes (e.g. product design, production, purchasing, sales)	2.72	2.76	2.64	2.56	3.07
Defining measurable goals for operational processes	2.66	2.51	2.90	2.52	2.98
Evidence of validation of new processes	2.63	2.59	2.69	2.50	2.93
Workstation instructions available in operational processes	2.55	2.46	2.69	2.41	2.87
Identification of performed operations	2.50	2.43	2.59	2.45	2.61
Infrastructure supervision	2.48	2.64	2.22	2.54	2.33

Table 1 presents the responses of the respondents broken down into domestic and foreign capital and the size of the enterprise (medium and large). When analyzing the presented results, it can be concluded that, regardless of the division into categories, the most important aspects include the status of product quality control (3.87) and the identification of the number of complaints (3.69). On the other hand, the least important aspects, according to the respondents, were the supervision of infrastructure (2.48) and identification of the operations performed (2.50).

The research also took into account the expectations of production companies towards suppliers in terms of defining measurable goals for operational processes, evidence of validation of new processes, job instructions available in operational processes, identification of performed operations, and supervision of infrastructure. The conducted cross-sectional analyzes (taking into account the segmentation criteria regarding the origin of capital, the number of employees, the sector and the implemented process improvement tools) allow for the identification of interesting observations.

Table 2. Expectations of industrial enterprises towards suppliers related to QEOH&SMS (general and comparison between the segments of the surveyed enterprises depending on the sector, average)

Expectations of industrial enterprises towards suppliers related to QEOH&SMS	General N=151	Sector			
		Automotive N=38	Electromechanical N=43	Chemical N=29	Furniture N=41
Product quality control status	3.87	3.92	4.07	3.97	3.56
Identification of the sources of the reasons for the complaint	3.69	3.71	3.93	3.74	3.39
Ensuring health and safety at work	3.11	3.18	3.42	3.17	2.66
Increasing the awareness and knowledge of the staff	3.06	3.11	3.28	2.90	2.90
Documenting corrective actions	3.03	3.21	3.07	3.03	2.83
Product identification at various stages of its production	2.84	3.03	3.00	2.83	2.51
Management of environmental aspects	2.79	2.89	2.91	2.59	2.71
Evidence of validation of new products	2.77	3.18	3.07	2.28	2.41
Identification of threats related to operational processes	2.74	2.76	3.19	2.76	2.22
Supervising equipment for measuring and monitoring products and processes	2.72	3.03	2.86	2.66	2.34
Use of measures for processes	2.72	2.71	3.23	2.45	2.39
Planning operational processes (e.g. product design, production, purchasing, sales)	2.72	2.68	3.23	2.48	2.37
Defining measurable goals for operational processes	2.66	3.05	3.02	2.07	2.34
Evidence of validation of new processes	2.63	2.97	2.91	2.24	2.29
Workstation instructions available in operational processes	2.55	2.79	3.07	2.21	2.02
Identification of performed operations	2.50	2.55	2.79	2.24	2.32
Infrastructure supervision	2.48	2.05	2.98	2.69	2.20

Expectations towards suppliers regarding the status of product quality control, identifying the causes of complaints, ensuring occupational health and safety, as well as documenting corrective actions are particularly important for large enterprises with foreign capital in the automotive, electromechanical and chemical sectors. On the other hand, medium-sized business entities (employing up to 250 people) with domestic capital operating in the automotive and electromechanical sectors pay special attention to raising the awareness and

knowledge of the personnel. It can also be noticed that expectations towards suppliers in terms of product identification at individual stages of its production, identification of threats related to operational processes, supervision of equipment for measurement and monitoring products and processes, determination of measurable goals for operational processes, are particularly concentrated in large enterprises with foreign capital as well as business entities from chemical sector.

Table 3. Expectations of industrial enterprises towards suppliers related to QEOH&SMS (general and comparison between the segments of the surveyed enterprises depending on the implemented process improvement tools; average)

Expectations of industrial enterprises towards suppliers related to QEOH&SMS	General N=151	Management system			
		QMS N=100	EMS N=45	OH&SMS N=36	TPS N=27
Product quality control status	3.87	4.09	4.20	4.06	4.11
Identification of the sources of the reasons for the complaint	3.69	3.82	4.13	3.97	4.19
Ensuring health and safety at work	3.11	3.24	3.47	3.50	3.52
Increasing the awareness and knowledge of the staff	3.06	3.05	3.16	3.33	3.19
Documenting corrective actions	3.03	3.30	3.58	3.47	3.59
Product identification at various stages of its production	2.84	3.00	3.42	3.32	3.19
Management of environmental aspects	2.79	2.87	3.33	2.28	3.15
Evidence of validation of new products	2.77	2.95	3.29	2.89	2.96
Identification of threats related to operational processes	2.74	3.10	3.40	3.25	3.19
Supervising equipment for measuring and monitoring products and processes	2.72	2.86	3.38	3.19	3.15
Use of measures for processes	2.72	2.96	3.22	3.17	3.33
Planning operational processes (e.g. product design, production, purchasing, sales)	2.72	2.94	3.02	3.17	2.89
Defining measurable goals for operational processes	2.66	2.95	3.31	3.06	3.11
Evidence of validation of new processes	2.63	2.78	3.04	2.72	2.85
Workstation instructions available in operational processes	2.55	2.74	3.09	3.22	3.11
Identification of performed operations	2.50	2.62	2.78	2.67	2.63
Infrastructure supervision	2.48	2.68	2.62	2.56	2.52

Managing environmental aspects as an expectation from suppliers is almost as important for entities with domestic and foreign capital. This expectation is especially indicated by enterprises operating in the automotive and electromechanical sectors. Entities from these sectors and large foreign enterprises emphasize their expectations towards suppliers in terms of evidence of validation of new products and processes, the use of measures for processes, workplace instructions available in operational processes, as well as identification of operations performed. Large business organizations with domestic capital from the automotive, electromechanical and chemical sectors clearly expect their suppliers to plan operational processes (e.g. product design, production, purchasing, sales). It can also be seen that domestic medium-sized enterprises (employing 50-250 employees) from the electromechanical and chemical sectors focus on the supervision of infrastructure by suppliers.

Analyzing the responses of the surveyed entities depending on the implemented process improvement tools, it can be seen that organizations declaring the introduction of EMS more clearly than other business entities expect from suppliers the status of product quality control, product identification at individual stages of its production, evidence of validation of new products and processes, identification risks related to operational processes, supervision of equipment for measuring and monitoring products and processes, as well as workstation instructions available in operational processes. On the other hand, enterprises that have implemented an OH&SMS clearly expect suppliers to ensure occupational health and safety, raise awareness and knowledge of staff, plan operational processes (e.g. product design, production, purchasing, sales), as well as job instructions. available in operational processes. Based on the research results, it can also be concluded that business entities that have implemented the environmental management system and the Toyota

Production System concept attach greater importance to the expectations of suppliers (than other organizations) to identifying the sources of the causes of complaints, documenting corrective actions, as well as to management of environmental aspects and the use of measures for processes.

4. Summary

Standardized management systems have been developed with the aim of improving key business processes. However, their guidelines should be understood more broadly and transferred to other links in the supply chains. The effectiveness and efficiency of supply chains depends on the effectiveness and efficiency of their individual links and the joint implementation of the adopted goals and strategies. Therefore, it is particularly important to closely cooperate with suppliers and to jointly solve any problems that arise. The considerations presented in the article show that managers of production companies do not fully perceive this fact. Although in some respects they have significant expectations towards suppliers, in most (12 out of 17) of the examined aspects their expectations are not significant (the average of responses below 3 on a 5-point scale). According to manufacturing companies, suppliers should make efforts to improve such aspects as:

- Product quality control status,
- Identification of the causes and sources of complaints,
- Ensuring health and safety at work,
- Raising employee awareness.

In other aspects of the examined aspects, the average level of their implementation seems to be sufficient for manufacturing companies. This can be interpreted in two ways. First of all, manufacturing companies face their own problems and have high requirements towards suppliers only in key aspects related to product quality and customer service implementation. Secondly, entrepreneurs do not have high standards of cooperation in

supply chains and leave more autonomy to their suppliers.

The results presented in the article have several implications. Business representatives can gain valuable insight into the impact of standardized management systems on supply chain collaboration. Based

on the research results, suppliers can make a more informed decision regarding the implementation of standardized management systems and learn about the expectations of entrepreneurs. Scientists can expand their research to include other management systems as well as industries and countries.

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