

A man in a dark suit is seen from behind, walking up a long, wide, grey stone staircase. The staircase is flanked by dark railings and leads up towards a dense cityscape. The city buildings are bathed in a warm, golden light, suggesting a sunrise or sunset. The overall mood is one of aspiration and progress.

QUALITY CHALLENGES

Edited by
Joanna M. Dziadkowiec
and Magdalena Niewczas-Dobrowolska

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Foreword

Quality is a term that refers to various aspects of our life and functioning, e.g. product quality, food quality, service quality, quality of life. Overall quality is increasing and we as consumers/clients expect high quality. Times are changing, globalization processes are progressing, there is a risk of conflicts in the world, etc., which all affect various aspects of quality, including, of course, the quality of our life. Therefore, there are many challenges to quality. Questions should be asked about the future of quality – what should we focus on, what aspects of quality will be particularly important, etc., and what will be the quality of the future based on this – what event can we predict, how the world and our functioning as consumers/clients, but also organizations, will change.

This book presents a set of papers trying to find out these answers. Various aspects of quality and quality management are presented which show the most important challenges to quality and also are the signs of times we live in.

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and Magdalena Niewczas-Dobrowolska

**The 11th National and 3rd International Conference on Quality
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**‘Best Before’ Labelling as a Key Factor
of the Informative Value of Food Packaging**

Abstract

Research background: The informative value of packaging is of particular importance in the purchasing process. One of the key elements of the informational value of food packaging is date label. Currently, there is a discussion in the EU on the concept of minimum durability (‘best before’) dates, consumer perception of ‘best before’- labeling and the rules of date marking.

Purpose of the article: The aim of the article is to identify and evaluate the perception of the information value elements of unit packets of shelf-stable foods on the example of tea and UHT milk package with particular emphasis on minimum durability dates against the background of other obligatory and optional information placed on the packaging of food products.

Methods: A qualitative eye-tracking study (ET) was conducted among 30 purposefully selected consumers declaring the systematic purchase of tea and milk. Additionally, ET was supported by a qualitative research carried out using face-to-face interview method with the use of short interview questionnaire.

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Findings & Value added: Minimum durability dates attracted considerable attention of the surveyed individuals but their relative importance depended on the product and the role it plays in human nutrition. Nutrition declaration was the first element of milk packaging the consumers looked at, whereas in the case of tea, which packaging does not contain information about nutrition value, information about the tea, product's certificates and awards were primarily noticed. 'Best before' date was the third most eye-catching element of the UHT milk packaging and fourth in the case of tea.

Keywords: Informative value of packaging, ET, customer behaviour, 'best before' date, date labelling

JEL Classification: D18, L 66, M38, O39, Q18

1. Introduction

Unit packaging is an integral part of a food product, allowing for its commodity trading (Ankiel and Grzybowska-Brzezińska, 2020). From the consumer's point of view, packaging is a source of important information about the product, brand, producer which are of particular importance in the purchasing process undertaken at self-service points of sale (Butkeviciene et al., 2008; Wang, 2013; Manijeh and Azadeh, 2017; Bigoin-Gagnan and Lacoste-Badie, 2017). Based on the information placed on unit packages, the consumer makes a decision to buy a product within a specific food category or to refrain from purchasing it. In addition, the information on the packaging or label creates the image of the product or brand, indicates the specific qualities of the product (e.g. health claims, freshness dates), therefore they must be comprehensive, understandable (Andrews et al., 2011; Hawley et al., al., 2012; Droulers and Amar, 2015; Bialkova et al., 2016; Dörnyei and Gyulavári, 2016; Fenko et al., 2016). Shelf-life dates are specific element of food labelling. Their role is informing consumers about food quality and safety regarding product's freshness. Consumer attitudes and behaviour may be influenced by this information. Recent focus is related to food waste behaviour promoted by the misunderstanding of

the 'best before' date (Gong et al., 2022; Song et al., 2021; Kavanaugh and Quinlan, 2020; Toma et al., 2020).

2. Problem Statement

Unit packaging of food products plays a key role in making purchasing decisions by consumers. In this process, packaging fulfils three functions: communication (product identification, information, product positioning), physical (product protection, transportation) and social (environmental friendliness) (Prendergast and Leyland, 1996, Nancarrow et al., 1998; Rundh, 2005). The key aspect is that the packaging in self-service stores takes on the role of the main communication/information channel between the producer and the consumer (Shah, 2013; Vieira et al., 2015). The food packaging should provide the consumer with ample information regarding the features and properties of the product, product storage conditions or the method of packaging disposal after the product has been used (Ankiel-Homa et al., 2014). The information value of unit food packaging results from two categories of information placed on the packaging:

- obligatory information that must be placed on the packaging in accordance with the legal legislation in force in a given country (or in the European Union);
- optional information, the placement of which on the packaging is voluntary and dependent on the entity introducing the product to the market (it is usually information of a marketing nature) (Ankiel-Homa, 2012).

The major rules for labelling food packaging in Poland (resulting from European Union regulations), important from the consumer's point of view, are contained in Regulation (EU) No 1169/2011 of the European Parliament and of the Council (EU). Pursuant to the Regulation, mandatory information on food packaging includes:

- information on the identity and composition, properties or other characteristics of the food;
- information on the protection of consumer health and the safe use of a foodstuff, such as allergens, shelf-life dates, special ways of storage and usage;

- information on nutritional characteristics (declaration of energy value and nutrients) that enable consumers to make informed purchasing and consumption choices (Regulation, 2011).

On the other hand, optional information placed on the packaging of food products may concern the following issues:

- emphasizing the specific, distinctive features and attributes of the product (e.g. nutrition and health claims, product certificates, recommendations of market institutes);
- creating the desired image of the product and the brand of the food product (e.g. decorations, ornaments and other linguistic and graphic signs);
- informing about promotional activities related to the food product (e.g. a QR code redirecting to the advertisement of the product, fan page) (Ankiel and Grzybowska-Brzezińska, 2020).

Date label containing shelf-life dates is one of the key mandatory element influencing the informational value of food packaging. A readable code of date labelling provides benefits at retail in the form of achieving effective stock rotation. It was intended to be understandable in the supply chain both by consumers and operators who are responsible for introducing the product to the market and for ensuring food quality and safety to consumers (Newsome et al., 2014). Recent labelling scheme in UE, which was constructed on the risk-based approach, covers dual system of the date of minimum durability (‘best before’) and the ‘use by’ date. It was intended to inform consumers about status of the food which is influenced by storage time (EFSA, 2020). Foods which, from a microbiological point of view, are highly perishable and are therefore likely after a short period to constitute an immediate danger to human health, are being labelled with the ‘use by’ date. After this date food should not be consumed and should be treated as to be unsafe. Opposite to the ‘use by’ labelling, the ‘best before’ term indicates the date until which the foodstuff retains its specific properties when properly stored. Minimum durability date refers to food quality, not safety. Therefore, after this date food is still safe for consumption although its quality may not be optimal (Regulation, 2011).

Date labelling may influence consumer behaviour by affecting the decisions at the stage of purchase and consumption. The intention of imposing the European date labelling system was to help consumers to distinguish between safe expired 'best before'-labelled foods and treated as unsafe expired 'use-by'-labelled products. Recent studies show that the role of date labels goes far beyond this simple function. It was proved that consumers tend to use the dates as the basis of grading fitness for consumption, regardless of the type of the date. This tendency is reflected by selection of food when doing shopping (Newsome et al., 2014) and by denigrating of food of high quality during its sensory experiencing (Samotyja and Sielicka-Różyńska, 2021). Moreover, it was shown that some consumers do not care about the type of the date ('use by' or 'best before') and consider expiration in accordance to the kind of the food products. The example of a product with a special consumer concern is milk which after expiration is treated as unsafe product, regardless if it is sterilized and therefore it can be marked with 'best before' date and safely consumed after expiration, or it is fresh milk labelled with 'use by' date – in this case safety considerations are justified (Thompson et al., 2018). The dual scheme of date labelling is difficult for consumers which have problems with distinction between the two types of the date and often treat the minimum durability date as the 'use by' date (Gong et al., 2022; Kavanaugh and Quinlan 2020; Toma et al., 2020). It was estimated that lack of proper understanding of dates meaning contributes to the 10% of food that Europeans waste unnecessarily each year because they are afraid of food poisoning (European Commission, 2018). In the light of these data and the policy of sustainable development, there is a discussion in the EU on the concept of minimum durability ('best before') dates, consumer perception of 'best before'-labelling and the rules of date marking. Despite the fact that the 'best before' dates cause much confusion, there is no certainty that not using them will be the best solution and if consumers will not feel deprived of information (Priefer et al., 2016). Therefore, there is need to deepen the role of the dates in consumer perception of the packaging information. Previous studies showed consumer interest in the dates but most of the studies were based on declarative responses

of consumers. In this study a method which measures the actual consumer interest in mandatory and optional information was applied. The use of eye-tracking (ET) method to evaluate how consumers perceive 'best before' labels according to different types of food was seldom discussed earlier in literature.

3. Aims of the Research

The aim of the article is to identify and evaluate the perception of the information value elements of unit packets of shelf-stable foods on the example of tea and UHT milk package with particular emphasis on minimum durability dates against the background of other obligatory and optional information placed on the packaging of food products.

4. Research Methods

The research method was a qualitative eye-tracking study conducted in Poland among 30 purposefully selected consumers declaring the systematic purchase of UHT milk and tea. The study was conducted in July 2019, by employing SMI Eye Tracking Glasses 2 Wireless systems with built-in HD cameras, which automatically corrected errors and recorded eye movements at a speed of 60 Hz. The used ET recorded the respondents' eye directions based on a 3-point calibration. The ET study was prepared using OpenSesame. Additionally, ET was supported by a qualitative research carried out using the individual face-to-face interview method among the participants of the ET survey. The subject of the study was the packaging of UHT milk (ultra-high temperature sterilised milk) and tea labelled with 'best before' date. The direct interview research tool was the short interview questionnaire. After the ET survey was completed, the respondents were asked to answer the following questions: 'Which information on the packaging did you pay attention during the survey?' and 'Do you know the difference between the 'best before' and the 'use by' date'?

5. Findings

The main goal of this study was to identify the involvement of consumers in Poland in the processing of minimum durability dates placed on food unit packaging.

The test was carried out using the ET technique, which has been employed earlier to gain knowledge on consumer involvement in processing of information regarding food composition and dietary properties (Sielicka-Różyńska et al., 2021; Bialkova et al., 2020; Zuschke, 2020).

The results of the ET study were presented in the form of heat maps and area of interest analysis (AOI). AOI was distinguished by grouping information elements on the presented milk and tea packaging. One of the identified areas of packaging interest was information on the shelf-life of UHT milk and tea (which is communicated by the 'best before' date). The following ET parameters were used in the analysis of consumer interest in information on the shelf-life of UHT milk and tea placed on the packaging:

- entry time – the time after which the respondent looked at a particular AOI;
- sequence – the order of looking at the selected areas of AOI;
- dwell time – the time of looking at the separated area of the AOI.

Heat maps for UHT milk packaging are presented in Figure 1.

Figure 1. Heat maps of UHT milk packaging



Source: own research

Table 1. Basic parameters for ET – UHT milk packaging

Area of interest analysis (AOI)	Entry time in ms (average)	Sequence	Dwell time in ms (average)
Product name (front)	2873.6	1	1507.4
A nutrition declaration, 'UHT milk', conditions of storage	4662.7	2	7279.7
Fat content (front)	5532.1	3	416.1
White space	5580.7	4	885.4
Logo (front)	5789.9	5	259.8
Product name (back)	6970.0	6	1455.9
Additional information	7556.0	7	2418.9
'Best before' date	8826.2	8	1918.7
'Source of calcium' nutrition claim	9264.8	9	552.3
Logo (back)	9743.8	10	186.0
Fat content (back)	9880.0	11	232.4
Bar code	10345.3	12	106.4
Net quantity (volume)	13057.0	13	159.6

Source: Own research

In the case of UHT milk, the packaging elements that attract the most attention are the nutrition declaration and detailed information about the product. The surveyed individuals devoted relatively much attention to the exploration of the date of minimum durability – it was the third most eye-catching element of the packaging. The surveyed looked at it for an average of 1919 ms. Detailed product information remains the area that attracts the most attention after standardization of packaging components (taking into account their size). Heat maps for tea packaging are presented in Figure 2.

Figure 2. Heat maps of tea packaging



Source: own research

Table 2. Basic parameters for ET – tea packaging

Area of interest analysis (AOI)	Entry time in ms (average)	Sequence	Dwell time in ms (average)
'Premium tea', mass	939.9	1	5155.7
Logo (front)	5156.6	2	583.1
Additional information 1	6255.2	3	2605.5
Bar code	6704.5	4	653.9
Photographic background	7080.5	5	790.0
'Best before' date	7527.1	6	1767.3
Product's certificates and awards	8815.8	7	2605.4
White space	9184.1	8	234.6
Logo (back)	9869.5	9	460.3
Additional information 2	11378.1	10	1356.5
Additional information 3	12515.6	11	1636.3

Source: Own research

In the case of tea, the packaging elements that attract the most attention are the product name, detailed information about the tea, product's certificates and awards. The surveyed individuals devoted relatively much attention to the exploration of the date of minimum durability – it was the fourth most eye-catching element of the packaging. The surveyed looked at it for an average of 1767.3 ms. The respondents paid the least attention to the brand's logo (front and back) and the photographic background.

Summarizing the results of ET in terms of consumer involvement in the processing of information contained on unit packaging of durable products (UHT milk and tea), it can be concluded that 'best before' labelling is one of the key information. The results obtained in this study are consistent with the study by Świda et al. (2018), where the most desirable information was the 'use by' or 'best before' date, followed

by the product composition and name of the producer. In the case of UHT milk packaging, this information is third in terms of consumer involvement (after detailed information about the product). In turn, in the case of tea packaging, the ‘best before’ information turned out to be the fourth in terms of consumer involvement, right after the product name, detailed information about product and product’s certificates and awards. The results of the eye-tracking study are consistent with the declared attitudes towards the subjective importance of information about the ‘best before’ – the vast majority of respondents indicated that this information is important to them when purchasing most food products. Additionally, respondents did not understand the differences between ‘use by’ and ‘best before’ dates. The participants of ET study claimed that these terms are synonyms. Respondents claimed that during food handling they are usually guided by the type of the product, declaring that they would throw out expired milk first, taking their time to do it with tea (results not presented).

Due to the fact that ‘best before’ labelling is one of the key information determining the informative value of unit packets of food products, it should be legible, clear and understandable for consumers. The results of research on the perception and analysis of information on packaging by consumers, where the text (linguistic) and iconic (graphic) signs are distinguished, indicate that graphical signs are easier to perceive (Reber et al., 2004; Graham et. al., 2013). On the other hand, in research on the perception and analysis of information (encoded in the form of linguistic signs) on the packaging, the key turns out to be information on the features and properties of the product and storage methods (which depends on the product category) (Wyrwa and Barska, 2016).

6. Conclusions

In the era of extensive development of stores with a self-service form of sale (convenience store, discount store, supermarkets), the unit packaging of a product becomes a mute seller. Therefore, the information value of packaging is one of the key purchasing determinants.

Information on the packaging of food products should be reliable, comprehensive and legible and understandable for consumers. 'Best before' date is one of the most important element of information engaging consumers' interest. Although its role depends on food category, consumers got used to reading it. In the case of milk, consumers still tend to treat this date as a safety guarantee, what results in food waste. ET study showed that even if consumers feel safe having expired tea, they care about the date. Lack of the minimum durability date would increase consumer uncertainty about the product' freshness and it is not clear if its abolishment would act in a preventive way. It is possible that consumers, deprived information about product's freshness, would reject it. Therefore further studies should be conducted in this field in order to propose the optimal solution in food labelling in the context of sustainable development policy and consumer protection.

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Directions of Development of Management of Quality-oriented Organizations

Abstract

Research background: The management of organisations is an important factor determining their effectiveness and development. The organisations focused on quality are the subjects which take activities directed at maintaining and creating the dynamics of growth based on improvement. The formulation of development strategies for quality-oriented organisations must be based on the analysis of potential changes determining the effectiveness of quality management in organisations.

Purpose of the article: The purpose of this paper is to analyse the potential directions of development in the management of organisations for which the strategy adopted focuses on quality-oriented development. The analysis concerns both the aspects of managing organisations in terms of organisational structure, process approach, as well as in terms of using standardised management systems.

Methods: The results presented in the paper are based on the analysis of available literature as well as normative requirements concerning the subject of the study. The analyses and views presented in the article result from the observation of trends and changes in the approach to managing organisations.

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The previous research and practical experience of the authors of the study in the field of quality-oriented organisations management constituted a contribution to the work connected with this study.

Findings & Value added: The study indicates potential directions of changes in the management of organisations in the perspective of the next decade, defines the significance of changes constituting both external and internal factors of the organisation. The results of the analysis are an example of defining key changes in quality-oriented organisations, covering aspects of organisation and management, including management systems. The defined directions of change can be a contribution to the formulation and adoption of development strategies for quality-oriented organisations.

Keywords: quality, management systems, organizational structure, process approach, integration

JEL Classification: L15

1. Introduction

Nowadays, organisations are functioning in a situation that is characterised by many changes and transformations, while at the same time pursuing sustainable success and a high position on the market. These changes affect the determination of the principles of action and mutual interaction, as well as the creation of the form of the organisation and the appropriate style of management, including the definition of processes and the implementation of selected management systems and formulation of their validation. Management, on the other hand, is a complicated system, which consists of many factors. It is worth citing here the words of P. Drucker confirming the validity of considering management functions in organisations: [Management will remain a fundamental and dominant institution in today's world. For management is not only grounded in the very nature of the modern industrial economy and the needs of the modern enterprise, to which the industrial system must entrust its productive resources, both human and material. It also expresses the fundamental beliefs of modern Western

society. It expresses the belief in the possibility of controlling the means of human existence through the systematic organisation of economic resources. Thus the efficiency and responsibility of management are of enormous importance for the whole free world] (Drucker 2017). It may be assumed, then, that the success of a modern organisation will be determined by the assumptions of a knowledge-based economy, focused on quality, taking into account the development of intellectual capital, the culture of the organisation and environmental and social conditions in a properly formed organisation.

2. From Organisation Models to Modern Approach to the Management of a Quality Orientated Organisation

The actions of more than one organised community over the centuries is directly related to the evolution of various forms of human activity, and this in turn to the philosophy of self-work and collective action, and consequently to the creation of forms of organisation and their management. There is also no doubt that the aspect of leadership activity and the principles of its functionality have been subject to change depending on the social, technical, technological, political or economic progress of society (Dudek-Burlikowska, 2019).

The literature indicate that for many centuries both aspects of management and the forms of organisation created have not been sufficiently appreciated due to the emphasis on primarily economic aspects and the fulfilment of efficiency conditions to the exclusion of the field of management.

In 1985, A. Toffler, a man known as a futurologist, defined three breakthrough periods for the implementation of knowledge in organisational forms at that time. In his idea he specified the so-called waves, the first wave being the period approx. 10,000 years ago, when agriculture took shape – the agrarian era. The second wave is the sudden conversion directly connected with the intensification of the industrial revolution, in it he detailed, for example, such elements as: the realisation of all functions, complicated structures, dominating single work,

concentration on financial resources, mass customer, narrow production assortment, long production sequences, low flexibility of the machinery park and high cost of assembly. The third wave is a time of extraordinary transformations and innovations, the so-called age of knowledge society, in which he defined the following aspects: concentration on processes, outsourcing of selected functions, narrowing of structures, domination of teamwork, continuous innovative changes, development of quality, domination of concentration on knowledge and intellectual resources, conscious, intelligent client, wide assortment of production, short production sequences (Toffler, 1985).

In the literature, therefore, there is a common standpoint among representatives of economics, economic history and management that until the 18th century the “organisational forms” created had only a few characteristics of organisational units. It was only really the breakthrough periods of waves II and III that fully influenced the formation of the knowledge, quality and innovation managed organisation.

Let us assume, therefore, that the Organization is a system having more than two subsystems, which act intentionally, having defined objectives, for which it is obvious to create and define the way of division of work in process approach taking into account properly selected forms of information transfer and ways of communication. The subsystems also indicate among themselves the subsystem which performs management and control functions in the system (Ackoff, 1999). An organisation is therefore a set of internal, ordered and connected elements that is independent of the environment. At the same time, it is also a group of people working together in a planned, methodical and synchronised manner (Griffin, 2001; Peszko, 2002).

Over the years, many organisation models have been developed, which were and still are intended to improve the functioning of organisations. A properly developed model of an organisation, and thus defining the structure of the organisation, indicating responsibilities and creating forms of information flow affecting the defined processes, is still a great challenge. In order to plan the organisation model properly, it is also worth using elements of models proposed in the literature, as well as the guidelines formulated in the ISO 9000 standards.

Chosen model o organization H. L. Leavitt Model. An organisation is a system that consists of four components that are interconnected: people, objectives, structure and technology. The defined elements of the organisation interact with each other and with the environment. They interact in a cause-effect way, i.e. a perceptible change in one element results in a change in the next element. People together with their qualifications, needs, hierarchy of values, attitudes and motivations are the pillar without which no organisation can function. Goals are viewed, for example, by the basic paradigms of the problems of objectives, and these are: classical, behavioural, systemic. Each of these emphasises, according to the name of the paradigm, the individual character of the organisation's operation. However, in all paradigms it is the objectives that confirm the legitimacy of the organisation's functioning. In addition, they are interrelated and dependent on each other, thus shaping the character and potential of the organisation. Structure is the right arrangement of elements with the individual unique character of the organisation together with their interrelationships and interconnections. Technology is both the implementation of previously existing scientific knowledge and information acquired in the course of continuous intellectual development in the field of methods, techniques, constructions. It can also be associated with a specific intellectual culture, manifested by an original style of thinking and a specific language (Bieniok, 2003; Dudek-Burlikowska, 2019; Krzakiewicz, 2008; Roszak, 2013).

H. Mintzberg Model. The model forms elements around processes. The main base consists of the following subsystems: top management, middle management, operational level and additionally the side pillars: technostructure and auxiliary units. The top management is responsible for building and defining strategy, creating information flow networks, shaping and coordinating all activities within the organisation, monitoring and motivating. Managers at the operational level are responsible for the implementation of processes occurring in the organisation – both management and related to the product life cycle, as well as supporting processes. Technostructure in an organisation is a group of analysts, engineers, planners, so-called support staff, who support the work of others in the areas of operational planning, human resources training,

quality control, occupational safety, operational research. Supporting units are persons providing indirect services, not necessarily employed permanently in the organisation, but related to research, development, public-relations, legal services, etc. (Bielski, 2004; Lunenburg, 2012).

D. Katz & R.L. Kahn Model. An organisational model consisting of five subsystems, namely: production, support, integration, adaptation, management, treated as an open system (Hassard, 1995; Jackson, 1991).

L. Krzyżanowski Model. The organisation is a totality of activities taking into account the managerial member, creative potential (people), structure, natural resources, technical and technological resources, output logistics. This model is seen as an intermediate approach between models: Katz and Kahn and systemic. According to Krzyżanowski, people create an organisation, define its vision, mission and goals – strategic, tactical and operational. Then, using the infrastructure, technology, know-how of the employees, they connect all the elements of the organisation by means of a properly formulated organisational structure. In the model, the author wanted to emphasize a broader interpretation of the perception approach to organization. Using the infrastructure, they connect all the elements of the organisation by means of a properly formulated organisational structure. In the model, the author wanted to emphasise a broader interpretation of the perception of the organisation approach (Krzyżanowski, 1999).

T.J. Peters & R.H. Waterman Model. The so-called “7S model”. The starting point for its development was the assumption that the success of an organisation depends to a greater extent on the so-called “soft” elements of management, i.e. human resources, leadership styles, organisational culture, competences, than on the so-called “hard” elements, i.e. structure, systems, strategy. The form of creating an organisation is actually a lot of relations and activities, interacting with each other and influencing each other. Interpreting the organisation through “7S” is a chance to create an organisation focused on success, valuing the involvement of employees, having a well-defined structure, emphasising organisational maturity through building an organisational culture and striving for a defined mission (Dudek-Burlikowska, 2019).

Business management today is a many-sided, complex form, often challenging to define explicitly. Management can therefore be defined as a continuous process, concerning the creation of rules, standards, forms and descriptions that bring organisations closer to achieving their objectives.

A modern approach to management was proposed by P. Drucker by defining the following aspects: flexible approach to environmental conditions and fast adaptation, proper communication within the organization, human resources management, customer orientation, acquisition of self-learning capacity of the organization, defined objectives, values, activities, tasks for all, exchange of information environment-organization, organization culture, measurement and assessment of organization performance – defining assessment model, system of indicators. The indicated features of management accentuate the importance of such elements as: forms of influence on human resources, ethics in business, norms of behavior, flow of information in management, effectiveness in taking actions related to the implementation of specific objectives, proper quality management of other systems (Dołhasz, et al., 2009; Dudek-Burlikowska, 2019).

Many authors of management science in their considerations refer to the evolution of approach to management from classical, through behavioural, systemic, situational, to the approach creating management as a philosophy of creating added value of organization (resource-based) and process approach. Thus, it is possible to specify three areas for defining management in contemporary organization: management interpreted as implementation of tangible and intangible resources to achieve the set goals, management as decision-making process, management as a way of leadership, exercising power (Morawski, et al., 2010; Szczepańska, 2013).

It is also worth noting the significance of the term modern management challenges because according to the literature they include globalization of business; quality, reliability and productivity; efficiency, ownership issues, ethics and social responsibility as well as workforce diversity. Thus, it is correct to say that organisations nowadays often operating in a global environment are subject to certain efficiency and

competitiveness related stresses, the pressure to learn in international markets, and the pressure to operate in a volatile and turbulent market. A skilful response to these mechanisms is related to the developmental capabilities of the organization and the forms of organization management, ensuring the possibility of carrying out undertakings of a qualitative change nature in all spheres of its activity (Dudek-Burlikowska, 2019).

M.E. Porter mentions that ethics, organisational culture, social responsibility are particular signposts leading to the success of the organisation, only the right way needs to be chosen. This way, preceded by appropriate decisions, is a guarantee of the company's self-development and becomes a mechanism facilitating overcoming potential crisis situations (Porter, 1990).

The modern enterprise model is a function that translates inputs into products or services depending on variables: traditional inputs i.e. labour force, fixed and working capital; employees' potential and their human capital; as well as any other non-measurable productivity determinants affecting the quality and efficiency of the organisation's functioning.

An effective organizational unit is one that has the ability to adapt to change, productive, having satisfied employees with their work. Having the ability of creativity manifested in the implementation of new, innovative ideas in the life of the organization that create new value for customers and added value for the organization. The company is conscious of the importance of the perception of quality in the organisation, constituting an instrument of management leading to a modern form of industrialisation, influencing the strategy and management model of the organisation taking into account the fact that the organisation is a process-managed system. Hence, in the PN-EN ISO 9000:2006 standard, the system is defined as a set of interrelated or interacting elements. Thus, an organization's management system may include various management systems, including quality management, environmental management, financial management, occupational safety management, among others. The quality management system in organisations is seen as a management system for directing and supervising the organisation with regard to quality (Skrzypek, 2013; Tkaczyk, 2013).

The management system is the management of an organizational unit in a planned, precise, logistic, systematic and consistent way, excluding the voluntariness of action. This system considers in its activity above all the correctness of the processes occurring in the enterprise, is flexible, reacts quickly and in a thoughtful way to changes, optimizes activities and takes into account risk aspects (Maleszka, 2009).

The contemporary perception of systems thinking in the organization is also the integration of the so-called five disciplines, i.e.: systems thinking, personal mastery, thinking models, building a common vision of the future, team learning, formed on three levels of thinking. Three Levels are: *essence* includes holism and interconnectedness; *principles* according to which structure influences behaviour, there is resistance to change the rules and reinforcement; *practices* includes so-called archetypes and simulations (Senge, 1988).

It is worth mentioning that with the development of the concept of Total Quality Management, the first information about process-oriented organisation management appeared. For the first time the relevance of the term “process” is emphasised, which is identified with a specific type of activities in correlation with the knowledge needed to perform them (Conti, 2007; Grudzewski, Hejduk, 2000).

Further development of the science of business management based on the process approach is the stage when M.E. Porter developed the concept of value chain in the area of strategic management. The foundation of the idea is the perception of the organisation as a system composed of processes. According to it, certain activities that are part of the enterprise’s processes should result in added value for interested persons and thus in added value for the organizational unit (Porter, 2006).

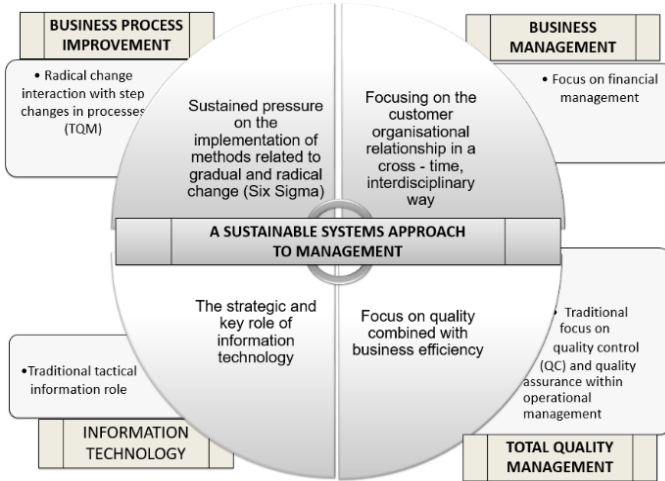
M. Hammer and J. Champy proposed the radical modifications needed to implement the process approach in an organisation, and that involved a complete abrupt shift in how employees thought about the organisation. However, they were not sufficiently prepared for that time (1990’s) for such a sudden turnaround of approach. Hence, T. H. Davenport, when assessing the opportunities, chances and threats related to the implementation of the process approach in an organisation, proposed a milder form of change consisting in the compilation of

existing organisational structures with horizontally running processes and a process-based management methodology. The acceptance of perceiving the organisation through the prism of processes resulted in the intensification of the emergence of methods, ideas and management concepts based on the process approach, and these are: Rummler and Brache methodology, Lean Management, Business Process Redesign, Business Scope Redefinition. At the same time, many IT tools have been developed to support the definition, understanding and functioning of processes, such as Workflow, Business Process Management, Enterprise Resource Planning, IT systems (Dudek-Burlikowska, 2019).

This period also saw the further development of Total Quality Management, which has become a permanent feature in the functioning of many organisations and has laid the foundations for the Six Sigma methodology, as well as influencing the transformation of the Quality Assurance System into a process-oriented Quality Management System compliant with the ISO series standards after 2000. Thus, defining processes and process management have been identified with the so-called process approach in an organisation, according to which an organisational unit should define, implement, maintain and continuously improve processes (Stabryła, Wawak, 2012).

Taking the above considerations into account, Ch. G. Cobb's proposal of a balanced systemic approach to management (Fig. 1), is the right way to look at the form of perceiving a modern process-oriented systemic organisation through the lens of quality (Goodwin, Wright, 2019).

Fig. 1 A balanced system approach to managing the organization



Source: based on [Goodwin, Wright, 2019].

In summary, the development of the requirements of today's turbulent market together with the consideration of a balanced systemic approach to the management of an organization provides for the expansion and integration of many organization management systems, the so-called global management systems, where the following are successively considered: quality (ISO 9000 series), environment (ISO 14001), quality costs and finance (BS 6143, occupational health and safety (PN-N 18001, from 2018 – ISO 45001), data security ISO/IEC/27001, social responsibility (SA 8000), knowledge management (Dudek-Burlikowska, 2019; Szczepańska, 2013; Skrzypek, 2013; Tkaczyk, 2013).

3. Organization management based on the implementation of quality management systems

Conscious and expecting success, managers look for effective and efficient management mechanisms. The dilemma related to adopting an appropriate organizational management strategy is one of the fundamental issues in this regard. Moreover, it is embracing the right management strategy for an organization impacts shaping its internal activities and directions of its development.

The ISO 9001 standard: Quality Management System is one of the most recognized standards in the world (del Castillo-Peces et al., 2018; Prado-Roman et al., 2018). According to the latest data, over one million valid certificates have been issued for the implemented quality management system. The issued certificates cover over one million organizations in over 190 countries. This undeniably proves its well-established position and the constant need for its implementation, certification and improvement by organizations worldwide (ISO, 2021).

The history of the ISO 9001 standard dates back to 1979. In 1987, the first edition of ISO 9000 was published. Since then, the standard has been reviewed and amended several times, adapting it to current changes, needs and expectations. Despite the changes to the standard, managers still see the need to use it in implementing and maintaining system management solutions that meet its requirements (Srdan et al., 2016; Prado-Roman et al., 2018).

Like each standard, the ISO 9001 standard requires reviews to be carried out by the approved schedule of works in the ISO – 176 technical committee. In over 30 years of the ISO 9001 standard history, it underwent two significant amendments in 2000 and 2015. The amendment of 2000 does characterize by consolidating the existing division of requirements into ISO 9001, ISO 9002 and ISO 9003 standards system. The amendment significantly facilitated the interpretation of requirements and the implementation of management systems in service organizations. Therefore, it was necessary to indicate the philosophy of the process approach as a significant and expected paradigm of organization management today (Pacana et al., 2017; Wolniak, 2019).

Looking at the organization through the prism of processes should be the basic assumption when planning, implementing and maintaining management systems, particularly those certified for compliance with international management standards (Chomać-Pierzecka et al, (2020); Pacana, et al., 2017; Rajkiewicz & Mikulski, 2016).

Implementing the process approach and related process management in organizations consists of optimizing the structure of organizational elements due to their impact on creating the value of the final effect of the separated processes (Skrzypek & Hofman, 2010).

The requirements for the process approach included in the ISO 9001:2015 standard correlate with one of the applicable management principles covering this issue.

Each organization carries out specific processes, and each function can be improved, which is the basis for each organization's development dynamics.

The process approach is the philosophy of managing organizations for which the process is the overriding element of management. In line with the above, allowing for the definition of process-managed organizations as process-oriented organizations (Gębczyńska, 2018).

Process management as an organizational tool puts the importance of process management, which is a dynamic and horizontal view of management, over function management used in organizations, closely related to the so-called structural and hierarchical management.

Adoption of process management in organizations allows for flexible influence on changes, both in the organization and should also concern the organization's participation in the supply chain (Adamczyk, 2018).

The adoption of a process approach by the organization and the implementation of process management also allows for the improvement of systemic management of the organization resulting from the analysis of dependencies between the processes. The assumptions related to the process approach force organizations to implement actions for the analysis, integration and improvement of both individual processes and the entire organization in connection with interactions between the processes (Skrzypek & Hofman, 2010; Wysokińska-Senkus & Senkus, 2013; Kafel, 2015; Pietras, 2018).

The implementation of process management in organizations increases the effectiveness and the effectiveness of achieving the organization's goals as a result of process improvement.

The use of the process approach in the organization's quality management system enables (ISO, 2015):

- better understanding and compliance with requirements, including through data analysis;
- analyzing processes in terms of the added value they create;
- obtaining the effectiveness of the implemented processes;
- process improvement to increase their efficiency.

Process management refers not only to processes carried out in an enterprise but also to those that occur between enterprises.

The process approach has established itself as the basic direction of the evolution of the approach to organization management. However, many enterprises are not managed in this way, and the determinant in their management is structural management (Gębczyńska, 2018).

Another significant amendment took place in 2015, and the last review of the ISO 9001 standard was completed in mid-2021.

The result of the review from 2021 states that the provisions of the ISO 9001 standard from 2015 remain unchanged. Such a situation takes place for the first time in ISO 9001. This message means that organizations that have a certified quality management system compliant with the ISO 9001 standard should strive to improve the implemented system and do not have to expect changes in the standard's requirements in the light of the next few years.

The current decision is the result of the opinions of the users of the standard obtained during the review and the aftermath of correctly made decisions and changes to the ISO 9001 standard from 2015.

The changes made to ISO 9001 standard 2015 were aimed at (based on Annex SL on the unification of the structure of standards in the field of management systems and the commonality of definitions used in them):

- levelling out differences in ISO standards in the field of management systems, and:
- ensuring a stable foundation for the requirements of the standard in the next ten years or even longer,

- maintaining the universality of standard as applicable to all sizes and types of organizations, regardless of the sector of activity,
- maintaining an emphasis on effective process management to better obtain the desired results,
- recognition of significant changes in the practice of quality systems in the field of management and technology,
- reflect changes resulting from the increasingly complex, demanding and dynamic economic environment in which organizations operate,
- simplifying the “language” of the standard and editing the content of the requirements in a style that is understandable and coherent to unambiguously interpret the requirements.

The 2015 amendment does characterized by a significant change in the documentation of the quality management system. Currently, the development of documentation requires the adoption of solutions dictated by the needs of the organization supporting the effectiveness of management, and not literal fulfillment of the standard’s requirements. Therefore, it was important to indicate the philosophy of the risk-based approach as important and expected in contemporary management of organizations (ISO, 2015).

The organisation’s experience so far since the last amendment of the ISO 9001 standard in 2015 shows that the changes undertaken at that time were well thought out, needed and valuable for users.

The confirmation of the above is the number of certifications for the management system compliant with the ISO 9001 standard.

The current decision not to make changes to the requirements of ISO 9001 should not be read as the lack of an opportunity or concept to develop further changes, but as recognition of the significance of the changes 6 years ago, and the potential that results from these changes, which organizations have not fully utilized (Jedynak, 2017).

The above indicates the potential for improvement that remains for organizations to use.

A special time that influences the shaping of organizational management solutions is the time of the global pandemic that has been going on for almost two years. This experience has created and creates changes in the approach to managing organizations at every level of

process implementation and the implementation of processes in the supply chain – cooperative cooperation. Those organizations that have successfully used system management tools contained in the ISO 9001 standard (including: risk-based approach, process approach, data analysis, improvement) could shape their resistance to specific changes resulting from epidemiological conditions affecting their activities.

The above emphasizes the importance of changes in the requirements adopted during the last amendment to standard, pointing to their topicality and the need to apply.

The above fact does not change that the actions taken to determine changes in the scope of the requirements of ISO 9001 will continue.

The ISO 9001 standard user expectations diagnosed during the last review indicate that many of them notice the need to conduct further work to improve the transparency of the standard's provisions, which will allow users to obtain more value from meeting them. In addition, the digital transformation, which also accelerated in connection with the COVID-19 pandemic, forces a new look at the applicable provisions of requirements, the quality management system must in this respect be appropriate to the goals set by the organizations and bring the expected added value in this regard (Roszak, et al., 2021).

Both changes in the business environment and their pace and continuous digital transformation will be among the most important in making decisions about the next shape of the requirements of ISO 9001 (Szczygieł, 2019). Therefore, particular attention should be paid to the transformation in human capital management, including the place and form of employees that is significantly shaped by the use of modern ICT technologies, which we are experiencing globally during the ongoing COVID-19 pandemic (Stephens & Roszak, 2021).

It should also emphasises that in the management of organizations, factors related to the environment, social responsibility, and so-called corporate governance are closely related to management (Zapłata, 2018).

Research and analyzes are underway on future quality concepts, including the concept of QUALITY 4.0, which will undoubtedly have a significant impact on the requirements of ISO 9001 during its

next amendment. Industry 4.0 is fundamentally changing the industry through evolving technologies, processes and practices that are changing the face of production. As part of the Industry 4.0 concept, the QUALITY 4.0 concept is also developing, which aims to create technologies, practices and procedures that enable manufacturers to develop, manage and maintain quality standards, extending them to the entire supply chain. Therefore, the QUALITY 4.0 has been recognized as important in shaping the scope of organization's activities in the coming years. Still, it should be borne in mind that few organizations have undertaken activities related to its implementation, and it is estimated that approx. 15% of organizations will be those that will take the trouble of its implementation in the next five years.

The above indicates the need for a special approach to review the requirements of ISO 9001 in terms of defining current and dynamically developing needs.

4. Conclusions

For many organizations, quality is a determinant of building internal and external development strategies. The organization's orientation towards implementing the Total Quality Management philosophy has been a way of effectively building a competitive advantage for nearly half a century. The experience of many organizations in this field proves the need and the rightness of deciding to implement solutions based on pro-quality thinking.

Implementing the TQM philosophy must correlate with the current needs and expectations in this area, which are conditioned both by variables inside and outside the organization.

The management of organizations in terms of the organizational structure has undergone a clear evolution aimed at searching for solutions with a high level of effectiveness in implementing management processes. It does also dictated by significant changes in the use of Information Technology (IT) and Operational Technology (OT) resources in the management of organizations. The search and implementation of

solutions aimed at flattening the organizational structures does dictated by the need to react quickly to changes, communicate about process variability, and fast information flow and related decision making.

The issues of job specialization and the associated assignment of responsibilities and powers aimed at effective management of the organisation's intellectual capital enforces the implementation of adequate approaches in the field of hierarchical management.

A significant factor influencing changes in the organizational management structure is the implementation of quality management systems based on standardized requirements. This applies to importance of management requirements in sphere of responsibility and authority and the implementation of the process approach.

The above forces organizations to implement actions related to the remodeling of existing management solutions and undertake analyses used in this area to identify potential areas for improvement.

Contemporary management of organizations in which the process approach is the way to build an organizational structure requires managers to consciously evolve the internal structure towards the so-called turquoise organizations.

The implementation and maintenance of quality management systems based on the requirements of the ISO 9001 standard supports the evolution in the field of organization management.

The decision made by the ISO technical committee regarding the lack of the need to change the requirements in the ISO 9001 standard and the time to the next revision of the requirements, should be used by organizations to improve the quality management system, including interest in the wider context of its requirements, using the requirements of the ISO standard 9004: 2018 "Quality management – Quality of the organization – Guidelines for achieving lasting success" in this respect.

Quality management systems in organizations, due to the lack of amendments to the ISO 9001 standard, do not lose their relevance, this requires the management staff in organizations to be aware of the need to use the system as a management tool and its continuous improvement, only then is the expected value obtained from maintaining and certification of the management system.

Regardless of when the next process of revising the ISO 9001 standard begins, each organization that intends to be successful must undertake improvement activities in its management, which are one of the basic goals of the conscious implementation and maintenance of the quality management system in the organization.

Due to its historical context, the ISO 9001 standard can be considered the “mother” of all standards related to systemic management. On this standard, the standards for management systems have been built and still are. Extremely important in this respect is its context relating to the construction of an integrated management system in organizations, or its direct relationship with industry standards, such as the IATF 16969:2016 standard.

Managers, when analyzing the needs for the integration of management systems, in particular aimed at holistic management of the organization, including in the aspect of environmental, work safety, information security, business continuity, energy management, should perceive this activity as a natural consequence of the development of system management in organizations.

The issue of process management significantly relates to the issue of integration of certified management systems, in particular in terms of their purposefulness, implementation and maintenance conditioning the improvement of the entire organization.

The effectiveness of the integrated implemented and maintained organization management systems depends on the integration of management mechanisms functioning in the organization, the purposefulness of which combines specific goals for processes, criteria for meeting the requirements of standards and the dynamics of changes aimed at continuous improvement.

Actions taken by managers to evolve the management of managed organizations shortly should be focused on:

- flattening of organizational structures, including taking into account the aspects of information flow and decision-making, including decisions of particular importance for qualitative aspects,

- undertaking activities related to building high awareness of the quality culture and its acceptance and implementation in common use by all employees,
- building an organization management strategy based on a process approach as a foundation for creating a competitive advantage in terms of creating added value,
- integration of management systems as an activity with significant potential for improvement, both in operational and management activities.

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**The 11th National and 3rd International Conference on Quality
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**The CSI Method For Testing Service QA at
Petrol Stations**

Abstract

Research background: Quality is about fulfilling customer expectations. Service quality is an important element in the functioning of a company, in this case a petrol station.

Purpose of the article: The aim of this study is to research the level of consumer satisfaction using the Customer Satisfaction Index (CSI) method on the basis of petrol stations.

Methods: On the basis of the questionnaire, the CSI index was calculated, which uses ratings and weights, i.e. the importance of individual characteristics relating to the petrol station. The subjects of the survey were respondents of different ages, living in different areas, with different educational backgrounds, with different driving status, filling up with different types of fuel, driving different numbers of kilometres, taking different routes and using different cars. A group of 170 people took part in the survey.

Findings & Value added: Consumer satisfaction surveys make it possible to show the strengths and weaknesses of the operation petrol stations. This allows

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these organisations to control factors and continuously improve the quality of the services they offer.

Keywords: Service quality, CSI, Customer Satisfaction Index, Petrol stations, Quality Management

JEL Classification: D91, E71, E21, F10, H31, L15, N7.

1. Introduction

No matter what area an organisation or business operates in, it is important to have satisfied customers around it. Thanks to consumers who are satisfied, a great deal of valuable information can be obtained about the operation of a particular enterprise. Undoubtedly, a satisfied customer will certainly use the organisation's services again and recommend it to other users. An important aspect is that without the consumer, the activities of any organisation would not take place, it is the customer who is the pillar of this. There are many definitions of satisfaction, however, the most general one is the feeling of being satisfied with something and thus having one's needs or desires fulfilled. This is why it is so important to satisfy these needs and, in a very broad sense, to focus on customers. Petrol stations in particular strive to ensure the quality of the services they offer, as the market for these facilities is large and full of competing companies. Customer satisfaction surveys by petrol stations are very important. Thanks to this, it is possible to obtain information that is used, for example, in improving the quality of the offered services, both basic and additional, customer service and others.

The method used to obtain the data was a survey. The CSI method for measuring consumer satisfaction was used to analyse the data obtained. On its basis, a CSI index was calculated, which uses ratings and weights, i.e. the importance of the individual characteristics relating to the petrol station. Thus, the result obtained makes it possible to determine the level of consumer satisfaction regarding the service station.

Consumer satisfaction research is an interesting issue, thanks to which you can learn about customer preferences. It promotes the continuous

development of the organisations concerned and the improvement of the services they offer. Undoubtedly, such surveys make it possible to retain existing, trusted, loyal customers, as well as to attract new ones. No doubt such surveys are subjective, as they are influenced by a multitude of factors, additionally linked to individual requirements, desires and needs of consumers. Customer satisfaction is constantly changing, which is why it is so important to meet their expectations. Therefore, the key to success for any organisation or business is to have satisfied consumers.

2. Problem Statement

According to the ISO 9000: 2015 standard, customer satisfaction means making the consumer aware of the level at which his requirements and needs are met (PN-EN ISO 9000:2015). Another term for consumer satisfaction is emotional behaviour, which is the reaction to comparisons and experiences of customers after using a product or service, comparing it to existing benchmarks or standards (Haffer, 2000; Mazurek-Łopacińska, 2005). On top of this, satisfaction is understood by certain behaviours that accompany consumers (Kall et al., 2006).

In the main, consumer satisfaction survey methods are classified into two types. These are direct methods, which determine perceptions, customer experiences, reaction to the product, and indirect methods, which measure the determinants of satisfaction or its effects. Direct methods are further divided into objective methods, i.e. those designed to show consumers' perceptions and sensations and their experiences correlated with products, and subjective methods concerning customers' opinions (Tarczydło, 2011).

The choice of the method by which customer satisfaction is measured may depend on (Nieżurawski et al., 2003) the type of customer, the type of product proposed, the preferences of the company (research problem).

Direct methods include: research in the form of surveys, consumer complaints and suggestions, critical incident technique, SERVQUAL, user and discussion groups, telephone and face-to-face interviews, employee "quality" survey, customer loss analysis.

Surveys are one of the most popular methods of measuring consumer satisfaction. They use a questionnaire. These surveys are periodic, making it possible to isolate the evolution in consumer satisfaction. Qualitative and quantitative information is obtained through this survey method. With this method, companies can receive feedback on their activities or those of their competitors. It is characterised by a huge source of information that a company can use to improve its operations. It is a low-cost form of consumer satisfaction research (Giemza, 2013)

Complaints and suggestions from consumers are intended to focus the trader on what needs to be improved in the company's operation and offering. Complaints are associated with high costs for the company and ignoring them can lead to more serious losses. Therefore, entrepreneurs try to react and respond to complaints as quickly as possible in order to satisfy customers. According to researchers, this type of research method is a free information about consumer interests (Falkowski, Tyszka, 2001; Słowińska, 2004).

The critical incident technique refers to the position of customers as a result of their experiences, which leave a positive or negative impression. These events lead to problems in the company, hence the company deals with them immediately. Mainly, this method is used in companies that provide services, thus collecting data on quality characteristics relating to meticulous customer service (Giemza, 2013; Sokół 1999).

The SERVQUAL method uses a ready-made thematic questionnaire with which the quality of a company's service is examined. It is also a measure of how the customer perceives the company in question (Hill, Alexander, 2003).

User and discussion groups bring together qualitative data. In this case, several people, who are representatives of a certain group of consumers, are brought together to discuss their feelings correlated with the product. A researcher, otherwise known as a moderator, is in charge in charge of it (Konarzewska – Gubała, 2003). When the discussion groups' conversations relate to durable products, the discussion groups become user groups. Hence, the interlocutors can be called the end users of the product. In addition, members of discussion groups can include frontline consumer staff, company employees, managers, designers, etc.

(Sudoł et al., 2000). Personal interviews are characterised by accuracy, detail and credibility. In this type of interview, customers can accurately describe their experiences with a product, its strengths or functional shortcomings. In this case, consumer perceptions are explored in detail and more qualitative information about the product is gained compared to other methods. Telephone interviews, on the other hand, are divided into two forms: a periodic satisfaction survey of random consumers or a complaint response. The first form consists of a telephone interview with a dissatisfied consumer in order to investigate the reasons for this and to offer compensation. The second case is aimed at maintaining continuous contact with the customer, creating a silhouette of the company with the consumers' welfare in mind, and creating loyalty (Hill, Alexander, 2003; Giemza, 2013; Sudoł et al., 2000).

The staff 'quality' survey aims to determine the quality of service flowing from the company. Hence, a higher staff rating is associated with a higher quality of service and, consequently, their satisfaction is also at a high level (Sudoł et al., 2000). The last type of method is customer loss analysis. It involves finding lost consumers. Contact with such people aims to find out the reasons and errors of abandonment of the respective company. Thus, it leads to the improvement of one's own offer to meet the expectations of potential customers (Giemza, 2013; Nowicki, Sikora, 2010).

Indirect methods include: benchmarking, reports from the service's frontline staff, reports from industry associations and consumer organisations, mystery shopper, sales trends, market share trends and return on investment trends, customer retention rates.

Benchmarking is based on the cyclical measurement and comparison of a specific process carried out in a company, with a process that is performed at a higher level in another company. This is done to gain data that will help identify the best methodology for process improvement (Słowińska, 2004). Reports from the service's frontline employees are intended to show the expectations and requirements of customers. Additionally, through complaints or similar activities, they highlight the negative features of a product. Reports from industry associations and consumer organisations show results that are a statement of the

situation in the respective markets (Giemza, 2011). In the mystery shopper method, it is the researcher who becomes the customer. The aim is to show him/her the problems encountered by consumers and the quality of their service, gaining information about the product, buying it or even consuming it (Kotler, 1994). Sales trends, market share trends and return-on-investment trends are measures of buyer satisfaction. Thus, by changing, they illustrate changes in consumer satisfaction. However, relying only on this kind of information only indirectly outlines satisfaction (Giemza, 2013). The last method given is the customer retention rate. It depicts the number of first-time purchasers of a product to those who bought again in a given period, from the same company. It is a comparison of the number of buyers of that company at the end of the year to the number at the beginning of the year, expressed as a percentage (Giemza, 2011).

In addition, direct methods can include indicator methods. A distinction is made (Biesok, 2016). CSAT – general satisfaction index, CSI – customer satisfaction index, NPS – net advocacy rate, CES – customer effort index, matrix indicators.

3. Research Questions/Aims of the Research

The subject of this research is the opinions of a group of respondents regarding their satisfaction rating in relation to the quality offered by petrol stations.

4. Research Methods

The CSI method is characterised by its high popularity considering today's times. It is based on research in the form of a survey questionnaire, measuring customer satisfaction. With this method, it is possible to obtain information on specific consumer expectations, the value of these expectations, products and services, investment in them and de-

velopment (Wolniak R, Skotnicka, 2008). The CSI makes it possible to examine the degree of customer satisfaction taking into account specific features. In addition, this study uses a weighted scale. Thus, the final result includes specific characteristics and the weights that are assigned to them (Woźniak, 2017). The CSI indicator method is a measure of customer satisfaction taking into account the relevance of conditions, their fulfilment, consumer demands. Moreover, it takes into account the characteristics reflecting the company's activity, which include the characteristics of the products, the competence of the employees, the similarity to products from competitors (Hamrol, 2005). With this method, the result obtained manages to be presented as a single figure. Thus, it is possible to correlate a particular company with others that are operating at the same level.

4.1. Characteristics of the CSI method

The following procedures, which are the most relevant, are followed to determine the CSI. These include (Kramarz, 2014) conducting a study using a survey questionnaire, collating the data obtained, determining the CSI, creating a quality map.

Using the CSI method, a questionnaire is created in the form of a survey. During the survey, respondents answer questions based on their perceptions and experiences in order to evaluate customer service and, importantly, assign specific weights to them. The resulting data are then collated and analysed (Woźniak, 2017). The next stage is to determine the CSI using formulas. This stage is complex. In order to calculate this index, formulas are required. First, the factor scores and their weights must be calculated. Formulas 1 and 2 are used for this.

$$c_i = \frac{\sum_k c_k n_{c_k}}{\sum_k n_{c_k}} \quad (1)$$

$$w_i = \frac{\sum_k w_k n_{w_k}}{\sum_k n_{w_k}} \quad (2)$$

The symbols in the formulas indicate in turn:

c_i – assessment of consumer satisfaction i-this requirement, c_k – evaluation of consumer satisfaction with a particular factor, n_{ck} – number of occurrences of a given response for a particular factor, w_i – weight of i-this requirement, w_k – the weight of a particular factor, n_{wk} – the number of occurrences of a given response from the range of importance of a particular factor.

The relative weights for the previously obtained indicators and the value of the CSI are then calculated. Formulas 3 and 4 are used for this.

$$w_{iw} = \frac{w_i}{\sum_{i=1}^n w_i} \quad (3)$$

$$CSI = \sum_{i=1}^n w_{iw} c_i \quad (4)$$

The symbols in the above formulas mean the following:

w_{iw} – relative weight of the i-this requirement, CSI – Consumer Satisfaction Index, I – number, n – number of factors used in the study.

Subsequently, formula 2 is used to determine the maximum score for this indicator that can be achieved:

$$CSI_{max} = \sum_{i=1}^n w_i c_{i max} \quad (5)$$

where:

CSI_{max} – the maximum indicator score that can be obtained, c_{imax} – maximum consumer satisfaction rating for the i-this requirement.

Based on the above formula, the CSI% is calculated, which is presented as a percentage. For this purpose, formula 6 is used:

$$CSI\% = \frac{CSI}{CSI_{max}} 100\% \quad (6)$$

where:

CSI% is the CSI value expressed as a percentage.

When the CSI is expressed as a percentage, the parameters in Table 1 can be used to analyse the CSI. However, it is worth mentioning that each company or organisation has different specifications and, therefore, the following criteria are not universal and need to be modified (Wolniak, Skotnicka, 2008).

Table 1. Evaluation criteria for the CSI% indicator

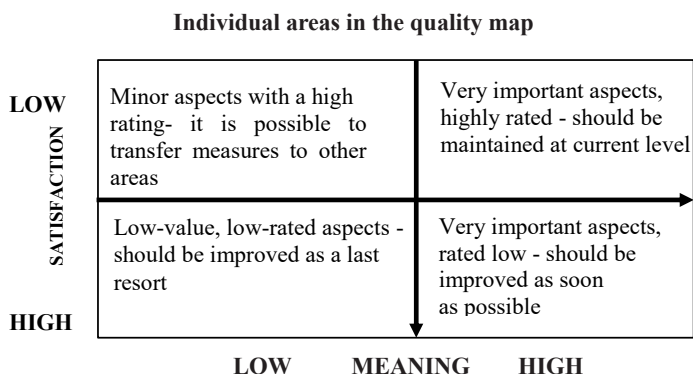
CSI % value criteria	Assessment
0–40%	Very poor – customer extremely dissatisfied
40–60%	Poor – customer dissatisfied
60–75%	Average – there are some problems in terms of customer satisfaction
75–90%	Good – there are few problems with customer satisfaction
90–100%	Very good – customer satisfied with a high degree

Source: Wolniak, Skotnicka, 2008

The final stage of the method discussed is the drawing up of a so-called quality map. Figure 1 shows the structure of such a diagram. It is divided into four parts. The quality map can suggest which areas

should be improved, which should be corrected as soon as possible, which aspects should be kept stable and which should be overinvested in. On the vertical axis, consumer satisfaction ratings are drawn, while the horizontal axis shows the relevance of a particular factor (Woźniak, 2017; Zimon, Kruk, 2015).

Figure 1. Construction of the quality map



Source: Woźniak, 2017

In summary, in a broader reference, research using the CSI method takes place in several stages. These include, in turn, detailing the customers of the company being surveyed, isolating the elements through which consumers perceive the degree of quality of products and services, creating a survey questionnaire, conducting the actual survey, collating the data obtained, determining the CSI index, depicting the results on a quality map, and presenting the results (Mazurek-Łopacińska, 2005).

4.2. Procedure of research

The subjects of the study were respondents of different ages, living in different areas, with different educational backgrounds, with different driving statuses, filling up with different types of fuel, driving different numbers of kilometres, taking different routes and using different cars. A total of 170 people took part in the study. The characteristics of the research subject were drawn up by means of a metric included in the questionnaire. It includes basic data such as gender, age, place of residence, education, work situation and factors related to the use of service stations. Table 2 shows the gender breakdown of respondents. 53% of respondents are male, while 47% are female.

Table 2. Socio-demographic profile of the respondents

In total	Number of respondents	Percentage
	170	100.0
Gender:		
female	80	47
male	90	53
Age:		
18-30 years old	85	50
31-40 years old	31	18
41-50 years old	40	24
51 years and more	14	8
Place of residence:		
rural area	52	31
city to 30 th. Residents	29	17
30 – 300 th. Residents	24	14
city with more than 300 th. Residents	65	38

Source: own study based on research.

According to the data collected in the survey, 38% of respondents fill up with petrol. 37% choose diesel, while only 3% of respondents choose gas. There are also those who fill up with all types of fuel. 10% choose petrol and gas. 8% fill up with both petrol and diesel. In contrast, 3% of respondents choose any type of fuel. This may be due to the respondents' use of different cars.

More than half of respondents fill up with fuel 3 or more times a month (53%). 34% of people visit the station to buy fuel twice a month. In contrast, 12% are respondents who refuel once a month. 1% do not refuel at all. This is due to the fact that few people recognise themselves as a passenger.

Splitting of respondents by the number of kilometres driven per month as a driver. 32% covered 500-1000 kilometres. 31% are respondents who drove between 200 and 500 kilometres. More than 1 000 kilometres driven accounted for 29%. 8% of respondents covered less than 200 kilometres.

Less than half of respondents drive more in the city than on the road (45%). 35% of respondents drive more on the road and less in the city. Those driving mainly in the city represent 17% of all respondents. In contrast, 3% are those driving largely on the highway. None of the respondents drive mainly on the motorway. The responses obtained show that most people own a private car. Only 8 respondents use company cars. In contrast, 1 of the respondents does not use a car at all.

As many as 98% of those surveyed were drivers. Only 2% are passengers. This is because the survey is aimed at vehicle users, who are generally drivers.

4.3. *Test method*

The study used a diagnostic survey method, with a questionnaire technique. The study was conducted using an original survey questionnaire, which was carried out using a web form. Participation in the survey was anonymous and voluntary. The survey consisted of both closed and open questions as well as a metric. The closed questions,

related to the service provided at petrol stations, were aimed at finding out which petrol stations were used most frequently by respondents. They revealed the factors that guide respondents in selecting a particular facility. In addition, they addressed the additional services offered by stations, their availability, types, frequency of use, and overall assessment. Questions also reported on the quality of service at the service stations used by respondents. Statements included the degree of satisfaction in relation to petrol stations. Factors taken into consideration included additional services on offer, accessibility of stations, professional staff, cleanliness, courtesy of station staff, free toilets, availability of refreshments, reliability, availability of loyalty schemes, prices of additional services, security, station facilities, lack of queues, speed of service, convenient location, price of fuel, network membership of stations, quality of fuel offered, facilities offered by stations, lack of queues at pumps and cash registers, well-known brand of fuel station, external appearance of station.

The metric questions asked for basic information about the respondent. His/her age, gender, place of residence, professional situation. In addition, for the purposes of the study, questions were drawn up about the respondent's status as a driver or passenger, the status of the car used, the status of the driver, the type of fuel filled, the respondent's most frequently driven route and its length.

5. Findings

The CSI method was used for implementation. The measurement tool is a questionnaire, which consists of 22 listed factors. The responses obtained were analysed in an Excel spreadsheet. First, the scores of each factor and their weights were calculated. Formulas 1 and 2 were used for this. Table 3 shows the responses obtained, which relate to the degree of satisfaction and the importance of each factor regarding the petrol station. The values indicate the average satisfaction rates, i.e. the ratings, and the average importance rates, i.e. the weights, of each factor.

Table 3. Presentation of detailed analysis of the 22 factors

Satisfaction index	Satisfaction					Factors	Importance					Significance index
	Delight	Satisfaction	Not too bad	Dissatisfaction	It couldn't be worse		It is fundamental	It matters	Indifference	It is of minor importance	It does not matter	
	5	4	3	2	1		5	4	3	2	1	
3,77	17	98	54	1	0	x_1	25	89	39	12	5	3,69
3,96	28	111	27	4	0	x_2	77	85	8	0	0	4,41
3,84	23	99	46	2	0	x_3	35	100	30	4	1	3,96
3,92	31	96	41	2	0	x_4	61	99	10	0	0	4,30
4,02	32	110	28	0	0	x_5	54	98	17	0	1	4,20
4,27	65	87	17	1	0	x_6	76	70	21	2	1	4,28
3,89	29	96	42	3	0	x_7	31	80	45	11	3	3,74
3,99	47	79	40	4	0	x_8	49	75	34	7	5	3,92
3,75	31	75	57	4	3	x_9	28	63	61	13	5	3,56
3,43	14	64	74	17	1	x_{10}	30	77	50	9	4	3,71
3,92	30	99	39	2	0	x_{11}	68	85	17	0	0	4,30
3,96	30	106	32	2	0	x_{12}	50	105	14	0	0	4,19
3,69	23	80	59	8	0	x_{13}	46	98	25	0	1	4,11
3,98	35	98	35	2	0	x_{14}	54	95	21	0	0	4,19
4,09	49	91	27	2	1	x_{15}	72	85	12	1	0	4,34
3,43	26	56	58	25	5	x_{16}	77	75	15	1	2	4,32
3,69	31	64	68	6	1	x_{17}	50	70	41	6	3	3,93
4,04	44	92	32	1	1	x_{18}	98	61	9	1	1	4,49
3,45	17	60	77	14	2	x_{19}	24	60	68	7	11	3,46
3,65	22	81	54	12	1	x_{20}	44	98	22	4	2	4,05
3,95	42	84	39	4	1	x_{21}	58	70	35	4	3	4,04
3,95	32	99	37	2	0	x_{22}	45	87	33	2	3	3,99

Source: own study based on research.

Explanation of abbreviations used:

x_1 – Extensive range of additional services, x_2 – Station availability, x_3 – Professional service, x_4 – Cleanliness, x_5 – Courtesy of station staff, x_6 – Free toilets, x_7 – Availability of catering facilities, x_8 – Reliability (I know I will always make a purchase when it is not possible at another facility, e.g. closed shops), x_9 – Availability of loyalty programmes, x_{10} – Prices for additional services (e.g. a restaurant, car wash or grocery shop), x_{11} – Safety, x_{12} – Station equipment, x_{13} – No queues, x_{14} – Speed of service, x_{15} – Convenient location, x_{16} – Price of fuel, x_{17} – Membership of a station in a given network, x_{18} – Quality of fuel offered, x_{19} – Facilities offered by the station, e.g. baby changing table, helmet rack in the toilet, etc, x_{20} – No queues at distributors or cash registers, x_{21} – Well-known petrol station brand, x_{22} – External appearance of the station (state of infrastructure, design).

Considering the results obtained, it is found that the highest rated aspect of satisfaction relates to free toilets with a value of 4.27, while the lowest relates to the prices of additional services and fuel prices with a value of 3.43. Regarding the importance of individual factors, the situation changes. The quality of fuel offered was considered to be the most important (4.49), while the amenities offered by the station were considered to be the least important (3.46).

The next step in the calculation is to determine the relative weighting for each indicator. Subsequently, the value of the CSI was calculated. Formulas 3 and 4 were used for this. The next step was to determine the maximum value of the CSI, i.e. CSI MAX and CSI%. Formulas 5 and 6 were used for this. The resulting values from the calculations are shown in Table 4.

According to the calculations, the CSI is 3.856. Consequently, the CSI% is 77%. According to Table 4 in the theoretical section, it can be considered relatively good. Undoubtedly, it should be noted that customer demands are constantly increasing and dynamic in nature. The indicator is at a high level. However, in order to satisfy customers, it is important to continuously improve the business area of the service station. It is certainly worth analysing the factors that are at a low level.

Table 4. Calculation of the index CSI, CSI max, CSI%.

Satisfaction factor	Factor assessment	Factor weight	Relative weight	CSI index	CSI MAX	
x_1	3,77	3,69	0,041	0,156	0,207	
x_2	3,96	4,41	0,049	0,196	0,247	
x_3	3,84	3,96	0,044	0,171	0,222	
x_4	3,92	4,30	0,048	0,189	0,241	
x_5	4,02	4,20	0,047	0,189	0,235	
x_6	4,27	4,28	0,048	0,205	0,240	
x_7	3,89	3,74	0,042	0,163	0,209	
x_8	3,99	3,92	0,044	0,175	0,220	
x_9	3,75	3,56	0,040	0,150	0,200	
x_{10}	3,43	3,71	0,042	0,143	0,208	
x_{11}	3,92	4,30	0,048	0,189	0,241	
x_{12}	3,96	4,19	0,047	0,186	0,235	
x_{13}	3,69	4,11	0,046	0,170	0,230	
x_{14}	3,98	4,19	0,047	0,187	0,235	
x_{15}	4,09	4,34	0,049	0,199	0,243	
x_{16}	3,43	4,32	0,048	0,166	0,242	
x_{17}	3,69	3,93	0,044	0,163	0,220	
x_{18}	4,04	4,49	0,050	0,204	0,252	
x_{19}	3,45	3,46	0,039	0,134	0,194	
x_{20}	3,65	4,05	0,045	0,166	0,227	
x_{21}	3,95	4,04	0,045	0,179	0,226	
x_{22}	3,95	3,99	0,045	0,177	0,224	
$\Sigma=89,18$				CSI	CSI max	CSI %
				3,86	5	77%

Source: own study based on research.

Based on the results obtained, a quality map was developed. This involves depicting the results of the evaluation of each factor influencing consumer satisfaction. The first step in drawing up the quality map is to determine the points of distribution. To begin with, it is important

to calculate the average weights of all factors. To do this, Formula 7 was used.

$$w_{sr} = \frac{\sum_{i=1}^n w_i}{n} \quad (7)$$

where:

w_{sr} – average weight of all factors.

Thanks to these calculations, the division of the axis of importance or meaning was obtained. On the other hand, the division point of the satisfaction axis was taken from the CSI index, which was calculated above. The developed results are presented in Table 5.

Table 5. Determination of quality map division points for collected studies

Satisfaction factor	Factor weight	Factor assessment
x_1	3,69	3,77
x_2	4,41	3,96
x_3	3,96	3,84
x_4	4,30	3,92
x_5	4,20	4,02
x_6	4,28	4,27
x_7	3,74	3,89
x_8	3,92	3,99
x_9	3,56	3,75
x_{10}	3,71	3,43
x_{11}	4,30	3,92
x_{12}	4,19	3,96
x_{13}	4,11	3,69
x_{14}	4,19	3,98
x_{15}	4,34	4,09
x_{16}	4,32	3,43

Satisfaction factor	Factor weight	Factor assessment
x_{17}	3,93	3,69
x_{18}	4,49	4,04
x_{19}	3,46	3,45
x_{20}	4,05	3,65
x_{21}	4,04	3,95
x_{22}	3,99	3,95
The average	4,05	3,86

Source: own study based on research.

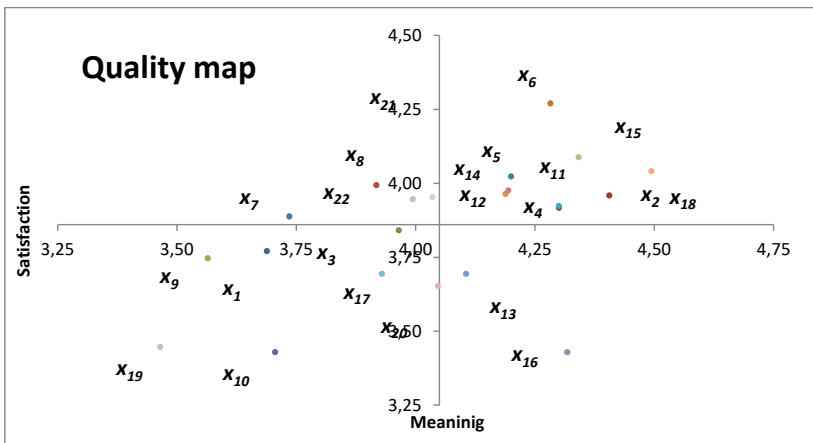
Based on the results obtained above, the map was divided into four parts. The division points are 4.05 on the importance axis and 3.86 on the satisfaction axis. A graphical display of the results is shown in Figure 8. Factors that are highly rated by customers with low importance to them are unimportant. Features above the satisfaction axis are among the most satisfactory. Thus, there is a need to sustain them at the existing level. The factors below the satisfaction axis require improvement, and are divided into those that need to be corrected in the immediate period or can be postponed over time.

The Figure 2 shows the quality map. Analysis of the quality map allows us to conclude that:

- Areas that are highly important and should be maintained at the current level are: quality of fuel offered (x_{18}), cleanliness (x_4), safety (x_{11}), station equipment (x_{12}), their accessibility (x_2), speed of service (x_{14}), courtesy of station staff (x_5), convenient location (x_{15}) and free toilets (x_6),
- The areas that immediately need to be improved and given special attention are: fuel prices (x_{16}) and the lack of queues (x_{13}),
- Professional service (x_3), a wide range of additional services (x_1), the availability of loyalty programmes (x_9), the affiliation of a station to a particular chain (x_{17}), no queues at pumps (x_{20}), prices of additional services (x_{10}) – these are areas that need improvement, not necessarily in the short term,

- Areas that meet consumers' expectations are: reliability (x_8), external appearance of the station (x_{22}), well-known brand of petrol station (x_{22}), availability of catering offer (x_7), with these factors being of little importance to customers.

Figure 1: Quality map



Source: own study based on research

6. Conclusions

Based on the above research, it can be concluded that the study of consumer satisfaction is quite important for the activities of any rganization or enterprise. The CSI method, which was used in this study, served to find out the degree of fulfilment (satisfaction) of petrol station customers.

Based on the research conducted and analysed, the following conclusions can be drawn:

The quality of fuel offered, cleanliness, safety, station facilities, their accessibility, speed of service, courtesy of station staff, convenient lo-

cation and free toilets are particularly important to customers who use service stations. These factors cannot be overlooked for improvement in the opinion of customers.

The indicator obtained is at a good level, however, the quality of the services offered by petrol stations needs to be continuously improved. This is influenced by the constantly changing demands of customers.

Consumer satisfaction surveys make it possible to show the strengths and weaknesses of service station operations. This enables these organisations to control factors and continuously improve the quality of the services they offer, while permanently improving their actions.

Factors such as reliability, the external appearance of the station, the well-known brand of the service station or the availability of catering facilities are the least important to respondents.

The graphical presentation of the results in the form of a quality map makes it possible to interpret each factor influencing customer satisfaction. Thanks to this depiction, it is easier to see features that are at the right level or those that need to be improved.

Petrol stations are not only a place where you can fill up your car. They are also a facility where it is possible to have a coffee, eat a meal, use a car wash and other services. Petrol stations are constantly striving to improve their services on various levels. The facilities in question are constantly monitoring customer satisfaction levels in order to better understand the customer and meet their needs and wishes. A satisfied customer is sure to return to use a particular service station again. Both to refuel their car and to make use of the additional services offered.

Based on the analysis of the literature on the subject and the own research carried out, it can be concluded that the survey of consumer satisfaction is very important in the aspect of the activities of all enterprises and organisations. It makes it possible to find out the needs and requirements of customers. The aim of this study was to check consumer satisfaction using the CSI method on the example of a petrol stations. Using a questionnaire prepared for the purpose of the study, the opinions of respondents on the satisfaction of the services offered by petrol stations were collected. The answers obtained were analyzed, among other things, by characterizing the respondents. On the basis of

the collected surveys, calculations were carried out, resulting in the CSI index, thanks to which the level of satisfaction of customers using the services of petrol stations was determined. Based on this, a graphical representation of the ratings of factors influencing customer satisfaction was drawn up in the form of a quality map.

In conclusion, the research showed that customers are satisfied with the service offered by the service station. However, this is not a reason to stay at this level. Continuous improvement is linked to customer retention and also to gaining new customers. Based on the research carried out, it can be concluded that customer satisfaction is an indispensable element in the functioning of organisations such as petrol stations.

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**The 11th National and 3rd International Conference on Quality
“Quality of the future – the future of quality”
(Cracow University of Economics, Cracow, June 09-10, 2022)**

Joanna M. DZIADKOWIEC^{1*}

**The Future of Changes Implemented
in Pro-quality Managed Enterprises During
the Covid-19 Pandemic**

Abstract

Research background: The pandemic of COVID-19 has changed our lives as well as the way we work. Our work in many cases has been changed to remote work. Companies had to elaborate and implement actions toward dealing with the pandemic situations. In many cases the implementation of ISO 9001 standards helped them to be prepared for risky situations.

Purpose of the article: The purpose of this paper is to identify the main actions taken during the COVID-19 pandemic in Polish enterprises.

Methods: The research took place in 2021 with the usage of the mixed mode survey procedure using different data collecting modes. In this study, the CAPI and CAWI methods were used.

Findings & Value added: It was shown that the main three activities taken during the pandemic of COVID-19 were: remote work, remote quality management, core pandemic regimes.

Keywords: remote work, post-pandemic plans, firm behaviour

JEL Classification: D22

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1. Introduction

Since March 2020, the world has been struggling with the challenge of the COVID-19 pandemic. In fear of the rapid spread of the virus, measures have been taken in all countries around the world to limit the transmission of the pathogen. Educational institutions, factories and service companies were closed or operated in a strict sanitary regime.

Also in Poland, the state authorities took a number of measures to prevent the spread of the virus. The restrictions slowed down the development of the pandemic, but on the other hand, businesses were disrupted. Enterprises were forced to quickly adapt to new operating conditions. As a result, remote work and digitization processes have been introduced in organizations on an unprecedented scale.

As a result, as much as 84% of Polish enterprises increased the number of people working remotely in 2020 (ARC, 2020). During the first wave of the pandemic, over 50% of Poles worked remotely, and in the group of young workers it was even 60% of employees. At the end of April 2020, remote work was performed by over three-quarters of white-collar workers in Poland, including 41% working only remotely, and 35% working in hybrid mode (Procontent, 2020). During the next year of the pandemic (2021), every tenth respondent worked remotely. People who worked in a remote work system most often performed their work in this form from 10 to 20 working days per month. The vast majority of employees (approx. 94%) who provided remote work, positively assessed its quality (UKE, 2021).

Currently, despite the fact that restrictions on social distancing are no longer in force, still 35% of Poles work remotely or hybrids. What's more, as many as 9 out of 10 people do not want to return to the traditional model (Grupa Pracuj, 2022). So it seems that a return to the pre-pandemic work style is no longer possible, as both employees and employers have changed their approach to the way work is organized. It is very likely that remote work as well as other solutions implemented during a pandemic will be developed and improved also in the post-pandemic period.

The purpose of the paper is to find out which of the changes, forced by the pandemic, are viewed positively by enterprises and what's more, they intend to maintain them in the post-pandemic period.

2. Problem Statement

Remote working is defined as a flexible work arrangement whereby workers work in locations, remote from their central offices or production facilities, the worker has no personal contact with co-workers there, but is able to communicate with them using technology (Di Martino & Wirth, 1990). It is a working model, developed since information and communication technologies (ICT) have enabled its organization. Remote working is also often referred to as telework, telecommuting, virtual work, and remote working arrangement (Campbell & McDonald, C., 2009). Various solutions are possible in this area – from individual work at home using a computer and telephone, to a thorough decentralization of the entire enterprise, which consists in dispersing the network of employees regardless of their location (Trziszka, 2020).

Remote work began to be more widely used in the second half of the 20th century, a period of very dynamic technological development. The main reasons for popularizing this form of employment were changes, both in the market and in organizations, and the increase in the pace of development of information technologies used by enterprises (Nilles, 2003). In Poland, such a way of working was implemented since the 1990s.

But it was during the COVID-19 pandemic that there was a sudden shift in the way people work. To keep business continuity, many organizations implemented a remote work working policy (Tanpipat et al., 2021). This period of pandemic became a massive experiment of the remote work operation. Employees who have never worked remotely under normal circumstances were required to do so during this crisis (ILO, 2020). Therefore while remote working is not new, the pandemic seems to have successfully exposed the positives, the negatives, and the inadequacies associated with remote working (Williamson et al., 2020).

Many new, previously unknown problems have been faced by employers, such as: the organisation of the remote work, the supervision and monitoring of work performance, work efficiency, and employee support (Raišienė et al., 2020). Employers' reluctance to facilitate remote working is also due to some perceived adverse consequences thereof, such as limited communication, employee isolation, work intensification, disengagement, reduced dedication and commitment and loss of control over employees' work processes (Martin and MacDonnell, 2012; Bessa and Tomlinson, 2017). Home workers also complain about various external distractions, such as noise from family members or technical failures (Maghlaperidze et al. 2021).

Remote work bring also many benefits, both for employees and employers. Above all, it is the good way to reduce costs and maintain a work-life balance (ILO, 2020). The relationship between remote work and job satisfaction derives from the assumption that remote work gives workers more flexibility and autonomy in their work performance while allowing them to meet both work and personal (personal and family) needs (Schall, 2019). Therefore, employers increasingly see the advantages of remote work as facilitating work flexibility, increasing work autonomy, increasing productivity, reducing business costs, reducing employee turnover intentions, improving work-life balance, improving job satisfaction, reducing commuting costs and increasing involvement in work (Stavrou & Kilaniotis, 2010; Ter Hoeven & Van Zoonen, 2015).

Regardless of the perceived drawbacks of remote work, however, it seems that it will be impossible to return to the pre-pandemic working model, especially as it is not certain that there will be no more waves of the pandemic. During the next, highly uncertain period, workers, employers, and governments will have to adapt to new way of living and working, which will require new behaviours and new norms. It most likely will involve a hybrid or blended form of isolation (i.e., teleworking) and deconfinement (i.e., the possibility to use the workplace but with controlled conditions based on physical distancing). (ILO, 2020). Many authors point out that the pandemic has forced many organizations and employees to consider continuing flexible and remote working options also in the future (Diab-Bahman and Al-Enzi,

2020; Aleksander et al., 2021, Kane et al. 2021; Pokojski et al., 2022). However, it is difficult to find studies indicating which of the actions taken by enterprises during the pandemic turned out to be the most useful and may constitute added value in the future. Therefore, the aim of this article is to contribute to filling this research gap.

3. Aims of the Research

The purpose of the paper is to find out which of the changes, forced by the pandemic, are viewed positively by enterprises what's more they intend to maintain them in the post-pandemic period. It was assumed that in the case of pro-quality managed organizations, it is possible to categorize these factors into homogeneous groups, because the implemented quality management system standardizes and unifies the activity of each organization, regardless of the size or industry (ISO 9001: 2015).

4. Research Methods

The data analysed in the paper is a part of a project which aim was to study the organizational behaviour of pro-quality managed the enterprises during the Covid-19 pandemic (Zarządzanie..., 2021). The research was conducted in 2021 using the mixed mode survey procedure using different data collecting modes. In this study, the CAPI and CAWI methods were used. The research form consisted of 5 parts focusing on various aspects related to the quality management in enterprises during the pandemic.

The paper presents the fifth part of the research in which the "post-pandemic" plans of the surveyed organizations are presented. These plans regard remote work and other solutions imposed by the pandemic restrictions. Survey sheet (part 5), presents a list of activities introduced by companies to maintain their businesses during the Covid-9 pandemic. The respondents mark the activities the organization intends to maintain in the post-pandemic period. Each described activity can be rated on a scale from 1 to 5 (1 = definitely not, 5 = definitely yes).

The organizations that met two conditions were selected for the study: (1) an implemented and certified management system compliant with the requirements of ISO 9001, (2) some employees worked remotely during the Covid-19 pandemic in 2020. The survey was taken by the employees responsible for the quality management system in the organization, mostly they were managers of these systems. The database developed for the purpose of the study consisted of 1.200 enterprises, from which 205 organizations took part in the study constituting 17.1% of the target group. Characteristics of the participants are presented in Table 1.

Table 1. Characteristics of the participants

Variable (N=205)	Number	Frequency (%)
Number of employees		
up to 9	15	7,3%
10-49	45	22,0%
50-249	77	37,6%
more than 249	68	33,2%
Annual income (PLN)		
less than 2 millions	32	15,6%
above 2 to 10 millions	28	13,7%
above 10 to 50 millions	30	14,6%
1% more than 50 millions	17	8,3%
no response	98	47,8%
Scale of the operations		
local / regional	35	17,1%
all-Poland	59	28,8%
international	109	53,2%

Source: Own study

The research covered a wide group of enterprises, most of them are organizations with more than 50 employees. One third of the respondents are large enterprises (33.2%), while 37.6% are medium-sized ones. Small enterprises constitute 22% of respondents, whereas the smallest group is represented by micro-enterprises (7.3%). The majority of the respondents are the companies of international range (53.2%), nearly one-third of them operate only in Poland (18.8%), while 17.1% focus on local/regional market.

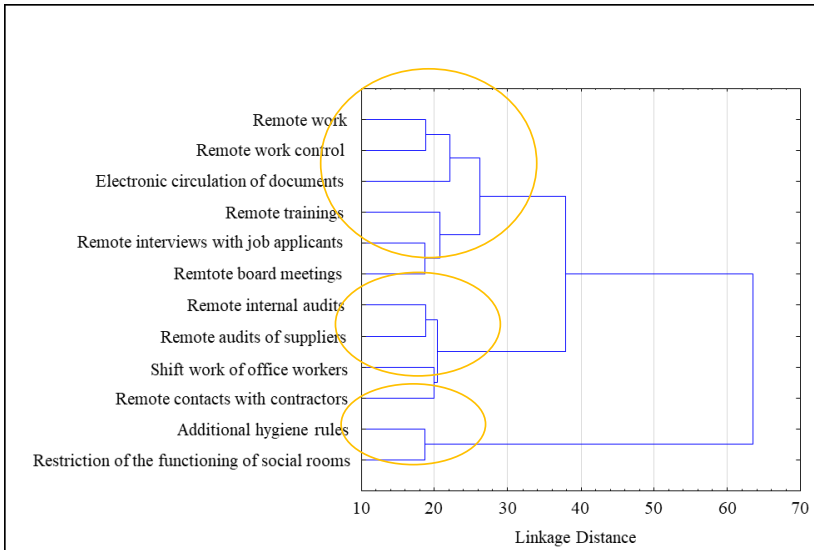
The respondents were also asked about the company's annual income but this data should be treated with caution. The smallest group represented in the survey are the businesses with the annual income more than 50 million (8.3%). Three other income groups were represented by about 15% of respondents each (from 13.7% to 15.6%). It is evident that the distribution of the declared annual incomes are not compatible with the sizes of the organizations. This situation may be due to the fact that almost half of the respondents did not answer the question concerning the annual income (47.8%). Moreover the research was conducted during the pandemic, which could have an impact on the level of revenue generated by each enterprise.

5. Findings

Cluster analysis were performed to check whether the actions implemented during a pandemic can be grouped depending on the willingness of enterprises to maintain them in the future. The Ward method was used, the distance measure was the Euclidean distance, and the type of variable linking was the single linking.

The dendrogram was created using a final partition of 3 clusters, which occurs at linkage distance level of approximately 20 (Fig. 1). The first cluster (top of the graph) is composed of 6 variables, the second one (the center of the graph) consisted of 4 variables. The third cluster (directly at the bottom) is the smallest one with 2 variables.

Figure 1. The results of cluster analysis



Source: own study

The first cluster gathers 6 variables that can be defined as “various aspects of remote work” (shortly: “remote work”). It can be divided into 2 sub-clusters (at linkage distance level 23). The first sub-cluster contains the variables: remote work, remote work control and electronic document flow, while the second group comprises of remote trainings, remote interviews with job applicants and remote board meetings. This shows that respondents similarly perceive the usefulness of continuing the solutions implemented during the pandemic. To continue and develop remote work in the future, it is necessary to implement electronic document flow, as well as the effective verification of remote work. On this basis the remote work system can be developed and extended to other activities, both internal (remote trainings and board meetings) and external (online interviews with job applicants).

The core of the second cluster are mostly activities that are linked to “remote quality management”. The organizations without implemented quality management system do not need to provide such activities as remote internal audits or audits of suppliers. However, for organizations with a certified quality management system, these activities are key to effective quality management, consequently, to maintaining certification. The other two activities that fall into cluster 2 (shift works of office workers and remote contacts with contractors) can be useful for all enterprises. However, positive contacts with the business environment is one of the principles of quality management. Therefore, it can be assumed that assigning variable “contacts with contractors” to “remote quality management” cluster results from the character of the target group of this study.

The third, smallest cluster consists of only 2 variables that can be defined as “core pandemic regimes”. They are not related to remote work and concern situations in which employees must have physical contact with each other. These variables represent two basic rules (social distance and disinfection) that prevented the spread of the pandemic. However, in the “post-pandemic” period, additional restrictive hygiene rules or restricting access to refreshments or break rooms are no longer necessary. Most of the surveyed enterprises declared that in the future they do not intend to limit employees in this way, therefore the third cluster can also be called “pandemic time only”.

6. Conclusions

The outbreak of the Covid-19 pandemic was undoubtedly a negative phenomenon, and all companies urgently needed to implement many organizational changes to survive this difficult period. The main changes were the transition to remote work as well as restrictions regarding social distancing for employees who could not work remotely. Organizations with an implemented and certified quality management system had to additionally take measures in order to ensure the maintenance of this system.

COVID-19 led to the world's largest remote working experiment which, while forced, also had positive results. Significantly, the speed of digitalization across the business due to COVID-19 related-change was accelerated even faster than workplace transformation in the normal situation (Amankwah-Amoah, 2021; IBM, 2021; Rodrigez Contreras, 2021). The pandemic has also triggered a general acceptance of remote work and plans to continue flexible working in the future. The combination of these two factors allows for the assumption that the flexible model of work will be used in the future by a large part of enterprises.

The subject of the analysis in this paper were organizations with the ISO 9001 system implemented. These enterprises, due to the implemented system procedures, should deal with problems in unexpected situations, which was undoubtedly the outbreak of a pandemic. On the other hand, they had to face additional problems related to the need to maintain the certification of implemented quality management system.

The conducted analyses show that the assumptions of the study were correct. The changes introduced by the surveyed organizations during the pandemic were categorized into homogeneous groups. The conducted cluster analysis made it possible to distinguish three clusters of activities: (1) remote work, (2) remote quality management, (3) core pandemic regimes. The grouping was based on the willingness expressed by the respondents to maintain listed activities by the surveyed organizations also during the post-pandemic period. Therefore it can be concluded that organizations are most interested in maintaining various activities related to remote work. This result is in line with other studies by other authors previously cited in this article and confirms that the pandemic has led to irreversible changes in the way you work.

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The respondents treat the activities grouped in the second cluster (remote quality management) with more reserve and much less frequently declared that they intend to continue them in the future. This may be due to the fact that the implementation of a certified quality management system consists in adapting to external requirements and procedures. Current research shows that currently also activities related to remote quality management are being developed and analysed (Nowicki&Kafel, 2021; Putrevu, 2021; Eulerich at al., 2022 . However, the number of publications is relatively small, which indicates that the topic is not yet fully understood. This article sheds some light on the subject of remote quality management, however, it seems that this topic is currently a research niche that is worth exploring.

In the last distinguished cluster, core pandemic regimes were grouped. There are activities that “normally” are not needed, so the vast majority of organizations do not intend to continue them after the pandemic.

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Perception of Organizational Culture by the Young Generation Employees in the Context of Building an Organizational Identity in the Light of Research Results

Abstract

Research background: Presentation of various approaches to organizational culture and its selected models. Showing the essence and determinants of organizational identity.

Purpose of the article: Discovering how representatives of the young generation perceive the organizational culture of enterprises/organizations they are employed in. What traits/elements of the functioning of these entities may constitute their basis for shaping their organizational identity?

Methods: A literature review on organizational culture and selected aspects of organizational identity. Presentation of the results of empirical research conducted with the use of a questionnaire tool among the representatives of the young generation representing various entities in the Lubuskie voivodeship. The research covered a group of respondents who represented entities diversified in terms of the geographical range of activities, type of activity, size of the enterprise or capital represented by their employer.

Findings & Value added: The results of the research indicated how the representatives of the young generation perceive their workplace in the context of the current organizational culture and what internal organizational condi-

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tions affect the building of organizational identity. The results can provide valuable guidance for the management in the development of appropriate programs for the social and professional adaptation of newly hired employees, and will also allow approximating their level of perception in relation to identification with the work environment. Managing the social potential in an enterprise should focus on motivating the management staff to shape an organizational climate that would contribute to building and consolidating lasting, positive ties between new employees and the enterprise/organization. Moving to a higher level of intra-organizational perception may affect the awareness of the role of company/organization employees in shaping the organizational identity.

Keywords: organizational culture; organizational identity; employees; the young generation

JEL Classification: M14

1. Introduction

Enterprises operating in the age of globalization face many challenges. Not without significance is the slogan of one of the ancient philosophers who formulated the still valid slogan “pan ta rei” – everything flows, everything changes, which concerns many areas of human activity, including the functioning of enterprises. How to meet the challenges of today in the field of business? How to stand out in the face of turbulence visible in the environment and maintain the specificity, uniqueness and unity of the company as seen through the eyes of its employees? This area of issues becomes particularly important from the perspective of the management and employees who enter their professional lives. The voice of newly hired employees is important because they will be the basis of the company’s strength in the future, also seen in the context of relations with business partners and external stakeholders.

The business world is on the verge of challenges of Industry 5.0 based on a new concept that requires sustainable development, which

becomes fully possible only thanks to the right approach to employees, as indicated, among other things, by Majerník et al. (2022) and Xu et al. (2021). A satisfied employee, who understands the basics of the assumptions of the organizational culture of the entity in which he is employed and identifies himself with this entity, constitutes a valuable capital of the enterprise, unique, non-copiable. In order for a company to build effective and efficient relations with the environment, it should start with working within its own resources (human resources). Only the driving force inherent in motivated, emotionally connected employees, involved in internal and non-organizational processes, can change the company's position on the market, raise its prestige, brand and raise relationship marketing to a higher level.

The aim of the article is to discover how the representatives of the young generation perceive the organizational culture of the companies/organizations they are employed in. What traits/elements of the functioning of these entities may constitute their basis for shaping their organizational identity. Both issues can be a glue that connects employees of enterprises, and which is particularly important, they constitute a certain platform connecting new entrants to the company with employees with more seniority in the studied enterprise or organization. Onboarding processes, important from the perspective of social and professional adaptation, understood in a comprehensive and systemic manner, can shape business relations to a new employee (business to new employees). There are a lot of publications on relationship marketing understood in the context of an enterprise – its external environment/external stakeholders; however, there is no in-depth, comprehensive, systematic (system/process) and multi-faceted analysis of broad conditions shaping the internal mechanisms of bottom-up socio/psychological processes within a particular enterprise in the post-pandemic period. The article is part of this topic, not only due to the period of research, but also due to the combination of issues related to organizational culture with the features of organizational identity, which refer to the areas/elements of the company's functioning – the workplace in the context of its internal and external sources.

In order to implement the adopted assumptions, the literature on organizational culture and selected aspects of organizational identity

were reviewed. For the purposes of the publication, empirical research was also carried out using the tool of a questionnaire among the representatives of the young generation representing various entities in the Lubuskie voivodeship, in the western part of Poland near the border with Germany, in March and at the beginning of April 2022. The research can be a valuable inspiration for reflection and then taking appropriate implementations of appropriate solutions in the field of management of young generation employees for representatives of the business world, including management staff of not only domestic companies operating in this area, but also foreign entities that mark their presence on the labour market after the demand side as job offerors. It is certainly an important step to discover and better understand and further explore research on the attitudes of young Poles not only from the border region, but also other areas of our country after large turbulent changes caused by the pandemic. Such research is badly needed nowadays. This applies not only to Poland but also to other countries.

2. Organizational culture – its essence, models, meaning

According to E. Schein, a leading representative dealing with organizational culture, it should be associated with “a pattern of shared basic assumptions that was learned by a group as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems” (Schein, 2004). Martins and Terblanche (2003) define it as norms, sets of values, social ideals or beliefs that are shared by members of an institution. Lee and Yu (2004) point to “a set of values and norms common to organizations”. A very frequently cited approach to culture is Hofstede’s (2011) definition, which assumes that it is “collective programming of the mind that distinguishes the members of one group or category of people from another”.

According to M. Armstrong and S. Taylor, “organizational or corporate culture is the pattern of values, norms, beliefs, attitudes and

assumptions that may not have been articulated but shape the ways in which people in organizations behave and things get done” (2017, p. 146). Analysing the approach of Tuan (2012), it should be considered that organizational culture should be perceived as a process of a continuous nature, which concerns not only the building/rebuilding of identity in the organization but also around it (Tuan, 2012). The new concept of the organizational culture of the future takes into account the situational awareness of a given economic entity, taking into account specific social and psychological conditions in connection with interpersonal and group dynamics. The future concept should be based on the implementation in practice of the company’s life not only of shared knowledge but also orientation on certain issues, the group spirit of “vitality” and active aging, which is to mean the exchange of experiences (Karapancheva, 2020, p. 42).

According to Daniel (2019, p. 97), “organizational culture comprises the attitudes, experiences, beliefs, and values of the organization, acquired through social learning, that control the way individuals and groups in the organization interact with one another and with parties outside it”.

A different approach to organizational culture is presented by Trompenaars and Hampden-Turner (2002). They are of the opinion that the four models of enterprise cultures they distinguish can be described with the use of features, among which it is particularly worth paying attention to: relations between employees, attitude towards authority, ways of thinking and learning as well as motivating and rewarding, attitudes towards employees, criticism and conflict resolution.

“Organizational culture is a system of consciously and intuitively shared beliefs and attitudes by employees and their recognition of values, ideas, behaviour patterns, principles of good work, implemented strategy and mission, essential for the life of the company” (Baňka, 2009, p. 18). Organizational culture has specific components that determine its quality. According to W. Baňka, these components include: knowledge about the company, the company’s location on the market, products, etc., emotional attitude to the elements that create culture,

the level of readiness to achieve goals at various levels, ranging from strategic to operational (Bańka, 2009).

One should agree with Lee (2011), who believes that organizational culture can be compared to the character of a person who defines it.

Culture for an organization defines the course of action and also influences the motivating system (Nogalski, Szpitter, 2012).

Its significance is essential as it affects the company's operations, contributes to the success of a particular economic entity (Rezaei et al., 2016), is related to its competitiveness (Cameron, Quinn 2006, Bogdanowicz, 2014), efficiency (Cameron, Quinn 2006; Amah, Dam-inabo-Weje, 2013; Sudoł, 2007), innovation and efficiency (Ha, 2020). Moreover, it determines the behaviour of the organization's members (Schein, 2004; Hofstede, 2011; Cameron, Quinn 2006).

Organizational culture, therefore, concerns many aspects of the organization's life, affects the interaction of employees, the functioning of the entire organization as an entity, it also concerns how the decision-making processes are shaped, and is also an indication for employees of enterprises on how to deal with difficult situations.

Furthermore, it influences the management style in a particular enterprise, its system of values and shapes interpersonal relations (Cameron, Quinn 2006).

The publications of such authors as e.g. Gimenez-Espin, Jime'nez-Jime'nez, Martí'nez-Costa (2013), Su, Yang, Yang (2012), prove the broad context of considerations related to the subject of organizational culture. It should be noted that its impact is visible not only in various areas of the life of a particular economic entity, but also in its relationship with the environment (Schein, 2004; Serafin, 2015). Therefore, it is an element supporting the implementation of its strategy (Serafin, 2015). Organizational culture, due to the deep reference to the daily practices of the company, affects the stability of the group of employees in terms of structure. It causes the formation of the work environment, consolidation of rituals, values and behaviours constituting a coherent essence and image of the internal understanding of the organization by its members (Schein, 2004), which influences the perception of employees (Habib et al., 2014).

According to K. S. Cameron and R. E. Quinn “Organizational culture is manifested in shared values, dominant leadership styles, language and symbols, practices and routine procedures and definitions of success. These are the specific characteristics of each organization, which distinguish it from others” (Cameron, Quinn, 2006). Moreover, perhaps thanks to its diagnosis, it is possible to make changes that would favour the development of the enterprise and achieve a higher degree of competitiveness (Cameron, Quinn, 2006).

The model of competitive values, resulting from research on the main features of organizational effectiveness, created by Cameron and Quinn (2006) describes the dimensions of organizational culture. Graphically, it is made up of four quadrants in a coordinate system that illustrate four types of organizational cultures, that is: clan culture, adhocracy, market and hierarchical culture. The first of them is characterized by high coherence and focus on maintaining good relations in the group. It is focused on teamwork, taking actions that trigger greater employee involvement as well as a sense of responsibility of the company for its employees. The adhocracy culture promotes the ability to adapt to new conditions, flexibility and creativity. A good leader is one who is visionary, innovator, and risk-taker. The third type of culture they distinguish – the market culture is much more oriented towards external than internal issues of the company. So it is important to shape its position in the environment. It is favoured by the pursuit of competitiveness and efficiency, while the focus on profit prevails. The last type of culture – hierarchical culture is procedure-oriented. Leaders are expected to be good coordinators and organizers. Looking at an organization of this type from a long-term perspective, it is perceived as striving for sustainability, predictability and effectiveness (Cameron, Quinn, 2006).

3. Organizational identity – views, meaning, relationship with organizational culture

Organizational identity is about what an organization is. Its strategic dimension is related to the choices made by the organization in terms of its mission, vision, and the entire spectrum of strategic intentions, it is also related to the values and culture of the organization. It also manifests itself in the form of the organization's brand (Abratt, Kleyn, 2012). Hatch (2002) presents a different approach, as he believes that "the identity of the organization is the experience and convictions of the members of the organization as a whole" and that "the term refers to how members of the organization see themselves as an organization".

Identity covers all functions and organizational aspects of the company's life (Vella, Melewar, 2008). As in the case of organizational culture, also the organizational identity, managed through internal programs initiated by the company's management, aims to show the main features of the organization to its members (Vella, Melewar, 2008).

Organizational identity is a set of interdependent features that give an enterprise distinctiveness from other entities operating on the market (Melewar, 2003). According to Whetten (2006), it is a set of features "which members consider to be central, permanent and distinctive [the so-called features of CED] in their organization", he also emphasizes that thanks to it, the company stands out from other entities operating on the market (which concerns the context of the environment), but also has an impact on the processes taking place inside the company, as it sets the framework for the activities of the members of the organization, decisions, which can be observed in various situations (Whetten 2006). It is worth noting that the greater degree of identification of employees with the enterprise in which they are employed, the greater the convergence of their personal attitudes and values with the attitudes and values represented by the company and expressed in its mission and strategy (Rughase 2006).

The relationship between organizational identity and organizational culture is visible, among the others, in the approach of Melewar (2003), Melewar and Skinner (2018) and Regenthal (2009), who also indicates on the aspects of strengthening the identification of employees and their

motivation, or shaping the homogeneity of decisions inside and outside a particular entity.

Good management of organizational identity can significantly contribute to the success of the organization, and by generating a sense of direction and purpose of the organization, it covers strategic issues important for the enterprise (Van Riel, Balmer, 1997; Abratt, Mingione, 2017), including relations with external stakeholders (Van Riel, Balmer, 1997). It is worth taking a closer look at what are the key features of organizational identity.

Balmer (2017) reports that: “Typically, key corporate identity traits encompass (but are most certainly no limited to):

1. an institution’s organisational type,
2. its purpose(s),
3. activities,
4. ethos and values,
5. market position,
6. markets and customers served,
7. product and service quality,
8. management and employee behaviours,
9. geographic scope, etc.”.

Based on the review of the scientific literature in the field of the studied subject, it was found that the valuable added value of the research will be to present how the representatives of the young generation perceive their workplace in the context of the current organizational culture and what internal organizational conditions affect the building of organizational identity in the context of recommendations for the sphere of management in enterprises/organizations.

4. Research objectives and research methods

The aim of the article is to discover how the representatives of the young generation perceive the organizational culture of the companies/organizations they are employed in. What traits/elements of the functioning of these entities may constitute the basis for shaping their organizational identity? The stated objectives of the article were

achieved not only by referring to the literature review on organizational culture and selected aspects of organizational identity, but also based on the results of empirical research conducted among representatives of the young generation representing various entities in the Lubuskie voivodeship. The research was carried out with the use of a tool such as a questionnaire. They included a group of respondents who represented entities diversified in terms of geographic coverage, type of activity, size of the enterprise or capital represented by their employer.

The research covered a wider group of employees who represented various age groups and were people working in various enterprises and organizations in the Lubuskie voivodeship. For the purposes of the article, people who met the age criterion, i.e. belonged to the age group up to 30 years, were selected from among the respondents. The total number of respondents meeting the given criterion was 95. A more detailed description of the discussed group of respondents is presented in Table 1.

Table 1. Characteristics of the studied population

Description		Number of indications	Number of indications as a percentage (in %)
Gender of respondents	women	74	78
	men	21	22
Work experience in the company/ organization	Less than 1 year	37	39
	From 1 to 5 years	52	55
	From 6 to 10 years	6	6
Workplace type	executive	79	83
	managerial	16	17
The nature of the work performed*	physical work	31	33
	mental work	73	77

Source: own study based on empirical research

*Note: Some respondents perform both physical and mental work.

Among the respondents, 78% were women and 22% were men. When it comes to work experience, the majority of people were those employ in a given company/organization from 1 to 5 years (55% of respondents). Then, 39% were people with a period of employment shorter than 1 year, and 6% were people working in a given entity for 6 to 10 years. In terms of the position of work, a greater number of indications concerned employees employed in executive positions (83%) and 17% – people working in managerial positions. 77% of the respondents perform mental work and 33% physical work. It should also be added that some people do both types of work.

Moreover, in order to present a more illustrative picture of the respondents, as a result of the collected data, a table was prepared showing the characteristics of the enterprises/organizations in which the respondents are employed. They are presented in Table 2.

Table 2. Characteristics of enterprises/organizations in which the respondents are employed

Description		Number of indications	Number of indications as a percentage (in %)
The period of operation of the enterprise/organization on the market	Up to 5 years	21	22.1
	From 6 to 10 years	11	11.6
	From 11 to 15 years	17	17.9
	From 16 to 20 years	11	11.6
	Over 20 years	35	36.8
The geographical scope of the enterprise/organization's activity*	Local market	26	25.8
	Regional market	19	18.8
	Domestic market	18	17.8
	International market	38	37.6

Description		Number of indications	Number of indications as a percentage (in %)
Type of the enterprise/ organization's activity*	Production	18	15.9
	Trade	32	28.3
	Services	57	50.5
	Others	6	5.3
Legal form	State-owned enterprise	11	11.6
	Private enterprise	78	82.1
	Other form	6	6.3
Capital ownership	Polish capital	69	72.6
	Foreign capital	9	9.5
	Mixed capital with a predominance of foreign	7	7.4
	Mixed capital with a predominance of Polish	8	8.4
	Equal share of Polish and foreign capital	2	2.1
Size of the enterprise/ organization	Micro (less than 10 employees)	19	20.0
	Small (10 to 49 employees)	22	23.2
	Medium (from 50 to 249 employees)	23	24.2
	Large (more than 249 employees)	31	32.6

Source: own study based on the survey research

* Note: In the case of two areas characterizing the surveyed entities in which the respondents are employed, i.e. with regard to the geographic scope of the activity and the type of activity, the respondents could choose more than one answer.

On the basis of the conducted research, it was found that the respondents are employed in entities diversified in terms of: the period of operation of the enterprise/organization on the market, geographic scope, type of activity, legal form, capital ownership and the size of the enterprise.

5. Findings

The surveyed respondents expressed their opinions on how they perceive the organizational culture of the entity in which they are employed. They are presented in Table 3.

As a result of the analysis of the conducted research, it was found that the respondents chose the answers that indicate mixed types of organizational cultures. The presented results refer to the particular types of cultures, distinguishing the indications constituting their characteristics. It was found that 28.6% of respondents indicate that the organizational culture of the entities in which they are employed has features of the clan culture. Then it was found that the respondents perceive the manifestations of hierarchical culture (27.4% of all answers). According to the opinions of respondents, the culture of adhocracy accounts for 24.3% of responses from the surveyed employees. In turn, the market culture, occupying the last place, was chosen by the respondents with the result 19.7% of the responses. Moreover, as a result of further in-depth analyses, it is worth showing how the respondents' opinions are shaped in relation to mixed types of cultures. Due to the limited scope of the article, a more in-depth analysis of the research was not presented.

Table 3. Opinions of respondents on the type of organizational culture of enterprises/organizations they are employed in

Culture type and its components	Number of indications	Number of indications in percentage terms in relation to the number of surveyed respondents (%)	Sum of indications / group share of all surveyed respondents representing the young generation
Clan culture			28.6
1. We are one family in a company/organization.	24	25.3	
2. Members of the organization/employees of the company share similar values and pursue common goals.	26	27.4	
3. Participation in the life of the organization is very high, even emotional	10	10.5	
4. The leader in the institution acts as a mentor and advisor.	23	24.2	
5. The coherence of the organization is related to tradition, the value of teamwork and personal development.	11	11.0	

Culture type and its components	Number of indications	Number of indications in percentage terms in relation to the number of surveyed respondents (%)	Sum of indications / group share of all surveyed respondents representing the young generation
Market culture			19.7
1. The organization/ enterprise is focused on external issues, such as the company's position in the environment or transactions.	17	17.9	
2. The basic values in the company/organization are efficiency and competition.	10	10.5	
3. The leader in the company acts as an overseer who manages the team by measuring performance.	16	16.8	
4. The main goal set by the company/organization is to influence the financial results.	16	16.8	
5. The management style is promoting fierce competition.	6	6.3	

Culture type and its components	Number of indications	Number of indications in percentage terms in relation to the number of surveyed respondents (%)	Sum of indications / group share of all surveyed respondents representing the young generation
Hierarchical culture			27.4
1. A company/organization is a highly formalized workplace with a strict hierarchy.	5	5.3	
2. The leader is a good coordinator and organizer.	26	27.4	
3. The consistency of the organization is ensured by its formal rules and regulations.	13	13.7	
4. Employee management focuses on job security, stability and predictability.	21	22.1	
5. The measures of success are: reliability of deliveries, adherence to schedules and low costs.	25	26.3	

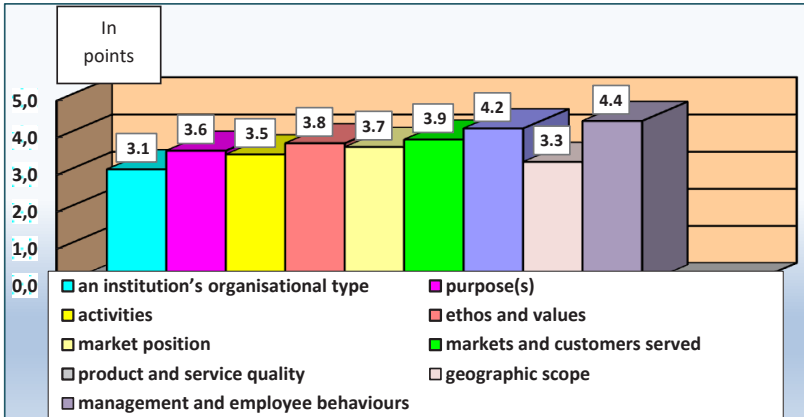
Culture type and its components	Number of indications	Number of indications in percentage terms in relation to the number of surveyed respondents (%)	Sum of indications / group share of all surveyed respondents representing the young generation
Adhocracy culture			24.3
1. Members of the company/organization should be creative in thinking and flexible in shaping the strategy and principles of introducing innovations.	24	25.3	
2. The leader is an innovator and visionary.	14	14.7	
3. There is no centralized centre of power in the company/organization.	4	4.2	
4. Success equates to offering unique and new products or services.	14	14.7	
5. In the long term, the organization puts emphasis on growth, taking up challenges and acquiring new resources.	24	25.3	

Source: Own elaboration with the use of research based on the Cameron and Quinn model

The second important aspect of the issue discussed in the article was the presentation of the respondents' opinions on how they perceive the features of organizational identity selected by Balmer (2017) in relation to their workplace. A scale of 0 to 5 points was adopted. Where 0 means "not important at all", 1 point – "not important", 2 points – "less important", 3 points – "average", 4 points – "important", 5 points – "very important".

The results obtained on the basis of the weighted average are shown in Figure 1.

Figure 1. Opinions of respondents regarding the traits/elements of the company's functioning that constitute the features of the organizational identity in relation to their workplace



Source: Own elaboration based on empirical research

In the opinion of the respondents representing the young generation, the most important feature of organizational identity is the management and behaviour of employees – 4.4 points. Then, the quality of products and/or services was indicated – 4.2 points. A similar number of points was

awarded to two features, i.e. markets and customers served (3.9 points) and ethos and values (3.8 points). Further positions are taken by: market position (3.7 points), purpose/objectives of the company's/organization's functioning (3.6 points) and the area of activity (3.5 points) and the type of organization of the enterprise (3.1 points). According to the conducted research, all the above-mentioned features of the organizational identity of the entities in which the respondents are employed were considered important. Their scores range from 3.1 points to 4.4 points.

Due to the limited scope of presentation of the obtained results, no further in-depth analyses of the dependencies between the assessment of identity features and types of organizational cultures have been presented.

6. Discussion of the results

The practical dimension of the research carried out may manifest itself in the area of improving the management of the "most valuable resource" of each organization, that is its human potential (Armstrong, 2011). Due to the fact that the company's culture is passed on in the process of socialization (Steinmann, Schreyögg, 2001), it is worth shaping the organizational climate so that newly hired employees feel a bond with their company and want to influence its identity.

The conducted research indicates the validity of the statement by Amah and Daminabo-Weje M. (2013, p.43) that organizational culture performs two important functions in an organization: "(1) to integrate members so that they know how to relate to one another and (2) to help the organization adapt to the external environment. It enables organizations respond rapidly to customers' need or the moves of a competitor". This striving to achieve competitive advantage is confirmed by the areas/elements of the functioning of these entities, which may constitute the basis for shaping their organizational identity. The conducted research proves that the respondents attach great importance to, for example, the market position or the quality of products or services (potential sources of a qualitative competitive advantage).

The presented research results give grounds for the conclusion that the success of an enterprise can be shaped on the basis of an organizational culture oriented on factors determining the perception of the organizational identity of the subject by the young generation.

Due to the fact that the organizational culture contributes to the improvement of business results (Lopez, Peon, Ordas, 2006; Graham, Nafunko, 2007), it is worth noting that the respondents perceive it in the entities in which they are employed. This is evidenced by the following indication, i.e.: 25.3% of respondents' opinions say that in the long-term the organization puts emphasis on growth, taking up challenges and acquiring new resources.

An important element of the organizational culture indicated by the respondents, which was noted by 27.4% of respondents' responses, is the statement that members of the organization/employees of the enterprise share similar values and are guided by jointly set goals. These are certainly factors that "cement" ties in the entity in which the employees are employed. They can be considered as the "pillars" of building organizational identity, they are confirmed in the opinions of the respondents (this is shown in Figure 1 – the weighted average assigned to the purpose(s) of the enterprise/organization at the level of 3.6 and to the ethos and values at the level of 3.8). According to Schwartz and Bardia, 2001 (p. 269), values represent "guiding principles in people's lives", so it can be assumed that they also guide the life of an organization.

Thus, as Amah and Daminabo-Weje (2013, p.47) say: "Corporate culture enhances cooperation and team spirit which are needed for organizations to succeed".

Organizational culture is reflected in the way of management and influences the behaviour of employees. In the opinion of the respondents, this is the most important area/element of the company's functioning, constituting an area of the characteristics of the organizational identity of the respondents in relation to their workplace.

One should agree with the statement that (Karapancheva, 2020, p. 42): "Today, in the dynamic and turbulent conditions, the future of the organizational culture is of outstanding importance".

7. Conclusions

The article presents how the interviewed representatives of the young generation representing the Lubuskie voivodeship perceive the organizational culture in their workplace and what traits/elements of organizational identity are important to them.

Conscious shaping of an employee-friendly organizational culture, and thus also the creation of pro-identity foundations influencing the success of the organization, requires the ability to look at the work environment through the eyes of employees and to take into account their point of view in making important decisions. This applies, of course, to all groups of employees in terms of the age structure, but in particular, it is worth focusing on newly hired employees, which can certainly largely affect their retention in the company, which, to a large extent, is important from the point of view of the stability of the company's operations and the achievement of its goals, including strategic ones. Moreover, it is especially important in the case of industries characterized by the employee market.

The results of the research may constitute valuable guidelines for the management staff in the scope of shaping appropriate programs of social and professional adaptation of newly employed employees and will also allow approximating their level of perception in relation to identification with the work environment.

Organisational culture must be binding on all member and staff of the company as this will encourage uniformity among members of the organisation and thus enhance commitment and group efficiency (Ojo, 2014, p.11).

Organizational culture influences the development of human resources based on the values that create it (Igor, 2022, p. 238), which is one of the important areas related to the socio-professional adaptation of young employees. Management staff should remember that "it is the ability of the employee to cope with the organizations culture that will determine his commitment to corporate goals" (Ojo, 2014, p. 11).

Managing the social potential in an enterprise should focus on motivating the management to shape an organizational climate that would

contribute to building and consolidating lasting, positive ties between new employees and the enterprise/ organization. Moving to a higher level of intra-organizational perception may affect the awareness of the role of company/organization employees in shaping the organizational identity. Undoubtedly, one should agree with the statement that (Karapancheva, 2020, p. 51): “It is necessary the managers to focus on coherent collective/corporate identity, to acquire situational awareness and to actively accept the cultural signals. Policy creators should offer advantages of the intellectual differences and to give impulse for common wellbeing”.

The more detailed recommendations for the management of enterprises not only in this region but also in other areas include:

1. Systematic monitoring of the identification of the reception of organizational culture by newly hired employees,
2. Determining to what extent the basic principles and elements describing given organizational cultures coincide with the needs and expectations of young employees,
3. Identifying where discrepancies can be seen between the way the management perceives the organization and young employees,
4. Determining what manifestations/elements of the organizational culture could be changed?
5. Identifying what integration activities could be undertaken in the enterprise to shape intra-organizational ties and, as a result, build organizational identity?

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Prospects for the Development of the Private Tutoring Services Market

Abstract

Research background: Private tutoring (shadow education) is perceived as extra classes, occurring outside of the formal channels of an educational system. They aim at improvement of students' chance of successful educational process. This has been growing on popularity in many countries and coronavirus has increased the interest in this form of additional classes. This applies in particular to modern forms of tutoring using the Internet and artificial intelligence.

Purpose of the article: The purpose of the work was to find whether there is an interest in shadow education, especially in terms of virtual private tutoring. In addition, the study shows the rationale behind this form of education and the perception of it by parents.

Methods: The survey was conducted from January to February 2020. An online questionnaire was used as a research tool. The sample consisted of 171 respondents.

Findings & Value added: The findings show there is very high public interest in tutoring services. The vast majority (73.8%) of respondents have their own experience of using tutoring services. But at the same time most of them did not use virtual private tutoring. Online teaching seems to be perceived as delivering teaching of the same quality as traditional by over 35% of respondents. Most found it difficult to give clear answer about it but at the same time are interested in this form of teaching. The price may be an incentive to use this

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type of service as the majority of respondents believe that traditional tutoring is too expensive. Respondents consider the education system to be inefficient and see tutoring as an investment in their children's future.

Keywords: shadow education, private tutoring, supplementary education, quality of education

JEL Classification: L15, I21

1. Introduction

In recent years (even disregarding the Covid-19 pandemic) there has been a noticeable increased interest in private tutoring services or supplementary education (also known as shadow education). Previously a very popular form in East Asia, it has become a worldwide phenomenon. (Zhang & Bray, 2020). In their analysis, Benckwitz et al. (2022) note that tutoring is a fairly common phenomenon, but with varying intensity depending on the region. For example, in Korea, 73.1 per cent of high school students were given private tutoring in 2021 and in Greece, 95 per cent of students were using private tutoring from English. Shadow education is also extensive in much of South Asia, Southern Europe, and parts of North Africa. (Bray 2013). Of course, these values can be significantly lower depending on the country or subject. However, it should be noted that tutoring is part of the educational-socio-economic landscape and is a standard addition to the traditional school system. Although Sutton (2014) points to shadow education as a follower of mainstream education, private teaching has the power to change the overall educational landscape. Chang (2019) believes that shadow education has already become part of our everyday life and makes society, culture, education and business interact with each other.

The objective of the work was to find whether there is an interest in shadow education, especially in terms of virtual private tutoring. Private tutoring has been present in many countries for years and was very popular in Poland. The two main reasons associated with interest

in this type of services are parents' concerns about their children future as well as educational system's weaknesses. Polish educational system has been affected by many reforms which according to the audience decreased the quality of teaching. The Covid-19 pandemic and switching to online classes severe disparities in learning have appeared. The research tries to find what is potential demand for tutoring services (especially virtual ones) and what are the rationale behind this form of education.

2. Problem Statement

Stevenson and Baker (1992) coined the term “shadow education” in the early 1990s to describe the strong link between the mainstream education system and widespread out-of-school educational activities. The term “shadow” might be also related to shadow economy, as much of the shadow education system is unregistered and untaxed (Malik 2017).

Buchmann et al. define shadow education as educational activities, such as tutoring and extra classes, occurring outside of the formal channels of an educational system that are designed to improve students' chance of successfully moving through the allocation process.

Three things are stressed when it comes to shadow education (Bray, 2003): tutoring in an academic school subjects, additional provision besides mainstream schooling, and the intention of financial gain.

The main reasons that guide young people when deciding to take up private tutoring include: treating private tutoring as a ‘cure for all evil’, serious problems with some school subjects, deepening knowledge in an area that particularly interests them, striving to gain an education (Mackowiak, 2003), building self-esteem (Bartosz & Bloch, 2009). Parents are motivated by: the belief that their children are not able to prepare for examinations on their own and the fear that their children's peers are more knowledgeable; the advancement of knowledge related to their child's interests (Siadak, 2009); ensuring a good start for the future, not having enough time to help their child with homework or not being able to explain issues that bother them (Mackowiak, 2003), lack of or limited trust in the public education

system, fear of possible educational failure e.g. final exam results. (Bartosz & Bloch, 2009).

Two sources of interest in tutoring services are most often indicated. One of the factors influencing more frequent use of tutoring by students is the higher educational level of their parents and, in particular, their higher socio-economic status. This is often due to greater financial capabilities, knowledge of the education system and also greater demands on their children (Park, 2016).

The second factor relates precisely to the functioning of the education system itself. The greater the emphasis on examinations, which then influence school choice options and the future of young people, the greater the importance of tutoring (Hannum, 2019). The more competitive the market, the more competitive educational systems. Parents assess the quality of educational services and choose schools, taking into account the “relevance of investment” (Nieżgoda, 2011). This creates greater demand for private educational services (Bray, 2013). Davies (2004) noticed that many families invest in private tutoring as part of the so called “intensive parenting”.

Does private tutoring have any positive results from students’ performance perspective? There are different studies highlighting the benefits of shadow education. They include increased exam scores (Briggs 2001, Lavy and Schlosser 2005), improved academic performance (Dang 2007, Buchmann 2002), or increased students’ motivation (Mischo and Haag 2002). However, care must be taken, as without a precise definition of shadow education the findings may be misleading (Bray, 2014).

In many countries, private tutoring is an alternative to the declining quality of public education associated with overcrowded public educational institutions, high numbers of students per teacher, low funding or constant changes in the quantity and content of teaching. They are also stimulated by intense competition for places at better universities (Popa, 2006).

This seems to be the case of Poland. The last reforms of the Polish education system were introduced in a hurried, top-down manner, without sufficient support for teachers and with mixed public opinion (Reimers).

The situation was further aggravated by the Covid-19 pandemic. The school's model of operating in the form of so-called 'distance learning' has had an adverse impact on the educational process, contributing to a reduction in the quality of education and a widening of educational inequalities education (NIK, 2021). The majority of parents believe that the quality of remote learning is far inferior to that of on-site learning. Parents' declarations show that more than half of primary school students required more or less assistance during online learning (CBOS, 2021).

Interestingly, at the same time, interest in online tutoring has increased. Even the term Zutors (Zoom tutors) has emerged (Rowe, 2021). This is an interesting and relatively new issue. As such, it can be treated as a research gap and therefore online tutoring is included in the presented study.

3. Research Questions/Aims of the Research

The aim of the study was is to examine the reasons and scope of private tutoring services used by primary and secondary school students in Poland, as well as to learn about the needs and expectations of tutoring service buyers, in particular to diagnose their potential interest in virtual tutoring services.

Three research questions were formulated. The review attempts to answer:

1. What are the most important reasons for using private tutoring services?
2. How do users rate the effectiveness of conventional private tutoring?
3. What is the attitude of the respondents to virtual tutoring services?
4. Research Methods

The survey was conducted from January to February, 2020. An online questionnaire was used as a research tool. The questionnaire consisted of ten substantive questions and two specification questions.

In the study 171 respondents took part. The selection of the sample was deliberate. People who are parents or guardians of school-age

children (5th to 8th grade of primary school² and high school students) were selected for the study. Among the respondents, 104 were female and 67 male. One of the respondents did not inform about the gender.

The age structure of respondents covered the full age range of parents and guardians of children at the indicated age. The study involved 8.2% people aged under 30, 28.7% people aged 31-40. The most numerous age group was 41-50 years. It included 57.3% respondents. In turn, 5.8% people were in the age group 51-60. One of the respondents did not provide his/her age. The presented structure of the research sample reflects the structure of the target group to which virtual tutoring services are to be directed.

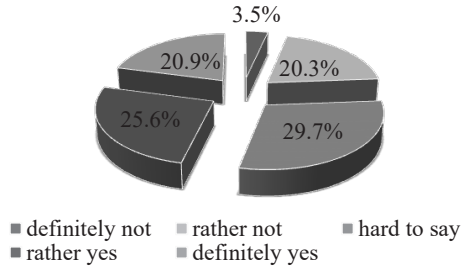
5. Findings

At the beginning, the respondents were asked to provide information whether they used private tutoring services at present or in the past. The vast majority (73.8%) of the respondents have their own experience related to the use of private tutoring services. In turn, 26.2% of the respondents did not have such experience. The obtained results allow conclusions as to the high public interest in the private tutoring services.

Those respondents who were active users of private tutoring services have been asked to point out the reasons for using them. One of possible reasons could be a fact that the school system fails to fulfil its educational obligations. Opinions about this fact are presented in Figure 1.

² Polish education system

Figure 1. The school fails to fulfil its educational obligations

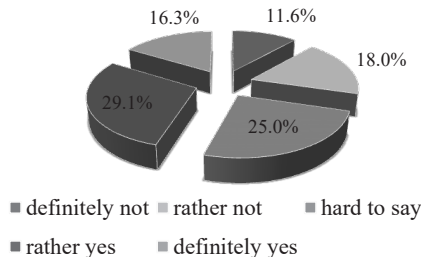


Source: own research

Undoubtedly, some parents use private tutoring services because, in their opinion, the school does not always fulfil the educational duties entrusted to it. This opinion was expressed by 46.5% of the respondents (answers “rather yes” and “definitely yes”). The opposite opinion was expressed by 23.8% of the respondents (answers “rather no” and “definitely not”). 29.7% of respondents did not express their opinion on this topic.

In the next question the respondents were asked about their opinion about private tutoring as an expression of their own concern for the future of their children. The results are presented in Figure 2.

Figure 2. Private tutoring is necessary if you care about the education of your children

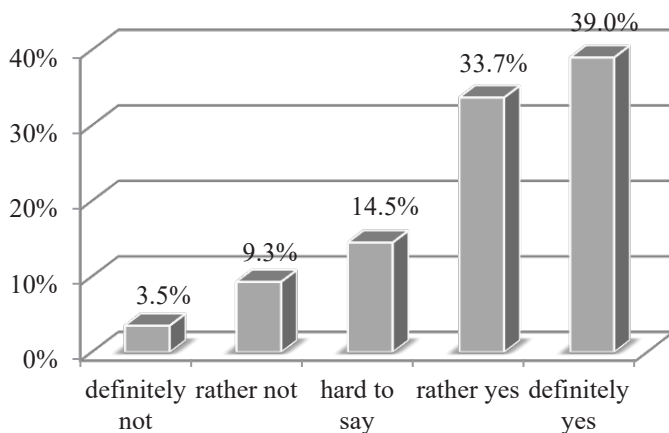


Source: own research

For some respondents, private tutoring does not have to be compensated for educational deficiencies of the school. They may treat it as in the case of concern for the education and future of children. According to the presented data, views expressed by 45.4% of the respondents (answers “rather yes” and “definitely yes”). Such a necessity is not expressed by 29.6% and 25% did not take an unequivocal position on this issue.

One of the motivators encouraging parents to use tutoring services is undoubtedly their concern for the future of children and treating these services as a form of investment. Respondents’ opinions are presented in Figure 3.

Figure 3. I treat tutoring as an investment in the future of children

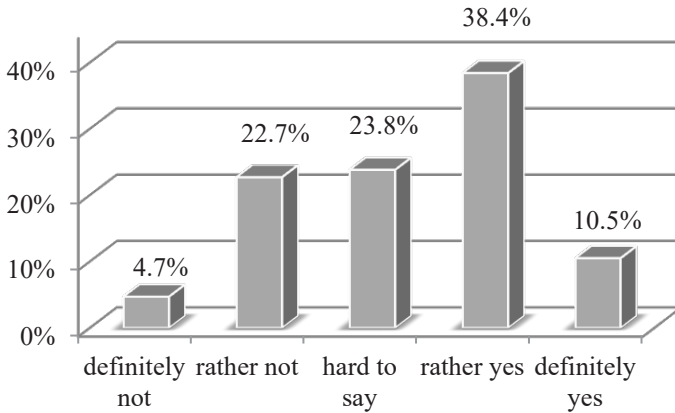


Source: own research

Private tutoring is perceived by 72.7% as an investment in the future of their children (answers “rather yes” and “definitely yes”). Only 12.8% of the respondents (answers “rather no” and “definitely not”) expressed the opposite opinion. 14.5% of the respondents did not present their opinion on this matter.

In the next question I wanted to check whether respondents perceive private tutoring as a significant cost in their home budget. The opinions are presented in Figure 4.

Figure 4. Private tutoring is too expensive

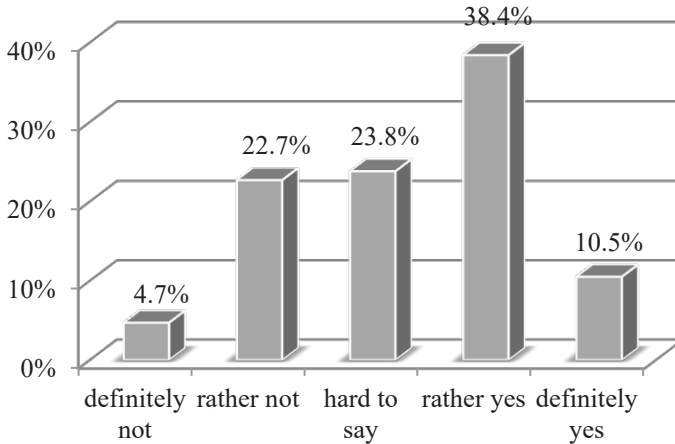


Source: own research

According to the data presented, a large proportion of the respondents (48.9% – answers “rather yes” and “definitely yes”) considered traditional tutoring to be too expensive. The opposite opinion was expressed by 27.4% of the respondents, while 23.9% of the survey participants did not take an unequivocal position. This allows the conclusion that the appropriate price level of virtual tutoring services should allow to obtain a high level of interest of recipients.

The next question was whether private tutoring was bringing the expected results. The obtained results are shown in Figure 5.

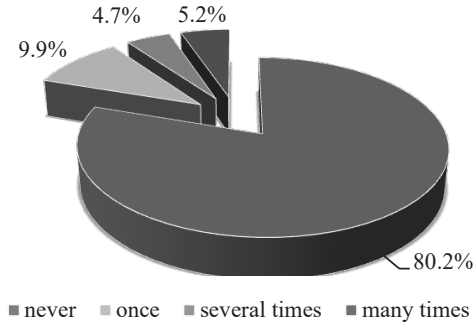
Figure 5. Private tutoring does not bring the expected results



Source: own research

The obtained results allow to conclude that the assessment of traditional services in this area is quite high. Only 7.5% of the respondents confirmed the deficiencies in the effects (“rather yes” and “definitely yes” responses). More than half (51.7%) of the participants (“rather no” and “definitely no” responses) assessed the effectiveness of tutoring as positive. In turn, 40.7% of the respondents did not have a specific opinion on this matter.

Figure 6. Frequency of use of internet tutoring



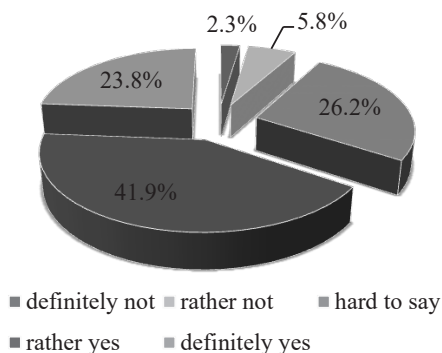
Source: own research

The vast majority (80.2%) of respondents have never used online tutoring, only 4.7% declared single use, 9.9% of the respondents used it several times, while only 5.2% did it many times. Considering the fact that more and more services are being transferred to the Web to an increasing extent, it can be concluded that the same future awaits tutoring services.

In the further part of the study, the respondents were asked to indicate the reasons for the low interest in virtual tutoring services. The most numerous group of respondents (57.9%) stated that the Internet is not able to replace the direct contact between the teacher and the student, and 16.5% do not believe in the effectiveness of virtual tutoring. On the other hand, 41.4% of the respondents did not know about the possibility of using online tutoring. The smallest group (2.3%) indicated high costs as the reason. The obtained results indicate, on the one hand, a certain resistance resulting from the lack of belief in the effectiveness of Internet learning, and on the other hand, a barrier resulting from ignorance. This allows us to assume that with a properly conducted information campaign, the group of people potentially interested in online learning could significantly increase.

Participants were asked to determine whether they would be potentially interested in the possibility of using virtual tutoring services, assuming their high effectiveness, at a level equal to or higher than conventional private tutoring. The obtained results are shown in Figure 7.

Figure 7. Level of interest in virtual tutoring



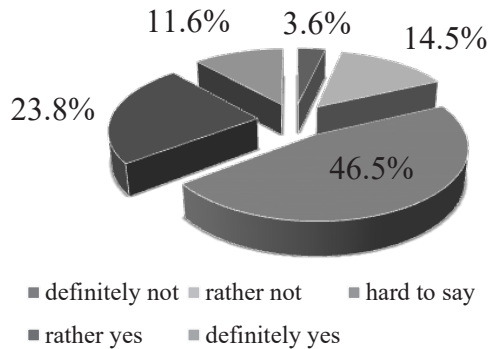
Source: own research

Among the respondents, 65.7% (answers “definitely yes” and “rather yes”) declare their interest in the service, assuming that it will equal or exceed the level of conventional tutoring. The second largest group (26.2%) were undecided respondents who did not clearly define their interest in this type of service, or the lack of it. Importantly, only 8.1% of the survey participants expressed a negative attitude (answers “definitely not” and “rather not”) towards virtual tutoring services. This allows the conclusion that in the case of the service implementation, there is a very high probability that it will be of interest to potential recipients.

In the next part, the respondents were asked to assess whether, in their opinion, virtual tutoring is able to match the quality of the traditional one. The largest part of the study participants was unable to take a clear position on the quality of virtual tutoring services. This result is

not surprising considering the fact that the vast majority of respondents did not have the opportunity to use this type of service. Nevertheless, 35.4% of respondents (answers “definitely yes” and “rather yes”) believe that virtual tutoring is able to provide knowledge at the same level as conventional tutoring. The opposite position (answers “definitely not” and “rather not”) was taken by only 15.1% of the respondents.

Figure 8. Subjective assessment of the quality of virtual tutoring



Source: own research

6. Conclusions

The findings show there is very high public interest in tutoring services. The vast majority (73.8%) of respondents have their own experience of using tutoring services. This provides an optimistic view of the public’s interest in virtual tutoring. One fifth (19%) of the survey participants not using tutoring were giving up because of the high cost. This group could be interested in the service itself if the affordability was at a higher level.

Of those surveyed, the vast majority (80.2%) had never used online tutoring. Given the fact that more and more services are moving to the

Web, it can be concluded that the same future awaits tutoring services. A significant group of respondents (41.4%) were not aware of the existence of online tutoring. This is a kind of barrier resulting from due to ignorance. Most likely, with a properly conducted information campaign, the group of people potentially interested in virtual tutoring could grow significantly.

The vast majority of respondents (65.7%) expressed interest in virtual tutoring services, assuming that they would match or surpass the level of conventional tutoring. Of the respondents, 35.4% are of the opinion that virtual tutoring is able to deliver knowledge at the same level as conventional tutoring. According to 61% of respondents, an acceptable price level for virtual tutoring services should be between 50-100% of the rates for conventional services. A large proportion of respondents (48.9%) considered traditional tutoring to be too expensive.

The problem of availability of teachers and tutors was perceived by 59.9% of respondents. According to 46.5% of respondents, the education system (school) is not fully fulfilling its educational responsibilities. Private tutoring is seen by 45.4% of respondents as a necessity when caring for the education and future of children.

By 72.7% of respondents, tutoring is seen as an investment in their children's future. Only 12.2% of respondents said that spending on tutoring services is an unnecessary necessity. At the same time the vast majority of respondents (78.5%) say they are interested in testing virtual tutoring services for free.

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**The 11th National and 3rd International Conference on Quality
“Quality of the future – the future of quality”
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Remote External Auditing Processes

Abstract

Research background: Conformity assessment as defined in the ISO/IEC 17000 standard shows that the specified requirements for the product, process, system, person or entity have been met. A special type of conformity assessment is certification, in which the assessment is carried out by independent organizations, which has been confirmed by an accreditation body. The current crisis related to the development of the COVID-19 global pandemic has forced many organizations to change traditional forms of operation and, where it was possible, switch to a remote mode of work within auditing processes.

Purpose of the article: The need to adapt to the new realities has not bypassed the certification bodies and producers, which had to adapt to the emergency situation, using the possibilities of remote work, including remote audits as part of certification processes as well as supplier audits. The purpose of this publication is to indicate the context of the operation of producers in relation to the remote second and third party auditing processes and the impact of such proceedings on the confidence in the results of their work, and to indicate changes in the way external audits are carried out.

Methods: For above mentioned matter, organizations with ISO 9001 quality management system operating on a polish market were surveyed in remote

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external auditing processes. The used methodology was a survey carried out during COVID-19 pandemic lockdown in Poland in the year of 2021, which was the very beginning of pandemic restriction in Poland.

Findings and Value Added: The main findings are related to the following issues: the more implemented and certified management systems is in an organization, the lower is the assessment of the usefulness of audits; the greater the number of management systems implemented in an organization is, the smaller the impact of conducted audits on the improvement of the organization; the more an organization hire employees, the more implemented systems are, the longer the systems are certified, the lesser is the willingness to conduct external audits in a remote form in the future.

Keywords: remote external auditing, global pandemic, standardized management systems, audit.

JEL Classification: D24

1. Introduction

ISO 9001 management system is still the most popular one within the international management systems. Its number of certifications tends to stabilise, and according to Mastrogiacomo et al. [1] we are facing the post-decline phase of ISO 9001 popularity. The ongoing COVID-19 pandemic has had a significant impact on the certification and auditing services of voluntary standards – mainly ISO 9001. The traditional approach to auditing and certification processes on-site visits has been significantly curtailed, and it is unclear when, and under what conditions, it might resume in full [2]. According to Mirtsch et al. [3] accredited certification bodies were hit hard by the disruptions caused by the pandemic, albeit to different degrees, in part due to their type of services, size, and sectors served.

External auditing as well as certification is a special type of conformity assessment, in which the assessment is carried out by independent organizations, which has been confirmed by an accreditation body. Conformity assessment in accordance with the definition given in the

ISO / IEC 17000 standard is a demonstration that the specified requirements for a product, process, system, person or unit have been met [4]. Depending on the adopted model, various methods of certification are possible. Regardless of the differences, there are several basic elements that may occur both in the certification processes of management systems and product certification. These stages can be described as [5–7]:

1. Selection containing an indication of what is the subject of certification and compliance with which criteria. In practice, this stage will be related to the submission of an application for certification.
2. Determining the properties through: system audit, testing, inspection, process or service evaluation. At this stage, the certification of management systems uses a two-stage system audit process. In the case of product certification, this stage may concern a combination of system audit and laboratory sampling and testing, inspection as well as evaluation of selected processes.
3. Review of all gathered information in the earlier stages and the decision on certification with granting permission to use certificates and marks.
4. Supervision over the issued certification, if applicable in a given certification scheme. As part of supervision, it is possible to repeat all or some of the steps indicated above.

Considering the supplier audits, the above-mentioned steps are useable. Only the certification is not issued. Usually the second part external audit goals are to examine the economic and legal situation of potential partners [8]. Suppliers audits allow also to verify the accuracy of the information contained in the self-assessment information's delivered by suppliers [9,10].

Taking into account the stages of the certification process and the possibility of using remote techniques, it can be assumed that the most sensitive of them is the stage of determining the properties. The submission of the application or the activities related to the review and decision are elements that can be performed using standard communication channels, e.g. traditional mail or e-mail, or are entirely conducted at the certification body. The stage of determining the properties by auditing the management system or assessing production processes is

much more difficult to assess at a distance. This does not mean that it is not possible. On the other hand, elements of the product testing (e.g. assessment of the product's taste and smell) or inspection may turn out to be impossible to perform remotely [11]. For supplier audits the situation is similar.

Requirements for auditing management systems included in the ISO/IEC 19011:2018 standard indicate the possibility of using both direct and indirect contact with the auditee – table 1. Although it is not a very popular way of conducting activities, it is permissible under the existing conformity assessment system. In the case of remote audits, the activities carried out may be a personal interaction, where the audit team contacts the auditee. In the absence of personal interaction, the audit team uses the information contained in the documentation, equipment or available infrastructure [12]. As a result of the challenges and restrictions arising from COVID-19, certification bodies as well as certified organisations have had to either postpone audits (and extend the validity of existing certifications) or introduce remote auditing. Remote auditing (or remote assessment) is defined as “the facilitation of assessment of a Conformity Assessment Body from a location other than that being physically present” [13] and is enhanced by using information and communication technology (ICT) “for gathering, storing, retrieving, processing, analysing and transmitting information”[14].

Table 1. Auditing methods

The extent of involvement between the auditor and the auditee	Auditor location	
	On site	Remote
Personal interaction	<ul style="list-style-type: none"> – Conducting interviews. – Completing checklists and questionnaires with the participation of the auditee. – Conducting document review with the participation of the auditee. – Sampling. 	Using interactive means of communication: <ul style="list-style-type: none"> – Conducting interviews. – Completing checklists and questionnaires. – Conducting document review with the participation of the auditee.
No personal interaction	<ul style="list-style-type: none"> – Document review (e.g. records, data analysis). – Observations of the work performed. – Conducting on-site visits. – Completing checklists. – Sampling (e.g. of products) 	<ul style="list-style-type: none"> – Conducting a documentation review (e.g. records, data analysis). – Observation of work performed by means of supervision (taking into account social and legal requirements). – Data analysis.

Source: [12]

Additional requirements for remote auditing processes are included in the IAF (International Accreditation Forum) MD-04 guidelines, the purpose of which is to ensure the consistent application and use of ICT in audits or assessments by certification bodies [14]. A risk-based approach [15–17] not least, for example, in ensuring that engagements are performed more effectively and efficiently, and that all the key risks of organisations are addressed, but also to ensure that scarce internal audit

resources are used optimally. This article describes the development of a model that can be used by internal auditors to perform this task. The model was developed from a study of the academic literature, current business practice norms, and other documentation whereafter it was tested in a practical scenario, and input from heads of internal audit departments in prominent South African organisations was obtained. The findings of the study, inter alia, support the use of the model. However, a concern is that the risk management strategy currently implemented by organisations is not mature enough for internal auditing to rely on the outcome of the risk management process, a prerequisite for the model to function optimally. A second concern is that internal auditing is reluctant to use a pure risk-based approach when performing audit engagements and still prefers to use a control-based approach with more emphasis placed on high risk areas. Dairy farms are audited in the Netherlands on numerous process standards. Each farm is audited once every 2 years. Increasing demands for cost-effectiveness in farm audits can be met by introducing risk-based principles. This implies targeting subpopulations with a higher risk of poor process standards. To select farms for an audit that present higher risks, a statistical analysis was conducted to test the relationship between the outcome of farm audits and bulk milk laboratory results before the audit. The analysis comprised 28,358 farm audits and all conducted laboratory tests of bulk milk samples 12. mo before the audit. The overall outcome of each farm audit was classified as approved or rejected. Laboratory results included somatic cell count (SCC has been adopted as a basis for these activities, where the opportunities and threats of conducting remote audits should be assessed prior to their use. Examples of activities that can be implemented as part of remote audits include [14]:

- meetings conducted using teleconference devices, including audio, video and data sharing;
- conducting audit / evaluation of documents and records via remote access, synchronously (in real time) or asynchronously (when there are delays);
- recording information and evidence by means of still images, video or sound recordings;

- providing visual / audio access to remote or potentially unsafe locations.

The applicability of remote audit techniques depends, on the one hand, on the confidence of all interested parties in the results of such processes. On the other hand, the costs of certification that must be incurred to carry out such processes need to be taken into account. As Stoma et al. [18] indicates, the use of computer-assisted audit techniques (CAAT) may shorten the audit time and thus lower the costs of certification. In addition, the dissemination of ICT should improve the evaluation process and significantly affect its effectiveness. Improving effectiveness is also meeting the requirements of the main audit principle, i.e. ensuring confidence in their results [19].

The use of remote techniques, as Stoma et al. [18] points out, in the certification process of a management system compliant with the requirements of ISO 9001 is difficult, e.g. in the case of such areas as: assessment of customer location and location-specific conditions, assessment of leadership requirements or assessment of the implementation of the main processes in the organization. In addition, the use of remote audit methods should rather complement direct methods, as is the case in auditing the organization's branches. For example, in order to audit the management system in a bank, it is possible to carry out on-site assessments in several branches, and then conduct additional ones as part of remote audits [20]. The obvious benefit of remote auditing is more efficient use of resources. Remote auditing techniques can save auditors travel time and expenses while improving efficiency during conformity assessment such as certification processes [11,21].

Travel restrictions, as well as the practice of social distancing, that have emerged throughout the COVID-19 crisis have affected the very core of certification bodies operations, i.e., on-site auditing and inspections, which are the foundations of certification and accreditation [22]. Those restrictions in movement introduced in order to minimize the effects of the global COVID-19 pandemic resulted in the need for certification bodies to introduce significant changes to the certification processes carried out. While the use of remote audit/evaluation techniques as a supplement to on-site work does not raise

major doubts, the complete cessation of direct activities is a significant threat to confidence in the effects of certification. The guidelines for dealing with emergency situations are regulated in the IAF ID3:2011 document, according to which certification bodies are introducing appropriate actions. Activities undertaken by conformity assessment bodies (certifying and accrediting) should be characterized by mutual understanding, due diligence and trust. Extraordinary events are events that are beyond the control of the organization, such as: war, strike, riots, political instability, geopolitical tensions, terrorism, crime, pandemics, floods, earthquakes, cybercrime, other natural or man-made disasters. Actions that can be taken by the certification body in an emergency are limited in time and their use may be introduced for a maximum of 6 months. In a situation where it is not possible to conduct activities on site, recommended activities carried out by units should include [23]:

1. Risk assessment of the current and future situation of the assessed organization before deciding on further actions.
2. Consider introducing non-standard assessment methods assuming that previously assessed risk is low. These methods should, in particular, include activities such as:
 - proactive communication with the organization,
 - planning further activities,
 - definition of a maximum period for which specific operating conditions will apply,
 - criteria for the renewal of normal procedures,
 - possible changes in organization supervision plans,
 - ensuring that any deviations from the accreditation requirements and procedures of the certification body are justified and documented,
 - re-establishment of oversight / recertification activities in line with the entity's oversight plans when access to the site is restored.

2. Methodology

The purpose of this publication is to indicate the context of the operation of both certification bodies as well as supplier audits in relation to the remote external auditing processes and the impact of such proceedings on the confidence in the results of their work, and to indicate changes in the way audits are carried out due to global COVID-19 pandemic. The data analysed in the paper is a part of a project which aim was to study the organizational behaviour of pro-quality managed enterprises during the Covid-19 pandemic [24]. The research was conducted in 2021 using the mixed mode survey procedure using different data collecting modes. In this study, the CAPI and CAWI methods were used. The research form consisted of 5 parts focusing on various aspects related to the quality management in enterprises during the pandemic.

The article presents the part of the research in which the external audits within pandemic context are analysed. These plans regard remote work and other solutions imposed by the pandemic restrictions. Survey sheet, presents a list of activities introduced by companies to maintain their businesses continuity during the Covid-19 pandemic. The respondents mark the activities the organization intends to maintain in the post-pandemic period. Each described activity can be rated on a scale from 1 to 5 (1 = definitely not and 5 = definitely yes).

The organizations that met two conditions were selected for the study: (1) an implemented and certified management system compliant with the requirements of ISO 9001, (2) some employees worked remotely during the Covid-19 pandemic in 2020. The survey was taken by the employees responsible for the quality management system in the organization, mostly they were managers of these systems. The database developed for the purpose of the study consisted of 1,200 enterprises, from which 205 organizations took part in the study constituting 17.1% of the target group [24]. Characteristics of the participants are presented in Table 1.

Table 1. Characteristics of the participants

Variable (N=205)	Number	Frequency (%)
Number of employees		
up to 9	15	7,3%
10-49	45	22,0%
50-249	77	37,6%
more than 249	68	33,2%
Annual income (PLN)		
less than 2 millions	32	15,6%
above 2 to 10 millions	28	13,7%
above 10 to 50 millions	30	14,6%
1% more than 50 millions	17	8,3%
no response	98	47,8%
Scale of the operations		
local / regional	35	17,1%
all-Poland	59	28,8%
international	109	53,2%

3. Results and Discussion

The maturity of the implemented and certified management system depends on many variables. Undoubtedly, one of the elements allowing to determine its functioning is the impact of audits, both internal and external, on the usefulness of improvement actions. In table 2, there are shown the responses of the respondents concerning the improvement. The average of the obtained results on a 5-point scale is 4.23, so generally it is on a high level.

Table 2. The impact of audits usefulness on the organization improvement actions

Number of responses	Mean	Median	Min.	Max.	Standard deviation
205	4,234146	4,000000	1,000000	5,000000	0,853944

Interestingly, the more implemented and certified management systems is in an organization, the lower is the assessment of the usefulness of audits. Spearman’s rank correlation for these variables is -0.16 and is statistically significant for p value below 0.05. When analyzing the operating time of the systems measured by the number of 3-year certification cycles, a negative correlation was also noted with the impact of audit usefulness on the improvement of the organization (Table 3). However, in this case, the differences cannot be considered statistically significant.

Table 3. Assessment of the audits usefulness on the improvement of the organization – Spearman’s rank correlation

Variables	Number of management systems	Number of certification cycles
Audits usefulness	-0,158706*	-0,023948

* statistically significant for $p < 0,05$

Based on the information obtained, it can be concluded that the greater the number of management systems implemented in an organization, the smaller the impact of conducted audits on the improvement of the organization. This may be explained by the large number of audits that take place in such organizations, which makes them a rather constant

and repeatable element of the organization's operations. In the case of organizations that have only recently implemented management system, each audit, especially a third-party audit, is a big event in the organization. This, in turn, may cause greater interest in the entire top management process and translate into activities undertaken in the organization.

The initial shock caused by the pandemic and the subsequent limitations in maintaining the continuity of the organization's processes were the probable cause of delays in the implementation of the adopted activities, also in the area of external audits. Less than half of the organizations had done the planned external audits (both suppliers and certification ones) for 2020 on time. Only in case of 31.7% of the surveyed organizations external audits were executed in the stationary form, and another 41.5% were carried out as planned, but using remote audit methods (see [24] p. 92-96). The remaining 26.8% of the audits were delayed or canceled.

Comparing the distribution of results (see table 4), it was found that there is a statistically significant difference for groups of organizations with a different number of implemented management systems ($Z = 2.54$, $U = 3169$). More delays in the implementation of external audits during the pandemic were observed for the group with more certified management systems. No such dependencies were found, taking into account the size of the organization, revenues and territorial scale of activity.

Table 4. Delays in the implementation of the planned certification audits

Certification audit	Number of implemented management systems				
	1	2	3	4 and more	<i>total</i>
Delay	15	10	13	17	55
On-time	64	33	29	24	150
<i>total</i>	79	43	42	41	205

The introduction of remote work resulted in many changes in the surveyed organizations. It also influenced the assessment of the credibility of external audits. According to 70.2% of respondents, remote work did not affect the credibility of the results of external audits. That result is in line with the studies of Kafel and Rogala [25] where credibility of on-site and remote audits were compared. The explanation of that result can be also the most important factor of satisfaction of external audits, which is auditor’s knowledge [26]. That knowledge, regardless of the method of conducting the audit (on-site, remote), it does not change.

The first experience with remote work, including for some of the organization with external audits, allows us to indicate expectations regarding future activities in this regard. The respondents were asked about their willingness to conduct remote audits (both certification and supplier’s ones) after the end of the pandemic. In table 5 the distribution of obtained results was indicated.

Table 5. Willingness to proceed with remote external audits after the end of the pandemic

Remote form of audits	Supplaiar audits	Certification audits
	Number of organizations [%]	
1 – definitely not	25,4	22,4
2 – rather not	26,3	22,0
3 – it’s hard to say	20,0	23,4
4 – rather yes	13,7	17,6
5 – definitely yes	7,3	8,3
No data	7,3	6,3

Analyzing the willingness of remote external audits continuation in in the future, it can be concluded that the more an organization hire employees, the more implemented systems are, the longer the systems are certified, the lesser is the willingness to conduct external audits in

a remote form in the future. In the case of the number of implemented systems and the number of certification cycles, the obtained results can be considered statistically significant for supplier audits and certification audits, respectively (table 6).

Table 6. Spearman's rank order correlation – willingness to conduct external audits remotely after the end of pandemic

Variables	Size	Number of management systems	Number of certification cycles	Scale of activities	Revenue
Suppliers audit	-0,127055	-0,143628*	-0,126502	-0,066130	-0,004171
Certification audit	-0,023769	-0,111355	-0,187709*	-0,091394	0,063914

* statistically significant for $p < 0,05$

The obtained results are surprising. The possible explanation could be the fact, that the remote audits are assessed as less effective one. At the same time, in the analyzed period, the certification bodies did not reduce the costs of certification in case of remote audits [11], therefore the studied organizations were not financially motivated to choose the remote form of audit.

Higher propensity to conduct external (post-pandemic) audits in a remote form may result from experience in this area from before the pandemic. In order to confirm this hypothesis, the studied organizations were divided into two groups and the distributions of the obtained responses were compared using the Mann-Whitney U test. The obtained results did not allow for the verification of such a hypothesis. This may have been due to the small size (5,9% of organizations) of the group of organizations that had experience with remote audits prior to the pandemic.

In the next step, an analysis was carried out using the experience in remote audits also during a pandemic time, as a grouping variable. In this case, organizations that had experience in remote certification processes were more willing to stick to this form of activity also after the pandemic ($Z = -2.58$, $U = 3167$).

4. Conclusions

Key findings for auditing processes at the start of a pandemic have been identified. According to the study, the more implemented and certified management systems is in an organization, the lower is the assessment of the usefulness of audits which were done before pandemic time. Moreover, less than half of the organizations had done the planned external audits for 2020 on-time. It clearly indicates, that during the first shock and pandemic movement restrictions caused great difficulties in maintaining the continuity of auditing activities. Organizations that had the experience with remote audits, mostly (70.2%) claims that remote work did not affect the credibility of the results of external audits. Due to the other barriers and problems with that method of auditing, the willingness to perform such audits after covid is rather low, both for supplier and certification audit.

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**The 11th National and 3rd International Conference on Quality
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Development of Customer Service System in Electronic Commerce

Abstract

Research background: Information technologies and systems are developing rapidly. Therefore, there are significant changes in business entities' interaction. E-business is an effective tool to make settlements with customers, expand markets for goods and services, seek new partners, and create a positive image. Certain business types are more favorable to introduce e-commerce; thus, their development level is higher. They are trade in intangible goods, securities, banking services, software development and implementation, information services, distance learning, etc.

Purpose: To determine electronic commerce features in customer warranty and service.

Methods: The following methods are content analysis in processing and searching literary sources; comparing protection of consumers' interests; analysis and synthesis; consolidation and systematization, particularly in the analysis of legislation, literature, and statistics.

Findings & Value: Service and warranty are key commerce elements. They are customer services. For proper service and being ahead of competitors, the

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consumers' feedback, complaints, suggestions, recommendations, claims, constant response should be set up. Protecting consumer rights in e-commerce is ensured by "On protection of consumers' rights," "On electronic commerce" etc. Improving regulations between a consumer and a seller, and finding new implementing ways are necessary. Ukraine should fulfill its international legal obligations. Despite protection of consumer rights is regulated, e-commerce is not established properly and there is a negative experience in using it because of poor government control. E-commerce stores' trends will allow achieving excellence, high ratings, and buyers' confidence. The country should have a high-quality e-commerce service.

Keywords: service and warranty service, consumer protection, e-commerce, online store, innovation.

JEL Classification: M 21

1. Introduction

In the traditional sense, doing business involves direct contact between a seller or service provider and a consumer. In this context, business relationships are very close, and a consumer usually has the opportunity to contact a manufacturer or seller directly. As a result, the personal component of business relationships has a significant impact on solving many fundamental and small problems. In turn, in terms of e-commerce, the relationship between producers, sellers, and consumers is indirect. Networks, websites, and mobile communications eliminate the personal factor in a significant way. Nevertheless, the businesspersons' responsibility to consumers remains at a high level, especially when competition intensifies and the importance of goods and services quality in comparison with price increases. In today's world, if take no notice to the market of high-tech products or services, the production problem is almost non-existent. The problems of functionality, quality, and safety are actual. Thus, the relevance of studying problematic aspects of warranty and customer service development is growing. It should be noted that in terms of e-commerce, the research on these

issues is poorly formalized. Most scholars, including Cox J., Dale B. G. [1], Rita P., Oliveira T., Farisa A. [2], Lee J., Cha M. S., Cho C. [3], Hackl F., Winter-Ebmer R. [4], Chuang H. M., Chen Y. S., Lin C. Y. et al. [5], Dhingra S., Gupta S., Bhatt. R. [6], Yuna Si. [7], Rehman A.U., Bashir S., Mahmood A., Karim H., Nawaz Z. [8], Ingaldi M., Ulewicz R. [9], Hafez L., Elakkad E., Gamil M. [10], pay attention to studying empirical data on consumer satisfaction, as well as situational factors, which is extremely important. Nevertheless, the fundamental factors of problems still remain poorly studied.

2. Problem Statement

The problem is that the features of e-commerce in terms of warranty and customer service are still scientifically unfounded. The important aspects of this problem are:

- To separate warranty and service system components;
- To identify positive and negative practices in protecting the interests of consumers regarding warranty and service in terms of e-commerce;
- To formulate suggestions to improve the warranty and customer service development in terms of e-commerce.

3. Research Questions

To determine electronic commerce features in customer warranty and service. To reach the goal it is necessary to do the following:

- to separate Warranty and Service System Components;
- to analyze positive and negative practices in protecting the interests of consumers regarding warranty and service systems in terms of e-commerce;
- to formulate the suggestions to improve the warranty and customer service system development in terms of e-commerce.

4. Research Methods

The following methods are content analysis in processing and searching literary sources (as a result it is separated the warranty and service system components); comparing protection of consumers' interests analysis and synthesis (as a result it is identified the positive and negative practices in protecting the interests of consumers regarding warranty and service in terms of e-commerce); consolidation and systematization, particularly in the analysis of legislation, literature, and statistics (as a result it is formulated suggestions to improve the warranty and customer service development in terms of e-commerce).

5. Findings

5.1. Warranty and Service System Components

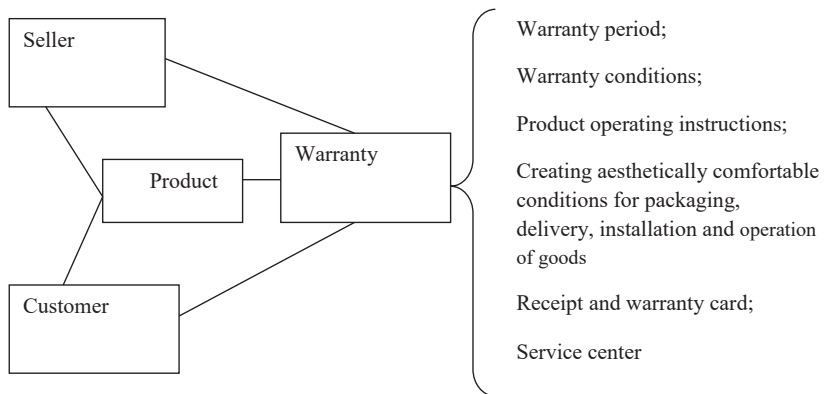
The main component of the customer warranty and service system is the product warranty. To understand the guarantee function more accurately, the consumer service systems of online stores around the world, namely: Epicentrk.ua, Walmart, Allo.ua, Target, SuperTarget, and others are studied. On the website of each online store, there is a section "Exchange and refund" or "warranty service", which contains detailed information on the terms of the warranty, as well as information on the conditions under which it is possible to exchange or return goods.

The features of warranty service: each product has its warranty period, so the seller indicates this period in the description of each product on the site or in Section "Exchange and Return"; some stores offer to hand over the product for warranty repair in three ways: independently provide the product to a service centre, transfer the product to one of the store chains, or send it by mail operator. However, most of the stores have the opportunity to provide repairs under warranty only when the goods are returned by mail to the seller; the websites of domestic online stores indicate information that according to the legislation of Ukraine, since 2017, the presence of a seal on the warranty

card is not mandatory for the provision of services [11-13]; as well as on the websites of Ukrainian manufacturers and sellers of goods contains a provision from the law of Ukraine “On consumer protection” of 12.05.1991 №1023-XII. According to Article 9 of this law, a consumer has the right to exchange goods of proper quality within fourteen days, except the day of purchase, unless a longer period is announced by the seller. Exchange of proper quality goods is carried out if it is not used and if its commercial appearance, consumer properties, seals, labels, as well as a settlement document issued to the Consumer together with the goods sold, or an electronic settlement document is sent to the subscriber number or email address provided by the consumer. The same law specifies a list of goods that are not subject to return [14-18].

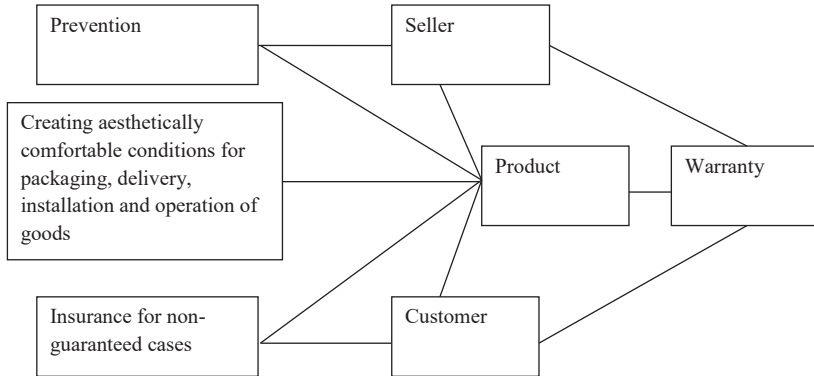
Thus, after researching the sites of international and domestic online stores, such as eBay Inc., Amazon, Walmart, Aliexpress, ROZETKA, Make up, Lamoda and others, we can conclude that the standard warranty is mandatory. The diagram of such a service system is shown in Fig. 1.

Figure 1. Standard service system for goods consumers.



However, for many products (electronic devices, household appliances, parts for them, etc.), a seller usually offers an extended warranty (Fig.2).

Figure 2. Advanced Customer Service System



This extended warranty allows using the warranty service for an additional fee for 1 or 2 years in addition to the standard warranty for the purchased device. This type of warranty works on the principle that one extended warranty covers only one item. If a customer has purchased two or more products and one package of the extended warranty, he can assign the extended warranty to any of the breathers; it will not apply to other devices. The extended warranty is a paid service and is purchased at the request of a customer. The advantage of this type of warranty allows getting additional maintenance and saving money.

Therefore, having analyzed the current practice of consumer warranty and service systems in the field of e-commerce, as well as the of scientists' positions, in particular, the studies by Ordanini A., Lukyanets V., and Zadorozhny S. we come to the conclusion that the consumer warranty and service systems in the field of e-commerce are a set of relations between sellers and customers for the subject of preventive, warranty and insurance services for consumers, as well as providing them with services related to the creation of aesthetically comfortable conditions for packaging, delivery, installation and operation of goods [11-12, 19].

In Table. 1. A comparative analysis of the standard and extended service system for consumers is presented.

As seen, the systems provide almost the same list of services, that is, they provide a guarantee for the product; diagnostics, repair or replacement of one product with another; post-warranty service in service centres. However, the extended consumer service system, unlike the standard one, provides such additional services as insurance for non-warranty cases of

Table 1. Common and distinctive features of standard and advanced customer service systems

Characteristics of the system	Types of schemes	
	Standard	Extended
Provides a guarantee for a product	+	+
Provides the prevention of purchased goods	-	+
Provides the insurance for non-guaranteed cases of purchased goods	-	+
Provides the post-warranty service in service centers	+	+
It involves diagnostics, repair, or replacement of one product with another	+	+
Creating aesthetically comfortable conditions for packaging, delivery, installation and operation of goods	-	+

purchased goods and prevention of purchased goods. Note, these additional types of services are quite attractive and useful for consumers, so the widespread service system is in great demand [20].

5.2. Analysis of positive and negative practices in the field of protecting the interests of consumers regarding warranty and service systems in the field of e-commerce

In order to compare the consumer warranty and service systems in the context of e-commerce accurately, it is worth studying reviews from consumers. This section reviews 20 online stores in Ukraine in order to give specific examples of how the system of protecting the interests of consumers works in practice. Stores that sell and produce goods in various fields of activity are presented to compare the warranty and service system as a whole. Some stores have branches in major cities of Ukraine, but in general, they sell on the Internet. To track the rating of stores based on reviews the site *otzyvua.net* [21] is selected as the basis.

Table. 2 considers stores in the field of e-commerce that have the best practices of consumer protection in the field of warranty and service.

Table 2. Top 10 online stores with the best practices of consumer protection in the field of warranty and service

Store's name	Evaluation of the warranty and service system
UkrSoft	The service system is at the highest level, the staff provides timely and high-quality support to customers. Users are guaranteed. More than 1300 positive reviews.
<i>Pratik</i>	More than 1000 excellent customer reviews of good warranty and service system. The online store provides a wide range of products at a low price, so it is in demand.
OriginalOff	In total, the store has over 300 satisfied customers. However, there are those who complain about the warranty service, namely problems with refunds, although the store's website indicates a 14-day warranty.

Store's name	Evaluation of the warranty and service system
Garne	More than 80% of satisfied customers note that the quality and appearance of the product fully correspond to the description. The website indicates the warranty period-14 days, the seller provides all the services provided by the warranty service.
UPPS	90% of reviews about positive practices in using the store's services. The staff provides excellent advice and service, as well as feedback, as the store representative responds and helps customers with feedback or comments.
Taburetka	70% of reviews about the excellent work of the staff and their service. The store takes care of its customer base and provides the necessary support and advice in case of disputes.
Gold.ua	The store is in high demand, as it has a large assortment and a low pricing policy. More than 900 satisfied customers and each of them is valuable to the store.
Telemart	In general, customers are satisfied with the staff service, attractive prices and quality of goods. However, there are consumers who have also had a negative practice regarding warranty service.
ANSWEAR	80% of customers are completely satisfied with the service and quality of the purchased products. The store is in demand because it provides an opportunity to purchase branded clothing at low prices.
Stylus	Most of the reviews are still positive, so the store can be classified in this category. However, due to the not always prompt work of the staff and problems with refunds, the store's rating gets worse.

The best reviews about warranty and service are provided by the online store "UkrSoft", which sells licensed software. Customer feedback is only about a high-quality service system; all customers are satisfied with the prompt work of the staff, the support provided by specialists,

fast delivery and the professionalism of the support service. The seller's warranty is 1 year from the date of software purchase. However, when analyzing customer reviews, it should be noted that warranty service is not in demand, since users do not complain about low-quality products or services.

The next store in the field of electronic commerce "Pratik," which sells shoes, also has a fairly high rating. The product is guaranteed for 60 days, so customers can return the product unsuitable for them. Customers are satisfied with the service provided by specialists in assistance with choosing a product. The reviews, prompt work and fast delivery provided by the online store should be paid attention. The staff also provides feedback to customers by responding to reviews. However, there are negative reviews about long delivery, low-quality goods, or the product does not correspond to reality.

"Originaloff" online store is one of the leading services on the gift services market in Ukraine. The store offers a user-friendly service interface, a rich selection of services, ease of placing an order online, prompt delivery, reasonable prices and the possibility of various payment methods. Customers highly appreciate the service system, staff support and delivery of purchased goods. However, on the sites of reviews about online stores, there is a place for negative experience of customers who complain about challenges with the sale of gift certificates or with poor service system.

"Garne" is an online store that offers a large selection of clothing, underwear and accessories. The store sells products from well-known manufacturers and new brands of domestic production. The store has a large circle of regular customers who are completely satisfied with the fast processing and sending of orders, pleasant service and high-quality goods. The staff of "Garne" monitors its rating, so they respond to negative reviews with an offer to exchange or replace the product.

"UPPS" is an online store with a high rating, which presents the best brands in the world. The website states that the seller offers a large and diverse range of accessories at favorable prices. All customers are satisfied with the convenient order processing, low price and service support. In the "warranty" section on the site, customers are provided

with information on the exchange and return of goods. During the warranty period, a customer has the right to free elimination of defects or faults in the product related to the production of this product.

“Taburetka.ua” is an online store of modern furniture that offers consumers a wide range of products, which is constantly updated. The company has been operating on the Ukrainian market since 2006. The store’s website states that if the product is properly operated under normal conditions during the warranty period, the seller will eliminate manufacturing defects free of charge, and if the defect cannot be eliminated, the part will be replaced. Terms of warranty service are set by the manufacturer. The seller also provides non-warranty and post-warranty service, which consists in the fact that a seller, at the request of a customer, can organize work on the repair of products or their parts that have failed. Online store “Taburetka.ua” rating is quite high, customers note in reviews that the seller quickly accepts orders and produces goods that, in turn, are of high quality. Some consumers still complain about the managers’ satisfactory service, but the store representative responds to reviews with a suggestion to solve the problem.

“Gold.ua” is an online store of golden, silver jewelry, costume jewelry, founded on the basis of a wholesale warehouse in 2009. The online store is distinguished by high quality products, high-class service and favorable prices. The store provides an opportunity to return or exchange the product within 14 days from the date of purchase. After analyzing the customer reviews of this store, it can be noted that the order processing and delivery is quite fast, the product arrives in a presentable form, employees give professional advice, all these factors determine high-quality service. On the website of the online store there are various promotions, there is also a place for a loyalty program that attracts customers to return to the seller more than once.

The online store “Telemart” offers one of the largest ranges in Ukraine in the field of computer components, products for gaming and cyber sports. The website of the online store states that the warranty period for products depends on the service policy of the manufacturer or importer. The duration of the warranty period for a particular product can be seen on the website in the product card. There are also addresses

of service centers where it is possible to contact about repairs under warranty. The store's rating is high, and most customers are satisfied with the fast delivery, service, and quality of its products. However, some customers complain about the poor quality of service provided by the managers and problems that arise when returning goods.

“ANSWEAR” is a European online store of women's, men's and children's clothing, shoes and accessories. The store has been operating on the market since 2015, not only in Ukraine, but also in 9 other European countries: Poland, Czech Republic, Slovakia, Hungary, Romania, Bulgaria, Croatia, Greece and Cyprus. Customers are satisfied with the store's service, namely: fast delivery, well-packaged goods and a loyalty program that provides customers with additional discounts. The warranty system provides for the return or exchange of goods purchased in the store within 30 calendar days from the date of receipt of the parcel, provided that it was not in use. However, sometimes consumers complain about a long refund, or about other problems that arise when returning an item. The store's rating is quite high, “ANSWEAR” has a wide range of regular customers who regularly make purchases and are completely satisfied with the service.

The online store “Stylus” has been in the Ukrainian online sales market since 2008 and during this time has managed to establish itself as an executive Online Store. The online store “Stylus” has more than 320,000 items of audio/video and digital equipment, small and large household equipment, accessories, books, goods for children, tourist equipment, cottage equipment, repairs and everything that is useful in household. “Stylus” offers customers service support, providing a customer with a full range of warranty and post-warranty service: from the simplest breakdowns to cases of high complexity category. Customers would like to thank the staff separately for their consultation, assistance and advice. It should be noted that the warranty service is also at a high level, the customer can easily return the purchased goods within the time period indicated on the warranty card, and the seller, in turn, returns the funds in a timely manner. Since the store sells equipment, warranty service is an important factor. Customers are satisfied with long warranty periods and high-quality service in service centers. However, some

consumers will note that the goods are not of high quality, since they were imported into Ukraine illegally. Also, customers of the store had a problem with the return of goods, the seller did not make a refund, due to the allegedly poor condition of the goods.

Next, let us look at online stores that have the worst practices of consumer protection in the field of warranty and service (table. 3). Such stores in Ukraine also have their place, since the state imperfectly exercises control over stores in the field of e-commerce, so there are online stores on the market with low quality of service and warranty system.

Table 3. Top 10 online stores with the worst consumer protection practices in the field of warranty and service system

Store's name	Evaluation of warranty and service system
<i>ROZETKA</i>	Service is at a low level, and consumers complain about the inefficient work of managers, poor quality of goods, irresponsible staff, and poor warranty service.
<i>Bonprix</i>	Customers are satisfied with the service, but they are not satisfied with the guarantees of the service at all. Due to the large number of dissatisfied consumers, the store has a low rating.
Mobilac	Most dissatisfied customers complain about the poor service provided by the online store's employees.
<i>Kasta</i>	In general, the service system is good, but poor-quality goods and problems that arise during warranty cases significantly reduce the store's rating.
MAKEUP	The online store has a regular customer base, but it is necessary to improve the warranty and service systems in order to increase the rating.
TTT	The store should establish a warranty system and improve the skills of its staff to increase positive reviews and satisfied customers.

Store's name	Evaluation of warranty and service system
Skidka	The service of this online store is at a low level, the warranty system is satisfactory.
LaGrande	Most customers rate the service of the online store unsatisfactory. The low rating was particularly affected by the unprofessional attitude of the staff to customers.
Leboutique	The quality of service in the online store does not meet the requirements, so the store is gradually losing demand in the market.
CACTUS	The store has the lowest level among others. Users rate the service and warranty systems as unsatisfactory.

ROZETKA is one of the largest online stores in Ukraine, which has been operating since 2005. The store offers a wide range of products of any field of activity. The warranty system provides that a customer can return a new product without signs of use within 14 days after purchase. Despite the fact that the store is popular in the country and has a wide range of products, ROZETKA has a low rating and a large number of reviews about a satisfactory system of both warranty and service. This is facilitated by the fact that ROZETKA is like a trading platform on which various sellers trade. Studying the reviews, it can be noted that ROZETKA does not perfectly check sellers for the quality of service and warranty system, and, as a result, the online store has a low rating and dissatisfied customers.

“Bonprix” is an online store that presents women’s, men’s, and children’s clothing, as well as various household goods. The store’s website states that the consumer can return the product within 100 days after receiving the order. Most of the customer reviews about the terrible operation of the warranty service, but the store’s representatives try to help solve customer problems in the comments. “Bonprix” has a high quality and diverse product, but the store’s poorly adjusted warranty system makes up its terrible rating.

“Mobilluck” online store has been operating on the electronics market since 2004. The website of the online store states that the sell-

er provides the consumer with a low price, convenience of ordering, professionalism and high-quality service, loyalty programs, favorable promotions, special offers, highly qualified service and an individual approach to each customer. The seller offers a 14-day warranty from the date of receipt of the goods. Customers complain about the terrible service of managers and hotline staff, slow processing and delivery of goods. One of the advantages is that the store allows consumers to purchase high – quality goods at a low price.

“Kasta” is one of the largest online clothing, footwear and accessories stores in Ukraine. For all the equipment purchased in Kasta.ua, an official manufacturer’s warranty is provided. In the event of a warranty event (product breakdown, detection of a defect), the customer has the right to free repair or replacement (return) of the product during the warranty period, subject to compliance with the operating rules. The warranty period is specified in the warranty card (other documents attached to the product) and begins to take effect since the moment the customer receives the product. Negative customer reviews are caused by imperfect warranty service, poor-quality and defective goods, and slow delivery.

The online store “MAKEUP” is a popular store of original perfumes, perfumes, decorative cosmetics, and cosmetics for care. The online store “MAKEUP” presents perfumes and cosmetics of the world’s leading brands, as well as perfumes and cosmetics of the category of mass markets. Within 14 days from the date of purchase, the product can be returned. Within 14 days from the date of purchase, the consumer can return the product. The low rating of the online store is due to imperfect service, consumers complain about terrible product packaging, poor site performance, and poor consulting of the managers. However, consumers note a large assortment, low prices and fast delivery of goods.

“TTT” is an online store, one of the leaders of the mobile phone market, and an official distributor of global mobile phone manufacturers. The assortment of the online store includes certified goods, which are provided with an official warranty from the manufacturer. Most customers are satisfied with the price and quality of their products, but they give low ratings due to inefficient operation of the service center

and problems with product return. Every customer, who tries to contact the service center for a guarantee or return the product, has problems and complaints about the work of the service center staff.

“Skidka” is one of the largest Ukrainian online hardware stores. The product is guaranteed for 14 days after receiving it. Customers of the online store write negative reviews about its unreliability, impossible refund in the event of a warranty event, incompetence of the staff and non-compliance of the product with the declared characteristics.

“LaGrande” is an online store of original cosmetics and perfumes for men and women. The warranty provides for the return of the product within 14 days from the date of its receipt. Most customers complain about poor service from the managers, terrible attitude of the staff to customers, slow delivery, poor quality and damaged goods.

“Leboutique” is an online shopping club that sells clothing, shoes and accessories of well-known Western and Ukrainian brands. The store guarantees the originality of the products presented on the site, and also guarantees the return or exchange of goods within 14 days. Negative customer reviews are caused by a poorly functioning warranty system and problems with refunds. Also, customers cannot contact the seller, due to the satisfactory operation of hot lines. The online store “Leboutique” has a rather low rating among others, due to the lack of professionalism of the staff and the warranty system is not configured.

The online store “CACTUS” is a trading platform where you can find a wide variety of product categories: gadgets and appliances, home and leisure goods, sports and cars, animals and smart homes, children and adults. The warranty period of operation is calculated from the date of receipt of the order by the consumer and ranges from 14 to 365 days, depending on the product. Almost every customer who applied to the service center for a warranty case had difficulties. Consumers also had problems with product returns and refunds. In general, more than half of customers do not recommend this online store to other users.

Thus, after analyzing a number of domestic online stores, it is worth noting that the development of e-commerce in Ukraine is progressing rapidly. There are a sufficient number of sellers who comply with all the conditions stipulated by the legislation of Ukraine, provide customer

service at the highest level and are equal to online stores in European countries. However, consumer protection in the field of warranty and service services of some online stores is not at a high level. Consumers often complain about problems in the warranty system and poor quality of service. Vasilenko M. and Kireea I. argue that: “the authorities are trying to regulate trade in the field of e-commerce with legislation and draft laws, but today the methods are not effective enough” [22].

5.3. Suggestions for improving the warranty and customer service system development in the context of e-commerce.

E-commerce is one of the most dynamic and competitive areas of business, which is changing both in terms of technology and business models. To be successful in this area, it is necessary to take into account all the factors and trends of its development. To do this, e-commerce entities must: improve and develop logistics, improve the speed and quality of delivery; take into account the development of the “subscription purchases” direction; track the emergence of new mobile applications in the field of e-commerce; introduce a personalized service for certain groups of consumers; conduct effective advertising. Special attention in the process of conducting e-commerce, as noted by Sumets A., Serbov M., Skrinkovsky R., Faldina V. and Satusheva K.: “...It is necessary to pay attention to protecting the rights of consumers and ensuring their interests by increasing guarantees from business structures” [23].

In the proposed table (table. 4) the list of problems in the field of protecting the interests of consumers of goods regarding warranty and service systems in the field of e-commerce that the consumer, manufacturer and seller face, as well as ways to solve them and the expected effect of implementing the proposed solutions is indicated.

Table 4. Current problems of stores in the field of electronic commerce, ways of solving them and expected results

Problems	Ways of solving problems	Expected results
<p>The seller loses customers due to poor performance of service centers (some work too slowly, others do not provide high-quality services).</p>	<p>Creating a significant number of small service centers scattered across large and medium-sized cities. It is also necessary to recruit only professionals to work in service centers or train staff at the expense of the enterprise.</p>	<p>As a result, the number of service centers will increase, so customer assistance will be provided faster. The store will receive fewer customer complaints about the low level of service delivery, since only qualified sellers will work.</p>
<p>Customers who purchase vehicles, household appliances, and other valuable goods want to contact the service center for warranty repairs, but the warranty period has expired.</p>	<p>It is advisable for an online store to offer an extended warranty, which will be provided for an individual product for a certain period of time for a set fee. The consumer, having such a guarantee, will be able to use the services of the service center without hindrance after the end of the standard warranty.</p>	<p>Thus, the store will attract additional consumer attention; the number of customers will increase when choosing an online store; most consumers will prefer an online store that offers an additional extended warranty. Such a seller will have the trust and demand of consumers.</p>

Problems	Ways of solving problems	Expected results
Often, customers refuse the services of an online store due to unsatisfactory staff service (poor advice, disrespect, and incompetence on the part of managers or hotline employees).	Analyze reviews of the services provided by the staff, offer clients to evaluate the service provided by the manager, improve the professionalism of the staff by completing mandatory regular training courses that will give them new knowledge each time and teach them creative service methods.	As a result, the store will not lose customers due to insufficient service, and employees will better understand their business, improve their knowledge regularly and apply innovations.
Users of the online store's delivery services had a negative service practice related to the delivery of damaged goods during transportation.	Products that have a high risk of damage during delivery to the customer should be packed properly. When packing products such as cosmetics or products containing glass parts, you should additionally consider protecting them from possible defects. It is appropriate to stick a sticker on the packaging with a courier warning.	The number of negative customer reviews about poor delivery quality will decrease. Consumers will characterize the seller as a reliable supplier and give high ratings for the service.

Problems	Ways of solving problems	Expected results
There are cases when a customer decides to change a store after an unsuccessful experience of purchasing goods in it	To avoid such incidents, the seller should provide additional bonuses, promotions, or gifts for subsequent purchases to consumers who have received poor service.	Thus, the online store will not lose a customer who is accidentally provided with poor-quality service. The consumer will be satisfied with taking care of as a customer.
There are customers (usually older people) who do not prefer online payment, so they refuse the services of an online store. Also, some customers refuse to pay in advance due to distrust of an unfamiliar seller.	For such customers, it is appropriate to provide for payment of goods to the courier or at the pick-up point of the goods. For greater consumer confidence after making a payment the customer must receive an electronic transaction document confirming the receipt of funds.	The store will be able to expand its customer base. It is the transfer of all operations in electronic format trading on a contractual basis can significantly help reduce risks in this area for both the seller and the consumer.

Although due to social and economic problems, Ukraine lags behind the United States and Western Europe, our state enters the global information space [24]. Given the need to increase the competitiveness of the Ukrainian e-commerce sector in the world market, the development and improvement of institutional support for this sector of the economy is relevant. For the development of e-commerce in Ukraine, it is necessary to introduce a number of measures at the legislative and institutional level in accordance with the concept of the information society, in particular:

- introducing the latest information and communication technologies in all spheres of economic activity, increasing the level of automation and updating the processes of enterprises in the trade and manufacturing industries;
- improving the security of data transmission and processing;
- developing digital communication networks as a replacement for analog ones;
- providing state support to telecommunications development operators in remote regions of the country. The introduction and development of tools for state regulation of e-commerce, the creation of regimes of the greatest legal assistance to the development of digital business in Ukraine is the basis for increasing the competitiveness of Ukrainian business entities both in the domestic and global markets [25]. Also, in order to transfer domestic trade to a civilized channel, it is necessary to adopt a law on consumer protection in the field of e-commerce. It should contain a number of effective standards that work in the EU countries:
 1. Prohibition of e-commerce to entities that do not disclose registration information. First, it is up to online stores, whose phone numbers are not verified or linked to the passport data of an individual entrepreneur.
 2. The right to online stores' block websites that do not comply with identification requirements by a court decision. It is necessary to provide for an expedited procedure for judicial consideration of such claims by law.
 3. A mechanism for depositing funds by banking institutions or marketplaces (an internet marketplace is a type of e-commerce website, where information about products or services is provided by third parties [26]). Such a tool works effectively, in particular, in China. The seller can receive funds from the consumer only after full fulfillment of its obligations. It is advisable for the state to conduct a powerful information campaign, that is, to explain the advantages of depositing funds in a separate account and identify the risks of paying for goods or services in P2P format (transfer of funds from one individual to another). It is much safer and more reliable for

both consumers and sellers to use the cash on delivery service. The main advantage of cash on delivery is that the customer pays for the order only after receiving and inspecting the product. There is no risk that the seller will not ship the goods after payment. The main disadvantage of cash on delivery is that the customer needs to pay a commission or percentage for transferring money by new mail to the seller.

4. Separation of functions of state policy formation and consumer rights protection. Provide the first function to the Ministry of Economy, the second one to the State Food and Consumer Service. The current model of trade regulation by the Ministry of Economy and the Ministry of Digital Development, and consumer protection by the State Food and Consumer Service does not provide effective regulation.
5. Official Register of virtuous online stores on the regulator's website. Such a tool corresponds to the European model of consumer protection. An example is the introduction by Germany, France, and Switzerland of a public register of bona fide sellers in the tax authorities [27-28].

Despite the existing shortcomings and threats, the e-commerce market in Ukraine has all the prospects for development. Trends that have already developed in the United States, Europe, China, and other countries and relate to increasing customer orientation in trade will be relevant [29-30].

6. Conclusions

1. Warranty and service systems are key elements of trading, they are services that are provided to customers before and after purchasing. To have the proper service and allow it to stay ahead of competitors, the company should establish feedback with consumers, arrange the reception of complaints and suggestions, recommendations and complaints, and constantly respond to them.
2. Consumer rights protection in the field of electronic commerce is provided by the relevant provisions of the laws of Ukraine "On

consumer rights protection,” “On electronic commerce,” and others. Having studied the challenging issues in the field of consumer protection, it is concluded that it is necessary to improve the legal acts regulating the legal relationships between a consumer and a seller and find new ways to implement them.

3. A brief overview of consumer protection in the European Union shows how multifaceted and complex this set of issues is. That is why, in order for Ukraine to properly fulfil its international legal obligations to bring its national legislation closer to the relevant European standards, it is necessary to take into account the particularities and aspects of the legal regulation of this field in the EU at all stages of approximation: not only at the time of transposition, that is, bringing legislation into conformity with the requirements of the law, but also in the process of practical implementation of European requirements and standards (implementation), as well as in the framework of their enforcement.
4. Despite the fact that the country’s authorities regulate consumer rights protection with relevant draft laws, trade in the field of e-commerce is not established accordingly. Consumers often have a negative experience in using e-commerce store services because of the lack of government control over e-commerce. The study showed that the problematic aspects of service and guarantee services for consumers in the field of e-commerce are: poor functioning of service centres; satisfactory guarantee system; poor service and incompetent staff; slow delivery and etc.
5. Applying the proposed trends will allow e-commerce stores to be successful, highly rated, and trusted by customers. The state should also help bring this area of trade to a new level, equating with highly developed countries and introducing draft laws that will allow the country to have a high-quality e-commerce service system. To improve the service and warranty system for consumers in the field of e-commerce, it is proposed to: introduce a loyalty program for customers; improve the skills of the staff, in particular, employees of service centres; improve the warranty system through the introduction of an extended warranty service; improve delivery services

due to high-quality packaging of goods; add cash on delivery service for purchased goods for consumers.

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**The 11th National and 3rd International Conference on Quality
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**Factors Determining the Quality of Catering
Services in the Opinion of Consumers and
Catering Staff**

Abstract

Research background: Ongoing interest in the provision of food service prompts an continuous assessment of the quality differentiators that determine demand for it. The pandemic has caused some restrictions on the ability to serve food services, so it is important to look at how customer expectations for these services has changed and how food service providers perceive this.

Purpose of the article: The aim of the research was to quantify the importance of the quality criteria of catering services as perceived by two parties: the service provider and the service recipient. **Methods:** The method used to achieve the objective is a diagnostic survey, for which a weighted cause-and-effect Ishikawa diagram was applied. The areas of menu, service and equipment

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were taken as the main causes influencing the quality of catering services. Value evaluation based on pairwise comparisons of second-order causes were made by 105 respondents from service users and 96 from service providers.

Findings & Value added: Research revealed that in the opinion of customers, the most important features they take into account are factors belonging to the areas of: menu (M) and environment (E), they are least interested in the quality of customer service. Catering workers care most about the quality of the food served and the quality of service. The results obtained show a slight change in consumer attitudes towards catering services. More important to them than before the pandemic is the convenience of eating a meal and the speed of service. Hygiene is at the end of the list of determinants which guide them when choosing a catering facility. In the opinion of service providers, the most important factors are meeting customer requirements in terms of taste satisfaction (M) and high quality of customer service (S). The results obtained can be used for further research on the evaluation of the quality level of catering services or as a source of information for managers and owners of establishments.

Keywords: food service, weighted Ishikawa diagram, service quality

JEL Classification: D79, L84

1. Introduction

Family traditions and habits, until recently, created a model of consumption, which was based on the preparation and consumption of meals at home. Currently, the changes that have taken place in social and economic life have contributed to a fairly intensive development of catering services. In 2020, this development was limited due to the emergence of restrictions related to the SarsCov2 pandemic. However, the return to normal functioning of the economy resulted in an intensification of the offer of catering services. Today, catering companies are once again meeting consumers' nutritional needs by offering food and beverages in any place of their choice. However, it is necessary to consider whether the dimension of perception of individual factors affecting the image of the quality of catering services has not changed.

A change in certain habits, habits that remained as a result of compliance with the sanitary regime can affect this. In the literature on the subject, the factors that the customer is guided by when choosing a gastronomic establishment have been widely discussed. It directs them to managers and owners of premises so that they can more easily adapt to customer requirements. However, no mention of the quality criteria that are taken into account by the service provider was noticed. Therefore, the aim of the work is to present the criteria for the perception of the quality of catering services and their validity by two parties: the service provider and the recipient.

2. Characteristics of catering services

The literature defines the concept of gastronomy in many ways, e.g. as a service that provides the population with food products prepared from fresh high-quality raw materials, recommended by nutrition science or as a whole of mass catering establishments (restaurants, bars) and specialized plants (e.g. delicatessen) of a production and service nature (Sala, 2011). W. Reith (1987) extended the concept of gastronomy to include additional services that are to make the provision of the catering service more pleasant. Thus, in addition to the basic service – serving a meal, the customer is also dealing with a cultural and entertainment service in this case (Kozłocka & Osowska, 2012). Taking into account the multiplicity of definitions of the term „gastronomy”, it can generally be said that it is one of the types of economic activities consisting in running a plant offering the service of serving food, drinks by employed staff and the possibility of consumption in a consumption room (Stasiak, 2007). Catering services, as a rule, are provided by independent catering entities that perform the following functions: service, which include the sale of meals and beverages with on-site consumption or take-away, with home delivery, catering service, cultural and recreational services, commercial function, consisting in the sale of tobacco, pastry products, alcoholic and cooling beverages, as well as production, which consists in the processing of food raw

materials into dishes, beverages, confectionery, etc. (Sala, 2011, Mutlu & Doğan, 2021, Quee-Ling et al., 2017).

In the basic division of catering establishments, two types are presented: open catering establishments, where each customer can use the services of such a place, and closed catering establishments, examples of which can be canteens in kindergartens, schools, hospitals (Sala, 2011).

Intensive development of the catering services market leads to the creation of different divisions of catering service establishments from those presented above. In one of them, the following are distinguished (Levytska, 2011):

- individual gastronomy, which is created by premises addressed to individual consumers, these are: restaurants, cafes, confectioneries,
- systemic gastronomy (franchise), an example of which can be commercial gastronomy (sandwich bars, cafeterias, salad bars), or fast food bars,
- special catering, these are premises that specialize in other types of services that cannot be included in the above-mentioned groups (e.g. canteens).

Another – quite interesting division, is based on gastronomic distribution channels. It distinguishes (Kowrygo & Stangierska, 2012):

- catering, whose place of service may be fast food restaurants, with full waiter service, in hotels or guesthouses, bars, cafes,
- restaurants located in medical and educational care facilities, workplaces and means of transport,
- food trade, which is provided, for example, at gas stations in specialty stores (bakeries, confectioneries), catering establishments in stores and retail sale of ready to eat, ready to heat products,
- vending carried out in medical and educational care facilities, workplaces or on the street,
- a category related to free time, entertainment, under which food is offered in food stands, catering outlets, mobile catering establishments or food sales points in cinemas or sports facilities.

Gastronomy is one of the oldest forms of human service activity. Gastronomic establishments have accompanied man for a long time, their prototypes already existed in antiquity (Milewska et al., 2010).

Their development was quite turbulent, which was influenced by many factors, e.g. lifestyle changes, professional activation of women, urbanization factors, or changes in consumer attitudes and motivations (Kwiatkowska & Levytska, 2009, Eris et al., 2022). According to the so-called „new gastronomy”, in addition to the implementation of its basic functions, it provides new experiences, the opportunity to reorganize free time, consolidate comfort (Doring, 2008).

The development of catering services has been disrupted by the emergence of restrictions related to the epidemic situation during the pandemic, as a result of the spread of the SarsCov-2 coronavirus. According to statistical data, at the end of 2020, the number of catering establishments decreased by almost 5% compared to the previous year (Rocznik..., 2020). During the pandemic, the activity of catering establishments was mostly based on the offer directed to consumption outside the premises (sales with delivery, take-away). The vast majority of premises recorded a decrease in sales, which means that in most premises the level of sales revenues from catering services also decreased. The largest relative decline in revenues was recorded by hotel restaurants (Rynek..., 2021). The dynamics of sales on the HoReCa market in Poland in 2020 compared to the previous year amounted to -30.9%, while in 2021 compared to 2021 it was already +14% (Filip, 2021). According to PMR research, during the pandemic, 23% of outlets were forced to cease or narrow down their operations, while currently many of them are struggling with a lack of experienced staff (Zagórska, 2021).

3. Determinants of the development of catering services (MSE-in and MSE-out model)

The importance of the presence and development of this sector is important. Despite some adversities, the owners of catering services want to stay on the market, taking into account the economic and social situation in the country and the competition and requirements of the customer. They should take care of the image of their premises and take action to improve it against the competition. Therefore, ongoing activ-

ities contributing to the improvement and maintenance of an optimal level of service quality are important. Restaurants and catering outlets should take care to meet the needs and expectations of their customers. They should listen to the voice of the customer and properly create an image of the quality of their services. It is influenced by many determinants, which, after examination, possible correction, can and even should contribute to the development of this sector.

The customer is very often guided by the so-called first impression, which is characterized by durability and supports his later decisions. Therefore, finding significant determinants for the customer, which are identified by him, is the first of the stages in quality improvement. In the next steps, their quality and value should be determined.

In recent decades, numerous studies have been carried out in order to broaden the existing knowledge about the attitude of consumers towards the catering services market, their requirements towards it. In the literature on the subject you can find many determinants that customers follow when choosing a catering service. These include, among others: the type of dishes and their quality, the variety of menus, the location of the catering point, the courtesy of the staff, the atmosphere in the premises, competent staff, child friendliness (Auty, 1992, Kivela, 1997, Fu & Parks, 2001, Buchral, 2006, Rowe, 2010). In addition, the price, accessibility for people with disabilities, promotions offered, the possibility of using the Internet in the premises are important for customers (Mazurek-Łopacińska, & Sobocińska, 2013, Sezik, & Gutkowska, 2018). The above determinants fit into the components of the catering product, which consists of: assortment (food, beverages and entertainment services), services for consumers (style, availability, standard of service), conditions and atmosphere of consumption (equipment, interior colors, decorations, lighting and size of the consumer room) and architecture (architectural style, or other elements such as parking, access, flowers, shrubs, ornaments) (Sala, 2011).

Looking at the determinants presented above, it can be concluded that the quality of catering services is influenced by three basic groups of determinants shaping quality: menu, service and environment (equipment). Among the determinants affecting the quality of the menu, one

can distinguish, among others, the price, determining the cost of the catering service, variety, taste of dishes, or the appropriate temperature of their serving (Świątkowska et al., 2017). Customer service, which is the so-called showcase of the premises, can be defined by such determinants as: speed of service (the moment from the customer's arrival at the premises to the moment of issuing the order), staff competence (knowledge about dishes), appearance (neatness of the employee's clothes), courtesy (pleasant attitude to the customer) (Krzepicka, 2014). On the other hand, the client's environment can be determined by, for example, convenience, aesthetics, cleanliness of the consumption room, cleanliness of the stower as well as aesthetics of the card (appearance, transparency) (Alonso et al., 2013). The determinant groups presented above form the MSE-out model (menu, service, environment quality image perceived from the outside). In a similar way, it is possible to create a model of the influence of determinants on the quality of catering services from the perspective of service provider. It turns out that so far no research has been done in this field. Therefore, for the purposes of the work, the MSE-in model (image of the quality of the catering service seen from the inside) was created, which takes into account the following criteria⁴:

- menu (aesthetics of the card and it, variety of dishes served⁵, their freshness and aesthetics of serving),,
- service (standard of waiter service, *savoir vivre*, repeatability of taste, organization of work),
- surroundings (external and internal appearance of the premises, equipment of consumer halls and kitchens).

The first guideline from the MSE-in model that was taken under the assessment was the menu – which included the aesthetics of the menu card, through its appearance and selected font and legibility, draws on the neatness of the operation of a given premises. With further evaluation of the menu, attention was paid to the variability of the dishes

⁴ The different criteria were extracted and assigned to each group on the basis of an interview with experts.

⁵ The paper assumes that the variety of dishes served does not always have to coincide with the dishes listed on the menu card.

served. The determinant in this concept is how many dishes a given place serves – because the customer has the opportunity to choose. Then the freshness of the dishes and the aesthetics of serving depend on the characteristic of the kitchen. With consciousness, the served dish should be presented impressively because every sense should get euphoria.

Determinants in the scope of service cover 2 groups of employees: hall workers and kitchen workers. The first group, having contact with the customer, should take care of their standard of waiter service, which includes the canon of behaviours established by the restaurant managers. This applies the staff behaviour that will be observed by employees to consumers, and the resolution of difficult disputes with restaurant customers. It is becoming more and more important to follow the principles of *savoir vivre* into everyday activities, both in private and professional life. The principles of *savoir vivre* related to the knowledge of good manners and implementing them during customer service (communication, body language, the appearance of the outfit, dress code, the way of setting and serving to the table). The second group of employees, although they do not have direct contact with the customers, play a very important role in this group of determinants because they are responsible for the repeatability of the taste of the dishes served, which is a very desirable feature by customers.

The internal and external environment is a factor that determines the comfort of work of the staff in a gastronomy entities, as well as the comfort of eating a meal. It is directly related to the distance between the tables and chairs, the availability of additional equipment, e.g. chairs for children, children's playground, the quality and aesthetics of the tableware, the availability of restrooms, friendly interior design. In this group of factors, the kitchen equipment is equally important, because the type, quantity and availability of devices affect the time and taste of the prepared courses. Each of the above features is combined with the other featured listed.

4. Ishikawa diagram and its use in determining the importance of determinants of catering services

Each organization strives to improve the quality of services offered or manufactured products. For this purpose, it can use well-known tools that have long functioned in the world of science and practice. These tools can provide a lot of information about problems in your organization, helping you find solutions to them. One of them is the Ishikawa diagram, which has gained extraordinary popularity in its application thanks to its uncomplicated procedure and short waiting time for results. Its creator was Kaoru Ishikawa, who was the first to present a tool aimed at helping to identify the causes generating a decrease in quality. Graphically, the diagram illustrates the relationship between a particular result and its causes, which is why it was called a cause-and-effect diagram. The studied effect or negative problem is the „fish head”, and the potential causes and sub-causes determine the „fish structure”, which is why it is also called the fish bone diagram. The traditional Ishikawa diagram is a tree showing the connections of the analyzed causes and their hierarchy. Displays groups of causes without specifying their impact on the problem under analysis.

The purpose of the Ishikawa diagram is to present all the factors that affect the quality of the process with the help of a visual list drawn up in an orderly manner. The 5 Why? Method can be used to identify the causes.

The procedure for creating the Ishikawa diagram consists of (Malinowska & Szymańska-Brałkowska, 2021):

1. Identification of the problem,
2. Determination of the main causes,
3. Detailing the causes (searching for sub-causes for each group of main causes, or subsequent sub-causes),
4. Analysis of results (discussion on the correctness of the selected root causes and sub-causes and their possible categorization).

The causes of the problem are most often grouped by category (Hamrol, 2005):

- People (Manpower) – e.g. lack of qualifications, poor team, low knowledge, staff shortages, dissatisfaction with work, short internship, malaise),
- Methods – e.g. outdated procedures, instructions for restrictions due to specifications, know-how standards, too large tolerances, legal restrictions, too narrow scope of obligations,
- Machines – e.g. end of license, durability, low efficiency, low precision, safety,
- Materials – e.g. improper input raw materials, blanks, elements, heterogeneous materials, poorly selected substitutes,
- Management – e.g. improper organizational structure, lack of good organization of work, shifts, poor working conditions,
- Environment – e.g. energy loss, temperature, dust,
- Measurement – e.g. improper measurement method, measurement conditions, ability of measuring instruments, fatigue of people performing measurements,
- Finance (Money) – e.g. purchase of cheaper input materials, elimination of technical inspections of machines, lack of training.

The above reasons are not constant determinants in working with a diagram. It is not necessary to strictly adhere to the presented nomenclature, you can use such reasons that actually have an impact on the analyzed problem. The same situation applies to their quantity. The optimal number of reasons should be tested so that the picture of the proposed test results does not turn out to be too complicated, falsified.

It should be remembered that the traditional Ishikawa diagram only indicates the causes, but does not value them. For this purpose, other tools and methods can be used, thanks to which it will be possible to get answers to the questions, e.g.: which cause occurs most often?, which of the causes has the strongest impact on the occurrence of the defect? (Wiśniewska & Malinowska, 2011).

One example of obtaining quantified results from studying a problem is the use of a weighted Ishikawa diagram. The idea of a weighted Ishikawa diagram is based on the presentation of qualitative information about the studied problem and quantitative analysis, determining the validity of individual causes against the background of the others.

The methodology of developing a weighted Ishikawa diagram involves the implementation of tasks that consist in determining a set of root causes and groups of sub-causes for each of the main causes, and then determining their weights, using the method of comparison in pairs. The final stage is the determination of the absolute values of the weights of the sub-causes, which determine the degree of their importance against the background of the other sub-causes. This makes it possible to identify those factors that have the greatest contribution to the formation of the effect studied.

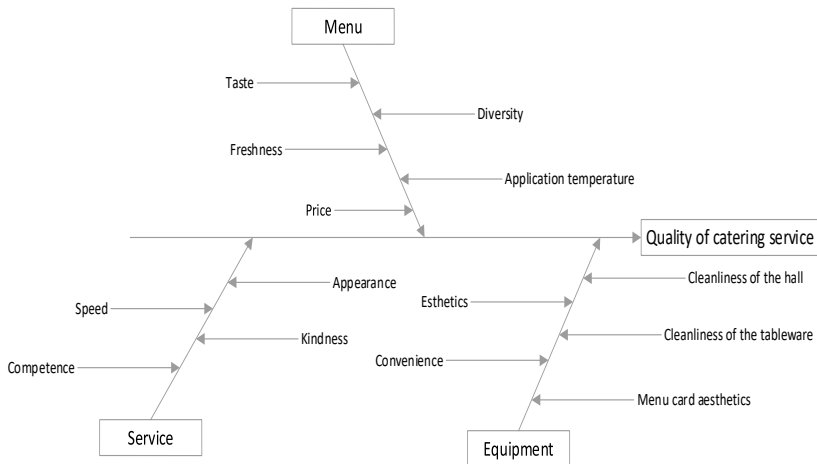
A cause-and-effect diagram is a very simple tool, characterized by transparency of description, low cost, quick obtaining of structured information. Ishikawa's cause-and-effect chart can be used to recognize any phenomena in various areas of life. It is most often used in industry (Gwiazda et al., 2021), more and more often you can see the use in services (Carvalho et al., 2021) as well as a supporting tool in risk analysis (Popa et al., 2021).

5. Purpose and methodology of research

The situation that happened all of us in 2020 has forced many entrepreneurs to take radical steps. Some were forced to cease their activities, others had to take a break or change their trade. Of course, there are also industries that have been developing rapidly during the pandemic. However, the catering sector is not one of them. According to forecasts, a return to the value of the market from 2019 will be possible only around 2024, when tourist and business traffic will return to a normal pace and the economic situation of society will improve (Rynek..., 2021). Most of the research is focused on the perception of the quality perceived by consumers (Czarniecka-Skubina et al., 2021, Lasek et al., 2016, Navarro-Dols & González-Pernia, 2020, Okumus et al., 2018, Perinotto et al., 2020). It is highly probable that as a result of this situation, the perception of the quality of catering services by customers as well as service providers will also change. To verify this, the aim of the study was to identify significant factors influencing the

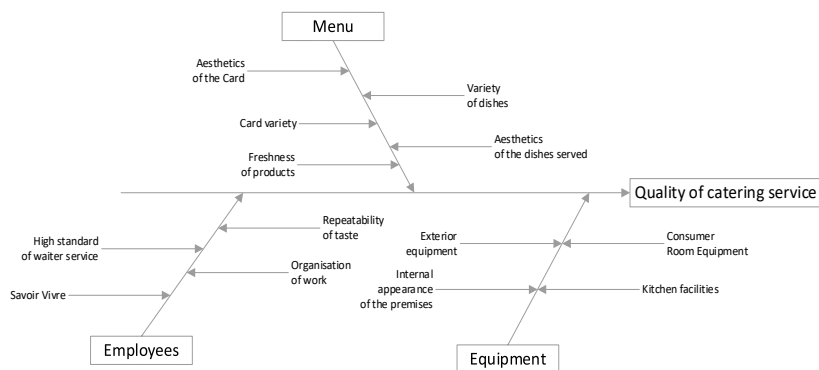
perception of the quality of catering services by two stakeholders: customers and employees. It was also decided to present changes in trends in the perception of the quality of catering services by the recipient keeper. The diagnostic survey method was used to carry out the research, a survey was used as a technique, and a survey questionnaire was used as a tool. The task of the respondents was to determine the mutual validity of the MSE-in and MSE-out model areas, then using a comparison in pairs (each with each) they determined the importance of individual determinants (Table 1) that formed a set of sub-causes of individual areas of MSE models (see Fig. 1, 2).

Figure 1. MSE-out model showing determinants shaping the level of quality of catering services from the customer's point of view



Source: own study

Figure 2. MSE-in model presenting determinants shaping the level of quality of catering services from the point of view of the service provider



Source: own study

Table 1. Table of comparisons of factors from the -Menu area (MSE-out)

Influencing factors on quality catering services, category MENU	taste	freshness	diversity	temperature	price
taste	x	52,37	43,82	45,39	50,59
freshness	47,63	x	46,56	49,63	52,05
diversity	56,18	53,44	x	53,04	54,46
temperature	54,61	50,37	46,96	x	50,98
price	49,41	47,95	45,54	49,02	x

Source: own study

The survey involved 105 respondents from the recipient and 96 from the service provider.

The correspondents forming the group of customers primarily used catering services once a week (47%) or once a month (33%). The gender structure was dominated by women (79%). Respondents most often chose Fast Food (70 indications) or pizzerias (45 indications) and restaurants (42 indications). Cafes and confectioneries were visited by 30% and 10% of respondents, respectively.

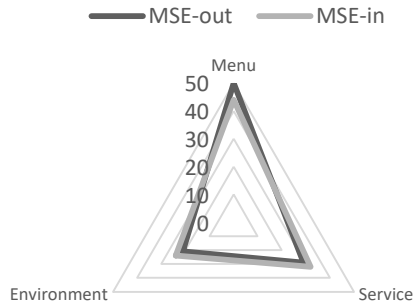
Among the representatives of gastronomy, the most numerous group were chefs (42%) and waiters (23%). Managers and owners of premises accounted for 10% of the respondents. Service providers most often worked in large (42%) and small (33%) restaurants.

6. Discussion of results

As a result of the conducted research, it turns out that for both one and the other group of respondents, the most important area is the menu area, followed by the service and the environment (see Fig. 3). When analysing the importance of individual determinants, it is worth emphasizing that for customers the most important are all determinants characterizing the menu area (see Fig. 3). One can be tempted to say that the results of the Auty (1992) study have been confirmed, according to which the type and quality of food are the main decision variables, as well as Knuston and Patton (1993), according to which the generally understood quality of the menu is a critical factor in the choice of premises among respondents 55+. Czarniecka-Skubina and coworkers (2021) also stated that the most important factors in the choice of food services were: the quality of meals, price and during the pandemic, additionally delivery time. One can be tempted to argue that the determinants affecting the quality of the menu were and probably will be the first determinant of choosing a gastronomic establishment regardless of social, economic and demographic situations. Carvache-Franco and his team (2021) came to similar conclusions. Sulek and Hensley's (2006), Navarro-Dols & González-Pernia (2020), Okumus et al. (2018), Eris

et al. (2022) research has shown that not only the quality of the menu is important, but also the atmosphere when eating meals. This view is shared by Kivela (1997), who emphasizes that in the market of services with a similar type of food, atmosphere and style are a critical determinant in the perception of quality.

Figure 3. Importance level of areas in MSE models



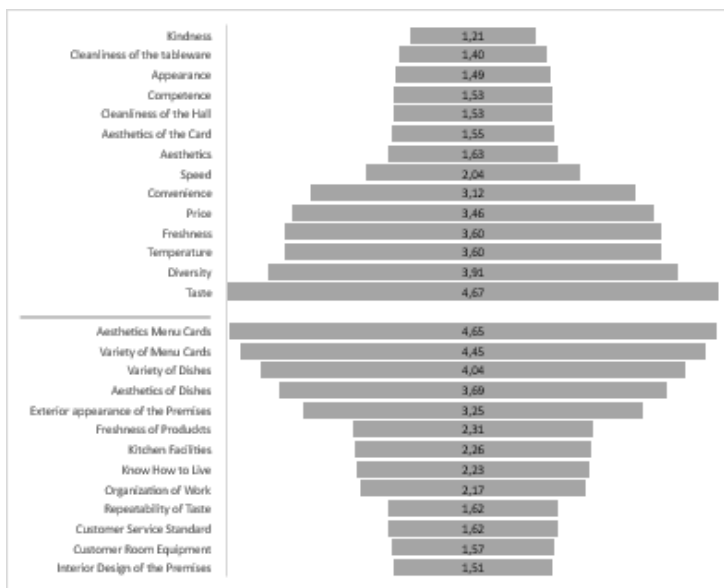
Source: own study

The research carried out for this paper shows that customers value convenience during meals above all. A similar conclusion was reached by Kim et al. (2010), whose research showed that the physical aspects of restaurants are important to their customers. Much less important for them are aesthetic impressions and maintaining cleanliness in the consumer room and cleanliness of tableware (Fig. 4). This is quite a surprising result, because the authors expected that the pandemic situation strengthened the place of hygiene among the factors affecting the quality of catering services. According to the report on the catering market in Poland, customers of catering services more often than before the pandemic pay attention to hygienic conditions in the premises (Zagórska, 2021). Doğan (2020) stated that it is very important for consumers “Trusting the Business” in meeting hygiene requirements and most

of consumers trust them. On the basis of their own research, it can be assumed that this topic has become commonplace for respondents and therefore they do not see the need to pay attention to this aspect, trusting in ensuring optimal sanitary and hygienic conditions in the premises.

The determinants that make up the MSE-out area service have received quite low marks of importance. It turns out that respondents do not pay attention to how employees are dressed, their competences and attitude to the customer. Only the speed of service is relatively important to them (Fig. 4). Shank and Nahhas (1994) reached similar conclusions according to which customers pay attention to the speed of service. A completely different approach to the way of serving the customer of a catering service is presented by Sezik and Gutowska (2018),

Figure 4. Importance level of individual determinants in the MSE-out model (top of the graph) MSE-in (added part of the graph)



Source: own study

which confirmed that restaurant guests expect trained and professional service. The authors put forward the thesis that the essence of the appropriate level of competence of waiter service may be related to the existing concerns among consumers as to the quality of the meals offered and food safety. It can be assumed that the competences of waiter service are not so extensive, moreover, with the low-rated importance of cleanliness, such information for respondents to the survey is not important. The high level of customer relations is also emphasized by the Njite et al. (2018), Dziadkowiec and Rood (2015) and Alonso et al. (2013).

Considering the arrangement of the importance of determinants followed by representatives of catering services, it can be concluded that, first of all, they want to encourage the customer with the basic and at the same time the final effect of the catering service – the served dish. They probably take into account the fact that taste sensations are extremely important, which often have a significant impact on overall customer satisfaction (Widdjaja et al., 2020). The choice of a given premises can be strengthened by the essence of repeatability of taste (the customer will remember this unique taste, which can be a determinant of good quality for him) and a high standard of service. As presented in the literature distinguishing customer service is a very good element in the fight against competition. It is important how the service provider will present the offer to the customer, how he will encourage him to use the services of this premises. A noticed and individually treated customer will feel like a desirable guest in the premises and will probably use his services again. By building lasting bonds, the owners and managers will be able to count on trust, which can turn into customer loyalty.

The service provider's side is least interested in how the customer reacts to the aesthetics and equipment of the premises. This is not exactly the correct look at the problem of shaping the quality of the catering service, because as the research shows, these factors largely influence satisfactory gastronomic experiences and generate a loyal attitude towards the restaurant or catering network (Ryu & Han, 2011, Bertan, 2020, Yu & Zhang, 2020).

7. Conclusions

The food service market plays an important role in the functioning of the economy and in social life. Changes taking place in the world affecting the way of life of the consumer have led to the fact that it is currently impossible to imagine a market without catering services. The customer has become accustomed to the fact that at any time he can buy a meal whether at work, at home, or resting, for example, during a trip. In the pre-pandemic period, there was a lot of competition on the catering services market. Currently, the situation is slowly returning to the state before 2020 and it is extremely important to recognize the customer's needs in relation to this type of premises. For this purpose, the MSE model was developed by means of which the level of importance of individual determinants shaping the quality of catering services was identified from the perspective of the consumer and the service provider. This model was based on the canvas of a popular tool used in quality improvement – the Ishikawa diagram, after separating three areas: menu (M), service (S), environment (E). In order to obtain the validity value, the concept of a weighted Ishikawa diagram was used. The obtained results are more objective than in the case of marking values on a regular scale, because within the area determinants are compared on a „peer-to-peer” basis. The respondent then has the opportunity to look at a given determinant on many levels.

The research results indicate slight changes in the expectations of customers in the catering sector. Individual determinants shaping the quality of service are not so important. It would seem that the customer cares about fast and efficient service, there is no need for individualized treatment. The intensification of the pace of work, spending free time and the length of time spent in „suspension” during the lockdown may be the reason for such a change in the client's attitude. It is also possible that the impersonality of faces in masks may have contributed to this perception of customer service.

The situation related to the emphasis on detailed, strict hygiene rules could have created two sides of the consumer's attitude towards maintaining cleanliness in the premises. One of them is very carefully

checking of hygienic conditions in the premises and following this criterion when choosing it. On the other hand, this determinant has no influence on the decision in terms of choice. It cannot be assumed that this criterion is redundant for the customer. It should be noted that the customer trusts the service provider who ensures appropriate hygiene conditions on an ongoing basis, which are imposed by the inspection authorities.

The conducted research indicated the existence of a research gap, which concerns the lack of studies on the perception of the significance of individual determinants by the service provider's side. It is known that in order to improve the quality of catering services, information should be obtained from the customer, but the voice of catering staff is also important. It may turn out that the image of the quality of the service is shaped by other criteria. An analysis should then be made, as a result of which some level of correlation may be obtained. The conducted research indicates to some extent such a phenomenon. In the opinion of catering employees, the environment is not as important as in the opinion of customers. According to the employees, it is the high quality of customer service that is more important than the decor, comfort and aesthetics of the premises. This may be due to the fact that the staff of the consumer room have a greater impact on customer service, as this is the main task commissioned by the owner. Presumably, it can be concluded that the higher the quality of customer service in the premises, the smaller the influence of secondary factors.

Summing up, it should be emphasized that research on the identification of the importance of determinants shaping the quality of the catering service is extremely important. They should be repeated cyclically, expanding the groups of respondents. It may be interesting to look at this problem from the point of view of the X, Y, Z generation. Differences in the perception of determinants can also be seen in immigrant responses. A more complete picture of the results may be extended by further research on the assessment of the quality level itself, and also, or above all, can serve as a source of information for managers and owners of premises. They can use them to develop marketing strategies.

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**The 11th National and 3rd International Conference on Quality
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Consumers Behavior Towards Food Safety

Abstract

Research background: Food safety is the basic and the most important characteristic of food. Consumers are aware of the importance of food safety. All food chain actors are responsible for the safety of food, including consumers. Consumers are the last link in the food chain so they should participate actively in food safety assurance. They can take various actions during food purchase, food storage or food preparations in their homes environment to assure food safety.

Purpose of the article: The purpose of this paper is to identify the most popular actions consumers can take to assure food safety during and after the food purchase. And also to pay attention to the role of consumers as the participants of the food chain in food safety assurance.

Methods: Survey among 2,000 Polish consumers was conducted in 2020. The survey was build of 23 questions asking about various aspects of food safety and quality from the consumers perspective. One of these questions was to assess the frequency of taking actions towards food safety (always, often, sometimes, seldom, none): checking the temperature in refrigerators, checking the best before date/expiry date, checking how long after the opening food can be consumed, storing food in refrigerators as recommended.

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Findings & Value added: The research shows that consumers take actions to assure food safety by themselves. 54% of them always check the best before/ expiry date, 36,1% of consumers often check how long after the opening food can be consumed. Women more often than men took these action always, especially when it comes to checking the best before date/expiry date and paying attention how long after the opening the product can be consumed. When we look at the role in food purchase decisions – persons involved in purchase decisions (who are mostly women) check the temperature in refrigerators during food purchase.

Keywords: food safety, consumers, behavior, food purchase, food storage

JEL Classification: L66, Q02, Q19

1. Introduction

Food safety is the most important characteristic of food. Food has the direct influence on our health (Lakner, 2021; Lipp, 2021; Lin, 2020; Vagsholm, 2020; Badrie et al., 2006; Grunert, 2005, Ma et al., 2019)). Food products offered to consumers should be safe. According to law, food producers are responsible for food safety. Food safety is also supervised and checked by the food authorities. Consumers can also play a role in food safety assurance by their behavior during food purchase, food preparation and food storage.

Food chain from farm to fork is complex, many food actors participate in this food chain. Each of these partners has a role to play in the process of food safety and quality assurance. Every food chain actors should know their role and responsibility for food safety. In 2006 WHO published 5 keys to safer food, these are: keep clean, separate cooked and raw, cook thoroughly, keep food at safe temperatures, use safe water and raw materials³. The subject of food safety is important for the whole society. As it was shown in the World Risk Poll⁴ (conducted in 142 countries, 150,000 participants) 60% are concerned about the food

³ <https://www.who.int/publications/i/item/9789241594639>, accessed 08.06.2022

⁴ https://wtp.lrfoundation.org.uk/LRF_WorldRiskReport_Book.pdf, accessed 08.06.2022

they eat. An important source of food safety hazards are factors related to human behavior and the use of inappropriate practices during meals preparation at home (Powell et al., 2011; Remond & Griffith, 2003; Milke et al., 2015, Czernyszewicz and Niewczas-Dobrowolska, 2022) as well as food storage (Koppel et al. 2016). The research conducted by Langiano et al. (2012) confirmed that in the home environment food hazard can be spread or made. By a proper food storage of food at home the food safety can be ensured as well as the food quality can be kept (McCurdy et al., 2009).

2. Problem Statement

The Food and Agriculture Organization (FAO) and the World Health Organization (WHO) announced the watchword “food safety is a shared responsibility”. Moreover, the motto of the World Food Safety Day in 2020 was “food safety is everyone’s business”, in 2022 the motto was “safer food, better health”. These mottos show first of all that each actor of the food chain is responsible for food safety, secondly the connection between food safety and health what is also very important from the consumer perspective. If the food producers launched on the market a safe food product but the food distributor do not obey the rules of food safety, that product would not be safe. In this same way consumers play a role in food safety assurance by their behavior during food purchase and after the purchase of food.

The aim of this paper is to show what are the popular actions that consumer take to assure food safety and what is their frequency. Other research show that consumers also have the role in food safety assurance (Janjic et al., 2018; Deloitte Food Value Equation Survey 2015; Redmond & Griffith, 2003; Hessel et al., 2019).

According to the results of the Deloitte Food Value Equation Survey 2015 it was shown that there are some evolving drivers that consumers consider while food purchase, such as: health and wellness, safety, social impact, experience (between the consumer and retailer or brand), and transparency (an overarching driver), and are equally prevalent in

all types of consumers, regardless of age, income level, or region of the country.

3. Research Questions/Aims of the Research

The research problem is connected with the responsibility for food safety. Although, to the highest degree the producer is responsible for food safety, also consumers do have the responsibility for food safety and should be aware of this responsibility and take actions toward food safety assurance during food purchasing and in their home.

4. Research Methods

The research process consisted of the following stages:

- developing research methodology;
- consultation of the research tool;
- sample selection, implementation of the measuring phase of the survey;
- developing a statistical report;
- developing a final report.

The study was carried out using the CAWI (Computer Assisted Web Interviewing) technique based on conducting a computer-supervised internet survey in Poland in 2020. The questionnaire was built of 23 closed-typed questions. The sample consisted of 2000 people selected taking into account the place of residence (voivodship), gender and age. Respondents were also characterized in terms of education and material status. The exact distribution of the sample taking into account gender, age and place of residence is presented below. It reflects the structure of the population of adult Poles residing in the country.

Numeric variables were characterized using basic descriptive statistics: cardinality (N), arithmetic mean (mean), standard deviation (SD), median, lower and upper quartile (IQR), minimum and maximum values (range). Group comparisons were made using Chi-square test.

The value of significance (p) was set at 0.05. Calculations were made in the R program (ver. 3.5).

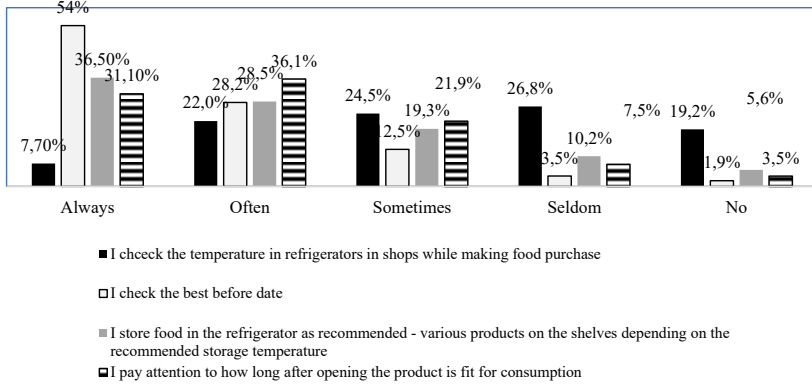
The sample was representative for the whole country. 1049 women and 951 men were interviewed. Among the respondents, 42.4% were the sole decision-makers in the purchase of food products. About 49.7% of respondents said they make the majority of purchasing decisions for the household. The smallest group (7.9%) were people for whom someone else makes the majority of purchasing decisions. In the survey, respondents also specified their education, size of place of residence and net income per family member. Most respondents had secondary education (32.2%) and basic vocational education (30.7%). Persons with higher education constituted 26.9%, and the remaining 10.3% of respondents had primary / lower secondary education. Persons with a net income not exceeding PLN 1200 (about 300 €) per person constituted about 19.1% of the total number of respondents. One-fifth of survey participants (20.0%) indicated an income of PLN 1201 to 1600 (301 to 400 €), and respondents declaring income per person within PLN 1601-2000 (401 to 500€) net constituted 20.7% of all respondents. Income in the amount of 2001-2400 (501 to 600 €) was indicated by 19.5% of respondents and 20.9% of respondents had income per one person exceeding PLN 2400 (+600 €) net. People living in the village accounted for 19.9% of the total, while about 23.0% of the respondents were city dwellers up to 50,000 inhabitants. Approximately 29.0% of respondents were residents of cities with 50 to 250 thousand inhabitants, and 14.7% lived in cities with 250 to 500 thousand inhabitants. The least 13.5% of respondents lived in cities with over 500,000 inhabitants (Table 1).

Table 1. Characteristics of the respondents

Region	Women (age)						Men (age)						Total
	18-29	30-39	40-49	50-59	60-69	+70	18-29	30-39	40-49	50-59	60-69	+70	
Dolnośląskie	12	16	13	11	15	13	12	16	13	11	13	8	153
Kujawsko-pomorskie	10	10	9	9	10	9	10	11	9	8	8	5	108
Lubelskie	10	10	9	9	10	10	10	11	9	8	8	6	110
Lubuskie	4	5	5	4	5	4	5	5	5	4	4	2	52
Łódzkie	11	12	11	10	13	13	11	12	11	9	10	7	130
Małopolskie	16	18	15	13	14	15	16	18	15	13	12	9	174
Mazowieckie	23	29	25	20	25	25	23	28	25	19	20	14	276
Opolskie	4	5	5	4	5	5	4	5	5	4	4	3	53
Podkarpackie	10	11	9	9	9	9	11	11	10	9	8	5	111
Podlaskie	6	6	5	5	5	6	6	6	5	5	4	3	62
Pomorskie	11	12	10	9	10	9	11	12	11	9	9	6	119
Śląskie	19	23	21	20	22	21	20	23	21	19	19	13	241
Świętokrzyskie	6	6	5	5	6	6	6	6	6	5	5	4	66
Warmińsko-mazurskie	7	7	6	6	7	6	7	8	6	6	6	3	75
Wielkopolskie	16	18	16	14	16	14	16	19	16	13	13	8	179
Zachodniopomorskie	7	9	8	7	9	7	8	9	8	7	8	4	91
Total	172	197	172	155	181	172	176	200	175	149	151	100	2000

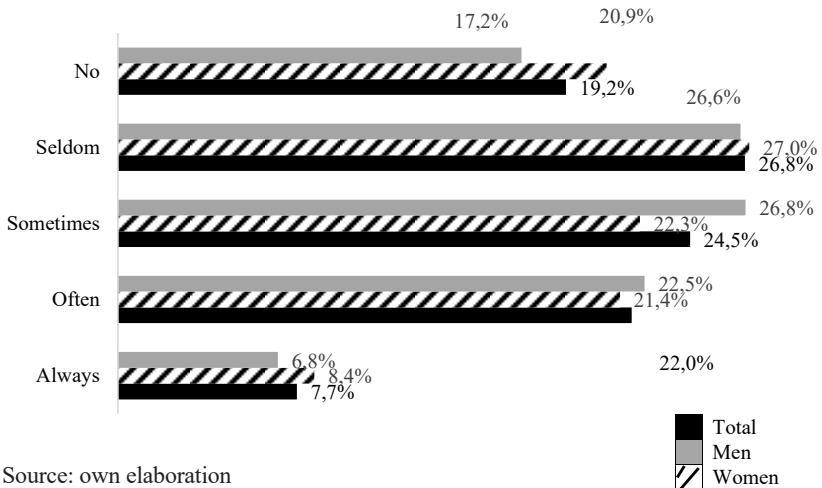
Source: own elaboration

Fig. 1. Frequency of actions towards food safety



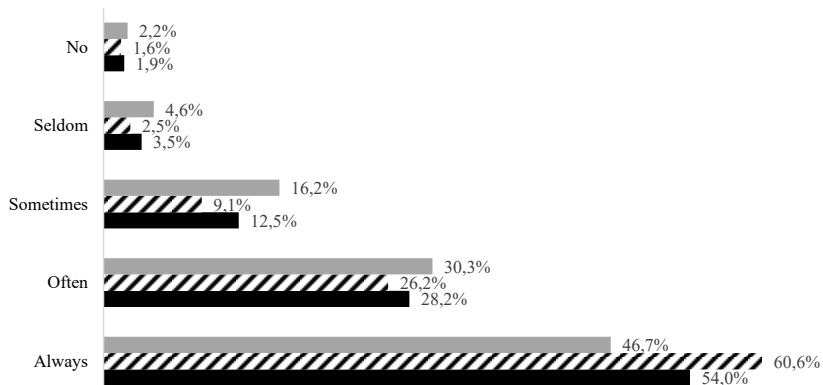
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Fig. 2. Frequency of the action: I check the temperature in refrigerators in shops while making food purchase



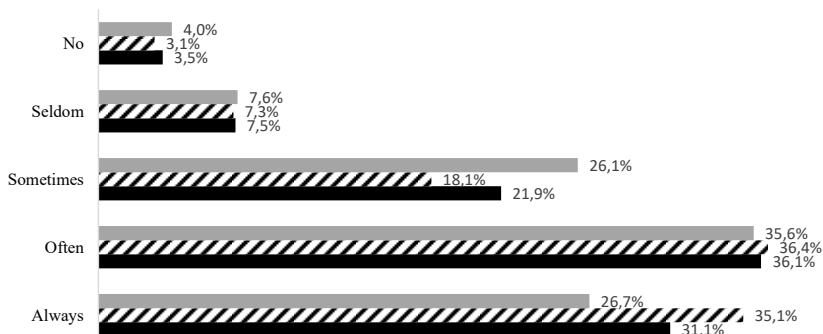
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Fig 3. Frequency of the action: I check the best before date/expiry date



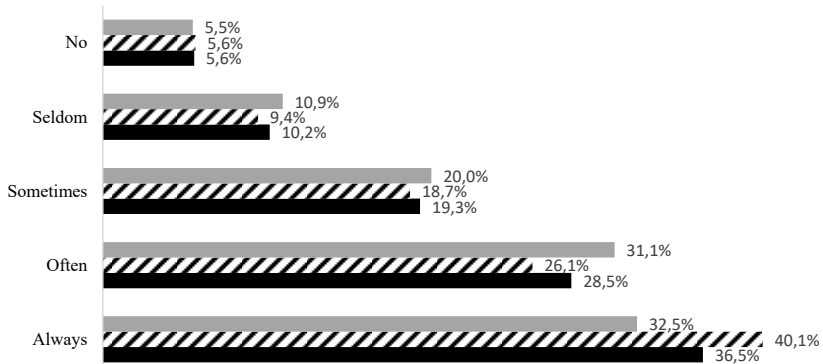
Source: own elaboration

Fig. 4. Frequency of the action: I pay attention to how long after opening the product can be consumed



Source: own elaboration

Fig. 5. Frequency of the action: I store the food in refrigerators as recommended



Source: own elaboration

5. Findings

Consumers were asked to indicate the frequency (always, often, sometimes, seldom, do not take) of taking the following actions: (1) I check the temperature in refrigerators in shops while making food purchase, (2) I check the best before date, (3) I pay attention to how long after opening the product is fit for consumption, (4) I store food in the refrigerator as recommended – various products on the shelves depending on the recommended storage temperature.

In general it can be said that consumers actively participate in food safety assurance and know what they can do in this process. Consumers participating in the survey declared that they always check the best before date (highest number of indications – 54%). Action towards food safety that is not taken by consumers is the check of the temperature in refrigerators while food purchase (Fig. 1).

On the basis of the chi2 analysis it was shown that important differences of answers depended on the sex of the respondents (Fig. 2-5), the role in the household. Women more often than men took these action

always, especially when it comes to checking the best before date and paying attention how long after the opening the product can be consumed. When we look at the role in food purchase decisions – persons involved in purchase decisions (who are mostly women) check the temperature in refrigerators during food purchase.

Toma et al. (2020) show that consumers often check the best before date during food purchase but also during food storage at their homes. Other studies show that consumers usually do not consume food after both best before date or expiration date (Hall-Philips and Purvi Shah, 2019; Boxstael et al., 2014; FMI, 2011). The proper understanding of the best before date and expiry date may also prevent the food waste (Koivupuro et al. 2012).

The temperature of food storage also plays the important role in food quality and safety and longer food freshness. James et al. (2017) report that most of the consumers do not know the proper temperature of the food storage. It is worth to mention that the most critical part of the cold chain of food is at its end. As many research show consumer do not have enough knowledge about the proper refrigeration practices (Derens-Bertheau, 2015; Jofre et al. 2019; Marklinder et al., 2004; Ovca et al. 2021). The research made by Baptista et al. (2020) also show that consumers are unaware of the proper temperature of food storage

6. Conclusions

It was shown that consumers are aware of their role in the food safety. As consumers are the last link in the food chain they should take actions towards food safety. Their behavior influences the food safety in two ways: the can keep food safe or they can cause food hazards by for example: lack of proper food storage or cross contamination. It is a very positive that most of the consumers pay attention to the temperature and the way of the food storage, best before/expiry date and check how long after opening the food product can be consumed. It is both important for food safety and also on the other hand helps to prevent the food waste. The mentioned actions were taken always

or often. The action indicated to be taken mostly always was to check the best before/expiry date. Consumers often admitted to check how long after opening the food can be consumed. Not many consumers indicated not to take these actions. Women are more involved in the abovementioned actions than men, also due to the fact that they are usually more involved in the purchase decisions.

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**The 11th National and 3rd International Conference on Quality
“Quality of the future – the future of quality”
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Grzegorz SAMBOR³

**Investment Project Portfolio Management in
a Large Enterprise in the Fertilizer and Chemical
Industry – a Case Study from Poland**

Abstract

Research background: The paper refers to project portfolio management as an important aspect of a company’s activity. A number of studies have been identified as regards this issue. Many of them report on the problem of project portfolio selection using various decision aiding techniques. A majority of identified studies refer to R&D project, while only a few of them – to investment projects.

Purpose of the article: The main objective of this paper is to present a case study of portfolio management of investment projects in a large company operating in the fertilizer and chemical sector in Poland. Real procedures and responsibilities for different steps in portfolio management have been identified and described.

Methods: Content analysis of internal documents provided by the Management Board of the company was used to identify and analyse the relevant procedures. The results of documentary analysis were supplemented by interviews with competent project and portfolio managers and the Director of Corporate Investment Supervision Department.

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Findings & Value added: The results consist of a detailed analysis of the existing procedures and responsibilities for these procedures in the company. It was analysed according to the following areas: 1) Company's strategy and activities. 2) Responsibilities in the investment implementation process. 3) Stages of implementation of investment projects. 4) Procedures during investment implementation. 5) Implementation of budget and schedule. 6) Investment works. 7) Supervision over implementation and monitoring of investment. 8) Settlement of investment works. 9) Settlement of investment projects.

Keywords: project management, portfolio management, investment, multi-criteria methods, decision making

JEL Classification: O22, C44, D81, D25

1. Introduction

The International Project Management Association (IPMA) provides the competence framework for project, program and portfolio managers. In ICB 4.0 guidelines (Individual Competence Baseline) project is defined as “a unique, temporary, multi-disciplinary and organized endeavour to realize agreed deliverables within predefined requirements and constraints” (ICB 4.0 2015). Similar definition was provided by a variety of other sources (e.g. PMBoK, Trocki 2012). There are many types of projects distinguished in the literature, grouped according to various criteria. A frequently used classification of projects refers to the area of activity, categorizing projects into investment, organizational, business, technical and IT projects. Other categorizations include size of projects (small, medium, big), place of realisation (internal, external), linkages (mutually exclusive, independent, complementary), and many others (Janasz and Wiśniewska 2014).

It is necessary to distinguish between a program and a portfolio of projects. A program is set up to achieve the strategic goal of an organization. It is defined as “a temporary organization of interrelated program components managed in a coordinated way to enable the implementation

of change and the realization of benefits”, while portfolio is “a set of projects and/or programs, which are not necessarily related, brought together to provide optimum use of the organization’s resources and to achieve the organization’s strategic goals while minimizing portfolio risk” (ICB 4.0 2015).

Nowak (2013) defines a program as a set of projects that need to be done in a specific order, while a portfolio as a collection of projects that are closely related in some way. From this perspective, the portfolio is seen to be a more general term than a program. He adds that while the program must be completed as a sequence of projects and the whole program itself, a portfolio is realized continuously. Similar view was presented by Nicholas & Steyn (2012), who stated that a program lasts a longer period of time and consists of many parallel or sequential projects, that are coordinated to achieve the goals of the program. Within a program, the projects often share common goals and resources, and often are mutually dependent. A project portfolio is a group of projects or programs in an organization that aims at strategic goals, share resources, and compete for funding.

According to Project Management Institute (PMI) program is a set of related projects managed in a centralized and coordinated way to obtain benefits and control not achievable from managing them individually. On the other hand, portfolio is defined as a collection of projects or programs and other activities that are grouped together to facilitate effective management of that work to meet strategic business objectives. However, projects or programs managed within the portfolio do not have to be interdependent or directly related (PMBok).

The main objective of this paper is to present a case study of the investment project portfolio management in a company operating in the fertilizer and chemical sector. The company is one of the largest factories in Europe, with about 15 000 employees. It implements a considerable amount of investment and R&D projects, and therefore has established procedures of project portfolio selection and management.

2. Problem Statement

Project, program and portfolio management are frequent subjects of research works. Different scholars analyse project portfolio management from different perspectives. One of the most frequently discussed research problems is portfolio selection and prioritization of projects to be selected to the portfolio. Most of them analyses the project portfolio selection as a decision making process, aiming at identification and scheduling of project portfolios from a set of candidate projects (Ghasemzadeh and Archer 2000, Carazo et al. 2010). As such, project portfolio creation is a multiple criteria problem. Thus, various decision aiding techniques dedicated for project portfolio selection problems have been proposed in literature. They can be divided into two main groups: 1) methods targeted to a wide range of project portfolio management (PPM) practitioners, and 2) decision making methods proposed by operational research (Nowak 2013).

A majority of project management textbooks propose simple scoring method based on the financial profitability indicators such as NPV or IRR (Gray and Larson 2008 in Nowak 2013). As regards multi-criteria decision aiding techniques within operational research, they include AHP (Analytic Hierarchy Process) traditional or fuzzy (Al-Harbi and Al-Subhi 2001, Yang et al. 2013, Alzober 2014, Hassanzadeh et al. 2011, Tavana et al. 2019), TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution) (Hassanzadeh et al. 2011), BWM (Best-Worst-Method) (Zarjou 2021), DEA (Data Envelopment Analysis) (Eilat 2006, Fiala 2021), BSC (Balance Scorecard) (Eilat et al. 2006), DEMATEL (Decision-Making Trial and Evaluation Laboratory) (Altuntas and Dereli 2015, Debnath et al. 2017), MABAC (Multi-Attributive Border Approximation area Comparison) (Debnath et al. 2017), ELECTRE IV (Wolny 2015), RPM (Robust Portfolio Modelling) (Liesio et al. 2008, Mild et al. 2015), and many more. Researchers also use interactive methods such as multi-objective programming and FITradeoff (Marques et al. 2022). Some researchers report on the possibility to use advanced algorithms for project portfolio selection. These are, for example, DP (dynamic programming), MIP (mixed integer programming), Monte

Carlo simulation (Pendharkar 2014, Mavrotas et al. 2020), Harmony Search Algorithm, Modern Portfolio Theory (Esfahani et al. 2016) and Boolean Programming (Belenky 2012).

Some publications describe resource allocation between different projects within the portfolio (Hendriks et al. 1999, Lova et al. 2000), while others refer to uncertain decision-making environment (Ghapanchi et al. 2012, Namazian et al. 2016, Ma et al. 2020). Within publications on project portfolio management, many of them refer to R&D projects (Coffin and Taylor 1996, Hassanzadeh et al. 2011, Carlsson et al. 2007, Hendriks et al. 1999, Eilat et al. 2006, Arratia et al. 2016, Cluzel et al. 2016). There are only a few of them referring to the investment projects specifically (Zhang et al. 2011, Altuntas and Dereli 2015, Wolny 2015).

Nowadays, investing is considered a necessity resulting from dynamic development of market economy. The functioning of an enterprise in highly competitive environment, especially in the long term, is impossible without new investments. Limited resources, market demand, social and political reasons and other factors force the search and identification of investments in various forms, places and times (Lubryka 2004). Investment decisions are very important to an organization, but they carry the highest risk. Investing entails many problems and limitations, and decision-making difficulties result mainly from the lack of information about the future. Lack of knowledge about future directions of product sales, changes in technology, manufacturing techniques and raw materials are the key difficulties in the correct assessment of the investment program (Walica 1999). Uncertainty means that the investor does not have information about the shaping of some premises, and is not aware of the existence of certain factors influencing the decision-making situation (Marcinek 1994). The consequence of such threats is the risk associated with the loss of the invested capital or failure to obtain the anticipated benefits.

Although in general understanding it is assumed that each project should be perceived as an “investment”, the properly understood investment project is defined as a set of organized activities with deadlines specified in the design and construction documentation, and the amount

of necessary resources, technologies and locations, the purpose of which is to build new or make changes to existing fixed assets (Marcinek 2006). The problem of investment project portfolio selection is to allocate the available investment capital to a suitable combination of projects, which are likely to maximize profits (Zhang et al. 2011).

A very important and difficult decision is to implement an investment involving full development cycle of the project, i.e. from the idea and capital investment into a project for its implementation. This forces the initiation of research on expenses and receipts in a very distant period of time, as well as the design and implementation of the necessary assets, their equipment and use. Due to the steps taken by competitors on the market, there is never certainty as to the ultimate success of the assumed results. The effects of wrong investment decisions are borne by both investors and those involved in financing the project (Borowiecka and Grudzewski 2002).

3. Aims of the Research

The case study presented in this paper will describe step-by-step procedures of the investment project portfolio management in a large fertilizer-chemical enterprise in Poland. It will help to understand how these processes work and who is responsible for their implementation.

The procedure of constructing an effective portfolio of investment projects usually consists of a number steps, including e.g. (Wilimowska 1997): 1) Determining the primary set of investment projects. 2) Defining the criteria for the preliminary selection of projects. 3) Estimating or calculating capital expenditure for each project. 4) Selection of projects. 5) Market research. 6) Identification of available funding sources. 7) Calculation of the cost of each source. 8) Selecting the financing sources. 9) Determining the method of financing each investment project. 10) Calculations of risk. 11) Rejection of “inferior” projects. 12) Calculation of the sum of inputs. 13) Establishing a set of projects A2. 14) SWOT analysis. 15) Determining the set of features/criteria characterizing the projects. 16) Discrete risk measurement. 17) Determination of an indi-

vidual risk price for each project. 18) Modification of the discount rate. 19) NPV simulation. 20) Calculation of the IRR. 21) Capital market. 22) Calculation of the β coefficient for each project. 23) Selection of a set of projects for further considerations A3. 24) Calculation of R_i for each project. 25) Portfolio construction criterion. 26) Determining the portfolio of investment projects. 27) Optimization of the capital budget. 28) Determining an effective portfolio of investment projects.

The idea for building new facilities or modernizing the existing ones is only the beginning of the entire investment process. Until the facility is put into service, the organisation must go through the following stages of the investment process: 1) Preparation of an investment project. 2) Designing, obtaining permits. 3) Preparation for investment implementation. 4) Project implementation and handing over the facility for use. 5) Investment settlement. However, the set of activities that make up the process is not the same for all investment projects. The final effect of its completion is determined by various factors. Thus, it is important to coordinate procedural activities that enable the meeting of deadlines and financial obligations. As part of systematising the principles of investment project portfolio management at the analysed company, guidelines have been drawn up that include supervision, monitoring and settlement of projects. They will be discussed in the subsequent section.

4. Research Methods

The procedures were examined using content analysis of internal documents provided by the Management Board of the company. The results of documentary analysis were supplemented by interviews with the Director of Corporate Investment Supervision Department, and with five selected project and portfolio managers, who were well informed on the company's rules. They were asked for an opinion about the description of the procedures. Based on the above, a detailed case study has been performed.

5. Findings

5.1. Company's strategy and activities

The chemical sector plays a major role in achieving all European Green Goals. Improvement of the climate situation depends on modern production processes and products. Innovative, environmentally friendly solutions in the chemical industry affect other industries, and thus the entire economy. The analysed enterprise is almost a hundred years old and currently is partially a stated-owned capital group listed on the stock exchange, with about 15 000 employees, who work in various locations in Poland (and in one location in Africa). The company's strategy refers to three strategy areas, namely:

1. **Fertilizers.** It is implemented based on the EU strategy "From Farm to Fork", which aims to reduce the use of pesticides and fertilizers by 50% by 2030. The company produces specialized fertilizers that reduce the loss of nutrients, e.g. by pelleting, which fits directly into the European Green Deal strategy. It also launched modern and environmentally friendly multi-component mineral fertilizers and provides services of soil analysis for farmers with specialized scanners. Such analysis provides recommendations for the mineral needs of the soil.
2. **Plastics.** Within this area, the group produces polyamide-6, which is used in many branches of the economy and significantly minimizes human impact on the environment. It also launched a new product, enriched with the appropriate concentration of urea, which is supposed to reduce the emission of nitrogen oxides in vehicles equipped with a diesel engine. Recently, the company implemented investment project in one of its plants, which is based on installation for the production of propylene and polypropylene. The group is the first company in Central and Eastern Europe to operate on based on the 100% biodegradable plastics.
3. **Energy.** The group is planning the implementation of projects related to the use of renewable energy sources and the development of green ammonia and green hydrogen technologies.

The company's strategy addresses in detail the challenges posed by the European Green Deal for modern industry. Specific projects in the area of, inter alia, industrial green energy, the need to reduce emissions and decarbonisation are based on 3 pillars: green products, green technologies and green organization. The priority is given to the climate and energy transformation. The company will consistently and consciously invest in innovation and look for new pro-environmental solutions and products. Moreover, the products and technologies have to contribute to the achievement of the production, sales and environmental goals of its customers. The company's mission is to improve the quality of life of the inhabitants of Europe, positively influencing the climate and the environment, and actively participating in building food security.

5.2. Responsibilities in the investment implementation process

In order to properly supervise the course of investment process, organizational units have been established that are responsible for individual scopes in the project implementation stage (Table 1).

Table 1. Scope of responsibility in the investment process

Unit	Responsibility
Member of the Management Board in the area of investments	Supervision over the implementation of the investment, appointment of a commission for commissioning of tasks, approval of applications for the cancellation of investment implementation.
Director of R&D Department	Defining the scope of work in the investment preparation process, coordination of the development of documentation and the price of investment projects, preparation of an annual investment activity plan.

Unit	Responsibility
Director of the Corporate Department	Supervision over implementation of the investment, reporting on the status of investment implementation, initiating the validation process.
Project Manager	Preparation of an opinion on documentation for a given investment, control of the investment implementation phase, collection and handover of the investment for operation.
Project Coordinator	Agreements regarding use, obtaining the information needed, in terms of technology, cooperation with the Project Manager, budget and schedule control.
Supervision Inspector	Providing opinions on pre-investment documentation in the scope indicated by the Project Manager.

Source: own research based on documentary analysis

5.3. Stages of implementation of investment projects

Nine stages have been identified in the investment implementation process:

1. Initial concept.
2. Data collection.
3. Defining criteria of evaluation of projects provided by the contractors.
4. Defining variants.
5. Evaluation of projects.
6. Contracts with the contractors.
7. Realisation of the investment project.
8. Investment start-up.
9. Exploitation of the investment.

The stages described above consist of the following activities:

- Preliminary assessment of investment opportunities based on development plans.
- Collecting and analysing technical information.
- Establishing the assumptions and requirements of the investment.
- Development of a technical design depending on design.
- Technological and production solutions.
- Evaluation of projects by the company’s management.
- Negotiating and concluding contracts with contractors.
- Construction of facilities and assembly of devices.
- Training of the crew.
- Technological start-up and commissioning.

All the above-mentioned activities are an indispensable factor influencing the proper functioning of the investment process. In addition, some of these activities may be outsourced, i.e. preliminary feasibility studies, conceptual designs, economic analyses, expert opinions, basic designs and others.

5.4. Procedures during investment implementation

The investment implementation phase begins with obtaining of relevant corporate approvals resulting from the Company’s Articles of Association. Information on granted corporate consents is provided by the Research and Development Department, after obtaining it from the organizational unit servicing the corporate bodies of the Company, to the Corporate Investment Supervision Department. The budget and deadline for the implementation of the investment for individual tasks are specified in the Investment Activity Plan. The budget also includes costs of the application for the investment in question for an appropriate integrated permit / sector permit. The implemented investments are covered by insurance.

The management of an investment project in the Company is based on three basic methods of implementing investment tasks:

1. EPC – engineering, procurement, construction. Implementation of investments in the EPC mode concerns the so-called “turnkey”

deliveries, based on a flat-rate fixed price – the so-called contract for design, completion of deliveries and construction.

2. EPCM – engineering, procurement, construction, management. In the case of EPCM, the contractor acts as a representative of the future owner of the facility and establishes a direct contractual relationship between the owner and suppliers and contractors of works.
3. Implementation with own resources at the disposal of the Department of Corporate Investment Supervision.

For the purposes of the investment process, a project team is created, which includes the following participants:

- Project Manager,
- Project Coordinator (Project Responsible),
- Investor supervision inspector,
- Designer,
- Site / works manager – Contractor’s representatives.

The Project Manager specifies the requirements for the team implementing the investment and, for this purpose, requests the Manager of the Project Implementation, Supervision and Settlement Office, proposing the composition of the team. Then, the Manager of the Investment Implementation, Supervision and Settlement Office requests the Director of the Corporate Investment Supervision Department to appoint a Team. The team may include not only employees of the analysed company, but also employees of external companies or persons employed for this purpose on terms other than an employment contract. The team is created in accordance with the requirements of the investment task. The team has members assigned to deal with individual tasks resulting from the scope of work and schedule. The Project Manager leads the team during the implementation of the investment.

The Team has Project Coordinator appointed from among employees of the Department or persons delegated to the Corporate Investment Supervision Department by a future user, in agreement with the Manager / Director of the organizational unit for which the investment task is being carried out. The Project Manager, in close cooperation with the Project Coordinator, manages the investment in accordance with the rules, which define the tasks and obligations of the Project Manager

and other participants in the investment process. The investment task is transferred to the Project Manager for implementation by the Corporate Department of Investment Supervision in the form of an order or agreement, or internally by “Appointment of the Project Manager”. Copies of documentation prepared in the investment preparation phase are an attachment to the order or contract.

5.5. Implementation of budget and schedule

The Project Manager is obliged to implement the investment project in accordance with the established budget and schedule. Thus, each document resulting in incurring a financial obligation, or directly encumbering a given task, must be approved by the Project Manager before presenting it to persons competent to incur obligations. The implementation schedule and the budget are subject to constant monitoring by the Project Manager. Strict financial discipline and the timing of the investment is a priority for the Project Manager.

Each increase in expenditure of the investment requires the consent of the same authority that issued the original consent. In such a case, it is necessary to obtain corporate approvals, in accordance with the competences resulting from the Company’s Articles of Association. The Director of the Corporate Investment Supervision Department prepares materials for the application for approval of the purchase of fixed assets to the Management Board of the Company and submits them to the Research and Development Department. Applications for consent to the acquisition of non-current assets are prepared for the Management Board of the Company in the Research and Development Department. Work related to obtaining further corporate approvals is coordinated by an organizational unit, which supports the corporate bodies of the company.

5.6. Investment works

The Project Manager is responsible for examining the reliability, experience, economic or technical abilities of the Subcontractor reported in the course of the investment implementation. After such assessment, the Project Manager presents a recommendation for verification to the Manager of the Investment Implementation, Supervision and Settlement Office, and then to the Director of the Corporate Investment Supervision Department, who – on behalf of the Investor – expresses a written approval or objection to the performance of works by the Subcontractor.

The Project Manager prepares a “List of Subcontractors employed by the Contractor” for a given investment project. The list of subcontractors includes: company name, address, scope of work (according to the technical project or a detailed description of work in the absence of technical project) and their value. The list of subcontractors is submitted for verification by the Manager of the Investment Implementation, Supervision and Settlement Office, and then for approval by the Director of the Corporate Investment Supervision Department. The list of subcontractors is part of the investment project documentation.

5.7. Supervision over implementation and monitoring of investments

All participants of the process take care of the proper implementation of the investment project. The project is supervised by the Project Manager in close cooperation with the Project Coordinator. He manages the process and makes the necessary arrangements. Relevant findings are documented. All documents are attached to the assignment file. In order to properly assess the implementation of the investment task or to make significant arrangements, the Project Manager initiates meetings and deliberations. Participants of the investment process are required to comply with the environmental aspects identified for the investment project, knowledge of the results of the occupational risk and fire hazards assessment. Process participants can track the

progress of work using Periodic Investment Reports prepared by the Project Manager. Reports on the implementation of the investment in relation to the progress of work, costs and schedule are drawn up once a month, unless the Director responsible for the implementation of the investment indicates otherwise.

5.8. Settlement of investment works

The Project Manager makes an appropriate assignment of expenditure on the appropriate document. The Supervision and Investment Settlement Office checks contractors' invoices for compliance with the concluded contract/order, expenditure indicated in the acceptance protocol, material scope and task budget. The Project Manager monitors the fulfillment of the Contractor's financial obligations towards Subcontractors during the implementation of the investment project. All investment works are monitored for the fulfillment of the Contractor's financial obligations towards Subcontractors. The monitoring is carried out based on the evidence obtained from the Contractor as regards payment of the remuneration to the Subcontractor for the implementation of the investment or its part, to which the remuneration relates, and the Contractor's declaration of non-arrears in payments submitted with them.

5.9. Settlement of investment projects

The settlement of the investment project consists in the proper division of expenditure incurred for individual fixed assets and is prepared by the Project Manager together with the Project Coordinator. The Project Manager initiates the preparation of technical acceptance documents. A designated employee of the Investment Realization, Supervision and Settlement Office is responsible for preparation of these documents. Project Manager, Task Coordinator and the future User are equally responsible for the settlement of the investment. After the completion

of the investment project, i.e. after completing all relevant activities, the Project Manager, the Investor Supervision Inspector (if appointed) and the Project Coordinator, who is the user of the investment, evaluate the accomplished project. The Project Manager submits the prepared assessment to the Department of Corporate Investment Supervision. Acceptance of the assessment is a condition for the formal closure of the investment project and its removal from the register of investment projects being “in progress”.

The Director of the Corporate Investment Supervision Department organizes the preparation of the initial validation of the investment project, using the presented assessments and data provided by the User. The results of the initial validation are sent to the Research and Development Department. The Corporate Department of Investment Supervision provides the results of full validation to the Vice-President of the Management Board of the Company responsible for the area of investment implementation (upon request) and to the Research and Development Department.

6. Conclusions

The introduction of project portfolio management procedures in an organization implementing many projects should be considered as an activity contributing to the improvement of the whole organization. A broad view of the organization allows improvement the efficiency and effectiveness of the activities. We do not take into account the benefits of individual projects, but the most important thing is the result of the project portfolio and, consequently, of the entire organization. Striving to optimize the portfolio may result in a situation in individual projects that deviates from the principles of effective project management, e.g. exceeding the project duration or budget, or even abandoning some initiatives.

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Remote Internal Auditing Processes As A One Of The Key Factors Of Business Continuity – The Context Of Global Pandemic Times

Abstract

Research background: The COVID-19 pandemic has had a significant impact on voluntary standards audit services. The traditional on-site approach to auditing has been greatly reduced. Regardless of the area in which auditing is used, one of its most basic assumptions is to ensure that all stakeholders have confidence in its results. On the other hand, taking into account the stages of the internal audit process and the possibility of using remote techniques, it can be assumed that the most sensitive stage is the stage of determining the properties. The stage of determining the properties by auditing the management system or assessing production processes is much more difficult to assess at a distance. This does not mean that it is not possible. On the other hand, the elements of product testing (e.g. product taste and aroma assessment) or inspection may not be feasible remotely.

Purpose of the article: The need to adapt to the new realities has not bypassed the producers, which had to adapt to the emergency situation, using the possi-

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bilities of remote work, including remote audits as part of business continuity. The purpose of this publication is to indicate the context of the operation of producers in relation to the remote auditing and the impact of such proceedings on the confidence in the results of their work, and to indicate changes in the internal audits are carried out.

Methods: For above mentioned matter, manufacturers operating on a polish market were surveyed in remote internal auditing processes carried. The used methodology was a survey carried out during COVID-19 pandemic in Poland in the year of 2021 and covers the very beginning of pandemic restriction in Poland.

Findings and Value Added: The main findings are related to the following issues concerning that remote auditing processes ensure business continuity; the effectiveness of remote audits wasn't rated high prior to the pandemic than the on-site once; larger organizations more often decided to run remote internal audits than smaller ones; more delays in the implementation of internal audits during the pandemic time were observed for a group of larger organizations; the remote work did not affect the credibility of the results of internal audits; the organizations that switched to remote processes of conducting internal audits were characterized by a higher tendency to stick to this form of activity also after the pandemic.

Keywords: remote internal auditing, global pandemic, standardized management systems

JEL Classification: D24

1. Introduction

The ongoing COVID-19 pandemic has had a significant impact on the functioning of management systems implemented in organizations. One of such areas are internal audits that require independent auditors who are usually employees from other processes that audited one. The traditional approach to auditing processes on-site has been significantly curtailed, and it has been unclear when, and under what conditions, it might resume in full [1].

Having a certified ISO 9001 system requires regular internal (first-party) and external (third-party) audits. ISO defines audit as “a systematic, independent and documented process for obtaining objective evidence and evaluating it objectively to determine the extent to which audit criteria are met.” Internal audits are performed by or on behalf of an organization by trained auditors as a means of declaring compliance with a management system standard [2,3]. Performing internal audits can add value beyond verifying compliance as well [4]. The internal audit differ between companies and also over time within the same company: from mere formal conformance to the requirements of the standard (in companies that are only interested in having the certificate) to audits that help companies actually achieve effective and efficient performance (in companies with a mature quality culture and mature QMS) [5]. The quality internal audits also establishes the qualitative objectives for its own activities, and evaluates the procedures and processes to maintain the quality. Its purpose is to evaluate whether the quality assurance works as intended, whether the quality assurance system produces useful and relevant information for the improvement of its operations and whether it results in effective improvement measures [6].

Internal auditing is also a way of conformity assessment, in which the assessment is carried out by auditors, which has been confirmed by the top management. Conformity assessment in accordance with the definition given in the ISO / IEC 17000 standard is a demonstration that the specified requirements for a product, process, system, person or unit have been met [7].

Requirements for auditing management systems included in the ISO/IEC 19011:2018 standard indicate the possibility of using both direct and indirect contact with the auditee – table 1. Although it is not a very popular way of conducting activities, it is permissible under the existing conformity assessment system. In the case of remote internal audits, the activities carried out may be a personal interaction, where the audit team contacts the auditee. In the absence of personal interaction, the audit team uses the information contained in the documentation, equipment or available infrastructure [8]. As a result of the challenges and restrictions arising from COVID-19, organization have had to either

postpone internal audits or in some cases introduce remote auditing. Remote auditing (or remote assessment) is defined as “the facilitation of assessment of a Conformity Assessment Body from a location other than that being physically present” [9] and is enhanced by using information and communication technology (ICT) “for gathering, storing, retrieving, processing, analysing and transmitting information” [10].

Table 1. Auditing methods

The extent of involvement between the auditor and the auditee	Auditor location	
	On site	Remote
Personal interaction	<ul style="list-style-type: none"> – Conducting interviews. – Completing checklists and questionnaires with the participation of the auditee. – Conducting document review with the participation of the auditee. – Sampling. 	Using interactive means of communication: <ul style="list-style-type: none"> – Conducting interviews. – Completing checklists and questionnaires. – Conducting document review with the participation of the auditee.
No personal interaction	<ul style="list-style-type: none"> – Document review (e.g. records, data analysis). – Observations of the work performed. – Conducting on-site visits. – Completing checklists. – Sampling (e.g. of products) 	<ul style="list-style-type: none"> – Conducting a documentation review (e.g. records, data analysis). – Observation of work performed by means of supervision (taking into account social and legal requirements). – Data analysis.

Source: [8]

Additional requirements for remote auditing processes are included in the IAF (International Accreditation Forum) MD-04 guidelines, the purpose of which is to ensure the consistent application and use of ICT in audits or assessments by certification bodies [10]. Nevertheless, those requirements can be easily customized by organizations for the internal auditing purposes. A risk-based approach [11–13] has been adopted as a basis for these activities, where the opportunities and threats of conducting remote audits should be assessed prior to their use. Examples of activities that can be implemented as part of remote audits include [10]:

- meetings conducted using teleconference devices, including audio, video and data sharing;
- conducting audit / evaluation of documents and records via remote access, synchronously (in real time) or asynchronously (when there are delays);
- recording information and evidence by means of still images, video or sound recordings;
- providing visual / audio access to remote or potentially unsafe locations.

The obvious benefit of remote auditing is more efficient use of resources. Remote auditing techniques can save auditors travel time and expenses while improving efficiency during conformity assessment [14,15]. The travel costs may be an important issue only in case of organizations that operate in more than one localization. The bigger company with more branches, the chances for cost reduction are increasing.

Travel restrictions, as well as the practice of social distancing, that have emerged throughout the COVID-19 crisis have affected the business continuity in some cases [16]. Those restrictions in movement introduced in order to minimize the effects of the global COVID-19 pandemic resulted in the need for companies to introduce significant changes to the internal auditing processes carried out. In a situation where it is not possible to conduct activities on site, recommended activities carried out by units should include similarly to third-party audits [17]:

1. Risk assessment of the current and future situation of the assessed organization before deciding on further actions.

2. Consider introducing non-standard assessment methods assuming that previously assessed risk is low. These methods should, in particular, include activities such as:
 - proactive communication with the organization,
 - planning further activities,
 - definition of a maximum period for which specific operating conditions will apply,
 - criteria for the renewal of normal procedures,
 - possible changes in organization supervision plans,
 - ensuring that any deviations from the accreditation requirements and procedures of the certification body are justified and documented,
 - re-establishment of oversight / recertification activities in line with the entity's oversight plans when access to the site is restored.

2. Methodology

The purpose of this publication is to indicate the context of the operation of producers in relation to the remote auditing and the impact of such proceedings on the confidence in the results of their work, and to indicate changes in the way internal audits are carried out by companies due to global COVID-19 pandemic. The data analysed in the paper is a part of a project which aim was to study the organizational behaviour of pro-quality managed enterprises during the Covid-19 pandemic[18]. The research was conducted in 2021 using the mixed mode survey procedure using different data collecting modes. In this study, the CAPI and CAWI methods were used. The research form consisted of 5 parts focusing on various aspects related to the quality management in enterprises during the pandemic.

The article presents the part of the research in which the internal audits within pandemic context are analysed. These actions regard remote work and other solutions imposed by the pandemic restrictions. Survey sheet (part 5), presents a list of activities introduced by companies to maintain their businesses continuity during the Covid-19 pandemic.

The respondents mark the activities the organization intends to maintain in the post-pandemic period. Each described activity can be rated on a scale from 1 to 5 (1 = definitely not and 5 = definitely yes).

The organizations that met two conditions were selected for the study: (1) an implemented and certified management system compliant with the requirements of ISO 9001, (2) some employees worked remotely during the Covid-19 pandemic in 2020. The survey was taken by the employees responsible for the quality management system in the organization, mostly they were managers of these systems. The database developed for the purpose of the study consisted of 1,200 enterprises, from which 205 organizations took part in the study constituting 17.1% of the target group. Characteristics of the participants are presented in Table 1.

Table 1. Characteristics of the participants

Variable (N=205)	Number	Frequency (%)
Number of employees		
up to 9	15	7,3%
10-49	45	22,0%
50-249	77	37,6%
more than 249	68	33,2%
Annual income (PLN)		
less than 2 millions	32	15,6%
above 2 to 10 millions	28	13,7%
above 10 to 50 millions	30	14,6%
1% more than 50 millions	17	8,3%
no response	98	47,8%
Scale of the operations		
local / regional	35	17,1%
all-Poland	59	28,8%
international	109	53,2%

3. Results and Discussion

Large-scale remote audits were introduced in organizations with the advent of the pandemic. However, some of the organizations had already carried out such activities before. The popularity of internal audits conducted with the use of remote techniques before the pandemic was small (5.9%) among the respondents. This group was dominated by large and medium-sized organizations, which together constituted 66% of all responses. At the same time, these were organizations in which the management systems were operated for a very long time (at least 3 certification cycles) and the good sales covered international markets. In case of organizations that used remote audit methods, its intensity (the scale of internal audits) was rather low and from the group of all audits included in the audit program (e.g. annual schedule), remote audits most often constituted up to 20% of all planned processes [18]. The surveyed organizations were asked to evaluate the effectiveness of remote pre-pandemic audits. The average score on a five-point scale is 3.8, which means that organizations did not rate very highly the effectiveness of remote audit activities prior to the pandemic.

As a result of the introduced restrictions, 54.6% of the surveyed organizations partially or fully conducted internal audits as remote ones. Comparing the distribution of responses regarding the implementation of remote internal audits in the organization with: the number of employees, the number of implemented systems, the system's operation time, revenues and sales markets, significant dependencies were found only regarding to the size of the organization. Table 2 shows the distribution of results for the transition to remote audits depending on the size of the organization.

Table 2. Remote audits vs. the size of the organization

Transition to remote internal audits	Size/Number of employees				total
	Micro 0-9	Small 10-49	Medium 50-249	Large 250 and more	
Yes	6	18	39	49	112
No	9	27	37	19	92
No data	0	0	1	0	1
total	15	45	77	68	205

Based on the results of the Mann-Whitney U test for $p < 0.05$, it was found that larger organizations more often decided to conduct remote audits than smaller ones ($Z = 3.45$; $U = 3704$).

The initial shock caused by the pandemic and the subsequent limitations in maintaining the continuity of the organization's processes were the probable cause of delays in the implementation of the adopted activities, also in the area of internal audits. Less than half of the organizations had done the planned internal audits for 2020 on time. Only in case of 34,6% of the surveyed organizations internal audits were executed in the stationary form, and another 14,1% were carried out as planned, but using remote audit methods. The remaining 51,3% of the audits were delayed or canceled. Comparing the distribution of results, it was found that there was a statistically significant difference for groups of organizations of different sizes ($Z = 2.61$, $U = 4141$). More delays in the implementation of internal audits during the pandemic time were observed for a group of larger organizations. No such dependencies were found, taking into account the number of operating systems, revenues and the scale of sales.

The introduction of remote work resulted in many changes in the surveyed organizations. It also influenced the assessment of the credibility of internal audits. According to 69.3% of respondents, remote work did not affect the credibility of the results of internal audits. That result is in line with results obtained by Kafel and Rogala for the credibility of external audits [19].

The first experience with remote work, including for some of the organization with internal audits, allows us to indicate expectations concerning future activities in this regard. According to Castka and Searcy the COVID-19 pandemic catalyzed the implementation of remote practices and seeded the ground for more investments in adopting advanced technologies [20]. In that line of study, respondents were asked about their willingness to conduct remote internal audits after the end of the pandemic. In table 3 the distribution of obtained results was indicated.

Table 3. Willingness to proceed with remote internal audits after the end of the pandemic

Remote form od audits	Number of organizations [%]
1 – definitely not	37,1
2 – rather not	25,4
3 – it’s hard to say	17,6
4 – rather yes	11,7
5 – definitely yes	3,9
No data	4,4

Analyzing the willingness to conduct internal audits in a remote form in the future, it can be concluded that variables such as size and sales revenues increase the tendency to conduct internal audits remotely also increase. In case of the number of implemented systems, the number of certification cycles and the scale of conducted activity, the tendency to stick to remote audits decreases (Table 4). However, the

Table 4. Spearman's rank order correlation – willingness to conduct internal audits remotely after the end of pandemic

Variables	Size	Number of management systems	Number of certification cycles	Scale of activities	Revenue
Willingness to conduct internal audits remotely after the end of pandemic	0,048766	-0,075062	-0,136534	-0,100181	0,040921

obtained responses do not allow, for the p level below 0.05, to indicate statistically significant correlations. Higher willingness to conduct internal (post-pandemic) audits remotely may result from pre-pandemic experiences in this area. In order to confirm this hypothesis, the studied organizations were divided into two groups and the distributions of the obtained responses were compared using the Mann-Whitney U test. The results did not allow for the verification of such hypothesis. This may have been due to the small size of the group of organizations that had experience with remote audits prior to the pandemic (5,9%). In the next step, an analysis was carried out using the experience in remote audits also during a pandemic as a grouping variable. In this case, organizations that switched to remote processes of conducting internal audits were characterized by a higher tendency to stick to this form of activity also after the pandemic ($Z = 0.14$, $U = 3046$). Regardless of with which method to proceed, it is important that internal audits results allow for the identification of improvement actions.

As the research of Lenning and Gremyr shows, internal audits focus too much on compliance and less on improvements [2].

4. Conclusions

Summarizing the results obtained from the above research, it can be stated that in order to ensure business continuity, the companies approached the auditing processes and used the elements of remote evaluation to a quite large extent. The surveyed organizations consciously approached the difficulties of quickly adapting to new realities during the global COVID-19 pandemic.

The research shows that the effectiveness of remote audits wasn't rated too high prior to the pandemic than the on-site one. The COVID-19 pandemic caused that according to the researches 54.6% of the surveyed organizations partially or fully conducted internal audits as remote ones. This is significantly more than in previously carried researches by authors, where over 40% of the surveyed enterprises underwent remote audit[21].

Another significant research results are: the larger organizations more often decided to run remote internal audits than smaller ones as well as more delays in the implementation of internal audits during the pandemic time were observed for a group of larger organizations. This may confirm the well-known statement that within larger organization it is much more difficult to undertake strategic business decisions that usually causes delays, but from the other hand bigger companies have more tools to go into modern solutions to keep the business continuity. The ability of larger companies to stick modern solutions may also be observed in the willingness of them to stick to the remote internal auditing activities even after the pandemic.

The last but not least finding, was that the remote work did not affect the credibility of the results of internal audits, which may be a good sign for the future.

According to the authors, the global pandemic also gives a positive impulse in the field of remote assessment, companies will have the opportunity to choose what type of audits they prefer on-site or remote. Of course, this will not be possible for all types of audits, but in some cases or standards it will be an opportunity and a way to reduce the costs of internal auditing processes and in the probable future lockdowns it will allow companies to keep the business continuity in this area for sure.

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**The 11th National and 3rd International Conference on Quality
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Young Consumers’ Perception of Fast Food Chains’ Advertising Campaigns

Abstract

Research background: Enterprises strive to be efficient in order to achieve certain goals within a certain period of time. Marketing communication between enterprises and purchasers is a very important instrument of the marketing strategy, which allows to realize the market objectives of the enterprises. The leader in the fast food market in Poland, McDonald’s, conducts numerous marketing activities to strengthen the brand and improve its image in the eyes of consumers. Consumer’s perception and the effectiveness of advertising measures directly affect the effectiveness of marketing campaigns, hence the importance of constant monitoring of the measures taken is becoming increasingly important. Current market trends, activities of enterprises, literature review were the premises for undertaking the research.

Purpose of the article: The aim of the study was to assess consumers’ perception of advertising campaigns of McDoland’s chain.

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Methods: The CAWI technique (Computer-Assisted Web Interview) was applied, using the author's research instrument. The research sample was selected using purposive sampling; the declaration of making purchases in the McDonald's chain was taken as the selection criterion.

Results and value added: The results of the conducted research indicated that the analysed marketing campaigns implemented by McDonald's in 2021 were met with varying consumer satisfaction ratings. The results provided both important information in the field of assessing consumer perceptions of McDonald's chain advertising campaigns and in having application value concerning the possibility of assessing consumer loyalty using the Net Promoter Score (NPS) as an alternative indicator of consumer satisfaction.

Keywords: consumer perception, consumer satisfaction, advertising campaigns, Net Promoter Score, marketing indicators

JEL Classification: D1, D4

1. Introduction

Marketing communication as an element of strategic management, is one of the most important areas of business activity. On the one hand it serves to achieve the strategic goals of enterprises, but is also based on dialogue and building relationships between the entrepreneur and the consumer (Mihaela, 2015). Appropriate management of marketing processes leads to greater recognition of a given brand and allows you to gain consumer confidence in the industry specified by the company. Enterprises establishing marketing concepts appropriately to their business increase the chances of being successful in acquiring potential customers. In order to maintain a strong sales position in a specific market, companies pay a lot of attention to choosing an appropriate marketing strategy and researching the behavior and preferences of their target consumers. Companies wishing to be successful in their marketing activities should adequately examine the tastes and characteristics of the target consumers. Appropriate understanding of consumer behavior and the factors that influence

it, facilitate communication with buyers (Kotler and Keller, 2019; Michalski, 2017; Mruk, 2012; Wiktor, 2013).

The market behavior of consumers are all measures that make up the decision to choose a given product, making that choice, or purchasing (Kasperek-Hoppe M., Rachocka J., Woś, 2004). Market behaviors are the result of an individual perception of needs or reasons influencing the reactions of buyers – emotional and rational, conscious and unconscious. A closer acquaintance with the basics of the effective fulfillment of consumer aspirations and the achievement of consumer goals make it possible to better predict the directions and nature of numerous changes taking place in the social and cultural life of consumers. Knowledge about consumer behavior on the market is very useful in terms of predicting structural changes taking place in the country's economy, the analysis of these changes makes it possible to forecast demand and plan the sales volume of specific products and services. Research on consumer attitudes is becoming extremely important nowadays, where customers are becoming more and more aware, and their needs, habits and purchasing motivations are constantly changing (Falkowski and Tyszka, 2009). The effectiveness of marketing activities depends mainly on the precise determination of customer behavior and the skillful adaptation of the commercial offer to them. Therefore, for this reason, companies spend more and more time delving into the information of buyers and conduct numerous studies in this field (Zimon, et al., 2014). The customer satisfaction survey is becoming increasingly popular for companies. Consumer satisfaction can be measured by direct and indirect methods. Direct methods are based on direct analysis of consumer reaction to the value of the product, while indirect methods are based on satisfaction indicators reflecting consumer market behaviour (Haffer, 2000). Advertising campaigns include effectiveness and attractiveness for the buyers, i. e. the ability to attract the attention of the addressee in a way that allows them to become familiar with the content of the message. The determinants of the perception of the quality of advertising services are manifold, both from the perspective of the consumer, the companies that carry them out, and from the perspective of the managers who carry out the commissioned advertising campaigns (Nowacki 2006,

Bachlik et al. 2018; Boudier et al., 2022; Zimand-Sheinera et al. 2020). An interesting method of obtaining information on consumer satisfaction and loyalty is the new psychological index. The NPS indicator is seen as an alternative to traditional methods, a method for assessing customer satisfaction surveys (Baquero, 2022; Eger and Mičik, 2017; Spoczyński, 2018).

Research shows that belonging to a particular generation is primarily determined by the way in which one communicates (Anishewska, 2015; Hole, Zhong and Schwartz, 2010). Young people of Generation Z (born in 1995 and beyond) are among the most active users of social media. These people are used to free access to the Internet, to the possibility of obtaining information in a simple way through the use of modern technologies. Therefore the possibility of using modern technologies for the purpose of communication makes it possible to maintain relationships in a virtual form (Molenaar et al. 2021). Generation Z succumbs to market trends very easily, easily and unknowingly they succumb to advertisements. Young consumers are willing to follow the latest product and brand trends. Their consumer behavior is often influenced by influencers or idols (Berg, 2017; Janecka and Juźwik, 2020; Krzyżan-Stachowiak, 2021; Lojza and Wolniak, 2021, Majkrzak i Salerno-Kochan, 2016).

One of the main reasons for the awareness of fast food chains among consumers in the food market is the intensive marketing of the companies. Food advertising has been found to have a significant impact on food selection, eating and consumer behaviour (Vukmirovic, 2015). For decades, the biggest brands in the food and beverage market have been reaching potential consumers through various marketing channels, providing continuous information about their campaigns and offers. The largest fast food chain in Poland, McDonald's, carries out numerous marketing activities that enable it to establish its brand in the eyes of consumers. The main channel of marketing communication is social media and online advertising, which have experienced a strong increase in popularity over the years. Increased exposure to fast food advertising is associated with increased consumption of energy-dense, nutrient-poor (EDNP) foods by adults (Scully, 2009). McDonald's strives to improve its image with consumers through numerous marketing campaigns.

Studies on the perception of advertising, specific to the fast food market, are still insufficiently researched in the literature. Taking into account the current market trends, the activities of the companies and the literature review, studies were carried out, the main objective of which was to assess the perception of the advertising campaigns of McDoland's, the market leader in the fast food market in Poland. To achieve the main objective, specific research objectives were defined: (1) to assess customer satisfaction with McDonald's advertising campaigns, (2) to identify and assess the factors that influence consumer perception of McDonald's advertising campaigns.

2. Materials and methods

The study used the CAWI method using Google's web forms. The selection of the sample was purposive: declaration of making purchases in the McDonald's network was performed using the "snowball sampling" method. The study was conducted in January and February 2022. The test sample was selected with a targeted selection; The Net Promoter Score (NPS) was used as a selection criterion to assess consumer satisfaction with the three McDonad's advertising campaigns: "Mata takes over Mac", "Better Side of Winter", "McHappy Day", the Net Promoter Score (NPS) was used. This indicator was first defined by Reichheld (2003). In the course of the survey, the consumer answered a basic question with 11 levels: How likely is it that you will recommend a product/service/company to a friend?

certainly not 0 1 2 3 4 5 6 7 8 9 10 certainly yes

- On the basis of the obtained consumers were divided into 3 groups:
- detractors – a group of consumers who answered between 0 and 6.
 - passives – a group of consumers who answered between 7 and 8;
 - promotores – a group of consumers who answered between 9 and 10.

The Net Promoter Score (NPS) is determined by Subtracted from the percentage of Promoters to obtain a Net Promoter score:

$$\text{NPS (\%)} = \% \text{ Promotores} - \% \text{ Detractors}$$

The determined NPS value can be negative or positive and is between -100 and +100. An indicator of +100 is a situation in which each respondent promotes an object of evaluation and is willing to recommend it. An indicator with a value of -100 indicates that every respondent is a critic who does not recommend the subject to review.

The study enrolled 344 subjects aged 16 to 27 years with different socio-demographic characteristics (Table 1).

Table 1. *Structure of the sample*

Feature	[%]
Sex	
woman	60.5
man	39.5
Age	
16-19 years old	28.2
20-23 years old	51.2
24-27 years old	20.6
Education	
basic	4.7
vocational	1.7
medium	62.5
higher	31.1

Feature	[%]
Residence	
village	20.1
city up to do 50,000	17.2
city up to 100,000	9.6
city up to 250,000	9.3
city with over 250,000.	43.9
Frequency of use of the McDonald's network	
several times a week	5.5
once a week	7.9
several times a month	30.2
once a month	28.2
less than once a month	28.2
Social Media activity	
I don't do this kind of activity	75.3
I submit ideas to make the offer more attractive	1.7
I am willing to rate and rate products on websites and forums	
I present projects of new products	19.8
	3.2
The way of life	
in any case healthy	4.9
health	45.3
hard to say	38.7
unhealthy	9.9
definitely unhealthy	1.2

208 women and 136 men from the Z generation took part in the survey. Most participants were between 20 and 23 years old (51. 2%). In terms of educational attainment, most people reported having tertiary and secondary education qualifications. There were significantly fewer respondents with vocational and basic training. Most of the respondents came from the city with more than 250,000 inhabitants, the next group were people from rural areas and small towns up to 50,000 inhabitants. The largest group of respondents was the number of people who reported

their frequency of use at McDonald's several times a month (30.2%). Two other groups reporting monthly and less than monthly frequency accounted for 28.2% of respondents. Respondents who were asked about their social media activities indicated that the vast majority (75.3%) did not engage in such activities and almost a quarter were willing to rate and rate products on websites and online forums. More than half of the respondents said they have a healthy lifestyle.

3. Assessment of consumer satisfaction with McDonald's advertising campaigns

Respondents were asked how likely it is to recommend three advertising campaigns to their friends: "Mata takes over Mac", "The Better Side of Winter", "McHappy Day" on a scale of 0 to 10. Based on the respondents' answers, the NPS value was calculated, expressed as a percentage. The results of the calculated NPS are shown in Table 2. According to the calculations, the least willingness to recommend was characterised by the "Mata takes over Mac" campaign, which showed a very low rate of -56.1%. The marketing campaign "Better Side of Winter" (-17.3%) achieved a higher NPS score. The best result was achieved by the advertising campaign "McHappy Day" with 5.1%.

Table 2. Customer satisfaction with McDonald's advertising campaigns in Net Promoter Score

Advertising campaign	Detractors [%]	Passives [%]	Promoters [%]	NPS indicator [%]
"Mata takes over Mac"	70.6	15.2	14.3	-56.3
"The better side of winter"	45.7	25.9	28.4	-17.3
"McHappy Day"	32.0	31.0	37.0	5.0

The negative NPS values of the advertised campaigns obtained prove that most of the respondents were against recommending McDonald's advertised campaigns. Presumably, the result of the assessment of loyalty to advertising campaigns could have been influenced by the overall low nutritional perception of McDonalds' product offer. This is confirmed by the results of the research carried out by the Temkin Group in 2017 on a sample of 10 thousand consumers. The obtained average value of the NPS index for fast food chains was 27 (the lowest was 2 and the highest -58) (Temkin, 2017). As a measure of consumer's emotional attachment to a product, the new psychoactive comparison of products and services was provided by entrepreneurs in different industries on different markets (Krol et al., 2014; Mandal, 2014). The NPS indicator makes it easy to track and monitor consumer satisfaction and can also serve as a tool for a bonus system within the company (Nowatorska-Romaniak, 2011). The NPS indicator has not been used to evaluate the advertising campaigns of fast food chains, but it can be used as an alternative indicator of consumer satisfaction.

Table 3 presents the most frequent responses of the respondents to the strengths and weaknesses of the analyzed advertising campaigns. 55.9% of respondents stated the involvement of a popular artist in the advertising campaign "Mata takes over Mac" as its most important strength.

Another important factor influencing the positive reception of the campaign was the introduction of a new product offer to the menu of the McDonald's restaurant chain. The last factor that stood out among the responses was the introduction of promotional products to the kit, such as stickers and garments added to the kit. Among the negative opinions, a quarter of respondents indicated a little unique set related to the promotion of the advertising campaign, which did not stand out from the standard McDonald's offer. 17.9% of respondents also pointed to the questionable quality of the products included in the promotional offer. The main disadvantage of the set was the new Matcha Latte drink, which, according to the respondents, caused negative feelings. The respondents also indicated that the choice of Mata was debatable.

Table 3. The most common responses from the respondents regarding the strengths and weaknesses of the analyzed advertising campaigns

Campaign strengths	[%]	Campaign weaknesses	[%]
„Mata takes over Mac”			
Popular artist engagement	55.0	A little unique set	25.0
A new set on offer	15.4	Unpalatable products on offer	17.9
Promotional additions to the set	6.2	The controversial figure of Mata	15.0
„Better side of winter”			
The taste of Drwal burger	44.1	Short offer availability time	9.9
Positive reception of the campaign	20.9	No vegetarian option	6.6
Seasonality of the promotional offer	16.9	High price of the set	6.0
„McHappy Day”			
Charity campaign goals	67.7	Low publicity for the campaign	25.9
Fries as the „hero” of the campaign	8.2	Promoting unhealthy food	9.7
Improving the company’s image	6.9	Short duration of the action	5.9

Another marketing campaign that the respondents were asked about was “The Better Side of Winter”, which recorded a much higher NPS result than the “Mata takes over Mac” campaign. There were 47.2% of the respondents among the critics of the advertising campaign, 25.9% remained neutral, and 28.4% were promoted. The indicated result shows that the respondents would be much more likely to recommend an action promoting the periodic introduction of the Drwal burger than to use a promotional set created in cooperation with Mata. 44.1% of the respondents considered the Drwal burger offered in the “Better side of

winter” to be the strongest side of the “Better side of winter” marketing campaign. The Drwal burger has received many positive opinions among the respondents regarding its taste and higher quality compared to the standard products offered on the McDonald’s menu. Among the respondents, 20.9% indicated an interesting advertising slogan, a nice graphic design of the campaign, and its good adaptation to the climate of winter. 16.9% indicated the seasonality and limited availability of the Drwal set as an interesting marketing step for the McDonald’s chain. These people mainly drew attention to the great popularity of the Drwal sandwich due to its short access in the menu, which results in customers’ waiting for it to be made available. Many respondents did not point out the weaknesses of the “Better Side of Winter” campaign, so its negative opinions did not indicate the same high results as in the case of the “Mata takes over Mac” campaign. Most people described its short duration as a weakness (9.9%), and their main argument was the inability to “enjoy” the promotional sandwich. Another negative opinion was the lack of proposals for vegetarians in the offer (5.6%) and the high price of the products offered in Drwal sets (6.0%) as the weakness of the campaign.

The last marketing campaign to which the respondents responded was “McHappy Day”. When asked about the probability of recommending a given action to their friends, young people noted the lowest number of critics (32.0%) in relation to all three advertising campaigns. Among the respondents, 31.0% remained neutral, while 37.0% indicated a high probability of recommending a given action to their friends. The most common opinion among the respondents indicating the strength of the “McHappy Day” advertising campaign was its charitable goals, which were to support the foundation (67.7%). The second most common opinion was the use of fries, which are very popular among McDonald’s customers, as a kind of “hero” of the campaign. 8.2% of the respondents considered it a good marketing move of the McDonald’s network. Another strength presented by the respondents (6.9%) was the improvement of the network’s image by supporting sick children.

One of the main weaknesses of the McHappy Day campaign was its poor publicity (25.9%), promotion of unhealthy food for charity (9.7%) and short duration of the campaign (5.1%).

4. Factors influencing the assessment of consumer perception of McDonald's advertising campaigns

The research also included an analysis of factors influencing the assessment of consumers' perception of McDonald's advertising campaigns. As the differentiating parameter, the arithmetic mean of all indications made by the respondents in the NPS study of the analyzed McDonald's advertising campaigns was adapted. Collective results are presented in Table 4. The relationship between the analyzed factors and the willingness to recommend McDonald's advertising campaigns was varied.

Table 4. Distribution of responses for satisfaction and willingness to recommend McDonald's advertising campaigns

Feature	Arithmetic mean of the NPS indications
Sex	
woman	6.0
man	6.4
Age	
16-19 years old	6.3
20-23 years old	6.2
24-27 years old	5.8
Education	
basic	7.2
vocational	7.2
medium	6.2
higher	5.9

Feature	Arithmetic mean of the NPS indications
Residence	
village	6.0
city up to do 50,000	6.4
city up to 100,000	6.5
city up to 250,000	6.2
city with over 250,000	6.1
Frequency of use of the McDonald's network	
several times a week	7.1
once a week	6.0
several times a month	6.2
once a month	6.1
less than once a month	5.9
Social Media activity	
I don't do this kind of activity	6.0
I submit ideas to make the offer more attractive	6.2
I am willing to rate and rate products on websites and forums	6.4
I present projects of new products	7.9
The way of life	
in any case healthy	5.5
health	6.1
hard to say	6.1
unhealthy	6.4
definitely unhealthy	7.5

By analyzing the sex of the respondents, age and place of residence, it can be concluded that there were slight differences, but they were not statistically significant. The degree of education, the frequency of using the McDonald's network, activity in social media, and lifestyle influenced the assessment of satisfaction and the willingness to recommend the analyzed advertising campaigns. The results show that there are two distinct groups in terms of education. The first group includes

respondents with primary and vocational education, the second group includes respondents with secondary and higher education. In the case of the frequency of using the McDonald's network, the respondents declaring using "several times a week" differed from other declarations. A similar differentiation was observed among young respondents who declared that they lead a decidedly unhealthy lifestyle and were highly active in social media.

5. Conclusion

The results of the research show that the analyzed marketing campaigns carried out in 2021 by McDonald's met with a differentiated assessment of satisfaction by Gen Z consumers. Only the "McHappy Day" advertising campaign obtained a positive NPS index. The campaign "Mata takes over Mac" had the lowest result, significantly different from the other campaigns. Presumably, the result of the evaluation of loyalty to advertising campaigns was influenced by the general nutritionally unfavourable perception of McDonald's product offerings. The degree of education, the frequency of using the McDonald's network, activity in social media, and lifestyle influenced the assessment of satisfaction and the willingness to recommend the analyzed advertising campaigns. The obtained results provided both important information in terms of assessing consumer perception of McDonald's advertising campaigns, and having an application value regarding the possibility of assessing consumer loyalty using the Net Promoter Score (NPS) as an alternative indicator of consumer satisfaction. The NPS indicator has not been used to evaluate the advertising campaigns of fast food chains, but it can be used as an alternative indicator of consumer satisfaction. Nevertheless, it should be remembered that the presented NPS survey is a one-time customer satisfaction survey over a specific period of time. In order to obtain more reliable information that allow entrepreneurs to take long-term actions, such research should be carried out periodically in a planned manner, e.g. when conducting a new marketing campaign or introducing a new product offer. Then, constant monitoring of market-

ing campaigns using the NPS indicator can be a simple and effective marketing indicator.

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**The 11th National and 3rd International Conference on Quality
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Dimensionality of Safety Culture. A perspective of OHS service

Abstract

Research background: Safety culture measurement needs to achieve as high a standard of as possible so that managers can use the resulting data to design effective safety management systems and interventions. There is no simple answer to the question which tool is most effective for assessing safety culture within organisations, but the literature suggests a wealth of tools from which to choose. Also, different authors discovered different dimensions of the safety culture.

Purpose of the article: The purpose of this study was to identify the dimensionality of the safety culture, perceived from the perspective of the OHS service.

Methods: A quantitative approach was applied. A questionnaire-based research was carried out. Employees working in the occupational health and safety (OHS) service were examined. A total of 299 valid responses were received for the online survey. The methodology tested the construct validity through exploratory factor analysis and reliability of an instrument through Cronbach's alpha, composite reliability and average variance extracted.

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Findings & Value added: It was discovered that the safety culture has three dimensions: (1) commitment and responsibility, (2) productivity and (3) identification of risk, loaded by 3 variables. When discussed with the results achieved by other researchers, it turned out that the dimensionality of the safety culture encompasses both commitment and responsibility, and identification of risk. Still, the existence of the additional dimension, productivity, was discovered. Authors' contribution and novelty of the paper is the innovative application of multidimensional exploratory techniques in the area of research. This allowed to identify the dimensionality of safety culture, especially its new dimension – productivity.

Keywords: safety culture; OHS service; instrument; validity; reliability

JEL Classification: M14, M54, C38

1. Problem Statement

The prevailing culture influences safety behaviors and outcomes for both workers and customers. Safety culture questionnaires need to achieve as high a standard of measurement as possible so that managers can use the resulting data to design effective safety management systems and interventions (Health Foundation, 2011). Organisations that choose to measure safety culture tend to be higher performing from the outset (Rosen et al., 2008).

Health and safety professionals must aim to apply current thinking in a practical way to achieve healthier and safer working environments. The challenge is how to have a positive influence on an organisation's health and safety culture. It's hard to change the attitudes and beliefs of a workforce by direct persuasion, but by acting safely workers can start to think safely (Reason, 1998).

There are a number of definitions of safety culture. Wiegman et al. (2002) conducted a comprehensive review of the literature and other data sources to gain a better understanding of safety culture, highlighting the commonalities as among others: safety culture is a concept defined at group or higher level shared values, related to management

and supervisory systems, has an impact of organisation's members, is reflected in contingency between reward system and safety performance, is reflected in an organisations's willingness to develop and learn from errors, incidents and accidents and it is relatively enduring, stable and resistant to change. For example Pigeon (1991) describes the safety culture as the set of beliefs, norms, attitudes, roles, and social and technical practices that are concerned with minimizing the exposure of employees, managers, customers and members of the public to conditions considered dangerous or injurious. On the other hand Cieslarczyk (2011) considered a safety culture as a way of thinking about safety, detection of safety values and the perception of safety.

A definition referenced by many authors, one that is also cited by the UK Health and Safety Executive, the one that covers the key elements mentioned above is given by HSC's Advisory Committee on the Safety of Nuclear Installations. The safety culture of an organisation is the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organisation's health and safety management. Organisations with a positive safety culture are characterised by communications founded on mutual trust, by shared perceptions of the importance of safety and by confidence in the efficacy of preventive measures (ACSNI, 1993). It may be mentioned that the nuclear sector appears to be the source from which the term "safety culture" came into widespread use, due to the conclusions from the report by the Chernobyl power plant reactor accident team. The term "safety culture" had been used many times in the report in the context of lack or weakness (INSAG-7, 1992).

At the same time, in the literature a term safety climate is present, with a meaning similar to safety culture, sometimes used by the authors as a synonym. "Health and safety climate" is the term often used to describe the tangible outputs or indicators of an organisation's health and safety culture as perceived by individuals or work groups at a point in time. The distinction between 'climate' and 'culture' is significant. The former embraces perceptions, attitudes and beliefs about risk and safety, is typically measured using questionnaires, and provides a 'snapshot' of

the current state of safety. The latter is more complex and long-lasting, and reflects more fundamental values (Mearns & Flin, 1999).

An effective health and safety management system is the basis for a good health and safety culture (McDonald et al., 2000). There are certain key aspects of an organisation which will influence its culture. These factors tend to be intangible and often difficult to change. Senior management commitment produces higher levels of motivation and concern for health and safety throughout the organisation. It is best indicated by the resources and support allocated to health and safety management and by the status given to health and safety. Strong orientation of an organization towards the low cost production or service often results in the shrinking of the finances for the collective and personal safety. It disturb the balance of health and safety and production goals. In the long term this strategy can destroy employees' feelings of safety, worsens the quality of products and services, and results in the heightened risks, dangers and uncertain events (Ambrož et al., 2000). Excessive production pressure creates an atmosphere of distraction and a shortage of time which makes human errors more likely. Excessive pressure may effect in a higher rate of 'violations' of health and safety rules (Saptari, 2015).

Another important factor is management style involving more regard by managers for individuals' personal and work problems is likely to be effective. Interventions to improve safety-related practices often focus on reducing power distances between senior and junior staff in order to improve communication processes (Tear & Reader, 2018). Good communications between all levels of employee, the policy of "open door" may be helpful with direct access to the management hierarchy where appropriate, encouraging junior team express their opinions by the managers (Edmondson, 2003) or ensuring leader inclusiveness in order to improve psychological safety and engagement (Nembhard & Edmondson, 2006).

Finally, again according to Pidgeon, positive safety culture has three key elements (Pidgeon, 1991): working practices and rules for effectively controlling hazards, a positive attitude towards risk management and compliance with the control processes, the capacity to learn from

accidents, near misses and safety performance indicators and bring about continual improvement. These three can constitute a starting point for considering the dimensionality of the safety culture.

A large number of tools are available to assess the safety culture in organisations and other industries and sectors and several detailed reviews are available comparing the properties and characteristics of these tools (Gaba et al., 2003; Nieva & Sorra, 2004). The available instruments vary in length, the dimensions covered, the intended sample population (hospital wide or unit level, or other contexts), and extent of psychometric evaluation. Most tools are self-complete surveys, which use Likert scales. Some are available online and the larger and better known surveys allow comparisons and benchmarking with international data. The available scales tend to have some overlapping dimensions, such as leadership, work environment, safety systems, risk perception, job demands, reporting errors or speaking up, safety attitudes and behaviors, communication and feedback, teamwork, personal resources such as stress, and organisational factors (Seo et al., 2004; Flin et al., 2006; Health Foundation, 2011).

Some of the dimensions of the safety culture, discovered by different authors, are shown in Table 1.

Table 1. Sample safety culture dimensions

Authors	Safety culture dimensions
Churucca <i>et al.</i> (2021)	Leadership Perceptions of safety Teamwork and collaboration Safety systems Prioritisation of safety Resources and constraints Reporting and just culture Openness Learning and improvement Awareness of human limits Wellbeing
Silliker (2018)	Addressing safety concerns Leadership commitment Trust and respect Accountability Inclusiveness Continuous improvement
Fernandez-Muniz <i>et al.</i> (2007)	Safety management system Managers' commitment Employees' involvement Safety performance
Machfudyianto <i>et al.</i> (2017)	Leadership People Contract system Behavior Process Strategy Value Cost Safety performance

Authors	Safety culture dimensions
Idris H. (2017)	Leadership Teamwork Care Evidence-based Communication Learning Just
BSEE (2013)	Leadership commitment Respectful work environment Environment for raising concerns Safety and environmental communication Personal accountability Inquiring attitude Hazard identification and risk management Work process Continuous improvement
SMICG (2019)	Commitment Just culture Information Awareness Adaptability Behavior
Cooper (2000)	Leadership Two-way communication Involvement of the staff in identifying safety practices Learning culture that promotes a continuous improvement Assessment instruments and questionnaires Health and safety management techniques to promote safety
Ginsburg <i>et al.</i> (2009)	Organisation leadership for safety Unit leadership for safety Perceived state of safety Shame and repercussions of reporting Safety learning behaviors

Source: authors' own study

Taking the above into consideration, the theoretical construct was developed. The first element in the development of a research instrument is the construction of a conceptual structure (theoretical construct) containing the questions and factors related to the theme (Johnson & Wichern, 2007). In this research, the theoretical construct of the instrument was created with the factors and statements loading them. The set consisted of 14 statements, as described below.

2. Research Questions/Aims of the Research

There is no simple answer to the question which tool is most effective for assessing safety culture within organisations, but the literature suggests a wealth of tools from which to choose. Most importantly, it must be emphasized that all of the instruments are for use as tools to spark discussions and facilitate improvement efforts (Health Foundation, 2011). Also, different authors discovered different dimensions of the safety culture (Churucca et al., 2021; Silliker, 2018; Fernandez-Muniz et al., 2007; Machfudyianto et al., 2017; Idris, 2017; BSEE, 2013; SMICG, 2019; Cooper, 2000; Ginsburg et al., 2009), to name just a few. Hence the following research question was raised: What is the dimensionality of the safety culture perceived by the OHS service workers?

Therefore the aim of the paper was to identify the dimensionality of the safety culture, perceived from the perspective of the OHS service.

3. Research Method

To conduct the empirical research, a survey questionnaire was designed. It consisted of 14 variables – statements concerning the perception of the safety culture within organizations, and also of several demographical data concerning respondents. Table 2 presents the statements of the substantive part of the questionnaire.

Table 2. Statements used in the survey questionnaire

No.	Statement
1	In my organisation both managers and employees are involved in OHS matters.
2	In my organisation safety is treated as a basic value.
3	In my organisation employees feel personal responsibility for safety matters.
4	In my organisation managers effectively supervise occupational health and safety matters.
5	Employees and managers often discuss occupational health and safety matters.
6	In my organisation employees are provided with proper, adjusted to the existed threats and ways of controlling risks, trainings concerning occupational health and safety matters.
7	In my organisation occupational hazard and employees' behavior are systematically monitored.
8	In my organisation employees do not obey the rules to make their work faster or easier.
9	In my organisation employees eagerly and consciously apply existing safeguards and personal protections.
10	Cooperation between employers and employees concerning occupational health and safety matters is good.
11	Managers are concentrated only on execution of the production plan.
12	In my organisation suggestions concerning the improvement of safety at work, reported by the employees, play an important role.
13	In my organisation we prefer to punish employees, even if their mistakes are the consequences of the bad organization of the workplace.
14	In my organisation employees are familiar with the occupational health and safety procedures and support each other when not sure of something, while the management eagerly advices them in the matters of the safe work.

Source: authors' own study

The choice of the sample was purposeful. Employees working in the occupational health and safety (OHS) service were examined. The research had a nationwide coverage. The survey was conducted in cooperation with the Polish Association of OSH Professionals (the largest and representative Polish OSH Professionals association with about 3,000 members in 38 regional branches). The association is a member of ENSHPO (The European Network of Safety and Health Professional Organizations). A total of 299 valid responses were received for the online survey.

The research was performed from September 29th to October 20th 2020 with the use of the Google Forms platform. The accordance of the respondents with the given statements was registered on a five-point Likert scales.

The collected data was processed using MS Excel 2010 and Statistica 13.0 software.

Table 3 summarizes the demographic information.

Table 3. Demographic variables

Variable	Categories	Fraction
Gender	Female	46%
	Male	54%
Age	25-30 years	6%
	31-40 years	32%
	41-50 years	33%
	51-60 years	18%
	Over 60 years	11%
Seniority in occupational health and safety service	Under 10 years	48%
	10-20 years	34%
	Over 20 years	18%

Source: author's own study

Table 3 shows the diversity of responses for the selected demographic variables.

4. Findings

After establishing the instrument's theoretical construct, its validation was started. The validity of an instrument is directly related to how it measures what it intends to measure (Johnson & Wichern, 2007). Thus, an instrument is valid when its construction and applicability allow it to measure its target. Through the principal component method to estimate the factor loadings and specificity, the exploratory factor analysis (EFA) was conducted (Hair et al., 2014; Alyahya et al., 2020).

The 14 questions were distributed into 3 factors, each allocated in one or more domains. However, the extraction and rotation method revealed the highest score in the factors, determining in which one the statement must remain. The results of the exploratory factor analysis are presented in table 4. These typed in bold in the table have factor loadings values at least equal to 0,7.

Table 4. Principal component analysis – factor loadings

Statement	Factor		
	1	2	3
1	0,78	0,23	0,16
2	0,80	0,25	0,17
3	0,78	0,10	0,14
4	0,80	0,29	0,14
5	0,72	0,17	0,36
6	0,52	0,04	0,65
7	0,53	0,03	0,70
8	0,27	0,79	0,04

Statement	Factor		
	1	2	3
9	0,68	0,22	0,25
10	0,72	0,29	0,30
11	0,35	0,71	0,12
12	0,70	0,18	0,45
13	0,07	0,57	0,70
14	0,81	0,24	0,16

Source: authors' own study

The Eigenvalues of the identified factors and the percent of explained variance are given in table 5.

Table 5. Eigenvalues

Factor	Eigenvalue	% of total variance	% of cumulated variance
1	7,725	55,18	55,18
2	1,146	8,19	63,37
3	0,935	6,68	70,05

Source: authors' own study

As it implies from the analysis of Table 5, the first factor explains 55,18% of the total variance, and the following two factors 8,19% and 6,68% respectively. Overall, the three revealed factors explain over 70% of the data variance. Finally, Table 6 shows the identified factors and variables (statements) loading them

Table 6. Factors and their loadings by statements

Factor	Statements
1	1-5, 9, 10, 12, 14
2	8, 11
3	6, 7, 13

Source: authors' own study

Taking into consideration the variables loading individual factors, included in Table 6, the following names for the factors were proposed:

1. Commitment and responsibility.
2. Productivity.
3. Identification of risk.

The instrument's reliability was verified through Cronbach's alpha, calculating the existing correlation between each item of the test and the remaining items or the total (total score). Cronbach's alpha has particular characteristics that seek solutions in a population surveyed, not simply a measure by itself, and these alpha values change according to the group in which the measure is adapted. Additionally, composite reliability (CR) and average variance extracted (AVE) were used, to ensure the reliability of the model.

Table 7 shows the obtained values of factor loadings (FL) composite reliability (CR) Cronbach's alpha (CA) and average variance extracted (AVE).

Table 7. Reliability assessment for the measurement model

Factor	FL	CR	CA	AVE
1	0,68-0,81	0,92	0,94	0,57
2	0,71-0,79	0,72	–	0,56
3	0,65-0,70	0,72	0,78	0,47

FL – factor loadings; CR – composite reliability; CA – Cronbach's alpha; AVE – average variance extracted

Source: authors' own study

Convergent validity has been assured through three conditions as suggested by C. Fornell and D. Larcker (1981). Firstly, the factor loadings should exceed 0,5. Secondly, for each factor AVE should exceed the value of 0,5. Finally, CR should be higher than 0,7. As shown in Tables 5 and 6 three conditions which approve convergent validity were met, only for factor 3 AVE value is slightly below the threshold.

5. Conclusions

The findings obtained from the empirical research allowed to answer the previously raised research question: What is the dimensionality of the safety culture perceived by the OHS service workers?

When identifying the dimensionality of the safety culture it was claimed that the considered construct encompasses three dimensions. These are: (1) commitment and responsibility, (2) productivity and (3) identification of risk.

Discussion with the works published by other authors shows that the first dimension, commitment and responsibility is present in scientific works by A. Silliker (2018), B. Fernandez-Muniz with colleagues (2007), American Bureau of Safety and Environmental Enforcement (2013) as well as Safety Management International Collaboration Group (2019). The third dimension, identification of risk is met in publications by H. Idris (2017) and American Bureau of Safety and Environmental Enforcement (2013). Also the existence of the additional dimension, productivity, was revealed. So the first two of the identified dimensions of the safety culture are widely discussed in scientific literature. However, the second of the dimensions identified in the current study, productivity, was not distinguished by any other researchers. So we can claim to reveal a new dimension of the safety culture perceived by employees working at OHS service. This can be treated as a novelty element and contribution into the development of scientific discipline brought by our study.

Nevertheless, the limited number of variables used in the questionnaire did not allow to discover the greater number of the safety culture

dimensions. Still, as the exploratory factor analysis showed, the proposed model is generally valid and reliable.

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**The 11th National and 3rd International Conference on Quality
“Quality of the future – the future of quality”
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**Business Processes Approaches in the Context
of Transition to the Concept of Industry 4.0
(Quality 4.0)**

Abstract

Research background: Our goal was to identify the starting elements that can facilitate the continuous improvement of processes and increase customer satisfaction, in the global context of transition to Industry 4.0 and the Quality 4.0 approach and which can be transposed into a model to be implemented within Romanian companies.

Purpose of the article: Processes are created around people and repeated errors or difficulty in decision making can lead to low productivity. Also defective machines cause delays, higher operating costs. Therefore, the improvement of the processes can be achieved by ensuring a better circulation of data and by implementing measures that can ensure predictability and at the same time eliminate redundancies that leads to the transitions to the Quality 4.0. model.

Methods: In this study a company was analyzed starting from its processes and then an attempt was made to identify the weaknesses and the areas most affected by these weaknesses with the help of the system’s performance indicators. At the same time, a study was made on an area with a high impact on customers, receiving the most complaints here. Proposals for improvement were made in the respective areas, following the new principles of Quality 4.0.

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Findings & Value added: This study revealed that this approach brought benefits to the company and the transition to process automation and digitization must follow a path as smooth as possible so that there are no disruptions in the processes, and ultimately bring a benefit to the parties involved.

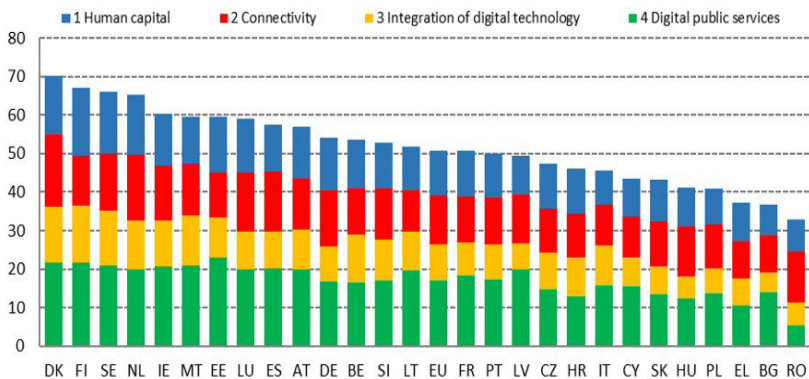
Keywords: process automation and digitization; Industry 4.0; transition to Quality 4.0 model; ISO 9001: 2015

JEL Classification: O14, M11, L15

1. Introduction

The annual Monitoring Report on EU Member States 2021 – Digital Economy and Society Index (DESI) Study (DESI, 2021), places Romania on the penultimate place of the 28 analyzed states, in terms of recording digital progress, the lowest component being represented by the integration of the digital technology Figure 1.

Figure 1. DESI 2021 study



Source: DESI 2021, European Commission

Digital technology is related to new, intelligent, automated platforms through which we can transmit and obtain data (Dana et al., 2022) and (Stachová et al., 2020), Internet of Things (IoT) and Cloud Computing (Liu et al., 2021), Biometrics (Alhayajneh et al., 2018) and their integration leads to increasing competitiveness and efficiency, that ensures progress.

Therefore, starting from digital technology, the innovation, transformation, and internationalization can be initiated (Pereira et al., 2022) and their implementation becomes a necessary condition in any company.

2. Problem Statement

Starting from the “Digital Compass”, respectively from the efforts initiated by the European Union starting with 2021 in establishing the targets and the strategy for achieving common objectives regarding the European digitalization planned for 2030 (Europe’s Digital Decade, 2021), but also from the continuous challenge of the management at the highest level within the private companies to be competitive, this paper focuses on identifying the opportunities from which the small and medium companies in Romania can initiate the migration to Industry 4.0.

At the same time, with the new trends of digitalization and transition to Industry 4.0 (Bonilla et al., 2018), it is necessary a processes approach through the Quality 4.0 (CQI, 2021) vision and of the 8 new predefined principles of quality management (CQI, 2021), respectively following the guidelines that define the new quality and how it should be integrated in a company’s processes. “Quality 4.0 represents “leveraging of technology with people to improve the quality of an organization, its products, its services and the outcomes it creates.” Therefore, to improve the performance of the organization, we will consider the following 8 new principles that define Quality 4.0:

- The advantage offered by a process to allow the interested parties, including the clients, to be provided with added value (ex-additional records regarding its evaluation, s.o) Added value.
- The opportunity of a process to record data both vertically and horizontally to improve performance. Vertical and horizontal recording.

- The smart networks created must be continuously assessed in terms of risk and transparency, because they exceed the traditional limits and interdisciplinary collaborations must be established. Risk assessment of smart networks.
- The automation of certain human activities is constantly changing. Automation.
- Mutual trust regarding the use of data, storage and how organizations use the data collected. Mutual trust in system compliance and data usage.
- Processes based on continuous and fast learning, on predictability. Adaptive learning.
- The value of process data (these must be identifiable, defined and able to provide future benefits) The identified data is a strategic asset.
- Symbiotic relationship between humans and machines to improve companies' processes (eg virtual reality, augmented reality, artificial intelligence). Technology and intelligence combined.

However, the evolution of each company towards the Quality 4.0 concept is different and depends on several factors, among which we mention: the specific of the company (Matt et al, 2021), the size of the company (Matt & Rauch, 2020), the organizational culture (Liu et al., 2022), the geographical location (Dossou et al., 2022). At the same time, we need to keep in mind that change needs to be made fast enough so that we can keep up with the changes around us (Müller et al., 2022) and at the same time, changing means effort combined and involvement. (Saarikko et al., 2020).

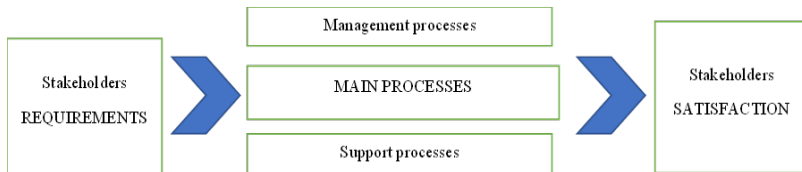
The starting point for change must be smooth and easy to apply to all the parties involved.

3. Research Questions/Aims of the Research

Based on Deming's statement: "If you can't describe what you're doing as a process, then you don't know what you're doing", this study aimed to obtain a process improvement model in the migration's context of Industry 4.0 and Quality 4.0, analyzing the processes of a small,

representative company in Romania in its segment, which has implemented the Quality Management System according to the ISO 9001: 2015 standard (ISO, 2015), (Figure 2).

Figure 2. The types of processes within a company



Source: Model compliant with ISO 9001: 2015

4. Research Methods

As discussed in the paper (Grabowska & Saniuk, 2022) the integration of digital solutions to transform and obtain an existing business model in line with the new requirements imposed by Industry 4.0 becomes essential and it is very important that this process should be adapted to the client's company.

Also, the processes can be redesigned as we saw in the paper (Severin et al., 2020) or new ones can be proposed by merging famous models such as EFQM and Bob Paldino and regenerate the processes as in the paper (Severin et al., 2016). At the same time, the approach of the processes within the companies through the prism of Industry 4.0 must take into account the sustainability in accordance with those mentioned in the paper (Ivascu, 2020).

The aim of this paper was to identify the opportunities from which we can innovate and align the processes so as to obtain Quality 4.0 in small and medium-sized companies in Romania.

The steps followed were process analysis, alignment of the main performance indicators of the organization and customer satisfaction

measurements to the 8 new principles of quality identified by Quality 4.0, so that we can improve processes by integrating Industry 4.0.

4.1. Analyzing the implementing opportunity of Quality 4.0 in the business processes

The study was conducted in a company with over 20 years of experience in the sale and service of warehouse equipment in Romania and it was taken as evidence the increased number of customer complaints. Within the support processes, at the warehouse level, the handling, lifting and forklifting equipment, are key elements of the company, and their efficiency can be an advantage of the company over competitors and in the same time a starting point for improving the company's process performance (Lascu et al., 2020). Any problem related to the malfunction of these equipment, influences the processes and in the end generates losses to the companies and represents a safety problem, therefore it is particularly important that the elements that affect the operation at the specified parameters are identified in time and incidents with them be minimized. Predictability is desirable in this case (Müller & Däschle, 2018).

Following the analysis performed by the management and a brainstorming session and the analysis of the results for a period of 4 months, respectively September 2021 to December 2021, were identified in the organization's processes, the relevant elements from which to start the study, respectively the places where society considers that there is room for improvement. The data were centralized in Table 1.

Table 1. Opportunity analysis of Quality 4.0 implementation (Part 1)

The processes of the organization	DOCUMENT ANALYSIS and input and output elements		MEASUREMENTS	
	Weaknesses	Strengths	Weaknesses	Strengths
1. Management analysis	Accessibility of documents	Fulfilled	Accessibility	Fulfilled
2. Policy and objectives	Hard to reach	Kept under control	Permanent tracking is difficult	Fulfilled
3. Sales	Complaints	Targets achieved	There is no customer value added; Dynamic targets (realization / planning); Average achievements per quarter / person;	Fulfilled
4. Service	Complaints	Not fulfilled	Targets not fulfilled	Achieved
5. Marketing	Missing elements	Kept under control	Lack of Strategies	not fulfilled
6. Human resources, training and development	Accessibility Missing elements	Not fulfilled	Permanent tracking is difficult	not fulfilled
7. Purchasing	Accessibility	Fulfilled	Number of orders	not fulfilled

8. Improvement opportunities	Accessibility Missing elements	Fulfilled	Permanent tracking is difficult	fulfilled
9. Risk analysis	Hard to reach	Kept under control	Customer interaction with sales and service	not fulfilled
The processes of the organization	DOCUMENT ANALYSIS and input and output elements		MEASUREMENTS	
	Weaknesses	Strengths	Weaknesses	Strengths
10. Control of documents and records	Accessibility	Fulfilled	Accessibility	Fulfilled

Source: Own elaboration

Accessibility – refers to the percentage in which the processes exist, are kept under control and are available

Hard to reach – refers to the difficult way of accessibility, which requires a lot of time for organization, completion, evaluation

Fulfillment – refers to the fact that it exists, is kept under control and is available

Unsatisfactory results have been thickened

4.2. Model implementation

In order to implement a transition model, we proceeded to group the performance indicators (Severin & Vizireanu, 2016) related to the processes that require a closer look, in 4 spheres of interest, in Table 1.

- A. Results
- B. Clients
- C. Employees
- D. Activities

The 4 areas of interest represent those areas where any change of the organization is felt, they being directly affected by the change (Figure 3).

Figure 3 Areas of interest on which the changes have a major effect



A. RESULTS

It was analyzed:

2. Policy and objectives fulfillment rate K_{pob}

$K_{pob} = \text{Targeted Objectives} / \text{Achieved objectives}$

$K_{pob} = K_{pob \text{ targeted}} / K_{pob \text{ achieved}} = 7/10 = 0.7$

Interpretation:	<p>Poor < 0.5</p> <p>Average $0.5 \leq K_{pob} \leq 0.70$</p> <p>Very well > 0.70</p>
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K_{pob} an average degree of achievement of the objectives was obtained. However, they are difficult to achieve, according to data from Table 1.

The proposed solution is in the area of the **Principle 1**, respectively to create added value by providing ease of use, the objectives being easier to follow and, in this way, increases the awareness of those involved.

Conclusion 1: Development of a program in which the policy and objectives can be pursued at any time.

8. Improvement opportunities K_{pprop}

The number of improvement proposal from the client was analyzed/ the number of proposals implemented

$K_{pprop} = K_{ppclient} / K_{ppimplemented}$

$K_{pprop} = 12/2 = 6$

Interpretation:	<p>Poor > 1</p> <p>Very well ≤ 1</p>
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The proposed solution is in the area of the new **Principle 2**, respectively to record data both vertically and horizontally, the objectives being easier to follow and this way will increase the awareness of those involved.

Conclusion 2: Improvement tools should keep up with customer requirements to consider customer feedback, possibly in the cloud.

B. CLIENTS

4. The Service process was analyzed separately based on the client's complaints. A larger study was conducted because most of the complaints come from this area. The study is below.

Conclusion 3: It is necessary a better planning of the activities and a better estimation of the cases in which the service intervention is necessary. It is necessary to improve customer satisfaction and to increase the productivity by upgrading the working tools, possibly ensuring a customer interface in the cloud. The proposed solution is in the area of **principle 2 and 5**.

5. Marketing

The traffic on the site was analyzed during the period September-December 2021.

site traffic:

under 4000 visits – **poor**

over 4000 visits -**medium**

over 40000 visits -**very good**

The results were that the traffic on the site was good, but it needs to be improved.

Conclusion 4: The proposed solution is around **Principle 1**, respectively added value for the client to attract more visits from them. Marketing strategies need to be promoted by creating tools in the online environment, so as to increase customer visits.

C. EMPLOYEES

3. Sales

$K_{psales} = \text{achived target} / \text{proposed target}$

$K_{psales} = K_{pachived} / K_{pproposed}$

$K_{p_{sales}} = 2017438 / 3000000 = 0.67$

Interpretation:	week < 0.5 medium $0.50 \leq K_{p_{sales}} \leq 0.70$ very good >0.70
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The proposed solution is in the area of **Principle 1**, respectively added value for the customer and **Principle 4**, respectively automation and facilitating the sales process to the customer.

Conclusion 5: We need to look for tools to improve the communication relationship between seller and customer to increase sales volume. Easy communication interface between seller and customer possibly in the cloud.

6. Human Resources

Absenteeism rate (between September- December 2021)

$$\mathbf{Kpabs} = \text{Number of hours absent} / \text{Total number of hours worked} = 2.1\%$$

Interpretation:

$\mathbf{Kpabsent} \leq 2\%$ **Acceptable**

$\mathbf{Kpabsent} > 2.1\%$ **High**

The proposed solution is in the area of the **Principle 8**, respectively combined technology.

Conclusion 6: Tools for flexibility and working in cloud must be provided, given the pandemic situation and the rate of absenteeism.

D. ACTIVITIES

9. Risk analysis

Number of risks kept under control / Number of identified risks

Kprisk

$$\mathbf{Kprisc} = \text{Kprisk Controlled} / \text{Kprisk identified} = 2/3 = 0.67 ; 67\%$$

Interpretation:	<p>Weak < 50%</p> <p>Medium $50\% \leq \mathbf{Kp}_{\text{risk}} \leq 80\%$</p> <p>Very good >80%</p>
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The proposed solution is in the area of **Principle 3**, respectively to record data both vertically and horizontally, the objectives being easier to follow and in this way the awareness of those involved will increase.

Conclusion 7: Improvement tools should be provided to keep up with customer requirements

7. Purchasing

Number of delivered orders / Number of orders received

$$Kp_{Orders} = K_{preceived} / K_{pdelivered} = 0.68 ; 68\%$$

Interpretation:	Week < 0.5 Medium $0.5 \leq Kp_{Orders} \leq 0.70$ Very good > 0.7%
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The proposed solution is in the area of **Principle 6**, respectively to ensure predictability, depending on periods.

Conclusion 8: For improvement, tools should be looked for to analyze the number of orders per period, so that an estimate can be made. Cloud solutions.

The **Service process** was analyzed separately as described below.

The study focused on the entries represented by the units sold by the company, under warranty or post-warranty, which were brought into service and took place over a period of 4 months: from September 2021 to December 2021 within the service department of storage equipment and sales department of spare parts.

At the service department level the following analysis took place:

Defect identification

The main types of problems were centralized when the equipment was brought to service, followed by their evaluation, by dividing them into 3 types of defects.

The following types of defects have been identified and centralized:

Table 2. Centralization of defects

	Number of defects of each type	Total defects (TD)
Major Defects (DM)	504	3510
Medium Defects (Dm)	2126	
Minor defects (Dmin)	880	

Source: Own elaboration

Their evaluation was made empirically and was based on how much it affects the operation of the equipment on a scale from 1-3 in Table 3.

Table 3. Defect classification based on how much it affects the operation of the equipment

No. crt	Description	The extent to which it affects the operation and safety of the equipment		
		Major (DM)	Medium (Dm)	Minor (Dmin)
1	Engine system	x		
2	Oil leakage		x	
3	Filters		x	
4	Steering system	x		
5	Acoustic and light signals		x	
6	Used wheels			x
7	Defective batteries		x	
8	Fuel losses		x	
9	Burners		x	
10	Forks		x	
11	Hydraulic system	x		
12	Braking system	x		
13	Seat sensor		x	
14	Mast problems	x		
15	Scheduled revisions			x
16	The electrical system	x		
17	Repositioning bolts, screws, scratches			x
18	Speed adjustment			x

The frequency of major defects in the total number of major defects (504) was calculated. (TM) Table 4.

Tabel 4. Frequency of major defects

No crt	Type	Description	Number of defects	Frequency of major defects FDM (no of defects DM/ Total number of defects TM)
1	DM	Engine system	43	8.53%
2	DM	Steering system	65	12.9%
3	DM	Hydraulic system	167	33.13%
4	DM	Braking system	71	14.09 %
5	DM	Mast problems	76	15.08%
6	DM	The electrical system	82	16.27%

Source: Own elaboration

The first 3 major defects that may affect the system have been selected in order of importance:

Hydraulic system, The electrical system and Mast problems.

Calculation of the frequency of medium defects in the total number of medium defects 2126. (Tm) in Table 5.

Table 5. Frequency of each medium defect in the number of average defects

No crt	Type	Description	Number of defects	The share of each medium defect in the total number of medium defects F_{Dm} (number of defects D_m / total number of medium defects T_m)
1	Dm	Oil leakage	196	9.22%
2	Dm	Filters	542	25.49%
3	Dm	Acoustic and light signals	86	4.05%
4	Dm	Defective batteries	364	17.12%
5	Dm	Fuel losses	102	4.8 %
6	Dm	Burners	343	16.13%
7	Dm	Forks	434	20.41%
8	Dm	Seat sensor	59	2.78%

Source: Own elaboration

The first 4 medium defects were selected in order of importance which can affect the system and where we can interfere in order to ensure predictability:

Filters, Forks, Defective batteries, Burners

T_{min} – The frequency of minor defects in the total number of minor defects was calculated (880) and they are listed in Table 6.

Table 6 Frequency of each type of minor defects in the number of minor defects

No crt	Type	Description	Number of defects	The share of the defect in the total number of minor defects FDm (no. of defects Dm/ total number of minor defects Tm)
1	Dmin	Used wheels	430	48.86%
2	Dmin	Scheduled revisions	89	10.11%
3	Dmin	Repositioning bolts, screws, scratches	241	27.39%
4	Dmin	Speed adjustment	120	13.64%

Source: Own elaboration

The first 2 minor defects that may affect the system have been selected and where to interfere in order to ensure predictability:

Used wheels and Repositioning bolts, screws, scratches

Following the above results, the 5 Whys Method was applied in Table 7 and a questionnaire was sent to the technicians in order to identify the main causes that could have led to the above defects.

Table 7 5 Whys Method

Encountered problems	Cause 1	Cause 2	Cause 3	Main Cause	Preventive action
Hydraulic system	Liquid leaks (oil, coolant)	Worn out system	Worn hose or cracked cylinder	<i>Improper pressure</i>	<i>Check and tighten the nut</i>
The electrical system	Wires, broken cables	Repeated bending	Improper handling	Wrap with insulating tape	<i>Voltage measurement</i>
Mast problems	Not working	Displaced, defective sections	mast and mast rollers	<i>Aging, heat, broken cables</i>	To check the mast and rollers periodically
Filters	Problems with leaks	The control valve is leaking	The oil filter is not changed	The oil filter is not changed	Periodic check and filter replacement
Forks	Broken, worn, thin	Improper use (pushing, overweight)	Improper maintenance	Forks fixed	Daily forks checking
Defective batteries	Sulphation	Discharge, leaks	Incomplete charging before use	Short circuit elements	Check that the batteries are fully charged
Burners	Clogging	Fuel filters are not changed	Fuel quality	Excessive use, aging, very high pressure	Check the adequacy of working conditions

Encountered problems	Cause 1	Cause 2	Cause 3	Main Cause	Preventive action
Encountered problems	Cause 1	Cause 2	Cause 3	Main Cause	Preventive action
Used wheels	The tires fall	Handling of irresponsible equipment	Improper working conditions	Their recommended pressure is not considered	Checking compliance with recommended pressure conditions
Repositioning bolts, screws, scratches	Accidents, aging	Overused	Repeatedly exceeding of specified work tasks	Concentration points of stress	Verification of compliance with the manufacturer's recommendations

Source: Own elaboration

Table 8. Daily check-up form for customers

Date: 20.12.2021 Daily check (operation)	Equipment 1	Equipment 2	Equipment n	Check Status		Requires service scheduling
				OK	Requires repairs	
Check and tighten the nut	x	x	x	OK		
Voltage measurement	x	x	x	OK		
Roller and mast checking	x	-	x	Equipment 2	anointment	no
Periodic checking and filter replacement	x	x	x	OK		
Daily forks checking	x	x	x	OK		
Check that the batteries are fully charged	x	x	x	OK		
Check the adequacy of working conditions fuels, liquid levels, dripping	x	x	x	x		
Check pressure conditions on the wheels	x	x	x	x		
Check the tightening of screws	x	x	x	x		

Source: Own elaboration

Table 9 The results of the centralized study

NEW PRINCIPLES PROCESS TYPE	1. Added value	2. Vertical and horizontal recording	3. Risk assessment of smart networks	4. Automation	5. Mutual trust in system compliance and data usage	6. Adaptive learning	7. The identified data is a strategic asset	8. Technology and intelligence combined
2. Policy and objectives	x							
3. Sales	x			x				
4. Service		x			x			
5. Marketing	x							
6. Human resources, training and development								x
7. Purchasing						x		
8. Improvement opportunities		x						
9. Risk analysis			x					

Source: Own elaboration

Conclusion 3: Based on these causes, a form was prepared for the machinery's operators of the customers, which must be filled in by them.

It acts in the area of **Principle 2 and 5**. Thus, it was proposed to create an interface with the customer in which he can centralize the data obtained after the daily check-up of the equipment and the transmission of service orders to the supplier, if necessary, after the analysis. The interface can be used in the cloud.

8. Findings

Following the analysis, Table 9 was drawn up in which the results obtained were highlighted. This table provides an overview of the measures that are recommended to be taken and in which area from the 8 new principles it is possible to act to improve the processes and reach the specified target.

A. RESULTS

2- Policy and objectives Conclusion 1: Policy and objectives fulfilment rate. Development of a program in which the policy and objectives can be pursued at any time.

8- Improvement opportunities Conclusion 2: Improvement tools should keep up with customer requirements to consider customer feedback, possibly in the cloud.

B. CLIENTS

4-Service Conclusion 3: It is necessary a better planning of the activities and a better estimation of the cases in which the service intervention is necessary. It is necessary to improve customer satisfaction and to increase the productivity by upgrading the working tools, possibly ensuring a customer interface in the cloud. The proposed solution is in the area of principle 2 and 5 from Table 2. It was proposed to make a separate application or integrate it with the other conclusions, considering the above, which would bring added value to customers.

5- Marketing Conclusion 4: The proposed solution is around Principle 1, respectively added value for the client to attract more visits from them. Marketing strategies need to be promoted by creating tools in the online environment, so as to increase customer visits.

C. EMPLOYEES

3- Sales Conclusion 5: The proposed solution is in the area of Principle 1, respectively added value for the customer and Principle 4, respectively automation and facilitating the sales process to the customer. We need to seek for tools to improve the communication relationship between seller and customer in order to increase sales volume. Easy communication interface between seller and customer possibly in the cloud.

6- Human resources Conclusion 6: The proposed solution is in the area of the Principle 8, respectively combined technology. Tools for flexibility and working in cloud must be provided, given the pandemic situation and the rate of absenteeism.

D. ACTIVITIES

9- Risk analysis Conclusion 7: The proposed solution is in the area of principle 3, respectively to record data both vertically and horizontally, the objectives being easier to follow and this way the awareness of those involved will increase. Improvement tools should be provided to keep up with customer requirements.

7- Purchasing Conclusion 8: The proposed solution is in the area of principle 6, respectively to ensure predictability, depending on periods. For improvement, tools should be looked for to analyze the number of orders per period, so that an estimate can be made.

9. Conclusions

In this study, a company was analyzed, starting from its processes and then an attempt was made to identify the weaknesses and the areas most affected by these weaknesses with the help of the system's performance

indicators. At the same time, a study was made on an area with a high impact on customers, receiving the most complaints here. They were followed by proposals for improvement in the respective areas, which take into account the new principles of quality Quality 4.0.

To sum up: the Policy and objectives should be consulted any time to see how much of the specified goals are reached and where the company should work more.

Therefore, developing a tool for this purpose must be created. This tool should also contain the Customers feedback and a way how clients can communicate with the company (a customer interface). At the same time, the tool should have a Service form to be completed by the customer with observations and the possibility to schedule the client's equipment. Regarding the Marketing, any suggestions should be taken into consideration and regarded as a potential source of improvement.

The company must provide the possibility of distance working for employees. An analyze of the orders should be included in the program, to ensure predictability.

The study showed that this can be a starting point for the transition to process automation and digitization.

The aim was to identify a model, starting from which to move to Industry 4.0 and Quality 4.0 (American Society for Quality, 2021) in small and medium-sized companies in Romania. The studied company has implemented the quality management system according to ISO 9001: 2015 and is maintained.

However, the study should be viewed with caution because it was conducted over a limited period on a limited number of defects in a medium-sized company. Nevertheless, it can be a starting point in achieving the principles of the new global trends, respectively achieving Quality 4.0.

We intend to conduct a similar study on a company operating in the service area in order to find out if the model is applicable in other areas and to validate it.

The final goal is to identify a model from which Romanian companies can improve their processes by indirectly targeting the proposed target to be reached by the European Union. Of course, future research

may include the development of an application that supports this model and is used as a permanent tool for evaluation by companies.

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**The 11th National and 3rd International Conference on Quality
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The Impact of Organizational Changes on the Quality of Internal Communication in Public Administration

Abstract

Research background: The article is devoted to the assessment of the impact of organisational changes on the quality of internal communication in municipal offices in the Silesian Province in Poland. The use of ICT in public administration resulted in organisational changes in these units. Along with the introduction of public e-services, municipal offices were divided into functional areas, the so-called front-office and back-office. Cooperation between employees of these two areas has an impact on the quality of public e-services.

Purpose of the article: The aim of the research was to indicate the impact of the introduction of front-office and back-office areas in municipal offices in the Silesian Province on the internal communication process and to identify communication problems between employees of these areas. For the research carried out on all problems in which people can improve the impact on communication in the organization in city offices, the achievement of the level of expected quality and improved communication in communication and communication in the front-office organization was achieved.

Methods: The article uses quantitative methods, statistical analysis and qualitative methods.

Findings & Value added: On the basis of the conducted literature analysis, no attempt was found in both domestic and world literature to comprehensively

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present the communication processes taking place inside public administration units, between employees directly providing e-services to citizens and those technically and organizationally supporting the provision of public e-services office and back-office.

Keywords: quality, internal communication, front-office, back-office, municipal office, ICT

JEL Classification: H8

1. Introduction

The use of new information and communication technologies (ICT) in the public administration sector is a global phenomenon. In international literature, the issues of applying new technologies in public administration in theoretical and conceptual terms were dealt with, inter alia, by: (Abramov & all 2018; Attour & Chaupain-Guillot 2020; Nixon & Koutrakou, 2007; Busch P. A., Henriksen H. Z. 2018; Clausen T., Mehmet D. 2020; Dobrolyubova E. 2021;). In Poland, the use of ICT in public administration has been constantly developing since 2000. This issue was raised, inter alia, by: (Bugdol, 2015; Papaj, 2017; Sułkowski, 2014; Ziemba, 2015). The introduction of new ICT technologies in public administration resulted in organizational changes. They are related, inter alia, with new methods of information processing as well as external and internal communication in public administration. These issues were discussed, inter alia, by (Kozuch, 2008; Descours, 2016). Together with the introduction of electronic administration, i.e. the provision of electronic services, the division into functional areas in public administration units was made, the so-called front-office – including employees providing e-services for external stakeholders and back-office – employees supervising and supporting the implementation of public e-services (Ziemba et al., 2015; Nogalski, 2001). The quality of provided public e-services and the service of external stakeholders such as citizens and enterprises depend on the communication between these employees.

This article assesses the impact of organizational changes on the quality of internal communication in selected municipal offices in the Silesian Province from the point of view of front-office employees. In the research, front-office employees were asked to assess the competences of back-office employees and to evaluate the cooperation between front-office and back-office employees.

The structure of the article is as follows: firstly the literature was reviewed. This part of the article ended with the definition of the research problem and determination of the research gap. The third chapter describes the research process of research methods. Further, the results of the research are presented. The article ended with conclusions referring to the impact of organizational changes on the quality of internal communication in public administration units and proposals of improvement measures.

2. Problem Statement

The concept of organizational change is interpreted in various ways by the researchers (Mikołajczyk, 2003; Reinholz & Andrews 2020; Abdelouahab Errida & Bouchra Lotfi 2021), they define the essence of change as a deliberate and conscious action that involves the transition of an organisation from its current state to a different – distinct one. Z. Mikołajczyk (2003) believes that it is most important to emphasise the purposefulness and awareness of introducing changes. According to M.S. Poole, A.H. Van de Ven, K. Dooley and M.E. Halmes (2003), defining and understanding the term organisational change depends on the paradigm in which this change is considered. S.P. Robbins and D.A. De Cenzo (2002) look more broadly at the concept of organisational changes, they believe that changes do not affect the organisation itself, but also its environment. According to the concept of H.J. Leavitt (1965), each organisation should undergo a change in three subsystems: structure, technology and people. The condition for introducing changes is that all subsystems are related to each other. Changes in one subsystem must force changes in another. To sum up, the concept of H. J. Leavitt

in relation to the research undertaken in this article is the closest. The ability to change continuously and effectively is considered one of the most important elements of the survival of any organisation. In the case of public administration units, the changes are closely related to the functioning of these organisations (Krukowski & Zastemowski, 2018; Frączkiewicz-Wronka, 2013; Kożuch, 2010). In line with the contemporary essence of public management, the opinion is formulated that increasing the efficiency of management in public administration units is innovative (Kożuch & Kożuch, 2012; Kożuch, 2005). Contemporary public management is focused on all external and internal processes that affect the functioning of public administration units (Jastrzębska, 2018). In turn, W. Kieżun (1997) believes that scientific and technological development causes a constant change in technology, which in turn causes organisational changes. A different view is represented by R. Batko (2011), according to him increasing institutional efficiency is achieved through modernisation of management processes in public administration, primarily by the implementation of a universal management system driven by objectives and results. According to this author, in public administration organisations it is important to design and implement process management, which is based on the theory of W.E. Deming (1982), which says that every activity, every work is part of the process, and management is about understanding these processes and making efforts for the purpose of their continuous improvement. According to R. Batko, the quality, efficiency and effectiveness of processes in public administration are influenced by the language of communication, customer needs, the external and internal environment of the organisation, as well as internal and external customer satisfaction. A. K. Koźmiński and K. Obłój (1989) in turn believe, that an organisation is a technical and social system which, by meeting the requirements of internal balance, ensures its balance in its environment. However, by these authors, balance is understood very broadly, firstly as a material and social dimension, and secondly as an internal and external one, that is, consisting in the mutual adjustment of intra-organisational and inter-organisational relations as well as the environment (Zarębska, 2002). B. Kożuch (2004) is of the opinion that organisational changes

result from the failure of these organisations to adapt to the conditions created by the environment, and this has an impact on disturbances in the implementation of processes within these organisations. According to W. Weber (1990), the ability to introduce changes in an organisation is the main factor influencing the organisation's survival.

Organisational changes are in line with the theories of contemporary public management and concern changes in the organisational structure, internal methods and functions, changes in tasks, procedures, process management, human resource management, information, financing, changes in relations with the environment and in the culture of the organisation. To be able to talk about an effective and efficient organisational change, you cannot change one process in the organisation, but you need to improve all processes in accordance with the principle of the process approach.

J. Penc (1999; 2002), L. Clarke (1997) believe that the introduction of organisational changes and the success of implementing these changes primarily depends on people, their understanding the changes and willingness to participate in these changes. R.M. Kanter, B. Stein, T.D. Jick (1992) distinguished three groups of people in the process of changes in the organisation, firstly, people making decisions about making changes, they were referred to as strategists. Secondly, people who prepare and implement the entire change process, known as executors or implementers. Thirdly, people who will work under the changed conditions, the so-called users. J. Penc noticed that in the whole process of changes, an important role is played by people or groups of people who are responsible for managing the introduced changes. They can be specialists in the field of introduced changes, managers of individual departments in organisations. Researchers dealing with changes in organisations believe that the basic barriers affecting their implementation are: primarily, employees' resistance to changes, uncertainty about what the future will bring after the changes are introduced, lack of reliable information about the introduced changes, lack of presentation by the management of the organisation of benefits for employees from the implemented changes, employees' distrust of management, fear of increasing bureaucracy (Kotter & Schlesinger, 1979).

To sum up, the literature on the subject lacks an analysis and assessment of the impact of organisational changes on the process of internal communication between back-office and front-office employees. The assessment of the impact of organisational changes on the process of internal communication in public administration units is part of the science of management and quality because learning about the processes of internal communication as one of the elements of the process approach in public administration units and defining directions for improving this communication allows for the improvement of the quality and effectiveness of the entire organisation. According to M. Bugdol (2008), quality management in contemporary public management is one of the tools for implementing organisational changes in public administration units. B. Kożuch believes that introducing organisational changes in public administration is the essence of modern public management and is conducive to the development of innovation in public administration (Kożuch, 2005; Jastrzębska, 2018; Kieżun, 1997).

3. Research Questions/Aims of the Research

The purpose of the article was to indicate the impact of the introduction of front-office and back-office areas in municipal offices in the Silesian Province on the internal communication process and to indicate problems in communication between employees of these areas.

The following research questions were also formulated:

- What quality factors influence the improvement of internal communication between front-office and back-office employees in public administration units?
- What are the problems in internal communication between front-office and back-office employees?
- How to effectively and efficiently improve internal communication in public administration units?

4. Research Methods

Based on a literature analysis relating to organizational changes in public administration units and on the basis of own observations, three dimensions have been determined that affect the process of internal communication between front-office and back-office employees. These are:

- First dimension – computer hardware and software. As part of this dimension, it was important to determine which IT and telecommunications tools are used by front-office employees, and what is their availability at all workstations of front-office employees. In this dimension, the applicable procedures and standards at computer workstations as well as the use of electronic document workflow and electronic mailbox were also taken into account. The basis for determining this dimension was the analysis of the following literature (Sandor, 2012; Bugdol, 2015; Papaj, 2017; Chełpa, 2003; Rozmus, 2017; Cardy & Selvarajan, 2006; Heeks & Davies, 1999; D. Esses; M. S. Csete, B. Németh, 2021;).
- Second dimension – IT competences of front-office employees. In this dimension, the problems faced by front-office employees using IT and telecommunications tools, as well as problems faced by back-office employees in communication with front-office employees were identified. The determination of this dimension was based on the analysis of the scientific achievements related to organizational changes in public administration (Ziembra, 2019; Fleszar, 2011; Hawrysz, 2012; Opolski & Modzelewski, 2004; Rogala & Białowąs, 2014; Wodecka-Hyjek, Kafel, Kusa 2021; Petterson F. 2018).
- Third dimension – cooperation between front-office and back-office employees.

Within this dimension, factors determining the level of communication quality between front-office and back-office employees were identified and problems in internal communication and directions for improvement were determined. Expectations for the quality level of internal communication were indicated. The perception of the quality level of internal communication was determined. The basis for de-

termining this dimension was the analysis of the following literature (Stobnicka, 2009; Wińska, 2014; ŚCSI, 2016; Żelazny, 2015; Ziemia & Papaj, 2012; Peters et al., 1980; Pološki N. Vokić, M. Rimac Bilušić, D. 2021; Krywalski Santiago J. (2020).

The main purpose of the analysis was to identify the problems that occur in internal communication between front-office and back-office employees and to indicate directions for improving this communication (Figure 1).

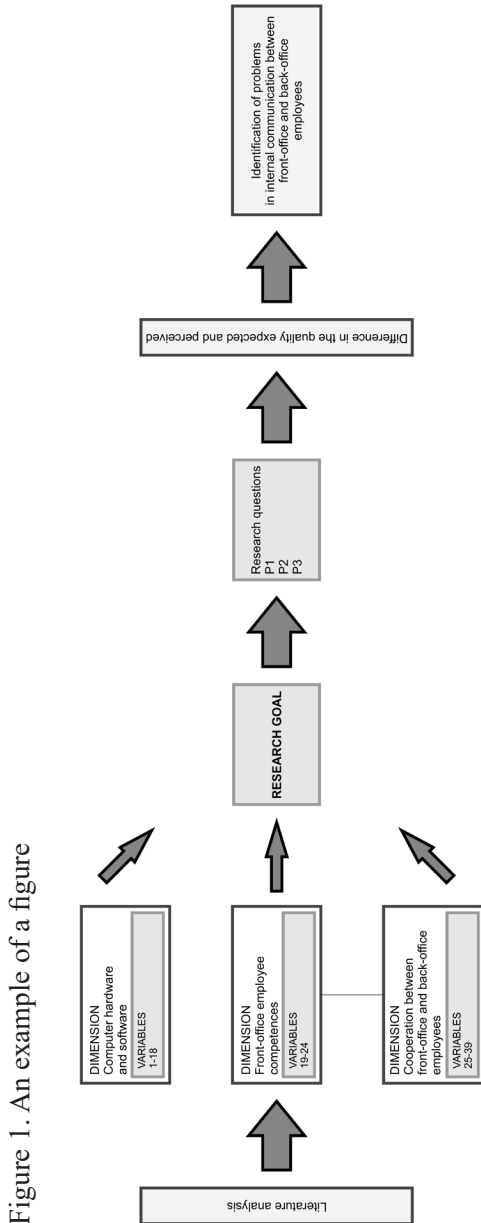


Figure 1. An example of a figure

Table 1. Dimensions of internal communication between front-office and back-office employees and the observable variables describing them

Dimension	Primary variable	Variable description
computer hardware and software	Z1.	The municipal office has a description of the standard of workstation IT equipment.
	Z2.	In the municipal office, each employee has access to the description of the standard of workstation IT equipment
	Z3.	In the municipal office, all employees have their own company computer
	Z4.	In the municipal office, there is a policy of computer hardware replacement
	Z5.	In the municipal office, the server room is only available to authorised employees
	Z6.	In the municipal office, data media is stored in a secure, locked place
	Z7.	In the municipal office, all elements of the IT infrastructure used for work are covered by the service
	Z8.	The municipal office has procedures in place in the event of a failure of the IT infrastructure
	Z9.	In the municipal office, the computer equipment is functional and new
	Z10.	The computer equipment operating in the municipal office is easy to use

	computer hardware and software
Z11.	In the municipal office, there is a description of the software standards at the workstation
Z12.	Each municipal office employee has access to documents describing the software standard at the workstation
Z13.	Operating systems at workstations in the municipal office are periodically verified and updated
Z14.	Each workstation has software that allows you to read files saved in the data formats specified in the NIF (National Interoperability Framework)
Z15.	At each workstation in the municipal office there are basic office packages including: text editor, calculation spreadsheet and tools for creating presentations, the ability to print
Z16.	Each workstation in the municipal office has access to the LAN network
Z17.	In the municipal office, electronic document flow (EOD) functions efficiently
Z18.	In the municipal office, the Electronic Inbox functions efficiently,

<p>Z. 19.</p>	<p>Each employee of the municipal office has clearly defined requirements regarding IT competences for individual workstations</p>
<p>Z.20.</p>	<p>When recruiting for office positions, the municipal office checks the general IT competences of the candidates</p>
<p>Z. 21.</p>	<p>In the municipal office, there is a mechanism for continuous improvement and verification of Internet competences of office employees</p>
<p>Z.22.</p>	<p>In the municipal office, training is carried out for office employees in the field of launching and providing e-services</p>
<p>Z. 23.</p>	<p>In the municipal office, employees using a computer as a work tool have their general documented IT competences verified, for example, with a certificate</p>
<p>Z.24.</p>	<p>In the municipal office, employees are informed on an ongoing basis, through training, about the implementation of new computer software</p>
<p>competences of front-office employees</p>	

cooperation between front-office and back-office employees	
Z.25.	In the municipal office, each employee can report failures and problems to support staff – the IT department supporting the service
Z.26.	First contact workers can always count on the help of support staff – the IT department, if necessary
Z.27.	First contact workers always meet with understanding and willingness to help from support staff – the IT department
Z.28.	The support staff clearly and comprehensively inform the first contact workers about new software
Z.29.	All failures and software problems are solved efficiently and in a short time by the support staff
Z.30.	Support staff (IT department) provide immediate assistance to first contact workers
Z.31.	Support staff are always willing to help first contact workers
Z.32.	First contact workers treat support staff in a polite and friendly manner
Z.33.	Support staff are always understanding and patient with first contact workers
Z.34.	Support staff get things right the first time
Z.35.	First contact workers clearly and understandably inform support staff about problems
Z.36.	Support staff are knowledgeable
Z.37.	Support staff inspire confidence
Z.38.	Support staff immediately react to equipment failures
Z.39.	First contact workers immediately inform support staff of equipment failure

The empirical research carried out consisted in identifying in individual dimensions the problems in communication between front-office and back-office employees from the point of view of front-office employees. The presented and described dimensions influencing the communication process between front-office and back-office employees in direct research were described by observable variables. The computer hardware and software dimension is described by means of eighteen observable variables, the front-office employee competence dimension consists of six variables, the cooperation between front-office and back-office employees is described by fifteen variables. All observable variables in Table 1 were determined based on the results of literature research and assigned to the identified three dimensions. Each observable variable reflects the activities of the processes and phenomena that shape a given dimension (Table 1). All observable variables are presented with the help of appropriate statements that unambiguously characterise them.

The impact of organizational changes on the quality of internal communication was assessed in municipal offices in the Silesian Province. The Silesian Province was chosen due to the fact that while conducting own observations in the municipal offices of this region, communication problems between front-office and back-office employees were noticed, which was also confirmed in the literature review (Christiansen, 2005). Therefore, research was undertaken in municipal offices in the Silesian Province in order to identify problems in communication between front-office and back-office employees. The conducted re-search may be helpful for the management staff in the process of improving internal communication in municipal offices.

The preparation of proper empirical studies in municipal offices in the Silesian Province was as follows: on the basis of a questionnaire on the quality of internal communication, relevant studies were conducted in municipal offices in the Silesian Province. The original questionnaire contained 39 questions (variables) (Table 1). The questions were divided into three dimensions: the computer hardware and software (SO) dimension included questions from 1-18, the first contact workers' competence (KPPK) dimension included questions from 19-24, the cooperation between first contact workers staff and support staff (WP)

included questions from 25-39. The five-point Likert scale was used to assess the variables. The respondents' task was to indicate the number on a five-point scale, in which: 1 – “strongly disagree”, 2 – “probably not”, 3 – “do not know”, 4 – “probably yes” 5 – “strongly agree”. The list of questions was preceded by an explanation of how the respondents should complete the questionnaire.

In the first stage of verification of the dimensions that affect the internal communication process between front-office and back-office employees, using factor analysis, and using the Kaiser criterion, Cattell's scree test, Varimax rotation and Bartlett's test, factors influencing the level of internal communication quality were identified in municipal offices. Then, the quality level of the expected and perceived internal communication was assessed among front-office and back-office employees in all dimensions, using the standard deviation, the mean, Wilcoxon's signed-rank test, coefficient of variation Vs Table 2.

The article identifies the factors of perceived and expected quality among front-office employees who are later referred to as first contact employees (in short PK) and back-office employees who are defined as support staff (in short PP).

5. Findings

The presented dimensions that affect the process of internal communication between front-office and back-office employees and the variables describing them were subjected to factor analysis in order to identify factors influencing the quality level of internal communication between front-office and back-office employees. Subsequently, the quality level of the expected and perceived internal communication of front-office and back-office employees was assessed.

5.1. Identification of factors influencing the quality level of internal communication between front-office and back-office employees

To identify the factors influencing the quality of internal communication in municipal offices in the Silesian Province, factor analysis was used using the Kaiser criterion and Cattell's scree test, and the number of factors was determined. In accordance with the Kaiser criterion, only those factors with an eigenvalue above 1 were taken for further analysis. In a further stage of factor analysis, Varimax rotation was used for so-called factor cleanings based on maximising the variance of the raw factor loadings of the variables for each factor table 2.

Table 2 Values and basic statistical measures for the identified factors

Variables	Mean	The standard deviation	Coefficient of variation Vs [%]
Dimension: Computer hardware and software			
Z2	2,01	0,89	44,11
Z3	1,61	0,76	48,92
Z4	2,38	1,03	49,27
Z5	1,98	0,97	61,08
Z6	1,78	0,84	64,28
Z7	1,58	0,75	52,83
Z8	2,03	0,94	47,76
Z9	4,23	0,94	23,07
Z10	2,16	0,99	46,17
Z11	3,67	1,08	27,74
Z12	2,56	0,99	38,74
Z13	1,98	1,06	52,83
Z14	2,03	0,97	47,76
Z15	3,02	1,02	27,76

Variables	Mean	The standard deviation	Coefficient of variation Vs [%]
Z16	2,00	0,98	49,03
Z17	3,95	1,03	26,01
Z18	4,10	0,95	23,07
Wilcoxon's signed-rank test	-2,06	0,56	
Dimensions: Competences of front-office employees			
Z19	1,62	0,90	58,76
Z20	1,64	0,91	61,08
Z21	2,63	0,98	37,34
Z22	1,95	0,99	50,26
Z23	3,66	1,04	
Wilcoxon's signed-rank test	-1,96	0,59	
Dimension: Cooperation between first contact workers and support staff			
Z25	1,68	0,75	47,30
Z26	1,90	0,57	49,27
Z27	1,41	0,77	64,24
Z28	2,01	0,89	44,11
Z29	1,78	0,84	47,34
Z30	3,48	1,04	29,91
Z31	3,29	0,93	28,13
Z32	2,18	1,01	45,70
Z33	3,49	1,03	29,90
Z36	1,95	0,98	50,61
Z37	2,75	0,95	33,75
Z38	2,38	1,03	43,46
Z39	4,25	0,89	22,06
Wilcoxon's signed-rank test	-1,95	0,54	

On the basis of the conducted factor analysis, factors influencing the level of the quality of internal communication between front-office employees (PK first contact) and back-office employees (PP support staff) were identified in individual dimensions together with the variable. The same factor and the same variables were identified for the quality of the expected and perceived communication between front-office and back-office employees. The result of the analysis is presented in Table 3.

Table 3. Identified factors affecting the quality of internal communication between front-office and back-office employees in individual dimensions

Dimension	Factor	Variables
Computer hardware and software	Factor 1: <i>Equipping offices with computer equipment and IT tools</i>	Z2, Z3, Z5, Z15, Z17.
	Factor 2: <i>Providing access to the computer network and services in the municipal office</i>	Z11, Z13, Z14, Z16, Z18.
	Factor 3: <i>Documentation of the use of computer hardware and software in the municipal office</i>	Z3, Z4, Z9, Z10, Z12,
	Factor 4: <i>Data security and computer hardware service at the municipal office</i>	Z6, Z7, Z8, Z12.
Competences of front-office employees	Factor 1: IT skills and knowledge of the provision of e-services	Z19, Z20, Z22, Z23
	Factor 2: Training and verification of IT competences	Z21, Z22

Dimen- sion	Factor	Variables
Dimen- sion: Cooper- ation be- tween first contact workers and sup- port staff	Factor 1: Confidence and responsiveness	Z26, Z28, Z30, Z37, Z38, Z39
	Factor 2: Support and assistance by sup- port staff	Z27, Z29, Z32, Z36
	Factor 3: Empathy	Z25, Z31, Z33

On the basis of the identified factors, in a further stage, the differences between the expected and perceived quality of the first contact workers and support staff were identified, and the level of the expected and perceived internal communication quality of the first contact workers and support staff was assessed.

Referring to the described specific objectives and research questions, it can be concluded that the first research question P1 was answered – what factors affect the improvement of internal communication.

5.2. Assessment of the quality level of the expected and perceived internal communication of first contact workers and support staff

Descriptive statistics such as standard deviation, the mean, Wilcoxon's signed-rank test and the coefficient of variation Vs were used to assess the quality of internal communication between first contact workers and support staff.

Problems in internal communication between first contact workers and support staff were identified by means of the Wilcoxon's signed-rank test and the coefficient of variation Vs in individual dimensions.

Using the Wilcoxon's signed-rank test, statistical differences between the level of expected and perceived quality of internal communication in particular dimensions were checked.

The difference between the expected quality and the perceived quality, both among first contact workers and support staff, was negative, which means that the expectations as to the level of internal communication between front-office and back-office employees in the surveyed offices are higher than the quality level of internal communication.

Front-office employees (first contact workers) believe that in the case of factor 1 – Equipping the municipal office with computer equipment and IT tools (SO dimension), the biggest problems in internal communication are related to the fact that not all employees in the municipal office have their own work computer (-2.13) and the fact that in the municipal office the electronic document workflow – EOD does not always function efficiently (-2.12), and according to first contact workers, not every workstation has basic office packages, including: a text editor, calculation spreadsheets and presentation and printing tools (-2.03). Problems with the lack of a sufficient number of computers and office packages may result from the fact that most offices have an insufficient budget for tasks related to digitisation. In this case, the following improvement measures can be introduced, such as: if possible, increasing the amount of ICT equipment; municipal offices, as part of the e-government development strategies created, can include the purchase of IT and communication tools as one of the goals. In the case of problems with the functioning of the electronic document workflow (EOD), an ad hoc team should be appointed to solve them in the event of problems. A leader from among the support staff who would supervise the functioning of the EOD could be chosen. It is important for newly recruited first contact workers that they are trained in how to use the EOD. The problem may be that one letter as a document is entered into several systems, because offices have many domain systems (related to individual departments) that are not connected with the circulation of documents. In this situation, electronic document workflow management should be created, obligatory for all departments in the municipal office. It would allow for the settlement of official matters by electronic

means from beginning to end. A document workflow system coordinator could be appointed.

In the case of factor 2 – Providing access to a computer network and services in the municipal office (SO dimension), the first contact workers considered the most important problem to be that in municipal offices not every workstation has a description of software standards (-2.04), and that operating systems at workstations should be periodically verified and updated (-1.95). According to the first contact workers in the surveyed municipal offices, not all positions have access to the LAN network (-1.95). As improvement actions in the case of the first problem, a procedure should be developed that would contain a de-scription of software standards at a given workstation, and all employees should be familiar with this procedure. In the case of the second problem related to periodic verification and updating of operating systems, in the surveyed municipal offices, it would also be necessary to develop a procedure that would include a plan for the verification of operating systems. A person responsible for updating and verifying operating systems can be designated from among support staff. In the case of the third problem – the lack of LAN network access at some workstations, support staff should inspect the workstations.

In the case of factor 3 – Documentation of the use of computer hardware and software in the municipal office (SO dimension), the first contact workers see the greatest problems in the fact that in municipal offices the computer equipment is not functional and new (-1.88), and the fact that computer equipment is not easy to use (-1.86). These problems are related to each other, if the computer equipment is old and failing, then the comfort of use is poor. As improvement measures to improve the level of the quality of use of computer equipment, it can be proposed that municipal offices replace old equipment with new one, if possible. They can include the exchange of IT equipment in their e-administration development strategies. Another solution might be to create an inspection and maintenance plan for computer equipment to extend its life. The job position of a system administrator responsible for computer hardware could also be created.

In the last factor 4 – Data security and computer equipment service at the municipal office (SO dimension), the first contact workers pointed out the problems that not every municipal office has a description of the IT standard of workstation equipment (-2.17), and that not all parts of the IT infrastructure that first contact workers use for work are covered by the service (-2.05). In the first place, support staff should verify the description of IT standards for workstation equipment, while for the second problem a computer equipment service plan should be developed.

In the context of the presented problems in the SO dimension – Computer hardware and software, as measures to improve internal communication between front-office and back-office employees, it is possible to introduce an internal communication audit, allowing for the assessment of the functionality of IT tools and communicators. The results obtained from the conducted audit can be compared with the expectations of the employees of municipal offices. The audit should be carried out every 2-3 years. Municipal offices should include initiatives related to the development of e-administration in the city's development strategy and long-term investment plans.

In the next dimension, KPPK – Competences of first contact workers, factor 1 – IT skills and knowledge of the provision of e-services. First contact workers noticed problems related to recruitment for office positions and checking the candidate's IT competences (-2.02), and also indicated that, according to them, IT requirements are not clearly defined for every job (-1.98). One of the improvement activities may be the development of a set of necessary skills for employees providing e-services, such as, for example, the ability to process digital data, the ability to work in a virtual team, the ability to use new technologies and digital communication. An interesting solution supporting first contact workers may be the introduction of e-learning instructions, which will be helpful in the provision of e-services. Another solution may be to introduce a question box – where employees could report their problems and doubts related to the provision of public e-services. An e-administration implementation leader who would provide first contact workers with information about new e-services on an ongoing basis could also be appointed.

Another proposal is to include a provision in the recruitment system and work regulations that promotes (in the form of additional remuneration) self-education and the development of skills in using new technologies.

First contact workers (front-office area) also noted the lack or insufficient amount of training in launching and providing e-services (-1.97). In this case, it is possible to appoint from among support staff people who would periodically conduct training in the field of new solutions related to e-administration, or teams and leaders responsible for the development of e-services provided in municipal offices.

In the case of factor 2 – Training and verification of IT competences (KPPK dimension), first contact workers consider the lack of a mechanism for continuous improvement and verification of online competences of office workers to be the biggest problem (-1.80). In addition to the previous proposals for improvement activities, it can be added that teams and leaders responsible for the development of public e-services, after organising periodic training courses, should verify the acquired knowledge regarding the use of ICT to provide public services.

Summing up, it can be said that for first contact workers it is very important to improve IT competences for better provision of e-services through participation in training. Raising competences in e-administration by first contact workers should be promoted by the authorities of offices.

In the last dimension of WP – Cooperation between first contact workers and support staff in the case of factor 1 – Confidence and responsiveness, first contact workers reported the biggest problems related to the fact that they do not immediately inform support staff about hardware failure (-2.15). Another problem is the clear and comprehensible communication of information about the failure to support staff (-2.09). However, on the other hand, first contact workers believe that there is no immediate response from support staff in the event of a failure (-2.07). This problem is very complex because, first of all, it is related to the lack of appropriate procedures for the conduct of first contact workers in the event of a failure. Such a procedure must specify the time when the equipment failure should be reported. The second

problem may be related to the inability to clearly convey information about the failure to the support staff. In this case, likewise, an instruction should be prepared that would contain a standardized description of damage and mal-functions of IT and communication equipment. The reason for not informing about the failure by the first contact workers may be the so-called mental barriers resulting from the lack of knowledge and experience in working with new technologies.

Regarding factor 2 – Support and assistance by support staff (WP dimension), the greatest problems are related to the friendly and polite attitude towards support staff (-2.04), the willingness to help and understanding the first contact workers by support staff (-1.99). The lack or poor understanding of the needs of first contact workers by support staff may result from the fact that among first contact workers there are many older people for whom the transition from the traditional form of providing services to electronic services is a big problem. The mere obligation to use IT tools to provide services is of great concern. Support staff, in turn, are young people, the so-called digital natives that grew out of technology and the Internet. Good relations between first contact workers and support staff require a great deal of understanding, mutual kindness and patience.

The last factor 3 – Empathy (WP dimension) only confirms the previous problems related to cooperation between first contact workers and support staff, namely problems with patience and understanding of support staff towards first contact workers. When summarising problems in cooperation between first contact workers and support staff, it can be stated that among support staff, as shown by the conducted research, there are definitely a majority of young people with IT education, while the first contact workers are mostly middle-aged people who worked in municipal offices in a traditional way before implementation of electronic services. Most of these people have problems with using IT tools to contact customers. Each problem with computer hardware and communicators is a big challenge for them. They expect understanding as well as a simple and clear explanation of the problem by support staff. In such a situation, support staff must show great patience, understanding and empathy.

The analysis carried out at this stage made it possible to achieve the goal of indicating the problems that occur in internal communication between first contact workers and support staff. Moreover, with regard to the research questions posed, it can be stated that the answer to the following research questions was obtained:

- What is the perception of the quality level of internal communication by front-office and back-office employees?
- What are the problems in internal communication between front-office and back-office employees?
- How to effectively and efficiently improve internal communication in public administration departments?

6. Conclusions

Organisational changes in public administration related to the implementation of information and communication technologies are a complex process. According to the theory of H.J. Leavitt every organisation should undergo change in its three main subsystems such as the structure, technology and people. personnel, skills and shared values. The article analyses the impact of organisational changes on communication between front-office and back-office employees, identifies problems in this communication and proposes improvement actions.

The conducted literature analysis and empirical research allowed for the presentation of the following conclusions:

Based on the literature review on the impact of ICT on organisational changes in public administration, it was found that ICT is an important factor influencing organisational changes in public administration. Based on the literature analysis and own observations, three dimensions of the impact of organisational changes on the quality of internal communication between front-office and back-office employees were determined. These are: computer hardware and software, IT competences of front-office employees, and cooperation between front-office and back-office employees.

On the basis of the statistical analysis, expectations as to the quality level of internal communication between front-office and back-office employees in the designated dimensions were determined, as well as the perception of the quality level of internal communication between front-office and back-office employees in the identified dimensions. The conducted analysis allowed to identify problems in internal communication between front-office and back-office employees in city offices and on this basis to develop an effective and efficient improvement of internal communication.

The presented research results made it possible to present the following recommendations for managers of municipal offices: front-office employees should be allowed to participate in training on the use of ICT in their work, activities aimed at integrating front-office and back-office employees should be introduced, they should ensure the best possible standards of software quality for front-office employees, introduce the obligation of intra-organisational electronic communication – email for employees, in order to shorten the time of providing information; in order to overcome the reluctance of front-office employees to use new ICT technologies, measures should be introduced to motivate employees to self-development and participation in trainings.

The implementation of the proposed solutions may improve the quality of internal communication in municipal offices, and thus improve the provision of public services by these units.

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**The 11th National and 3rd International Conference on Quality
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Consumers’ Perception of the Phenomena of Food Terrorism in Poland

Abstract

Research background: Food terrorism is a specific type of a terrorist activity, included in the group of new emerging risks. The specificity of the issue results from the type of a used tool and its global nature. The risk of using food as a transmitter of biological, chemical, physical, or radiological weapons concerns all participants in the food market—the entire humanity (soft target).

Purpose of the article: Despite its niche nature, if it occurs, food terrorism can have catastrophic consequences for the lives of citizens and/or the economy of a country. The remedy may be an increase in public awareness and equipping it with appropriate tools, which may translate into increased effectiveness in counteracting terrorist threats. But is such “education” something the society wants to be equipped with ?

Methods: The author attempts to examine consumers’ perception of selected elements of the phenomena of food terrorism in Poland. The article is based on a quantitative analysis of empirical data that was conducted by the author in 2019.

Findings & Value added: Research has shown that the perception of: 1) the risk of a terrorist attack with the use of food, 2) the degree of preparation of state institutions in this regard, and 3) the appropriateness of involving citizens in the creation and management of the security system, to a large extent depends on the knowledge about this threat and respondents’ professional experience.

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On the other hand, no difference was observed in the interviewees' approach to the issue of making the society aware of in terms of prevention and response to the phenomena of food terrorism in Poland.

Keywords: food terrorism, social awareness, education for security, consumers' perception

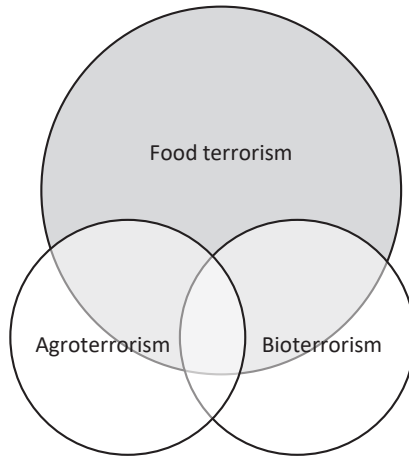
JEL Classification: : L66, Q02, Q19

1. Introduction

Safety, *sensu stricte*, is an undeniable, crucial element of broadly understood quality of life, enabling entities to function with a sense of certainty and peace (Wiśniewska, 2016). Consumer attitudes towards safety, including food safety and security, have been noticeably intensified in recent years. There are a number of specific concerns in addition to the dangers posed by modern production and processing techniques (such as food ionization, genetic alteration, and so forth) (Balali-Mood et al. 2013). Among them, there is one that is defined as a terrorist attack by means of food items (Bertrandt, 2004). Due to potential for destruction the items are referred to as "soft targets" due to their potential for destruction (Binczycka-Anholcer & Imiołek, 2011).

There are many definitions of terrorism (Schmid, 2004) and, by extension, food terrorism in the relevant literature. The WHO defines food terrorism as an act or threat of deliberate contamination of food for human consumption with chemical, biological, physical, or radiological factors in order to disturb social, economic, or political stability in a state by causing (risk of) death of the civilian population or damage to health," (WHO, 2008) and the author uses this definition as a starting point for further analysis. It should be noted that the intentional (effected or usurped) contamination of food products also applies to bioterrorism and agroterrorism.

Figure 1. The relations between food terrorism, bioterrorism and agroterrorism.



Source: Own study (2019)

Bioterrorism is an illegal and unlawful use of biological agents in order to cause damage to people or animals, or to cause damage to plants. Bioterrorism is aimed at intimidating the government and the civilian population of a specific country in order to achieve personal, social, religious, or political goals by using (or threatening to use) selected biological agents. Agroterrorism, also referred to as an indirect food terrorism, is a terrorist act committed against the primary producers in the food chain (including animal husbandry before slaughter, cereal cultivation, and fishery) (Wiśniewska, 2016). Although the attack factors and targets are different in these definitions, they also share some similarities (Fig. 1) For example, deliberate contamination of feed for farmed animals with the use of biological agents to induce pestilence may be simultaneously categorized as bioterrorist (biological agent) and agroterrorist activities (primary production). Similarly, it is considered food (bio) terrorism when viruses, bacteria, and other microbes (agents)

are intentionally released into food with the aim of inflicting illness or death on people, animals, or plants (Manning et al., 2005).

2. Problem Statement

From a global perspective, the risk of a terrorist attack linked to the use of food is increasing. According to American experts, attacks that include bomb explosions and public executions, which are currently preferred due to their spectacular nature, are expected to be replaced by actions that are less visually effective but “will bring (the recipient) the most economic damage”² (Weimann, 2010). The food industry (agriculture, breeding, production, and food distribution), due to the potential for destruction—the whole of humanity is consumers and market participants—is a soft target for terrorists. Additionally, the cross-border migration of food at various stages of production, the lack of unified standards of quality control and sanitary supervision, the technological diversification of producers and the lack of advanced security measures increase its attractiveness as the last protected and commonly available weapon (Chalk, 2005).

Previous observations and scientific analysis show that the increase in public awareness and equipping it with appropriate tools (knowledge, practical skills, attitudes) translates into increased effectiveness in counteracting terrorist threats (Baranowska, 2021; Wiśniewska-Paź, 2021). The bombers’ preference for “soft targets” and the identification of new emerging risks force the transformation of security systems towards more open models (Chmielecki, 2021; Telep & Telep, 2019; Hirschmann, 2000). In an environment where qualified anti-terrorist services are not able to ensure the tightness of the system on their own, it becomes necessary to involve citizens in conscious activities enabling

² Captain Olson concerns that „Terrorists know that a successful agroterrorism incident threatens America’s economic welfare and its standing as a leading exporter of agricultural products to the world. A significant disruption in agricultural exports caused by such an attack would have ripple effects in the United States’ and global economies.” (FBI, 2012)

them to successfully identify the danger (Liedel, 2017). A “sensitised” civil society has the potential to reduce hysterical behaviours in favour of rational decisions in the event of a real threat (e.g. the attitude of the Japanese during the 2011) (Sokała, 2014).

Despite the fact that the consumers are not the intended target of a terrorist attack involving the use of food, they remain a direct victim of these acts. The involvement of informed civilians improves the level of safety and, in extreme circumstances, may contribute to saving the health and lives of many people. Objects of interest to terrorists are not only entities directly involved in the production, storage, or delivery of food, such as large farms or large agri-food industry plants. These also refer to intermediate cells, such as packaging producers, catering companies and mass catering establishments (Dzwolak, 2014). It should be kept in mind that the consumption of intentionally contaminated food can occur both during a meeting of high-ranking government officials and during a meal in the school canteen (Wiśniewska, 2016).

It is of highest importance that actions to increase public awareness are a procedure that should be carried out in a planned, consistent and responsible manner. Compliance with these principles apply to both the scope and the type of the content provided as well as the tools used for this purpose. Inadequate selection and/or too high intensity of such content can cause a catastrophic imitation effect or create a false sense of a threat (Bolechów, 2010; Mroczek 2010). The links that exist between viewing (information about) violence and its subsequent dissemination pose a serious risk of repetition of acts of terror presented in the media by hitherto uninvolved individuals. Even minor incidents of food poisoning, when published alongside a commentary containing suspected intentional acts of hostile entities, can result in an avalanche of deliberate food infections. Furthermore, participants in the food market follow reports on health risk with greater interest than the reports that do not contain such information. Also, frequent appearance in the media of messages regarding the risk of terrorist activities, with the use of food, may increase the consumers' feelings of fear and threat (Szumiło-Kulczycka, 2020).

3. Research Questions/Aims of the Research

The perception of the phenomenon of food terrorism in Poland is the topic of the article. The risk of using food as a transmitter of biological, chemical, physical, or radiological weapons concerns all participants in the food market—the entire humanity (soft target). Despite its niche nature, if it occurs, food terrorism can have catastrophic consequences for the lives of citizens and/or the economy of a country. The remedy may be an increase in public awareness and equipping it with appropriate tools, which may translate into increased effectiveness in counteracting terrorist threats. But is such “education” something the society wants to be equipped with? The author attempts to examine consumers’ perception of selected elements of the phenomena of food terrorism in Poland.

4 Research Methods

The present article is empirical. It is supported by quantitative data obtained by means of a diagnostic survey method that applied a survey technique and questionnaire conduction. This study was of a pilot nature and constituted an initial stage for the purposes of the actual study³.

The survey was conducted on a deliberately selected sample of 50 participants of the 9th National Security Conference⁴ (including government and local administration employees responsible for crisis

³ The main study is aimed at selected participants of the food market (food operators, authorities, experts) and aims to develop a methodological model for managing the safety of food products as an integral attribute of their quality in the context of the threat of food terrorism in Poland. The research is conducted for the purposes of the author’s doctoral dissertation

⁴ The conference was organized by the National Security Support Association, the National Association for the Protection of Classified Information, the Business Security Committee of the Polish Chamber of Commerce, the Peacekeeping Veterans Association of the United Nations, the Ministry of Digitization and other organizational units of government administration responsible, inter alia, for crisis management and ensuring an appropriate level of security, public order and civil defence on 9-10 October 2019 in Białobrzegi near Warsaw.

management, ensuring an adequate level of security, public order and civil defence, managers of critical infrastructure protection enterprises, representatives of units with large economic and defence importance, and particularly important for the security of the state and its citizens). All respondents were residents and citizens of the Republic of Poland.

The survey questionnaire referred to many issues, but for the purposes of this text, answers to seven selected questions were analysed. Due to the nature of the questions, the study was divided into two parts. The first part concerned the perception of the phenomena of food terrorism in Poland in relation to the current (so far) situation. The survey contained closed questions. The second part concerned learning the recommendations for increasing the awareness and involvement of Polish society. It consisted of open-ended questions.

The first stage verified whether the respondents had encountered the problem of food terrorism in their professional or non-professional life; how they assessed the feasibility of terrorist acts involving the use of food products; and how they perceived the preparedness of state authorities in the event of such an attack. The responses that had been analysed in the second part were adopted as recommendations for the problem of: disseminating issues related to terrorist attacks with the use of food in Poland; the need (or lack thereof) to involve consumers in activities aimed at managing the risk of an attack and preventing it.

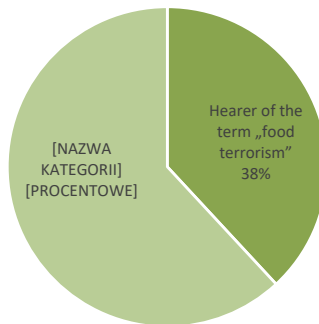
5. Findings

Out of all respondents, 38% declared they knew the term “food terrorism”⁵- hearer”, and this percentage, although numerically high in relation to the nature of the meeting and participants’ profiles, still confirms the niche nature of the issue. The main sources of knowledge of the respondents in this regard were professional work (50% of informed respondents) and media (50% of informed respondents). These are men

⁵ All respondents were asked to complete the full questionnaire, in case of unfamiliarity with the issue of “food terrorism”, they were asked to choose / give answers according to their beliefs

holding managerial positions in state institutions (including law enforcement agencies, the Polish Academy of Sciences and Energy), with an average work experience of 30 years (15–50 years) and with an average age of over 50 (34–over 58 years). The remaining 62% of the respondents – “non-hearer” of the term “food terrorism” – are men and one woman, all professionally active for 26 years (12–40 years), with an average age of 45 (26–over 58 years), representing mainly private enterprises.

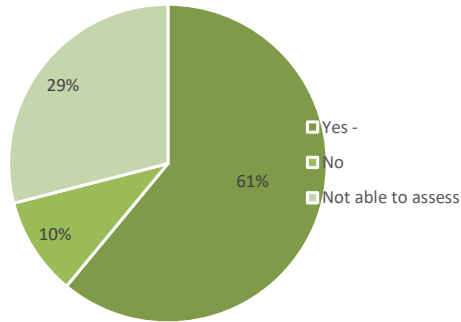
Figure 2. Division of respondents according to the knowledge of the issue – “hearer” and “non-hearer” of the term “food terrorism”



Source: Own study (2019)

Survey participants declared a high sense of the threat of food terrorism in Poland. 61% of respondents considered the risk of carrying out an act of terror using food as real, while 48% believed that it results directly from the ease of access to the food chain, and 10% felt it is related to media messages (more and more often the media provide this type of information). 10% of all respondents were of a different opinion, 5% assessed the risk of occurrence as low (such attacks are extremely rare), and 29% did not know or were not able to assess whether food terrorism poses a real threat to the inhabitants of Poland.

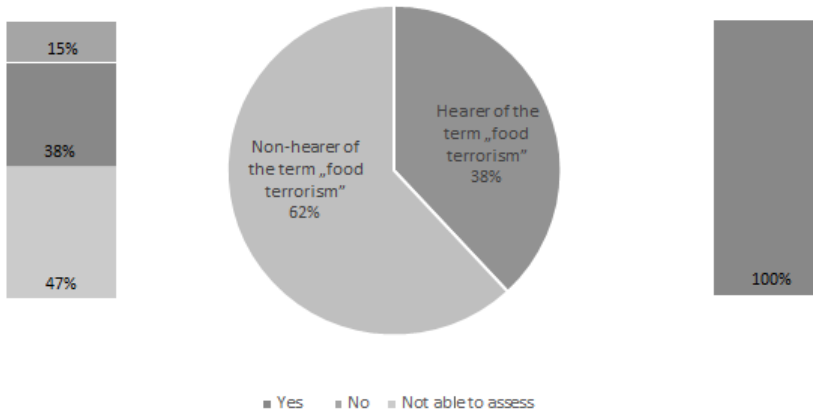
Figure 3. Perception of the reality of the threat of food terrorism in Poland by all respondents



Source: Own study (2019)

When analysing the same issue but with the division into respondents for whom the concept of food terrorism was known and those who came into contact with it for the first time, clearly different trends can be observed. The first group, as a whole (100%), supports a real threat from terrorist interference in the food industry, with 88% of informed respondents considering such a risk as high and 13% as low (rare incidents). 38% of the remaining respondents (the second group) were of the opinion that the ease of access to the food chain translates into a high probability of an attack, 47% were not able to assess it, and 15% considered this type of terrorism to be harmless in Poland.

Figure 4. Perception of the reality of the threat of food terrorism in Poland by all respondents divided into “hearer” and “non-hearer” of the term “food terrorism”



Source: Own study (2019)

The next question concerned the preparation of state authorities in the event of food terrorism in Poland. In the field of preventing and responding to such events the interviewees assessed the condition of preparation of Polish authorities and state institutions as poor 43% of respondents stated that government entities are not working in this area and the problem is being ignored. This issue is perceived slightly more favourably by 24% of respondents who consider these institutions to be prepared in the event of a terrorist attack with the use of food, but to a small extent. Only 5% of the total believed that the national authorities are very well prepared in this regard. The remaining 29% of respondents were not able to provide answers to this issue.

The analysis of the results, with the aforementioned division into (so far) aware and unaware respondents, may be optimistic. Indeed, 50% of respondents holding managerial positions in national state institutions believed that Polish government bodies are prepared in the event of

food terrorism. Nearly 13% of whom believed that this readiness is at a very high level. On the other hand, one fourth stated that the threat is disregarded that no actions are being taken at the institutional level; the remaining 25% were not aware of such issue at all.

The opposite opinion is shared by more than half of the “novices” (54%), who stated that authorities do not deal with the issue of prevention and response in the field of food terrorism. Only 15% perceived national institutions as dealing with the issue, but to a limited extent. Nearly one third of the respondents (31%) declared unfamiliarity with the issue and were unable to take a position.

The second part of the questionnaire was aimed at finding out the opinions of the respondents on the involvement of consumers (society) in activities aimed at preventing the use of food products for terrorist activities. The first question in this series concerned the dissemination of knowledge in this area. 95% of all respondents (33% hearer and 62% non-hearer) were of the opinion that such activities are necessary and will have a positive impact on the level of security, while 5% of respondents strongly advised against this type of initiative, perceiving the risk of causing social anxiety by “creating an atmosphere of danger”. All opponents of information campaigns belonged to the group declaring knowledge of the issue. Apart from this exception, no significant differences in statements were observed. Awareness-raising and preventive activities addressed to both recipients and suppliers (including food producers) dominated among supporters of anti-terrorist education in relation to food (45 percent of respondents).

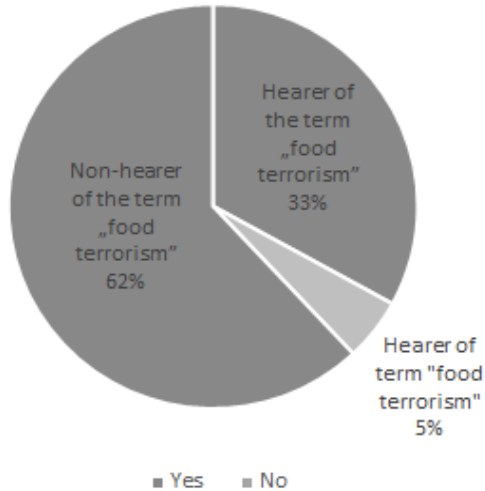
Table 1. Preparation of state authorities in the event of food terrorism in Poland by hearer and non-hearer of the term “food terrorism”

In your opinion, are the state authorities prepared in the event of a terrorist attack with the use of food in Poland?	Hearer of the term „food terrorism”	Non-hearer of the term „food terrorism”
Yes, is very good prepared	13%	0
Yest, but not enough	37%	15%
No, the problem is ignored	25%	54%
Not know	25%	31%

Source: Own study (2019)

According to these interviewees, awareness-raising campaigns should be conducted both in the general forum (mainly media campaigns) and individually in selected entities, including in schools, (state) institutions, food producers and food companies, in the form of training and information programs. The remaining 55% of respondents did not propose specific solutions in this field.

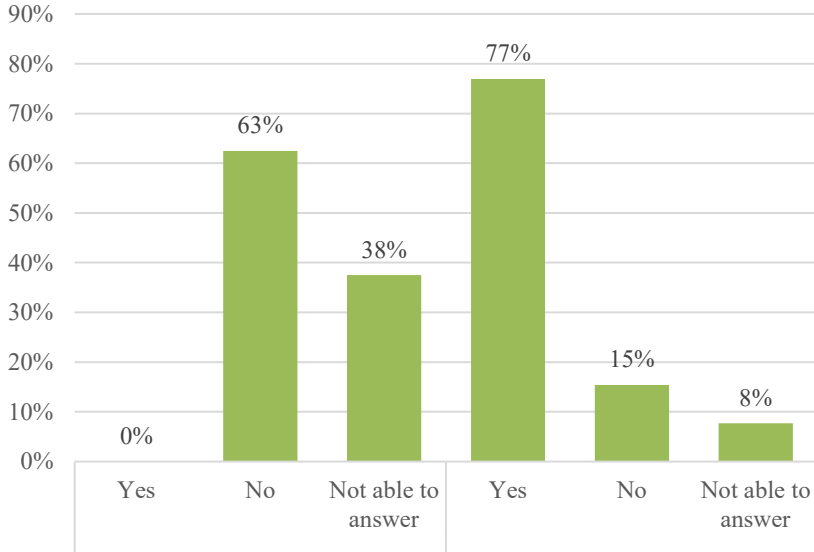
Figure 5. Recommendations for the dissemination of food terrorism awareness among consumers in Poland divided into “hearing” and “non-hearer” of the term “food terrorism”



Source: Own study (2019)

A clear difference in the perception of the respondents was revealed regarding the problem of involving consumers in activities for the management of the risk of food terrorism in Poland. In general, 48% of the respondents declared their support for this initiative, 33% expressed their opposition, and the remaining 19% did not take a position. Considering this issue in relation to the group of respondents selected at the beginning of the study—with a higher average length of service and declaring employment in state bodies—a complete lack of approval for such activities was noted. The vast majority of those polled (63%) advised against engaging civilians in management work. The remaining 37% did not express an opinion on any of the options. 77% of the second group of respondents supported such solution to improve security, and 15% of its members were against it. 8% were unable to provide an answer.

Figure 6. Recommendations for consumers' involvement in the management of the risk of food terrorism in Poland divided into "hearer" and "non-hearer" of the term "food terrorism"



Source: Own study (2019)

The last final question analysed concerned the involvement of citizens in preventive work to prevent/ severely minimize terrorist attacks through the use of food. Almost all of the respondents – 95% of both hearer and non-hearer of the issue (5% of the respondents did not take any position) – were in favour of involving the society in activities aimed at minimising the risk, and in the event of occurrence, reducing the effects of these types of terrorist acts. Social consultations, education, and the acquisition/ consolidation of good consumer safety habits were indicated among the types and scopes of the recommended cooperation methods (e.g., “the practise of assessing the integrity of the packaging”).

6. Conclusions

The results of the research, despite their pilot preliminary nature and the small size of the sample, are in line with the currently observed trend in terms of increasing the role of civilians in defence in local, regional, and global terms (Baranowska, 2021; Davidson et al., 2017; Kinsey et al., 2009; Szenczi-Cseh & Szeitzné-Szabó, 2009). The need to use the potential of civil society has been diagnosed not only on the part of security services. The initiative to join anti-terrorist activities has also been declared by consumers. The respondents considered raising public awareness and “sensitizing” citizens to the issue of food terrorism as adequate. However, it should be remembered, as noted by some respondents, that the activities planned in this area do not cause an increase in the sense of fear or threat in general. It is worth noting that the beginning of education in this field is recommended at the stage level of primary school, which may be due to the willingness to build appropriate attitudes towards threats already at the “foundations of society”. Recommendations also include actions to improve the knowledge and skills of consumers to prevent and properly respond to terrorist attacks involving food. Recommendations also include actions to improve consumers’ knowledge and skills in order to prevent and respond appropriately to terrorist attacks involving food.

Despite the issue’s specialised nature, the respondents have a strong sense that food terrorism in Poland poses a threat. The study’s findings also unequivocally show that Polish authorities and state institutions are perceived to be inadequately prepared to deal with food terrorism. The low level of citizen trust in the government in the area of security may be one of the causes for such evaluations. The full support for educational and preventive measures in this area may follow suspicious statements. The author leaves this relationship empirically unsupported for further analysis because it cannot be independently verified.

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**The 11th National and 3rd International Conference on Quality
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Environmental management systems models for higher education institutions

Abstract

Research background: Sustainable development is based on the three pillars of sustainability i.e. environment, society and economy. Worldwide, various organizations contribute to the environmental pillar by implementing environmental management systems (EMS) such as ISO 14001 or EMAS compliant systems. Among these organizations there are also higher education institutions (HEIs), which have a special role to play, by acting as agents of change for sustainability.

Purpose of the article: This article aims to identify (1) problems that are addressed in the studies on EMS in HEIs and (2) various formal and informal EMS models implemented in HEIs worldwide.

Methods: A systematic literature review was used. It was based on 24 peer-reviewed articles published in English in academic journals and monographs between 2000 and 2020. These papers were found in EBSCO Discovery Service, ProQuest and Scopus databases.

Findings & Value added: The review outcomes show that researchers mainly focus on the description of formal and informal EMS in HEIs. The issues they address also include different elements of EMS (e.g. training, communication), approaches and challenges in planning and implementing EMS, as well as

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measurements and EMS results. HEIs implement both formal and informal EMS. Out of formal EMS models, the most often implemented one is ISO 14001 compliant system. HEIs also use their own informal EMS models tailored for a specific institution.

Keywords: environmental management system, EMAS, higher education institution, ISO 14001, universities

JEL Classification: F64, I23, L15.

1. Introduction

In response to the deepening environmental problems, numerous initiatives have been taken to prevent or eliminate the effects of the negative impact of the organizations on the environment. Worldwide, various organizations contribute to the environmental pillar of sustainable development by implementing environmental management systems (EMS) such as ISO 14001 or EMAS compliant systems. Among these organizations there are also higher education institutions (HEIs), which have a special role to play, by acting as agents of change for sustainability. As their social impact is high, HEIs are challenged to take a leadership role in sustainability issues (Disterheft et al., 2012), in particular, in the area of sustainable protection of the environment and the use of resources (Viebahn, 2002).

EMS have been implemented on a large scale to improve environmental performance and to certify their achievements, primarily by manufacturing companies (Disterheft et al., 2012). With time, in an environmentally aware global culture, managers of other types of organizations, e.i. HEIs, started to consider EMS as a tool for managing environmental impacts of these institutions (Barnes & Jerman, 2002). However, in contrast to industrial contexts, HEIs face a range of unique challenges as they strive to improve campus sustainability (Bero et al., 2012). Bero et al. (2012), citing other authors, consider the following challenges: (1) diverse community of faculty, students and support

personnel, (2) broad set of institutional activities and facilities, (3) wide diversity of buildings and (4) relatively limited financial and personnel resources for implementing an effective EMS.

The issue of environmental management in HEIs is not new. Universities in the United States of America started to introduce the environmental theme in their management in the 1960s (Brandli et al., 2011; Price, 2005). In the 1980s, the major focus was on waste management and efficiency related to energy, whereas in the 1990s, environmental politics were developed (Brandli et al., 2011). For example, in 1990, in the United States, South Carolina's three research universities, Clemson, Medical University of South Carolina and the University of South Carolina, started the project to incorporate sustainability into their own institutions, under the assumption that it would be extended to other HEIs in the state (Barnes & Jerman, 2002). At the same time, in Germany, a growing number of HEIs were assessing environmental performance by controlling the impact of their activities on the environment. Over time, the need to be more effective and to conduct these assessments within a structured, formal EMS, such as EMAS or ISO 14001 was noticed (Delakowitz & Hoffmann, 2000). However, not all HEIs decided to implement formal EMS. Some chose a different path and created informal EMS (e.g. Lincoln University in New Zealand (Spellerberg et al., 2004)).

In response to the demands of the modern world, HEIs have a two-fold mission. They are encouraged to reduce their environmental impact as operating organizations and they are called to conduct research in the field of sustainability (Disterheft et al., 2012). This article answers that call, as it aims to identify (1) problems that are addressed in the studies on EMS in HEIs and (2) various formal and informal EMS models implemented in HEIs worldwide.

2. Problem Statement

The environmental management system is a part of the management system of the organization used to 'manage environmental aspects,

fulfil compliance obligations, and address risks and opportunities' (ISO 14001:2015). It defines how a sustainability program is implemented by providing information infrastructure for the environmental data collection and assessment activities imposed in that program (Bero et al., 2012). Disterheft et al. (2012) add that EMS might be perceived as a proof that an organization is following sustainable principles and as a sign that it aims towards incorporating sustainability at an advanced level.

HEIs due to their specificity have to make many decisions related to the implementation of EMS. Probably one of the most important is which EMS model to choose: a formal or an informal one? To be precise, the term 'model' is a general term used in this paper for different types of EMS. Other authors refer to them as models, systems, frames, frameworks, approaches, etc.

There are two formal models of EMS. They were established in the 1990s, when the International Organization for Standardization (ISO) published the international standard ISO 14001 and the European Union issued a regulation allowing organizations from the industrial sector to participate in the European Eco-Management and Audit Scheme (EMAS). It is worth adding that the EMS requirements under EMAS are in line with ISO 14001, but more stringent and stronger. Both, EMAS and ISO 14001, are voluntary management tools for organisations that aim to measure, evaluate and improve their environmental performance. They are also seen as the most commonly known EMSs (Jones et al., 2012). The popularity of ISO 14001 is evidenced by the ISO statistics. In particular, in 2020, there were 348,473 organizations worldwide certified with this standard, 955 belonging to the European Accreditation Code 37, which is Education (The ISO Survey, 2020). The numbers for EMAS registration are lower. According to the European Union register of EMAS-registered organisations, in 2020, there were in total 3,838 registered organisations (The European Commission, 2020), of which 231 belong to the education sector (The European Commission, 2021). There are ISO 14001 certified and EMAS registered HEIs that are a part of the education sector. In 1999, the first in Europe were, for example, Mälardalen University in Sweden, which implemented and

certified EMS according to ISO 14001 (von Oelreich, 2004) and the Hochschule Zittau/Görlitz – University of Applied Sciences having undergone the full cycle of EMS requirements and being included in register of EMAS-registered organisations (Delakowitz & Hoffmann, 2000). Interestingly, one of the first universities to develop and implement EMS according to both ISO 14001 and EMAS systems was the University of Gothenburg, located in Sweden (Omrčen et al., 2013).

In the case of informal EMS models, the situation is more complex. As they are created for specific HEIs, they take into account different goals, values and priorities. The approach for development of EMS vary amongst HEIs, depending upon the key environmental aspects and impacts that they identify internally (Jain & Pant, 2010). Sometimes EMS are given names (e.g. ‘Osnabrück Environmental Management Model for Universities’ (Viebahn, 2002), ‘EMS Implementation Model for US Colleges and Universities’ (Savely et al., 2007b)) or not (e.g. EMS developed at Dalhousie University (Clarke, 2006) or at Lincoln University (Spellerberg et al., 2004)). Some EMS are created based on the chosen ISO 14001 and/or EMAS guidelines, but since they do not meet all the requirements, they are not subject to certification or registration. Informal systems are rather single cases of HEIs and have been developed over time. Researchers point to many models of informal EMS apart from the above-mentioned. For example: Higher Education 21, the EMS Self-Assessment Checklist, the Auditing Instrument for Sustainability in Higher Education, Sustainable University model (Clarke & Kouri, 2009), EcoCampus (Disterheft et al., 2012). It is worth mentioning the framework to achieving campus sustainability proposed by Alshuwaikhat and Abubakar (2008), which ensures more sustainability through the integration of three strategies: EMS, public participation and social responsibility and promoting sustainability in teaching and research.

The above mentioned considerations indicate that researchers have analysed EMS models in HEIs in the past and various EMS sets were identified (e.g. Clarke & Kouri, 2009), but each of them contained different EMS types. Research in this area is rather fragmented and according to the author’s best knowledge, no attempts were made to

identify EMS models in HEIs with the use of a systematic literature review. Furthermore, some time has passed since these research projects, so it seems that making a new attempt to identify EMS models used by HEIs around the world in 2022 is an interesting issue. This identification is important because so far few HEIs have implemented EMS. Demonstrating the choice of their different models may prove useful for those HEIs that have not introduced such an approach yet but are considering doing so.

3. Research Questions

This article aims to contribute to reducing the research gap by identifying problems that are addressed in the studies on EMS in HEIs and various formal and informal EMS models implemented by HEIs. The purpose of the article led to the following two research questions:

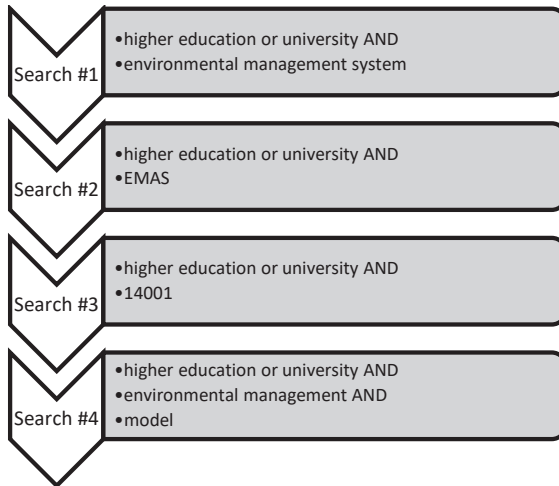
- (1) what research problems are addressed in publications on EMS in HEIs?
- (2) what EMS models are implemented by HEIs around the world?

4. Research Method

To achieve the purpose of the study, the systematic literature review method, defined by Czakon (2015) as ‘a targeted selection of the literature along with its quantitative analysis carried out according to strictly defined stages’ (p. 124; author’s translation), was used. The 4-phase approach of this method, described below, was applied (Czakon, 2015). The determination of the study’s purpose (Phase 1) was described in the previous section. Phase 2 consists of three stages: (1) selection of basic literature, (2) selection of publications and (3) development of a publication database. To avoid the journal selection imposed by the database administrator and to gain access to all major

international journals published in English (Czakon, 2015), three databases were selected, that is, EBSCO Discovery Service, ProQuest Central and Scopus. Publications were selected based on the keyword criterion. Four groups of keywords were used in the searches in each of the databases (Figure 1). Keyword combinations were searched in the titles of publications.

Figure 1. Keywords used in the searches



Source: Own elaboration

Next, the publication database was developed, based on the criteria for including (English-language, full-text and peer reviewed publications). Duplicate and out-of-scope items were removed (Table 1). It is worth noting that most publications were obtained (1) from the first search in which the following keywords were used: ‘higher education or university’ and ‘environmental management system’ and (2) from EBSCO Discovery Service.

Table 1. The number of publications in the databases

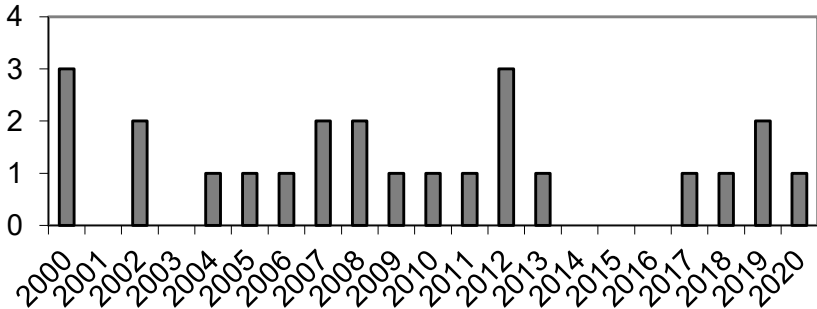
	Search number	EBSCO publications number	ProQuest publications number	Scopus publications number
Number of publications in the developed databases	#1	96	17	8
	#2	11	1	2
	#3	8	4	1
	#4	8	1	1
Number of publications after removing duplicate, non-English and out-of-scope items	#1	28	17	7
	#2	1	1	1
	#3	3	3	1
	#4	3	0	1
	Total:	35	21	10

Source: Own elaboration

The results obtained from the three databases (EBSCO: 35, ProQuest: 21, Scopus: 10) were combined and then duplicates were removed again. The number of articles that were eligible for inclusion was 38. The resulting database has been validated by reviewing the abstracts, which led to the final number of publications, that is, 31. In the last stage of selecting publications, after reading them, those that did not add value in terms of answer to the research questions were rejected. For example, these articles described hypothetical EMS studies, lack of EMS in the HEIs in the investigated country, general barriers to EMS implementation, undefined need to implement EMS, lack of preparation of HEIs to implement EMS in the investigated country, no longer used EMS according to BS7750. The final publication database contained 24 articles, presented in Table 2. They were published in the years 2000-2020.

In phase three, bibliometric analysis and content analysis were performed. In the bibliometric analysis, the number of publications in subsequent years was measured (Figure 2).

Figure 2. The number of publications concerning EMSs in HEIs in subsequent years



Source: Own elaboration

The analysis of the number of articles in subsequent years indicates a slight but continuing interest of scholars in the issues of EMS in HEIs.

The content analysis (included in Phase 3 in the systematic literature review) and the preparation of the report (Phase 4) are presented in the next section

5. Findings

The problems undertaken in the analysed publications constitute the background to consider the EMS models implemented or planned to be implemented in HEIs. These issues are presented in Table 2.

Table 2. Main results of the literature review

No.	Source	HEI/country (area)	Problems in the analysed publications	EMS models
1.	Delakowitz & Hoffmann, 2000	Hochschule Zittau/Görlitz – University of Applied Sciences Germany	Presentation of successfully undergone the full cycle of EMS based on EMAS.	EMAS
2.	Herremans & Allwright, 2000	50 HEIs Canada and USA	Determining initiatives taken to implement EMS.	Lack of specific model
3.	Noeke, 2000	University of Paderborn Germany	Describing the development, implementation, certification, and continuation of EMS.	ISO 14001
4.	Barnes & Jerman, 2002	The Clemson and the University of South Carolina USA	Presentation of the Sustainable Universities Initiative (SUI) and plans for the development of EMS.	An informal EMS ‘SC-SUI EMS Standard’
5.	Viebahn, 2002	University of Osnabrück Germany	Describing the ‘Osnabrück Environmental Management Model for Universities’ based on EMAS.	An informal EMS ‘Osnabrück Environmental Management Model for Universities’
6.	Spellerberg et al., 2004	Lincoln University New Zealand	Gradation of approaches to improve environmental performance.	An informal EMS
7.	Price, 2005	University of Glamorgan Wales, UK	Providing an overview of how EMS are becoming employed.	ISO 14001

No.	Source	HEI/country (area)	Problems in the analysed publications	EMS models
8.	Clarke, 2006	Dalhousie University Canada	Presentation of EMS model.	An informal EMS
9.	Savely et al., 2007a	273 HEIs USA	16 elements of EMS based on ISO 14001 used in HEIs.	Lack of specific model
10.	Savely et al., 2007b	Various HEIs USA	Detailing the 'EMS Implementation Model for US Colleges and Universities'.	An informal EMS 'EMS Implementation Model for US Colleges and Universities'
11.	Sammalisto & Brorson, 2008	University of Gävle Sweden	Describing training and communication methods in the EMS.	ISO 14001
12.	Taddei-Bringas et al., 2008	University of Sonora Mexico	Exploring how EMS contributes to the transition of HEI towards a sustainable university.	ISO 14001 (using the framework without certification)
13.	Clarke & Kouri, 2009	Various HEIs Various countries	Discussion of different EMS frameworks, drivers and features.	Lack of specific model
14.	Jain & Pant, 2010	TERI University India	Presentation of EMS for HEIs in India with focus on planning.	An informal EMS
15.	Brandli et al., 2011	University of Passo Fundo Brazil	Analysis of the sustainable practices.	An informal EMS

No.	Source	HEI/country (area)	Problems in the analysed publications	EMS models
16.	Bero et al., 2012	Northern Arizona University USA	Presentation of challenges and lessons learned in the development of an EMS.	An informal EMS 'Dynamic Environmental Management System'
17.	Disterheft et al., 2012	35 HEIs Europe	An overview of the implementation of EMS and comparison of approaches.	Lack of specific model
18.	Jones et al., 2012	University of the Aegean Greece	Exploring results of implementing EMS.	ISO 14001 and EMAS
19.	Omrcen et al., 2013	University of Gothenburg Sweden	Presentation of the implementation of EMS.	ISO 14001 and EMAS
20.	Nieblas-Ortiz et al., 2017	Autonomous University of Baja California Mexico	Development of an environmental management model bound to indicators.	An informal EMS
21.	Lo-Iacono-Ferreira et al., 2018	The Polytechnic University of Valencia Spain	Defining environmental Key Performance Indicators for HEIs with EMS.	EMAS
22.	Nurchahyo et al., 2019	University of Cadiz and Vytautas Magnus University Spain and Lithuania	Integration Universitas Indonesia Greenmetric performance measurement with ISO 14001 implementation in higher education.	ISO 14001

No.	Source	HEI/country (area)	Problems in the analysed publications	EMS models
23.	Okayama, 2019	Chiba University Japan	Exhibiting the ‘Student-led EMS based on ISO 14001’.	ISO 14001
24.	Beuron et al., 2020	Brazilian HEI Brazil	Brazilian university’s EMS examination.	ISO 14001

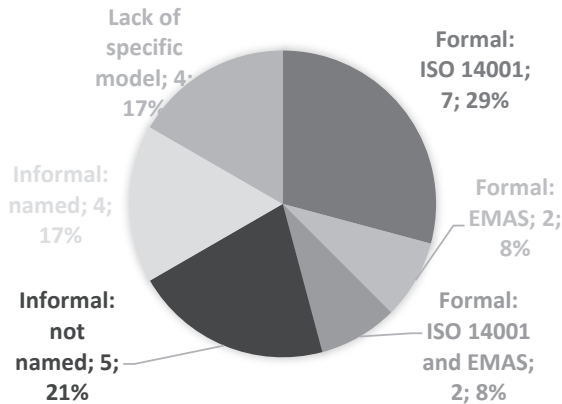
Source: own elaboration

Table 2 presents the problems undertaken in the 24 analysed articles. It turns out that most often (8 times) researchers focused on description of the EMS and presented case studies. In this group there are papers describing informal EMS or the full cycle of formal systems, in accordance with EMAS or ISO 14001. The authors of the four above publications took up the problem of various elements of EMS, for example training, communication, engagement etc. The next four articles demonstrated different approaches, frameworks and challenges in implementing EMS. Another three have been devoted to measurements and indicators. Scholars described planning and the preparation processes for EMS implementation in HEIs in three papers. Two subsequent articles present the results of the EMS, including transition of HEI towards a sustainable university.

The data shows that formal and informal EMS models are implemented in HEIs. Among the formal ones, the ISO 14001 model dominates (7 HEIs). EMAS is used less frequently (2 cases). In the two HEIs, both models exist simultaneously: ISO 14001 and EMAS. In the group of informal EMS there is a similar number of those that are named (e.g. ‘EMS Implementation Model for US Colleges and Universities’, ‘Osnabrück Environmental Management Model for Universities’) (4 HEIs) and those described in the literature simply as ‘informal EMS’ (5 cases). Four analysed publications did not contain

information on specific HEI cases, but concerned research on numerous groups of institutions, hence they were included in the category ‘lack of specific model’ (Figure 3).

Figure 3. EMS models implemented at HEIs



Source: Own elaboration

6. Conclusions

With reference to the research questions posed, two conclusions can be drawn from the content analysis of the articles. First, researchers most often focus on description of formal and informal EMS in HEIs. They also take up the problems of different elements of EMS (e.g. training, communication, engagement), approaches and challenges in planning and implementing EMS, measurements and EMS results. Therefore, problems undertaken in the analysed publications can be considered exhaustive. However, with respect to the Deming PDCA cycle (Plan-Do-Check-Act) on which EMS are built, it can be noticed that while the researchers often focus on planning, implementation

and measurement, there is a lack of articles on EMS improvement. Secondly, data shows that HEIs implement formal and informal EMS. The most often implemented are formal EMS models, above all, the ISO 14001 compliant system. EMAS is used less frequently. They also use their own informal EMS models tailored for a specific institution.

Finally, it should be pointed that there are some limitations to this study. They concern the fact that one of the criterion for including publications into the database, i.e. English-language items, marginalizes literature written in other languages. Publications not available in the digital version were also omitted. It is therefore worth to include other types of publications in future studies.

The research planned by the author in the future includes the issue of benefits derived from implementing EMS in HEIs. It would also be worthwhile to conduct in-depth research of HEIs to identify whether described EMS models are still used, or whether the EMS implemented in the past are still certified.

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**The 11th National and 3rd International Conference on Quality
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Radosław WOLNIAK¹

Job satisfaction of employees on the example of the Welding Institute

Abstract

Research background: Effective functioning of an enterprise requires a good system of motivation, which leads to the involvement of employees in their activities. For this reason, the analysis of factors influencing employee satisfaction as well as dissatisfaction in different types of organizations is important from a scientific and practical point of view.

Purpose of the article: The aim of the publication is to examine how the level of job satisfaction of employees of the Łukasiewicz-Institute of Welding Research Network unit in Gliwice is shaped?

Methods: An internet survey was used in the research in this article due to the possibility of distributing it in the form of a link to the questionnaire via e-mail. An internet survey allows you to reach respondents quickly, saves time (of the researcher and respondents), allows you to control the number and quality of completed questionnaires, avoid mistakes in transcription.

Findings & Value added: Respondents assessed that the strongest influence on job satisfaction have work environment, relations between workers and with the management, work atmosphere. On the other hand, low salaries, lack of appreciation and development opportunities as well as conflicts with co-workers have a weakening effect on satisfaction. There is therefore a certain discrepancy between what motivates and what demotivates employees.

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Non-wage factors are the strongest motivators, but at the same time they are in relation to wages. This confirms the employees' opinion about the elements which, if changed, would influence job satisfaction. Apart from higher salaries, the respondents indicated improved human resources management, elements of the non-salary motivation system, improved communication within the team and with superiors and opportunities for professional development. The value of the publication is the identification of factors positively and negatively influencing job satisfaction on the example of the research institute. This kind of approach allows for a comprehensive analysis of the satisfaction problem.

Keywords: satisfaction, job satisfaction, satisfaction, quality of life, motivation

JEL Classification: J28, L8.

1. Introduction

Each enterprise must develop its own individual motivation system and, in particular, adapt it to its capabilities, taking into account the skills and competences of its workforce (Cheung et al., 2022). In the motivational process it should be taken into account that the highest degree of motivation will be achieved when the enterprise is open to changes (Phelps et al., 2022).

The most important objective of the application of tools must be an appropriate motivation of subordinates, which in turn leads to greater efficiency, increased productivity and involvement – this contributes to the proper implementation of the strategic and current objectives of the company and gaining a competitive advantage among other organizations (Otache & Inekwe, 2022). Contrary to various opinions, the motivational system is not based only on giving bonuses to subordinates, but it is also embedded in a specific employee culture – i.e. it has to favor the realization of the company's goals.

The literature has identified the conditions that a job must fulfil to give satisfaction to the employed person. These include (Gazi, et al., 2021; Szromek & Wolniak, 2020):

- the work should be an intellectual challenge for the employee to cope with,
- there must be consistency between the employee's own and the organization's goals,
- no excessive physical strain (no excessive work),
- respect for the organization's employees,
- physical working conditions that enable the achievement of goals that are compatible with the needs of the individual employed,
- both fair and adequate remuneration according to individual aspirations,
- support in combining both individual and professional goals, minimizing conflict and role ambiguity.

The involvement of employees in the activities of the company, and their knowledge and experience affect the competitiveness of the company and allow it to achieve an advantage in the market (Pio, 2022). Organisations in employees can and want to develop should implement strategic human resources management to adapt smoothly to changes in the market environment (Qiu & Dauth, 2022). It is therefore crucial to motivate employees to develop and involve them in achieving the strategic goals of the company (Ramesh & Katta, 2022).

Remuneration tools in motivating employees are, and will undoubtedly be for a long time to come, the primary source of motivating employees (George & Zakkariya, 2018). Therefore, the motivational power of money should be an important tool for stimulating employee attitudes, as it can only be weakened in the face of a sudden and significant increase in the wealth of society (Sanchez et al., 2022). Money has an important motivational function not only because it allows certain needs to be realised, but also because it is a form of recognition (Wolniak & Zendla, 2015). Wages have five essential functions: cost, income, motivation, social and market (Ghasemy et al., 2022). The motivational function is to introduce the interdependence of the interests of employees and the company (Gkliati & Saiti, 2022). Wages, to motivate good work, professional development, promotions and fulfilment of attitudes expected by the employer, should fulfil two basic conditions (Ketebi et al., 2022; Kwiotkowska et al., 2022):

- should ensure a fair level of remuneration. Otherwise, the employee will not feel sufficiently motivated to perform his duties and be loyal to his employer,
- part of the wage should be dependent on the employee's performance, attitude and behaviour. If all remuneration is guaranteed, employees may be less motivated than if part of it is paid in a discretionary form: time, time and bonus, piecework, task, commission, lump sum.
- among non-wage motivational factors, there are many tools and opportunities for use in a company's incentive system. They serve to express appreciation by providing prospects for professional and personal development. Non-wage motivation tools include (Henricks et al., 2022; Hong et al., 2022; Orzeł & Wolniak, 2022; Wolniak & Szromek, 2020):
- benefits in kind, which are guaranteed to employees. Particularly valued by the employees' benefits in kind are a company car also for private use, company housing, covering the costs of training, company telephone, trips abroad with the family at the expense of the employer,
- training to broaden the employee's skills which is valuable for their career development. Training increases the stock of knowledge in the company, influences employees' potential and increases their self-confidence,
- employee development programme. It is a distinction and at the same time assurance of the prospect of building a career in the company,
- promotion based on performance. It involves a change of position in the organisational structure, assignment of new duties and extension of responsibilities. It satisfies the need for recognition and development, thus increasing employees' self-confidence and commitment to their tasks,
- participation in management through the development of organisational arrangements which involve workers in economic, organisational and personnel decisions. Employees feel that their opinions and views are important to the employer and therefore actively participate in the management of the company,

- flexible working hours, which is particularly important for employees with families or those wishing to further their education. However, it is appreciated by all employees, even if this form of working is only possible to some extent or periodically,
- work organisation. The aim is to organise premises, workspace and teams in such a way that work is as productive as possible,
- communication and a favourable psychosocial climate. Good communication within the enterprise between workers and between workers and management ensures a proper flow of information, thus preventing misunderstandings and conflicts,
- working standards and conditions. An important element is the ergonomics of the workplace, i.e. the proper organisation of space and workstations. Discomfort at work reduces motivation, which is why it is so important to provide employees with appropriate working conditions,
- an organisational culture that fosters the need for respect and recognition and allows employees to be autonomous in planning and achieving goals, influences the development of an appropriate motivational system,
- a pension scheme. Introducing them in a company provides an additional pension for employees and promotes a culture of saving
- integration trips – they influence motivation and strengthen relations within and between teams.

The scope of application of these measures is highly dependent on the needs of a given enterprise, the needs of the employees, the economic and organisational possibilities and the approach of the managers to creating a strong organisation (Lam et al., 2022).

Understanding motivation, or what triggers, directs and motivates employee behaviour, has always been important for managers. This has to do with the fact that managers work with and by people (Martin et al., 2022). The motivational process is dynamic and involves the satisfaction of a specific need that has an emotional charge. The emotional charge makes people's behaviour complex and sometimes even irrational. Therefore, there are many theories of motivation, and most of them differ in their indications of the actions a manager should take

to get more effective employees. However, practice shows that people respond strongly to praise and encouragement and their dedication to the organisation is influenced by the awareness of success at work (Yoruk & Acikgoz, 2022).

Another approach to motivation is represented by the equity theory or the injustice theory. It is based on the premise that an important factor in motivation, performance and satisfaction is an employee's subjective evaluation of the fairness or rightness of the reward or praise they receive (Wang & Rashid, 2022). Fairness, in this theory, means the ratio of an employee's effort and the rewards they receive, compared to giving rewards to others for a similar effort. An individual's motivation, performance and satisfaction depend on a subjective assessment of the level of his or her ratio of effort to rewards with that of other employees (Thakur et al., 2022).

2. Problem Statement

The issue of studying job satisfaction with employees is important and present in contemporary scientific literature. Most of the studies focus on issues concerning industrial or service organizations. The literature lacks detailed analyses of job satisfaction in research institutes. In particular, it seems interesting to examine the issue in the case of the Welding Institute in Gliwice, which is part of the Łukasiewicz Research Network.

3. Research Questions/Aims of the Research

The paper formulates the following main research problem:

How is the level of job satisfaction of employees of the unit of the Research Network Łukasiewicz-Institute of Welding in Gliwice shaped?

The Welding Institute was established on March 26, 1945. The organization of the Institute was the responsibility of Bolesław Szuppa, Eng. and Józef Pilarczyk, Eng. who were authorized by the Personnel

Department of the Ministry of Industry. From its inception, the main task of the State Welding Institute was to train welders and later also engineers, constructors, inspectors and welding technologists. The Institute also supervised courses run by other centers.

4. Research Methods

An internet survey was used in the research in this article due to the possibility of distributing it in the form of a link to the questionnaire via e-mail. An internet survey allows you to reach respondents quickly, saves time (for the researcher and respondents), allows you to control the number and quality of completed questionnaires, and avoid mistakes in transcription.

The object of research in this study is a unit of the research network Łukasiewicz-Institute of Welding. The representative sample was selected randomly from among the employees of this unit. They are persons with different lengths of service, occupying different positions. The research was conducted in 2021. A survey questionnaire was sent to the Institute's employees via a link to a Google form and eventually, 105 responses were received.

5. Findings

The most important objective of the application of tools has to be the proper motivation of subordinates, which in turn leads to greater effectiveness, increased efficiency and involvement – this favors the proper implementation of the strategic and current objectives of the company and obtaining by the company a competitive advantage among other organizations. On the other hand, job satisfaction is a result of the value of the expected reward, the effort that was put into achieving the desired result, the perception of the subjective probability of success, the evaluation of the rightness of the received reward, the comparison of the

reward with social standards. The remainder of this paper will present the results of the job satisfaction part of the survey of the Institute's staff.

Table 1 presents the results of the employees' evaluation of job satisfaction (scale 1-5). 12,4% of respondents rated their own job satisfaction very high. 45,7% of them rated it highly. For 7,6% of the respondents their job satisfaction is low and 0,9% considered it very low. 33,3% of the respondents indicated a medium rating. In the overall assessment, the job satisfaction of the surveyed employees is at a medium to high level. Measures should be taken to raise the level of job satisfaction as it translates into employees' commitment to their tasks.

Table 1. Assessment of job satisfaction

Rating (1 – very low, 5 – very high)	N	%
1	1	0,9
2	8	7,6
3	35	33,3
4	48	45,7
5	13	12,4
Summary	105	100

Source: Own adaptation on basis of: (Gęborek, 2021).

Table 2 contains data on the assessment of the surveyed institute as a place of work. In the assessment of the respondents, the Institute as a place of work received most high ratings (44.8%), medium ratings were indicated by 29.5%. 12.4% of respondents rated the Institute as a workplace low. A company should strive to be the best possible place to work. This influences its attractiveness on the market for potential employees, but also significantly contributes to job satisfaction of current employees.

Table 2. The institute as a workplace as perceived by staff

Rating (1 – very low, 5 – very high)	N	%
1	4	3,8
2	13	12,4
3	31	29,5
4	47	44,8
5	10	9,5
Summary	105	100

Source: Own adaptation on basis of: (Gęborek, 2021).

The next table (Table 3) compares the results of the research as to what elements have the strongest influence on job satisfaction according to the employees. According to the respondents the strongest influence on building job satisfaction have friendly contacts with co-workers (62,9%), doing the job they like (58,1%) and nice atmosphere at work (48,6%). For 31.4% of respondents, satisfaction is influenced by development opportunities, good salaries and respect and recognition from management. The data shows that the strongest influence on job satisfaction is the work environment – interpersonal contacts between employees and between employees and management, work atmosphere and opportunities to do work that employees like.

Table 3. Elements which have the strongest impact on job satisfaction according to employees

Elements influencing job satisfaction	N	%
Good wages	33	31,4
Nice atmosphere at work	51	48,6
Friendly relations with co-workers	66	62,9
Respect and recognition from management	32	30,5
Opportunities for development	35	33,3
Doing the job I like	61	58,1
Doing a job that is in line with my training	23	21,9

Source: Own adaptation on basis of: (Gęborek, 2021).

Table 4 shows the factors that weaken job satisfaction. Low salaries have a weakening effect on job satisfaction according to 73,3% of respondents. 36,2% of respondents considered that lack of appreciation from the management, lack of development opportunities, conflicts with colleagues have a weakening effect. As for other answers, the respondents indicated the lack of involvement of other employees in their tasks (3.8%), interference of the head office in what happens in the branch (1.9%) and bad communication (1.9%). Based on the survey results it can be concluded that when it comes to undermining job satisfaction, low salaries have the strongest impact. Adequate remuneration, as already mentioned, is the basis for motivation to work and therefore to a large extent also job satisfaction.

Table 4. Elements that weaken job satisfaction

Elements that undermine job satisfaction	N	%
Low wages	77	73,3
Conflicts with co-workers	25	23,1
Lack of appreciation from management	38	36,2
Lack of development opportunities	26	24,8
Jobs incompatible with my education	12	11,4
Doing a job I do not like	17	16,2
Other		
Lack of involvement of other employees in their tasks/doing their job	3	3,8
Interference from headquarters	2	1,9
Poor communication	2	1,9

Source: Own adaptation on basis of: (Gęborek, 2021).

Table 5 summarizes the changes that staff think would improve job satisfaction at the Institute. The question was open-ended and was answered by 60% of all respondents. The responses were categorized and the number of responses for each category was summed. 28.6% of respondents felt that their higher job satisfaction would be influenced by higher salaries, 18.1% by improved human resource management. To a lesser extent, the respondents indicated improvement of non-wage motivation system (7.6%), professional development opportunities (3.8%), improvement of communication within the team and with superiors (4.8%), better work organization and working conditions (1.9% each). The introduction of changes indicated by employees is necessary to increase their job satisfaction.

Table 5. Changes that could lead to higher job satisfaction

Type of change	N	%
Increased earnings	30	28,6
Improved human resources management	19	18,1
Opportunities for professional development	4	3,8
Improved non-wage incentive system	8	7,6
Better organisation of work	2	1,9
Better working conditions	2	1,9
Improved communication within the team and with superiors	5	4,8

Source: Own adaptation on basis of: (Gęborek, 2021).

6. Discussion

Comparing the results of the research with other international research we can observe that in other international research the results are also middle. For example, Feldy and Bojko (Feldy & Bojko, 2020) have divided the staff in scientific institutes into groups: demanding, aspiring and unengaged. Each group have its characteristic. We think that in the Wielding Institute the staff tends to be aspiring. For them the problems connected with social development are important but the satisfaction level tends to be in the middle level. Some researchers think that there is a positive relationship between job satisfaction level and the quality of relationships within the organization (Castillo & Cano, 2004; Edgar & Geare, 2005; Özpehlivan & Acar, 2015; Stringer, 2006; Raziq & Maulabakhash, 2015). The relations between colleagues as in the presented research also are an important factor in the job satisfaction level. This relation was identified for example by: (Aydin et al., 2012; Sageer et al., 2012; Izvercian et al., 2016).

In the presented research the main elements of job satisfaction are good wages, a nice atmosphere at work, friendly relations with

co-workers, respect and recognition from management, opportunities for development, doing the job they like, and doing the job that is in line with their training. The Feldy and Bojko (Feldy & Bojko, 2020) research has distinguished the following factors of job satisfaction in scientific institutes: showing appreciation by superiors for a job well done, sense of stability, organization of the workspace, amount of remuneration, availability of additional non-financial benefits, the possibility of developing knowledge or improving skills, the possibility of pursuing one's scientific aspiration, selectable working hours, possibility to work remotely. Yoon as main factors influencing job satisfaction distinguishes (Yoon, 2020): physical characteristics, scale, budget, history, mission, research cost, research level, position, establishment type, administrative support, technology support, Information system, regulation, control, leadership, organizational culture, administrative and financial support. According to Ghaffar research (Ghaffar et al., 2013) we can distinguish especially: salary and compensation, job security, working conditions and relationships with coworkers.

Presented research has distinguished the following dissatisfaction factors: low wage, conflicts with co-workers, lack of appreciation from management, lack of development opportunities, jobs incompatible with my education, doing a job they do not like, lack of involvement, interference from headquarters and poor communication. Eroglu thinks (Eroglu et al., 2014) that the main dissatisfaction factors for institute staff are: transportation services, promotion opportunities, assignments, supplementary payments, the possibility of overtime, wages and salaries, complaints system, and sensitiveness of rules.

7. Conclusions

Employee satisfaction at the Welding Institute surveyed is at a medium to a high level. The Institute was assessed similarly as a workplace. However, changes are necessary to improve employee satisfaction.

The Institute's management should carry out a detailed research and diagnose the basis of the problems with employee satisfaction

and implement appropriate measures. Respondents estimated that the strongest influence on job satisfaction has the work environment, relations between workers and the management, and work atmosphere. On the other hand, low salaries, lack of appreciation and development opportunities as well as conflicts with co-workers have a weakening influence on job satisfaction. There is therefore a certain discrepancy between what motivates and what demotivates employees. Non-wage factors are the strongest motivators, but at the same time, they are concerning wages. This confirms the employees' opinion about the elements which, if changed, would influence job satisfaction. Apart from higher salaries, the respondents indicated improved human resources management, elements of the non-salary motivation system, improved communication within the team and with superiors and opportunities for professional development.

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