

The Impact of the Implementation of an Integrated Management System on the Operation of a Company: A Case of a Food Production Company

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ABSTRACT

The need for efficient, sustainable, and flexible systems in organizations for a variety of products and services is growing rapidly. Companies that regularly face overlapping requirements or areas of operation need to consider the integration of different operations, processes and systems into a single framework. For this purpose, companies may need to evaluate the potential benefits of implementing an integrated management system. In the food industry, significant emphasis is put on the control of nonconformities as the safety of the company's products for the end consumer is in question. Companies develop control processes within integrated management systems to prevent nonconforming products from reaching end-users.

The aim of this paper is to analyze the impacts of implementing an integrated system in a company. Research methods such as literature review method and qualitative content analysis, as well as logical analysis are applied. Based on both the theoretical research and a case study of a food production company the authors identify the main aspects of operation impacted by the implementation of an integrated management system in a company and determine the effects of implementation of an integrated system focusing on the improvement of control of nonconformities in a food production company.

Keywords: Business effectiveness, Cost efficiency, Integrated management systems, International standards, Nonconformity control, Process management.

1. INTRODUCTION

The implementation of an integrated management system is an appropriate strategy for managing a number of systems that need to meet the expectations and needs of different stakeholders. It covers and coordinates all organizational procedures, systems, and processes in a one complete framework and, if successful, allows the organization to operate as a single entity with common goals in all departments. Organizations often have to comply with the requirements of more than one international standard, often three or more. As a result, each business unit may need to implement processes to meet a number of requirements derived from different management standards. Parallel management systems are commonly used, leading to the separate and independent implementation of each system, which has several shortcomings as they require many duplications of management tasks such as written procedures, inspections, control forms and other paperwork recommended in the standards [1].

Various management systems of companies such as quality management, environmental management and others have been

certified in recent years, and many companies have implemented an integrated management system [2]. The implementation of an integrated system has become a challenge for companies in any industry as globalization and technological developments progress along with business competitiveness and the requirements for quality and social responsibility [3]. Researchers have concluded that the benefits of integrated management systems include both cost-effectiveness and cooperation between key environmental, health and safety and quality issues [4].

The scientific aim of the research activities is to analyze the impacts of implementing an integrated system and determining the effects of implementing said system, focusing on nonconformity control, in a food production company.

The methodology is based on the comparison and analysis of literature and views published by various authors about the characteristics of an integrated management system, measures for nonconformity control, the impact areas and benefits of the implementation of integrated management systems in companies. Research methods such as literature review method, qualitative content analysis, as well as logical analysis are applied. The method of literature review allows to identify common denominators, to evaluate the available theoretical basis and to get acquainted with the experience of other authors in relation to the research goal.

The characteristics of an integrated management system and aspects of its implementation, maintenance and monitoring, as well as measures for nonconformity control are analyzed in Section 2. In Section 3 the authors determine the impacts of implementing an integrated management system in a company through the conduction of the qualitative content analysis. A case study of a food production company regarding the implementation of an integrated system that focuses on the control of nonconformities is performed in Section 4. In Section 5 the authors summarize the conclusions of the study.

2. THE IMPLEMENTATION AND MAINTENANCE OF INTEGRATED MANAGEMENT SYSTEMS AND MEASURES FOR NONCONFORMITY CONTROL

As the safety requirements for products, services, processes and systems are developing rapidly, the need for efficient, sustainable, and flexible systems in organizations is increasing. A fully integrated management system is a system that can link all the management standards and systems applied by an organization. Such systems enable organizations to ensure the quality of their products and services and to demonstrate that these products and services meet the vision, mission, core values and objectives of the organization [1].

The maintenance of quality and other management systems is often based on the principles of the Deming cycle (plan-do-check-act) which is most often used to solve iterative problems, thus addressing the issues surrounding the management system and improving business performance [5]. Additionally, to ensure compliance with widely accepted guidelines or characteristics for operations and their results for an optimal level of performance, companies often apply standards [6]. It is recognized that standards can be a critical component for a variety of industries as they provide necessary knowledge and promote operation in international markets [7]. Some of the most widely used international standards such as ISO 9001, ISO 14001 and ISO 45001 include an overlapping framework and requirements. A common understanding of the overall process and task management cycles is developed which ensures synergies and compromises between the three systems by harmonizing their policies and coordinating the goals and objectives [1]. A study by Kraus and Grosskopf claimed that integration did not respect the nuances of one particular standard. This means that the establishment of a widely applicable system to be implemented in all areas of environment, health and safety and quality may lead to some aspects being missed and not being met [8].

Companies that have implemented management systems in accordance with the requirements of ISO management system standards may need to perform loss assessments to develop improvement plans. Typically, managers use two approaches to managing losses. The first is an overall loss assessment, which consists of a company-wide loss estimate and action plans in line with the improvements to be made. The second is the implementation of priority goals and strategies based on information from customers, processes and company strategy [9; 10]. It is not necessary to conduct separate review processes for each individual area of an integrated management system that is covered by the requirements of the different management system standards. The organization only needs to ensure that it conducts management reviews at sufficient intervals, as required by the specific standard requirement, while maintaining appropriate records of each management standard issue included [8; 11].

In order to ensure the monitoring of the integrated management system for the continuous improvement of performance, it is necessary to assess the state of the processes. A suitable tool for this task is the use of performance indicators – variables that indicate the effectiveness of any part or whole of a process or system in assessing its status in relation to the objectives set [12]. It is important to ground performance indicators within the strategy of the organization, otherwise the setting of the indicators may be dysfunctional [13]. Typically, a performance evaluation model consists of three main parameters, i.e., objectives, measures, and evaluations. Performance indicators should have certain characteristics in order to ensure ease of use, comparability and consistency:

1. Definitions and theoretical terms must be definite and clearly defined;
2. Procedures must be clear to ensure comparability, even if the indicator is for internal use only. Indicators must be easy to measure and easy to apply;
3. All defined indicators must reflect the performance of the company's process;
4. All performance indicators must be in line with the company policy [12].

Studies look at several methodologies for defining key performance indicators related to factors that influence the objectives of the organization. The choice of the most relevant performance indicators is based on the experience, understanding and knowledge of the organization. It is then revised and

approved to ensure that the selected indicators are up to date and are in line with the objectives of the company [14; 15].

An important part of the effectiveness of an integrated management system, especially in manufacturing companies, is the control of non-compliant process results, products or services, which occurs when an organization's results do not meet certain requirements, which may be both international standards and norms set by the company. The best solution to ensure control and conformance of products is to either prevent unforeseen events or to implement measures to eliminate their consequences [16]. The occurrence of a defective or non-conforming product also imposes costs on the company in terms of processing, storage, disposal and interferes with the normal operation of the processes. Non-conformities in the production plant can occur for a variety of reasons: unknown quality problems during production, defects that are known but not checked due to poor control, ineffective control [17]. The three main steps to control nonconformities are to identify the problem or non-conformance, record it, and take appropriate action to correct it. When nonconformities are detected, they must be identified, a cause-and-effect analysis must be carried out and corrective action must be taken to correct the result and prevent the nonconformance from recurring. From the moment an inappropriate process or product is detected in an organization, a sequential set of actions must be taken to introduce a solution to the problem and prevent it from recurring in the future [18].

The number of product recalls is increasing, which happens if a product does not meet certain requirements [19]. The issue of product recalls is very sensitive for manufacturing companies, therefore mechanisms are established to ensure the prevention of nonconformities, such as risk analysis to prevent defects, and detection systems to ensure timely identification. However, in some cases these measures may lead to irregularities and prevent certain nonconformities from being detected and spreading. Such cases entail significant costs for companies, as they lead to defects, recycling, disposal, as well as delays and possibly product recalls, which affects customer satisfaction [20; 21]. Product recalls illustrate the damage made for the company in terms of costs and reputation caused by the nonconformities that reach the final consumer, but they also call into question the company's ability to manage its industrial processes. If the consumer questions the company's ability to manage its processes, the company may feel a significant influence on the consumer's choice between competing products and the goods offered by the company. Even leading companies that maintain quality and continuous improvement systems feel this threat. Product recalls have a significant impact on both the company's finances and its organizational processes and employees [19].

It is essential in management systems to establish processes to detect, prevent and correct nonconformities as soon as possible, which means real cooperation between the parties involved. These deviations from the established or non-compliance can be identified by conducting internal and external audits, recording and analyzing customer complaints, performing regular inspections in accordance with the company's established processes and procedures. The requirements for which compliance is measured in audits are mostly derived from standards, documentation and procedures of the company, and best practices [22]. The integration of management systems also introduces combined auditing that not only saves financial resources but also provides other potential benefits. Management systems should be reviewed periodically, and these audits may reduce the cost of internal audits when combined with other regular business reviews that management already performs. In particular, it may give managers and responsible parties the

opportunity to assess how different management standards interact and allow them to include operating items from multiple standards into a single overall action plan that addresses a number of challenges. Also, the leadership of the company will be able to evaluate more clearly how the problems overlap. These activities may reveal that, for example, certain aspects of occupational health and safety may be related to environmental issues and vice versa [8; 23].

Among the aspects that need to be considered when implementing an integrated management system in companies, is the recommendation that all documents be maintained and managed using software that allows access to documents for employees working in various areas of the organization. A mechanism may be developed to allow management to give final approval to changes to documented procedures before the change is formally implemented [24]. The importance of employee involvement in the implementation and maintenance of a successful integrated management system is also considered. The integration of management system components is facilitated when employees who work with the organization's product and service implementation processes take direct responsibility for quality, environmental, and occupational health and safety issues. In addition, the integration of management programs at the employee level can reduce the confusion that employees so often face when they have to meet the requirements of multiple standards. Management representatives assigned to oversee each area of management standards can support employees' efforts by acting as contacts and sources of information for employees, they can help and look for ways to improve staff training and knowledge. The experience gained by employees can also help to improve the overall quality performance of the organization, as well as the environment and occupational health and safety management programs [25].

The authors conclude that by implementing maintaining and improving an integrated management system, the company can enhance the design, review and development of processes and ensure continuous monitoring and improvement, as well as maintain effective mechanisms for the control of nonconformities to ensure compliance with the requirements applicable to the operation of the organization. The maintenance and monitoring of the integrated management system is important and already widely implemented since it has a significant impact on the processes and development of the company.

3. IMPACT OF THE IMPLEMENTATION OF AN INTEGRATED MANAGEMENT SYSTEM ON THE OPERATIONS OF A COMPANY

Considering the relative advantages and efforts for the implementation of an integrated management system is a good starting point for assessing whether management platforms need to be integrated or whether the integration will not yield immediate or long-term returns. When weighing the impacts on the company, it is desirable to consider the following aspects – cost-effectiveness, time efficiency, the company's brand, as well as cooperation within the company [2].

The literature review developed by the authors is based on papers published in the electronic database EBSCOhost. In order to perform qualitative content analysis of the research question “Which areas of operation of a company are impacted by the implementation of an integrated management system?”, using the keywords “integrated management system”, 13828 papers were obtained in the database.

The following inclusion and exclusion criteria were used in the subsequent literature selection:

1. Including only full-text articles, 6930 studies were obtained.
2. Excluding non-English studies, the number of articles in the database was reduced to 5553.
3. Focusing on the topics “industrial management” and “system integration”, 59 studies were obtained.
4. The number of studies was reduced to 13 through an in-depth analysis of the content.

As a result of the selection of literature, in the following study, 13 articles were selected to determine the impact of the implementation of an integrated management system on the company's operations (Figure 1).

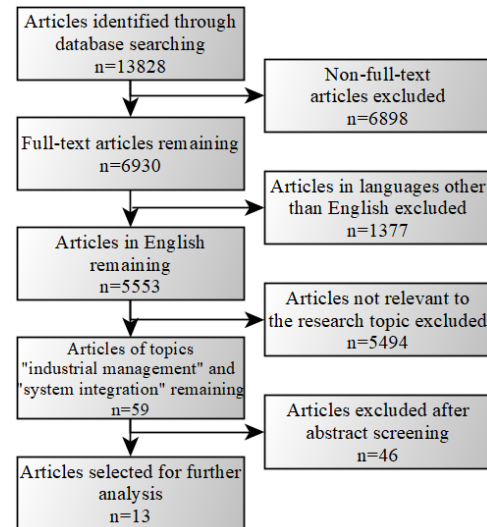


Figure 1. The selection of articles for exploration of the research question.

The authors selected scientific papers on various topics related to the research area – operation of integrated management systems, risk management, auditing of integrated management systems, improvement of integrated management systems. The selected studies cover the period from years 2000 to 2021.

As a result of the qualitative content analysis, seven categories were defined, which show that the implementation of the integrated management system results in beneficial changes in seven elements – procedures, employee involvement, cost efficiency, process, business results, product, service, and customer. The results were classified into two clusters – impact on the internal elements of a company and impact on the external elements of a company i.e. external customers (Table 1).

Table 1. Frequency of the identified categories.

	Procedures	Employee involvement	Cost efficiency	Process	Business results	Product, service	Customer
Frequency	7	5	9	10	6	8	4
Frequency, %	14	10	18	20	12	16	8
	Impact on internal elements				Impact on external elements		
Frequency	31				18		
Frequency, %	63				37		

The analysis of the frequency of categories indicates that the impacted areas of a company after the implementation of the integrated management system are related to processes (20%), cost-efficiency (18%), products or services (16%), as well as company procedures (14%). Other factors have a smaller impact on the company's operations: business results (12%), employee involvement (6%), customer (8%). Researchers have concluded that the benefits of integrated environmental, health and safety and quality management systems include both cost-effectiveness and cooperation between key environmental, health and safety and quality issues. Studies have examined several benefits of system integration as it can help an organization to:

1. Set goals and objectives that are not competing or contradictory but are consistent and consistent with overall business goals;
2. Promote coordinated business management processes;
3. Promote mutual cooperation that will better avoid duplication of duties and responsibilities;
4. Identify coordinated solutions to non-compliance and problems and promote comprehensive approaches to corrective and preventive action;
5. Facilitate better decision-making by providing a more complete and in-depth picture of the impact of quality, environmental and occupational health and safety programs on the company's operations;
6. Reduce the number of documents by harmonizing procedures and mobilizing existing resources.

One of the main conclusions of this study is that the implementation of an integrated management system can have a positive impact on business processes, professional development, often reduce non-compliance, improve product quality, reduce non-value-added costs and also the reduction of costs related to the organization and performance of external and internal audits. As implementing and maintaining separate management systems costs more, integration should help increase operational efficiency and ultimately save financial resources for organizations. The authors conclude that the factors that were given less importance in the study – employee involvement and customer – are closely related to the more impacted areas of operation – process, cost-effectiveness, and product. The studies selected in the literature review reflect the aspect of external stakeholders minimally as no information was obtained about suppliers, cooperation partners, the public. The impact of the implementation of the integrated management system on these stakeholders may be the subject of further research.

4. A CASE STUDY OF THE INTEGRATED MANAGEMENT SYSTEM OF A FOOD PRODUCTION COMPANY

The main business activity of the company in question is the production and wholesale trade of non-alcoholic beverages and beer, as well as the import and distribution of various beverages in Latvia. The company operates in 4 segments of the Latvian market – water, juice, non-alcoholic beverages and beer. The company is following the development of the industry by investing in the development of production processes to speed up and automate them. In total, the company employs more than 300 employees. During the year 2020, the company made capital investments worth a total of 0.6 million euros. Major investment projects were related to the adjustment of the production unit as well as the improvement of production efficiency.

The quality management system of the company was implemented in 2002 in line with the requirements of the ISO 9001:2000 standard. The quality management system maintained

in the company is currently re-certified in accordance with the requirements of ISO 9001:2015 which indicates the effective maintenance of the implemented system. The company has also implemented a HACCP food safety system since 2008, as well as a food safety system that meets the requirements of the FSSC 22000 standard, thus introducing opportunities for system integration and reducing overlapping processes and policies. The task of the organization's management processes is to identify, provide and maintain the necessary infrastructure for process and product compliance, as well as to ensure a qualified workforce and a safe, results-oriented work environment. Objectives and criteria have been set for the relevant processes to ensure effective control. For these processes, risks and opportunities are identified at least once a year, as well as the necessary changes in the processes are determined and implemented in order to improve their course and achieve the planned results.

As for a food production company, an important element of the integrated management system is the control of nonconformities, which begins with the registering of nonconformities in the quality portal. Operational information is recorded in the register and passed on to the responsible staff for further analysis. If nonconformities are found in the product after production, the fact is recorded and stored in product recall document folders if full or partial disposal of the product is required. The occurrence of nonconformities introduces quality costs which are related to non-compliance with product quality, determined by the product specification and customer requirements. The costs related to the loss of quality are mainly related to the product produced. These can be divided into the following categories:

1. Non-compliant product: loss of material as the product cannot be used economically, direct costs to the company – raw materials, products, energy resources;
2. Recycling: the cost of repairing defects to make them fit for use, i.e. defects that occur during production are not noticed in time and the products must be sorted in stock, separating the corresponding product from the defect;
3. Downtime: the cost of downtime due to defects, such as during equipment repairs or product changes;
4. Loss of profitability: elementary time costs added due to inefficient performance controls. For example, the sequence of production products is inefficiently planned, raw materials are not delivered on time.

Evaluating the company's management system, the authors observe that the company is targeting safe and high-quality food received by the consumers. Compliance with food safety systems in accordance with the requirements of HACCP and FSSC 22000, as well as quality management system standard ISO 9001:2015 is continually ensured, and the company's performance is considered to be effective. It can also be observed that the implementation and maintenance of the management system has introduced beneficial effects on the previously identified impact areas: the business results of the company indicate stable development and increase of the market share, as well as continual customer trust in the company's products. Processes have been streamlined and conformity to set requirements is being monitored, cost-efficiency has been improved, new products are being developed, as well as improvements have been introduced for existing products. The implementation of the management system has also enhanced employee involvement and the review and improvement of operational procedures. Taking into account the compatibility of the requirements applicable to the operations of the company, aspects of effective integration can be observed in the existing management system, however, authors observe an opportunity of introducing an integrated control system to reduce the likelihood

of non-compliances, thus reducing quality costs. Enhanced process integration would be an essential aspect of ensuring the continuous effectiveness of the integrated management system as it would allow the company to improve the efficiency of internal audits, reduce the volume of documents, as well as improve documentation management and reduce the time spent on process performance evaluation. An equally significant benefit of integrated processes would be the simplifying of the system and facilitating the day-to-day work of employees by combining and integrating existing work responsibilities.

The main objective of the internal control system would be to reduce the risks of non-compliance, which have been identified and assessed as the most significant in the company's operations since the consequences are significant and related to quality costs if the product has to be partially or completely disposed of. The authors identify that the non-compliance control process is currently not integrated into the system in a holistic way which includes the binding documentation and relevant procedures. The aim of integrating and implementing an internal control system would be to reduce the number of non-compliances related to non-compliant products and their causes. Previous failure mode and effects analysis has identified many significant risks for the occurrence of nonconformities, including mechanical damage in the process environment which can cause the entrance of foreign objects in the liquid part, thus producing a non-conforming product, the lack of recording of storage temperatures as it does not provide traceability which is critical for the food business, and the use of personal belongings in the manufacturing premises which may be introduce the development of bacteria, mold and yeasts.

Based on the theoretical analysis of the maintenance and improving of an integrated management system, the authors offer a plan of improvement measures – implementing a unified internal control system, which includes combined control measures – establishment of an internal control and inspection of the process environment, review and improvement of the competencies and job responsibilities of the responsible employees, development of a plan for training employees about shortcomings in the process environment and their significance, as well as the establishment of internal control measures for the inspection of detergents and disinfectants, which is critically important to prevent non-conforming products.

As a first step, the company would need to review existing procedures for non-conformity control, the competence, responsibilities of employees and the effectiveness and control of detergents and disinfectants. Reviewing the existing documented

evidence would allow to get an overview of the company's performance at a particular step in processes and identify their weaknesses.

The second step in the implementation of the internal control system is planning, which includes the development of process flow charts and process descriptions, the renewal and definition of new responsibilities, and competence for the employees involved, and determining measures for the inspection of detergents and disinfectants.

After the completion of the second step, in accordance with the description of the quality system document management processes, before the inclusion of new process descriptions in the quality system documentation, the approval of the board member is required, the informing of involved parties about changes in processes and job descriptions should be performed, as well as the determined control measures for detergents and disinfectants should be established.

The fourth step is considered to be the most important that remains constant in the company's operations – monitoring and inspection of the process environment, as well as inspection of detergents performed by a determined responsible employee, e.g. the head of the laboratory of the company.

An integral part of the internal control system would be the annual training aimed at maintaining and updating employees' knowledge of current quality and internal control issues and procedures, focusing on the identified causes of product non-compliance.

The authors believe that successive measures divided into four blocks as illustrated in Figure 2 will structure the necessary stages of improving the integrated management system and will give the company's management an idea of the process for the integration of the identified measures into day-to-day operations, and promote effective management.

It is expected that the integration of the internal control system in the company's processes will contribute to the aspects identified in the theoretical analysis – the non-conformity control processes will be improved, thus reducing quality costs, employee involvement will be enhanced and the internal control system will contribute to the conformity to products, thus ensuring compliance with the requirements which will have beneficial effects on customer satisfaction. The integration of internal control measures will improve internal procedures by reducing the volume of documentation, thus improving staff efficiency. Given the positive impact on processes and products, business results are expected to improve in line with the company's goals.

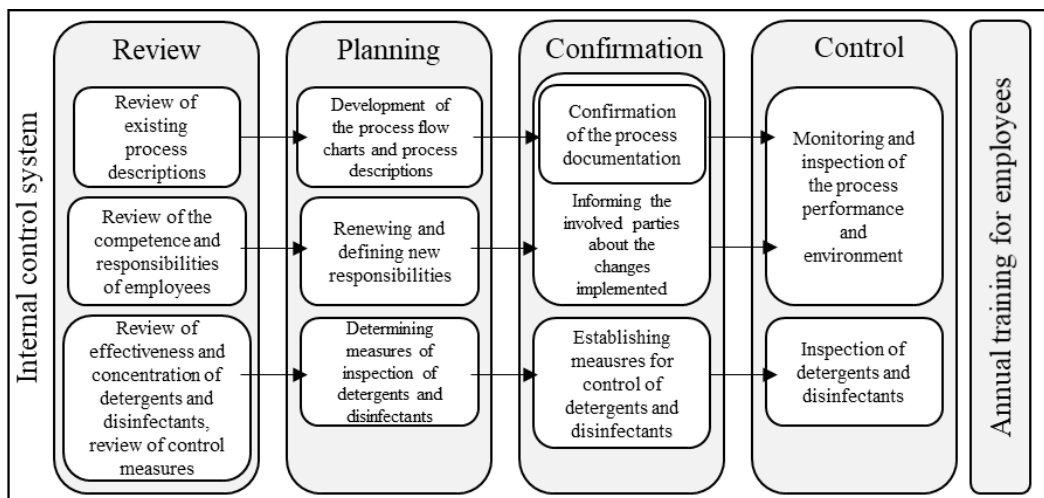


Figure 2. Steps for integration of the internal control system within the existing management system.

5. CONCLUSIONS

The implementation of an integrated management system is an appropriate strategy for managing several systems that have to meet the needs of different stakeholders. An integrated management system enables an organization to ensure the quality of its products and services and to demonstrate that those products and services meet the organization's vision, mission, core values and goals.

As a result of qualitative content analysis, seven categories were identified which indicate that the implementation of the integrated management system results in changes in seven elements of the company's operations – procedures, employee involvement, cost efficiency, process, business results, product or service and customer. The analysis of the frequency of categories indicates that the factors that most influence the company's operations after the implementation of the integrated management system are related to processes (20%), cost-efficiency (18%), product or service (16%) and company procedures (14%). When summarizing the obtained impact categories for the implementation of an integrated management system, a tendency is observed that the largest impact of the system implementation is on the internal elements of the company (63%), but less external impact can be determined on the external elements of the company (37%).

The implementation of an integrated management system has introduced beneficial impacts on the previously identified categories for the food production company observed in the study. A plan for the integration of an internal control system into the existing management system has been developed for the company to enhance non-conformity control, improve cost-efficiency and the overall performance of the integrated management system in the impact areas.

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