Article

The Development of an Integrated External Environment Monitoring Framework Aimed at the Internal Control of the Procurement Process of Fat and Oil Companies †

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Abstract: The article deals with the development of methodical recommendations for monitoring the external environment aimed at the internal control of the procurement process in business based on a risk-oriented approach and with the digital techniques used by fat-and-oil industry companies. For research purposes, the following were necessary: first, to develop an integrated scheme for monitoring the external environment aimed at the internal control of the procurement process, taking into account the specifics of the commercial organization's activity; and second, to analyze the features of the integrated monitoring scheme with the use of digital techniques. The methodology for developing methodical recommendations for monitoring the external environment aimed at the internal control of the procurement process is based on a risk-oriented approach, the unforeseen circumstances theory, and the use of big data and business analytics. In the first section, the authors substantiate the relevance of the research topic. In the second section, investigations on the topic are reviewed, the theoretical foundations are summarized, and research hypotheses are formulated. The third section determines the methodology of the study. The fourth section presents the research results, their practical value, recommendations and limitations, and the developed integrated scheme for environment monitoring with regard to the internal control of the procurement process based on a risk-oriented approach taking into consideration the specifics of the fat and oil industry. This section also determines the specifics of the digital techniques used for monitoring the environment and discusses issues surrounding the external monitoring of raw material prices, different types of work, and services based on digital techniques aimed at internal control. In the fifth and final section of the article, the authors analyze the research results and substantiate the prospects for further research in this area. The research results could be used by commercial companies in processing industries which are undergoing digital transformation and developing platform solutions aimed at improving internal control. The main research result of this article is the development of methodical recommendations for monitoring the external environment aimed at the internal control of the procurement process in business based on a risk-oriented approach with the use of digital techniques and a developed integrated monitoring scheme.

Keywords: internal control; business; procurement process; business analytics

1. Introduction

It is impossible to effectively operate a commercial company without rational planning, supply management, the use of methods for finding suppliers and checking them while taking into consideration the principle of due diligence based on digital techniques, price coordination and control, risk management, inventory control, economic and legal expertise relating to contracts with suppliers, and monitoring prices for purchased inventory, works and services.

In October 2019, in Russia, the public council of the "Leader of Competitive Procurement 2019" award (Competition 2019), which included 100 independent experts, summed up the results of the annual award. Based on the 16 winners' cases, the experts defined the main trends, and one of them was an integrated approach to procurement. An integrated approach to procurement is impossible without the effective monitoring of the external environment aimed at the internal control of the procurement process based on a risk-based approach. The Deloitte study, carried out in 2019 and based on the results of a survey of 500 purchasing directors from 39 countries, determined the widespread use of data analytics (Deloitte 2019). In 2020, Ariba, together with Oxford Economics, conducted a global study of modern types of purchasing activity, which summarized the results of a survey of 500 managers of large companies from 18 countries, as well as 500 procurement specialists (Ariba Network 2020). The study defined four main trends connected with globalization, such as the desire for systematization based on the use of automated procurement systems, the development of business networks, and the use of electronic document management systems. According to the results of the above mentioned studies, it is necessary to effectively monitor the external environment aimed at the internal control of the procurement process based on a risk-oriented approach. This is due to changes related to the use of new channels of interaction between customers and suppliers (for example, through social networks, platforms on which trades are carried out, etc.) and the use of new digital techniques. In addition, companies apply the principle of due diligence and evaluate potential suppliers based on the analysis of a wide range of data, using different services, both paid for and free. In such conditions, in which there is a transition from a "consumer society" to a hyper-informational one, there is a relationship between suppliers, potential buyers, and competitors. For all these, it is necessary to improve the monitoring of the external environment used by a given company in relation to procurement process in order to increase contribution of that process to the value of the company. With the evolution of the procurement function, the control of businesses' procurement processes changed significantly, and the need for monitoring the external environment also increased. At the stage of business support (until 1990), internal compliance control prevailed, which assumed an evaluation of the correctness of determining the needs for procurement, their timeliness, and legality. In 1990–2000, the predominant function of procurement was cost reduction, while internal control was supplemented by a detailed analysis of procurement efficiency. The period spanning 2000–2010 was concerned with ideas of sustainable development. During this period, supply chains became significantly more complicated and the KYC procedure, involving the identification and verification of each counterparty, became widespread. The period from 2010 to 2020 was concerned with focusing the procurement function on creating value, which is impossible without analyzing and monitoring the state of the external environment. In the current period for strategic supplier management, it is necessary to generalize on the experience of external environment monitoring aimed at the internal control of the procurement process in business based on a risk-oriented approach.

Internal control is aimed at providing the compliance of the procurement process with the regulatory acts requirements, the reliability of both financial and non-financial reporting, and the achievement of the main goals in accordance with the implemented strategy. In the context of digitalization, monitoring the external environment of the procurement process is extremely important. It is aimed at the timely identification of risks within the framework of the internal control and risk management system and the making rational management decisions.

One of the problems is that studies do not reveal the issues surrounding the monitoring of the external environment focused on internal control implementation according to specific business processes. In practice, when Russian companies make decisions they do not always take into consideration the results of environmental monitoring. The established and functioning systems for external environment monitoring do not fully take into account industry specifics and are not properly integrated with internal control systems.

To fill the above-mentioned gap in research, as well as the gap relating to the methodological aspects of improving the environment monitoring system, it is necessary to take into consideration industry specifics and to further orient the system to the needs of internal systems.

Most of the research articles in this area are devoted to methods for analyzing the external environment and are not focused on the needs of internal control.

The monitoring of the external environment, which primarily affects the level of prices for raw materials, makes it possible to generate results for the purposes of assessing the risks of procurement processes in business entities in the fat and oil industry. Its use is aimed at improving the internal control system using a risk-based approach.

Research into the development of an integrated environment monitoring scheme for internal control was carried out in relation to the procurement process of an oil and fat company, taking into consideration, on one hand, industry specifics and the features of a particular business process, and, on the other hand, the possibilities of using monitoring results for internal control and management decision-making.

In the context of digital transformation, the research results could be used by companies in the manufacturing industries when developing platform solutions aimed at improving internal control. International standard ISO 37001: 2016 "Anti-corruption management systems. Requirements and Application Guidance" involves, along with financial control, the use of non-financial control mechanisms aimed at managing corruption risks in such areas as procurement, current activities, and sales, requiring the use of information about the external environment and its monitoring. The synthesis of financial and non-financial information allows an organization not only to carry out control procedures, but also to apply the principles of integrated thinking, to implement an integrated reporting system, and to apply SASB standards, promoted by the Value Reporting Foundation at the international level.

2. Research Review, Theoretical Foundations and Research Hypotheses

Ideas for monitoring the external environment have been worked out in strategic management. Various types of strategic analysis are commonly used as the most important tools for monitoring the external environment in strategic management. An overview of the analysis methods identified by the researchers for the organization of monitoring the external and internal environments of an organization is presented in Table 1.

Table 1. Overview of analysis methods identified by researchers for the organization of monitoring the external and internal environments of an organization.

Researcher (-s)	Analysis Methods Identified
Khorin A.N., Kerimov V.E. (Suyts et al. 2019)	Analysis of the external environment Finance analysis Market analysis Customer analysis Business process analysis Cost estimation Analysis of strategic indicators
Aaker D.A. (Aaker 2003)	External analysis and customer analysis Competitor analysis Market analysis Environment analysis
Wissema H. (Wissema 2000)	Competitive analysis External analysis
Efremov V.S. (Efremov 2001)	Assessment of business conditions Analysis of strategic stance in the business space
Thompson Jr. A.A., Strickland III A.J. (Thompson and Strickland 2002)	Analysis of the industry and the competitive situation Analysis of the resources and competitive capabilities of the company

Table 1. *Cont.*

Researcher (-s)	Analysis Methods Identified
Grant R. (Grant 2008)	Industry structure analysis Competitor analysis Market segmentation analysis Resource and ability analysis Competitive advantage analysis
Fleisher K., Bensoussan B. (Fleisher and Bensoussan 2009)	Strategic analysis (BCG matrix, General Electric business screen matrix (Ge multifactoral analysis), industry analysis, SWOT analysis, value chain snalysis) Competitive analysis and consumer analysis (blind spot analysis, competitive analysis, consumer segmentation analysis, purchasing value analysis, analysis of functionality and resources, assessment of the individual characteristics of competitors) External environment analysis (disagreement analysis, shared environment analysis (STEEP), scenario analysis, middleman analysis) Development analysis (experience curve analysis, growth vector analysis, patent analysis, lifecycle analysis, S-curve analysis (technology life cycle)), financial analysis (analysis of financial ratios, analysis of the level of sustainable growth)

The issues surrounding the use of various methods of strategic analysis are highlighted in the studies of Charmaine B., Cortis D., Perotti R, Sammut C., Vella A. (Charmaine et al. 2017), Izvarina N.Y., Kovaleva M.P., Vorozhbit L.E., (Izvarina et al. 2020), Ghazinoory S., Abdi M., and Azadegan-Mehr M. (Ghazinoory et al. 2011).

It should be noted that the selected areas of analysis are used, as a rule, in fairly large Russian organizations, which is due to the peculiarities of disclosing information to interested users within the framework of annual, integrated reports. In small businesses, strategic analysis is not performed, which is associated with the possibility of submitting only the balance sheet and the statement of financial results to the state. Abroad, the practice of forming integrated reporting is much wider, and the formation of an integrated report requires the use of strategic analysis techniques, which are used not only to disclose information in reporting, but also within the framework of the management accounting system.

Integrated reports and information on the results of strategic analysis are disclosed on the websites of public joint stock companies within the framework of annual reports. However, the data from these analyses are not fully used for internal control purposes. Russian organizations put an emphasis on the formal part of the internal control system, which presupposes the achievement of such goals as compliance with applicable laws and ensuring the reliability of financial and non-financial reporting. At the same time, insufficient attention is paid to achieving the informal part of the internal control system, within which the effectiveness of the organization's activities should be ensured and value created.

To achieve this objective, management has traditionally used financial analysis of the organization's reporting, focused on the information needs of stakeholders (Akhmetshin et al. 2018). We should agree with the position of Koshkin A.P., Abramov R.A., Rozhina E.Y., and Novikov A.V. regarding the fact that economic analysis is only a very small part of the process of transforming the array of primary and summary data (information resources) formed in the organization into results that are significant for management in the form of preparation or automated decision-making (Koshkin et al. 2018). At the same time, such analysis does not allow for the characterization of the external environment, which should be taken into account when making management decisions (McKelvey et al. 2019). This lack of economic analysis is noted in works by Abramov (2015); Abramov and Sokolov (2017), Abramov R.A., Tronin S.A., Brovkin A.V., and Pak K.C. (Abramov et al. 2017), Vázquez M., Peter van der, S., and Fernando, J.S. (Vázquez et al. 2010), Del Bosco B., Chierici R., and Mazzucchelli A. (Del Bosco et al. 2018), Leyden D.P. (Leyden 2016), and Pech, R.M. (Pech 2016). The importance of ensuring the interdisciplinary nature of the analysis of economic activities is noted in studies Block J.H., Roy T., and Haibo Z. (Block et al. 2013), Malerba F. and Maureen M.K. (Malerba and Maureen 2018). The purpose of the analysis is to generate information for making management decisions aimed at increasing the efficiency

of business entities and the locating of intra-production reserves (Morozov et al. 2018). The analysis data can be used to control the achievement of the goals set within the framework of the chosen strategy, which requires an assessment of the organization's position and the monitoring of the external environment. It is necessary to shift the emphasis from the analysis of historical information to the analysis of prospective information in order to assess the future activities of the organization (Ni et al. 2017).

In the context of digitalization, it is necessary to move to operational analytics based on big data and to automate the adoption of operational and strategic decisions. Russian scientists V.P. Suyts, A.N.Khorin, and Yu.M. Potanina consider it necessary to move from economic analysis based on financial reporting to operational analysis, taking into account global trends in the study and analysis of big data. The concept of turning traditional analytics into an operating room is not new, but this concept has rarely been applied in practice in the past (Suyts et al. 2019). External and internal users are interested in the prospects for the development of the organization in a changing external environment. In our opinion, in the context of digitalization and the generation of large amounts of data, it is necessary to structure databases within an organization in order to further monetize them, and also to consider the possibility of using external information to control the value creation process. The integration of large amounts of data from external sources (internet, digital, social, and search platforms) with internal sources of information could be used within the information model for the internal control of the business's procurement process.

A turbulent external environment significantly affects the procurement process of a business. At the same time, the range of external factors affecting the procurement process is expanding. The influence of the external environment cannot be described on the basis of the traditional group of factors within the framework of PEST analysis (political, economic, social, and technological). Disruptions in the supply chain can occur due to the natural factors, and their effect is manifested in natural disasters, pandemics (for example, the Great East Japan Earthquake of 2011, the flood in Thailand in 2011, the COVID-19 pandemic in 2020–2021). These factors generate a system risk connected with supply disruptions. According to Kimura and Ando (2005) companies are unable to control this risk. Currently, there are studies aimed at developing new approaches to risk management based on the results of external environment analysis in relation to specific types of economic activity. Thus, McMaster M, Nettleton C, Tom C, Xu B, Cao C, and Qiao P. (McMaster et al. 2020) investigated the impact of the COVID-19 pandemic on the risk management and supply chain processes of fashion clothing for multinational corporations. Quendler and Morkūnas (2020) investigated issues connected with improving the economic sustainability of Austrian agriculture (note the growing number of different areas of analysis carried out at the level of the country, region, province, city, local labor market, etc.). They admit the importance of analyzing different factors which influence the development of the industry (economic, political, social, and technological ones). The study carried out by Inoue (2021) is of scientific interest. The study, which made use of a world input–output table (WIOT), used modeling in the company based on agents. Inoue (2021) proposed three models for connecting domestic firms to the WIOT that made it possible to estimate "the value-added losses of Japanese firms caused by shocks of varying magnitude and duration occurring in China, the EU and the USA, as well as all over the world".

It is necessary to distinguish the above from the scanning of the external environment, which is a rapidly developing area of analytical and predictive work used in strategic management systems of companies and is aimed at collecting, evaluating, and forecasting the effect on the company of changes in the external environment.

Choo (1999) notes that scanning the external environment differs from competitor analysis, competitive intelligence, and business analytics, by organically complementing them. Scanning the external environment is carried out in a much broader aspect and covers not only competitors, suppliers, and customers, but also a wide range of factors affecting the activity of the company.

Choo (1999) is quite right to pay attention to the fact that scanning the external environment is mainly used to manage the strategic planning process, but an integration with strategy is necessary for this. Scanning involves the use of online methods of information collection and communication, active cooperation with experts in the field under study, and IT specialists. At first, scanning involves identifying information needs, obtaining information, organizing and storing information, developing information products or services, and distributing and using information.

Alastair Lee (Lee 2021) recommends the use of the following resources in order to identify and track external threats: Horizon scan reports which provide companies with information about the main causes of disruption over the past 12 months and contain a risk forecast for the coming year, information received within professional associations, information from companies that can provide daily and weekly reports on different issues, a national risk register, internal resources (for example, risk maps, etc.), disaster maps and risk evaluation tools, and news resources.

In contrast to scanning the external environment, monitoring the external environment involves the constant monitoring of current and newly emerging information, on the basis of which the causes of changes in the studied factors and risks generated by them are identified, trends in their development are determined, and emerging opportunities and threats are evaluated.

A study conducted by Costas Markides, Daniel Oon, and Mail Schnegg (Mercedes et al.) indicates the necessity to develop and apply new ways of monitoring the external environment. The researchers found a positive relationship between "monitoring intensity" and effectiveness.

We wholly agree with Costas Markides, Daniel Oon, and Mail Schnegg regarding the need to use new tools and to increase the efficiency of the tracking of environmental changes and reactions to them. To improve business efficiency, it is necessary to update environmental monitoring processes, which are often a relic of a bygone era (Markides et al.).

In our opinion, the monitoring of the external environment should be integrated with internal control systems of risk management and specified in relation to specific business processes. As we have already noted, the methods of strategic analysis used in the framework of monitoring make it possible to identify risks. Risk evaluation is one of the elements of the internal control system according to COSO. In turn, the conceptual framework of risk management COSO ERM 2017 provides an analysis of the conditions of the company's activity, which also involves an external environment analysis.

A review of the investigations indicates the importance of developing methods and techniques of strategic analysis and the need to improve environmental monitoring. At the same time, these methods reveal a general approach that should be concretized relating to a specific business process and the specific type of economic activity the company in engaged in.

Despite extensive research devoted to methods and techniques of strategic analysis, the issues surrounding the monitoring of the external environment with regard to specific business processes, while also taking into consideration the specifics of the activity, have not been fully investigated. This article is intended to fill this gap.

A logical framework for the formation of an integrated system for monitoring the external environment for the purpose of internal control of the procurement process is presented in Figure 1.

Two hypotheses were formulated for the study. The first hypothesis is that environment monitoring should take into consideration both the specifics of the industry and a specific business process, and should be integrated with the internal control and risk management systems. The second hypothesis is that an integrated scheme for monitoring the external environment for the purpose of internal control of the procurement process should be formed on the basis of a risk-oriented approach with the use of digital techniques.
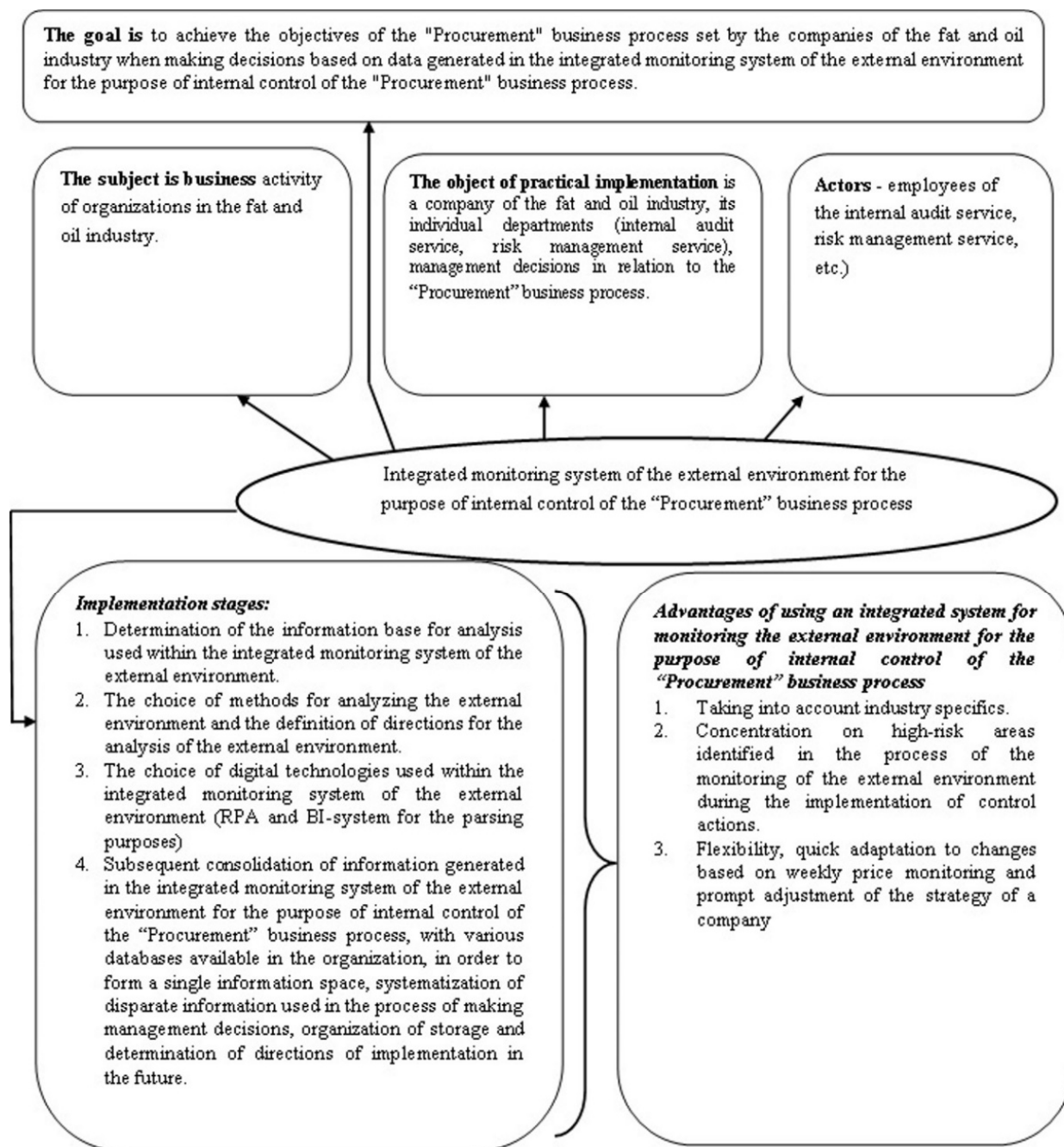
The goal is to achieve the objectives of the "Procurement" business process set by the companies of the fat and oil industry when making decisions based on data generated in the integrated monitoring system of the external environment for the purpose of internal control of the "Procurement" business process.

The subject is business activity of organizations in the fat and oil industry.

The object of practical implementation is a company of the fat and oil industry, its individual departments (internal audit service, risk management service), management decisions in relation to the "Procurement" business process.

Actors - employees of the internal audit service, risk management service, etc.)

Integrated monitoring system of the external environment for the purpose of internal control of the "Procurement" business process

Implementation stages:
1. Determination of the information base for analysis used within the integrated monitoring system of the external environment.
2. The choice of methods for analyzing the external environment and the definition of directions for the analysis of the external environment.
3. The choice of digital technologies used within the integrated monitoring system of the external environment (RPA and BI-system for the parsing purposes)
4. Subsequent consolidation of information generated in the integrated monitoring system of the external environment for the purpose of internal control of the "Procurement" business process, with various databases available in the organization, in order to form a single information space, systematization of disparate information used in the process of making management decisions, organization of storage and determination of directions of implementation in the future.

Advantages of using an integrated system for monitoring the external environment for the purpose of internal control of the "Procurement" business process
1. Taking into account industry specifics.
2. Concentration on high-risk areas identified in the process of the monitoring of the external environment during the implementation of control actions.
3. Flexibility, quick adaptation to changes based on weekly price monitoring and prompt adjustment of the strategy of a company

Figure 1. A logical framework for the formation of an integrated system for monitoring the external environment for the purpose of internal control of the procurement process.

3. Research Methodology

In general, the improvement in environmental monitoring is based on the following theoretical conceptions: the concept of sustainable development, the concept of risk management, the conceptual foundations of risk management, the conceptual foundations of internal control, the concept of process management in the company, the theory of unforeseen circumstances, as well as the use of big data and business analytics.

It should be noted that it is possible to use the unified algorithm to develop an information model of the internal control of business processes using digital techniques, that subsequently takes into account the specifics of the activity carried out by the company and specified in relation to each type of business process (for example, in relation to the procurement process).

The introduction of an information model of the internal control of the procurement process, formed on the basis of a unified algorithm that presupposes the functioning of a single platform and the use of digital techniques, made it possible to replace disparate point solutions and ensured effective communications and increased the effectiveness of control measures for procurement activity, and this business process as a whole (Bulgakov 2021). Testing of the information model of the internal control of the procurement process was carried out in the largest Russian agro-industrial group of companies.

As a disadvantage of the model identified during its testing, it is important to highlight its insufficient integration with information about the external environment. It therefore requires the methodological recommendations for monitoring the external environment aimed at internal control of the procurement business process, taking into account the specifics of the company operating in the fat and oil industry. It should be noted that in Russia, the approaches used by companies to form an information model of the internal control of the procurement process differ significantly. This is due to the use of different sets of databases and the different degrees of their integration. For example, the Sibur Digital company forms a corporate data lake that includes data from all the systems for the predictive analysis.

Thus, the issues related to not only the rational use of databases available in the company, but also the structuring of information about the external environment based on different information sources and the creation of a single information space, are relevant and can be solved with the full digitalization of production in all its contexts.

Big data includes a large amount of unstructured data (non-numeric data, emails, audio, video, images, free text, and social media content). By some estimates, 80% of all data is unstructured. Big data analytics allows you to combine disparate sources to provide previously unavailable information (Kaya et al. 2018). As part of the internal control system, internal auditors could develop monitoring reports by extracting information from various databases. Big data could be a tool for broader understanding of risk (Tabuena 2021). The prospects for using big data and business analysts are noted by Delen and Ram (2018), Sun, Z., Sun, L., and Strang, K. (Sun et al. 2018), Tang F., Norman C.S., and Vendrzyk V.P. (Tang et al. 2017), and Cangemi M.P. (Cangemi 2016) and were confirmed by the results of the 2017 Internal Audit Opportunities and Needs Survey conducted by Protiviti (2017).

Data analytics for organizations in modern conditions is one of the most important methods of monitoring and achieving goals. Data analysts can use visual communication as a form of information technology (Khorin and Voronova 2021).

Issues related to the organization of internal control with the use of digital techniques in agricultural companies have been studied by researchers in economics, such as I.V. Alekseeva, E.M. Evstafieva, M.V. Charaeva, and V.A. Mosentseva (Alekseeva et al. 2019); Bogataya et al. (2021); Kyshtymova et al. (2018), who investigated the issues of the use of digital techniques in internal control relating to such an object as capital. Ertz et al. (2021); Delen and Ram (2018); Feichter and Grabner (2020); Grover et al. (2018); Martin et al. (2016); Popovich et al. (2018); Sykes (2020); and Spann and Skiera (2020) studied opportunities and the impact of big data and business intelligence on company efficiency. Issues relating to the use of end-to-end digital techniques are determined to be of a greater extent in "Selling" processes. Thus, Sykes (2020) investigated these problems in relation to the largest companies.

At the same time, improving the internal control of the procurement process with the use of digital techniques to assess risks, to minimize them, and to optimize this business process plays an important role in manufacturing sector companies.

In this context, improving the internal control of the procurement processes of businusses and the monitoring of the external environment use is urgent. In designing control systems, the unforeseen circumstances theory is applied. According to this theory, "there are no multipurpose control mechanisms equally effective for all the companies in any conditions" (Spann and Skiera 2020).

The systematic approach of the unforeseen circumstances theory proposed by Grabner and Moers (2013) assumes the choice of internal control tools in the context of the main elements of the internal control system, taking into account the specifics of a particular company with all the possible risks.

One of the most important factors of unforeseen circumstances is the external environment and its main characteristics, such as market dynamics and structure, price dynamics, etc. Risks caused by the external environment are of great importance in the risk profile of a commercial company. As a rule, in most situations it is impossible to completely eliminate such risks and it is much more difficult to minimize them. In order to identify risks and carry out subsequent control measures, it is necessary for commercial companies to have a system for monitoring the external environment which will have its own characteristics for each business process. The features of this system should depend on each specific business process.

It is impossible to efficiently implement a procurement process without a clear understanding a company's position in the market and the strategy of the largest players and market analysis, including the regular monitoring of its development.

At the same time, it is important to take into consideration industry specifics, and in each of the industries to determine the areas of analysis specific to a particular industry.

In this context, it is important to develop an integrated scheme for monitoring the external environment aimed at the internal control of procurement processes based on a risk-oriented approach.

4. The Research Results, Its Practical Value, Recommendations and Limitations

4.1. The Development of an Integrated Scheme for the Monitoring of the External Environment, Taking into Consideration the Specifics of the Fat and Oil Industry, for the Internal Control of the Process of Procurement of Businesses Based on a Risk-Oriented Approach

The development of an integrated layout for monitoring the external environment for the purpose of the internal control of the procurement process of businesses was carried out on the example of a fat and oil company. The choice of this organization was due to the growing demand for vegetable oils from the world population. The global demand for vegetable oils has grown 3.7 times since 1990. In the context of oil production for the marketing year (m.y.) 2019–2020, solid oils (palm, palm kernel, coconut) accounted for 42% and 58% were liquid oils.

The Russian oil and fat industry has proven its high competitiveness in the world market and is one of the most dynamically developing sectors of Russian agribusiness. The intensive growth of oilseeds production is due to both internal factors (demand from processing enterprises) and external ones.

Since the Russian oil and fat industry is more focused on the sunflower market, the organization of the oil and fat industry was chosen as the object of research. The study of this market should be linked to key trends in the global production of oils, as well as the place of the sunflower market in the fat and oil industry in Russia, with the aim of monitoring the external environment for internal control purposes.

The studies of researchers such as Adamov N.A. and Gorbacheva M.V. are devoted to the development of the oil and fat industry. (Adamov and Gorbacheva 2018), Ryzhkova S.M. and Kruchinina S.M. (Ryzhkova and Kruchinina 2016), Sukhocheva N.A. (Sukhocheva 2018), and I.V. Chernova (Chernova 2015).

Table 2 presents data on world oil production.

An analysis of the dynamics of the world production of sunflower oil indicates an increase in production. So, in 2019/2020 m.y., 21.5 million tons were produced compared to 8.1 million tons in 1990/1991, i.e., sunflower oil production increased 2.6 times.

In 2020, 7310 thousand tons of oils were produced in the Russian Federation, with imports amounting to 1328 thousand tons and exports to 5070 thousand tons. In 2020, Russia produced oils valued at 378.3 billion rubles, with imports amounting to 78.9 billion rubles exports to 284.0 billion rubles.

Table 2. World production of oils for 1990–1991 m.y. and 2019–2020 m.y., million tons.

Oil Type	1990/1991	2019/2020	Growth Rate, %
Soy	15.8	58.3	368.99
Palm	11.0	73.2	665.45
Rape	8.8	28.0	318.18
Sunflower	8.1	21.5	265.43
Cotton	3.7	5.1	137.84
Palm nut	1.4	8.5	607.14
Peanut	3.3	6.2	187.88
Coconut	2.9	3.6	124.14
Total	55.0	204.4	371.64

Monitoring the external environment should be an integral part of the information model of internal control of the procurement process, assuming the use of digital technologies and business intelligence.

The importance of information about the external environment of the organization, competitors, and market conditions is noted by Baboshkina A.A., Savina N.P., and Morozov I.V. (Baboshkina et al. 2018).

Monitoring the external environment is necessary to reach the goals of the commercial companies' strategy. As an example, a commercial company specialized in sunflower seeds processing was chosen. It is necessary to monitor the external environment relating to the procurement process in order to study the sunflower market, on which the Russian fat and oil industry is more focused.

As a result of the study, it is proposed that in order to improve the monitoring of the external environment aimed at the internal control of the procurement process based on analytical procedures, it is advisable to monitor the external environment for internal control of the procurement process on the basis of big data and business analytics.

It is necessary to constantly collect information (not once a year) using digital techniques.

It is reasonable to track the external environment for the internal control of the procurement process on the basis of big data and business analytics.

Big data is large volumes of structured and unstructured data, to which statistical processing and analytical procedures are applied.

The information base is analytical materials and reviews of the market of oilseeds and their processed products provided by the Institute of Agrarian Market Conjuncture (IAMC), which is an information and analytical agency carrying out a wide range of applied and theoretical research on the development of the worldwide and Russian agricultural and food system, analysis and short-and long-term forecasts for the development of agrarian and food markets in Russia and in the CIS countries. The research conducted by IAMC covers the entire set of the vertical product chain. It is necessary to determine the volume of processed data, the analysis of which is one of the key problems for a particular company.

Monitoring the external environment with the aim of the internal control of the procurement process involves an analysis in the following five key areas.

During our research, these directions of analysis were formed the within the framework of external environment monitoring for the internal control of the procurement process, taking into consideration the specifics of the fat and oil industry and the information base used for analysis, presented in Table 3.

Analytical procedures should be carried out systematically with the purposeful formation of both current and retrospective information in order to identify trends and patterns of market development. It is also necessary to take into account the frequency of receiving information. For example, the Institute of Agricultural Market Conjuncture provides an overview of the market of oilseeds and their processed products once every two weeks. This should be taken into account when designing an environmental monitoring system. In order to monitor the external environment in commercial organizations, price comparison

sites or offers, marketplaces (aggregators), and online store sites can be used when choosing suppliers.

Table 3. Recommended directions of analysis within the framework of external environment monitoring for the internal control of the procurement process, taking into consideration the specifics of the fat and oil industry and the information base used for the analysis.

	Analysis Direction	Information Base
(1)	The analysis of the structure of the per capita consumption of seed oils and fats in the world, as well as the study of the dynamics and structure of oil production in the world and in the Russian Federation.	Data on the per capita consumption of seed oils and fats based in the EU, the USA, the Russian Federation and its structure; Data on the demand for seed oils, on the production of seed oils in natural and value terms, and their dynamics in the world and in the Russian Federation; Data on the structure of oil production in the world and in the Russian Federation, as well as data on major players in the oil and fat market; Data on the export and import of sunflower oil in physical and monetary terms;
(2)	Analysis of sunflower yield by federal districts in the Russian Federation, and also the dynamics and structure of the gross harvest of oilseeds by types.	Data on sunflower yield in the world and in the federal districts of the Russian Federation; Data on the dynamics and structure of the gross harvest of oilseeds in the Russian Federation by type, as well as by federal districts.
(3)	Analysis of the dynamics and structure of seed oil production in the Russian Federation by districts and the largest players in the sunflower oil production market.	Data on the dynamics and structure of seed oil production in the Russian Federation by districts and the largest players in the sunflower oil production market.
(4)	Analysis of operational information on sunflower sowing for grain in farms of all categories in the Russian Federation.	Operational information about the sowing of sunflower for grain in farms of all categories in the Russian Federation.
(5)	Analysis of the market conditions of oilseeds (sunflower), which involves an analysis of prices for sunflower seeds, sunflower stocks by agricultural organizations, and shipments of sunflower seeds.	Operational information on prices for sunflower seeds, sunflower stocks for agricultural organizations, and shipments of sunflower seeds. Data on the dynamics of Russian and world prices for sunflower seeds.

4.2. Features of the External Environment Monitoring Organization, Taking into Account the Specifics of the Fat and Oil Industry, for the Internal Control of the Process of Procurement with the Use of Digital Techniques

Digital transformation provides a change in the business model used by the commercial organization, the most important characteristic of which is to use digital platform solutions in order to create value. As evidenced by the study conducted by Ertz et al. (2021), "The analytics of large data can improve the organizational processes to such an extent that such improvements can significantly improve the company's financial performance". Scientists have established that the use of business analysts has a positive effect on the company's performance, descriptive analytics has a positive effect on profit indicators, and predicative analytics has a positive effect on revenue and profit indicators. Thus, large data, business analysts, and artificial intelligence opens up new features associated with the automation of functions previously performed manually, which helps to increase productivity and reduce the number of unfair activities for employees. In addition, these allow a company to organize the monitoring of the external environment at a new level, the results of which can be used for planning purposes. Employees should have high qualifications and digital skills. In light of increasing data, it is necessary to clearly determine which data

from external sources must be analyzed for planning, control, and making management decisions. Descriptive and predictive analytics are advisable to integrate with planning and internal control processes.

Haugom (2020) studied the concepts and models that involve the use of MS Excel software, since not all organizations could afford the software for price analysis.

Monitoring the external environment within the framework of the internal control system in relation to the procurement process, carried out on the basis of digital techniques, allows for the identifying of risks and how these affect the level of raw material prices. The approaches used by suppliers to form the price of raw materials and the industry-specific features of the procurement process in commercial organizations both determine the most characteristic risks caused by both the reliability of counterparties and the abuse of the top managers of the company when making management decisions. Thus, the constant improvement of the internal control system based on a risk-oriented approach is required. Let us focus in more detail on the fifth direction of the analysis used within the framework of the proposed integrated scheme for monitoring the external environment for internal control of the procurement process, in view of the special importance of issues related to dynamic pricing due to the use of digital techniques.

Internal control in the context of digital transformation should take into account the features characteristic of dynamic pricing. As part of the monitoring of the external environment on the basis of descriptive and predicative analysts, it is advisable to exercise domestic control over the level of prices for purchased commodity and material values, work, and services and on this basis decide on a supplier.

Spann and Skiera (2020) made a great contribution to the development of the economic foundations of dynamic pricing. The scientists note: "Dynamic pricing describes a pricing strategy in which prices for the same product, defined here as a product or service, vary depending on the time of purchase or consumers. The main distinguishing feature of dynamic pricing in comparison with other forms of price differentiation is that the price change is not announced in advance". They distinguish two forms of price differentiation: price differentiation "without independent choice" and price differentiation "with self-selection".

In the context of the digitalization of the economy, the volume of information has significantly increased and communications have changed due to the formation of an interactive environment and the use of digital techniques that contributed to the emergence and development of dynamic pricing. The increase in prices for goods, works, and services that occur randomly for buyers is an example of dynamic pricing and should be the object of analysis and control within the framework of the procurement process of businesses (Bulgakov 2020).

In practice, dynamic pricing can be used to manage the income of the organization. A comparative analysis of forms of price differentiation is represented in Table 4.

Table 4. Comparative analysis of forms of price differentiation (Spann and Skiera 2020).

Comparison Parameters	Price Differentiation "without Independent Choice"	Price Differentiation "with Self-Selection"
Essence	The potential buyer receives his individual price	Potential buyers are offered different versions of the same product and are given the opportunity to choose the product option that is best suited for them at the appropriate price.
Features	High requirements for data quality, acceptability, and the need to ensure non-discrimination from a legal point of view	The need to develop products in different ways based on at least one parameter is perceived by customers as a fairer price differentiation
Principles of division into groups	(a) geographical segments (b) characteristics of the buyer	(a) the time of purchase or use, (b) the quality of the product, (c) the quantity of the product, and (d) the effort required to find cheaper price options
Types of dynamic price changes	Non-interactive (prices are provided by the seller or an intermediary between sellers and buyers), interactive (prices are set by the intermediary/broker based on the use of the platform or trading platform, either by third-party traders on the platform, or through spot pricing	

From the point of view of procurement, it is necessary to analyze possible suppliers, the requirements imposed on them, issues related to data protection, and the features of dynamic pricing, which can lead to wider access to inventory values, works, and services.

Large data could be used in price monitoring in the context of geographic segments. Table 5 presents a fragment of price data on sunflower seeds by region in the Russian Federation as of 20 April 2021, rubles/t.

Table 5. Fragment data on prices for sunflower seeds by region in the Russian Federation as of 20 April 2021, rub./t according to the Institute for Agricultural Market Studies (IKAR).

Region	Purchase Prices of Oil Extraction Plants for Sunflower with VAT the Basis of the CPT Plant			
	Min	Max	Prevailing Price	Last Week
Voronezh region	59,000	63,100	61,500	61,400
Tambov region	59,200	62,300	60,800	61,000
Penza region	59,850	61,600	60,700	60,400
Samara region	60,200	62,000	610,201	61,100
Saratov region	59,600	61,700	60,850	61,000
Republic of Tatarstan	60,350	63,400	62,300	62,150
Volgograd region	59,000	60,150	59,700	60,100
Krasnodar Territory	60,300	65,200	62,500	62,600
Stavropol Territory	60,700	63,500	62,350	62,300
Altai Krai	53,000	55,000	54,000	55,500
Weighted average price in Russia	59,120	61,800	60,570	60,900

It should be noted that the presented data form a number of numerical values characterizing the price for subsequent periods of time, and are used to describe and analyze changes in purchase prices. Arrays of digitally generated data can be used in combination with other databases (for example, data on weather conditions affecting business processes in agricultural and processing companies). With the use of data analytics it will be possible to analyze information about prices in different regions, to forecast prices, and at last to make decisions aimed at implementing effective procurement activity.

These tables allow us to conclude that the weighted average price in the Russian Federation is 60,900 rubles per ton. Prices exceed the weighted average price in the Russian Federation in almost in all of the regions. Only in the Altai Territory, the Penza Region, and the Volgograd Region are prices lower than the weighted average price in the Russian Federation. In the context of the stagnation of prices for sunflower processing products, it is unprofitable to buy raw materials at current prices. Sellers are not ready to lower prices and prices cheaper than 60 thousand/rub. per ton in the European part of the country are rare.

The Institute for Agricultural Market Studies (IKAR) provides weekly information on the dynamics of Russian prices for sunflower seeds in the context of regional (RF, Center, South, Volga, Siberia) and world prices, which can accumulate in the organization. This information allows for the swift tracking of the main trends and changes in pricing. In addition, it is advisable within the framework of an integrated system for monitoring the external environment to use using special software for the purpose of parsing both sunflower oil in catalogues and the websites of potential suppliers. This would entail the automated collection of data on the characteristics of sunflower seeds offered on the market (prices, discounts, grades, packaging, etc.). Parsing provides the generation of leads, prices, and the monitoring suppliers' reputations. Parsing provides high speed data collection, accuracy, and the absence of "human" factor. Parsing in relation to the procurement process in business requires determining a list of potential supplier companies, determining information for parsing (prices, discounts, grades, packaging, regions for data collection, etc.), and determining the frequency of the parsing. Based on the collected data in combination with the data of the Institute for Agricultural Market Studies (IKAR), it is advisable to compare products using data visualization and to make decisions on the choice of suppliers, taking into account the outputs of the KYS procedure. In combination with the parsing results, weekly data from the Institute for Agricultural Market Studies

(IKAR) on the prices of sunflower oil producers, formed in the context of regions and the largest sunflower oil producers, could be applied as well (Table 6).

Table 6. Prices of sunflower oil producers, RUB/kg with VAT on the domestic market for the period 12–18 April 2021 according to Institute for Agricultural Market Studies (IKAR).

Region	Prices for Unrefined Sunflower Oil, Including VAT SFO Prices EXW-Crusher Ind. VAT, RUR/kg		
	Min	**Max**	**Prevailing**
Orel Region			
Joint-stock company "Orelmaslo"	x	x	119.0
Kursk Region			
LLC "Agroresurs"	x	x	117.0
Tula Region			
"Kubanmaslo" Efremovsky Oil Extraction Plant	x	x	x
Voronezh Region	**116.0**	**120.0**	**117.5**
Borisoglebsky Oil and Fat Plant	x	x	118.0
LLC «Olgam»	x	x	120.0
Rossoshansky oil seed plant	x	x	116.0
Narodnensky oil seed plant	x	x	120.0
Tambov Region			
Zherdevsky oil seed plant	x	x	117.0
Lipetsk Region Altair LLC			
"Donskaya Niva"	x	x	121.0
LLC«Altair»	x	x	x
Penza Region			
LLC Penza oil seed plant	125.0	130.0	125.0
Samara Region			
CJSC "Samaragroprompererabotka"	x	x	120.0
Utevsky Oil Extraction Plant	x	x	120.0
Saratov Region			
Atkar Oil Extraction Plant	x	x	120.0
Krasnodar Region	116.0	125.0	118.5
Average for the Russian Federation	116.0	125.0	118.7

The prevailing average price in the Russian Federation is 118.7 rubles/kg with VAT. To conclude contracts with suppliers that provide high-quality inventory items, works, and services at lower prices in comparison with other prices, it is necessary to use big data that allows you to compare prices, to compare a variety of price offers from suppliers, and to control prices for purchased inventory items, works, and services.

The practical significance of the research is in testing the formed integrated monitoring scheme of the external environment, taking into consideration the specifics of the fat-and-oil industry, aimed at the internal control of the procurement process based on a risk-oriented approach within the framework of the developed information model of internal control of the procurement process in a fat-and-oil industry company. The limitations of this scheme are its orientation to a specific industry and business process. For developing an external monitoring scheme for other industries and business processes, it would be necessary to have a deep understanding of their features.

The particularity of the formed integrated environment monitoring scheme is that it takes into consideration the specifics of the fat and oil industry and its application not only within the framework of strategic planning, but also for the internal control of the process of procurement based on a risk-oriented approach. This scheme can be used in companies in the fat and oil industry in relation to the process of procurement (Abramov 2016).

The removal of restrictions on the export of sunflower seeds during the period of active harvesting in the agricultural season of 2020–21 led to threats to the raw material supply of Russian raw processors and created uncompetitive conditions in the world market for foreign producers of fat and oil products, primarily Turkish ones. On the one hand, this provided an additional export channel for agricultural producers, but, on the other hand, it was a loss for the state as a whole in financial terms in the form of taxes to budgets of all levels as well as sales markets for high-margin goods obtained as a result of processing sunflower seeds, i.e., the highly profitable export product, sunflower oil. In the 2019–2020 season, more than 1.2 million tons of sunflower seeds were exported from Russia, due to

which the state did not receive an additional $ 0.5 billion of proceeds within the framework of the "Export of agricultural products" project.

In the context of an increase in the exchange rate and active contracting for the export of sunflower, in the agricultural season of 2020–2021, the volume of sunflower exports significantly exceeded the indicators of the 2019–2020 season, which led to a significant underutilization of processing capacities within the country. As harvesting approached, the process of exporting raw materials intensified, causing an increase in domestic prices for sunflower seeds and reducing the competitiveness of Russian raw processors. Under these conditions, transnational companies exported Russian sunflower seeds, primarily from the and Krasnodar Territory and the Rostov region, to their foreign factories in order to replenish raw materials. So, in the 2019–2020 agricultural year, the export of sunflower grown in the Rostov region and the Krasnodar Territory amounted to 600 thousand tons (350 thousand tons from the Rostov region and 250 thousand tons from the Krasnodar Territory). This accounted for 23% of the volume of sunflower grown in these regions. At the same time, the processing capacity of sunflower in the Rostov region alone is 2.5 million tons per year. Thus, taking into account the export of raw materials, the level of provision for processing enterprises in the Rostov region with regard to sunflower was 51%, and in the Krasnodar region it was less than 30%.

In the 2020/21 season, the situation not only repeated itself, but also worsened significantly due to climatic conditions. At the same time, factories in the southern regions of Russia were forced to carry raw materials from the central regions and the Volga region. In the current conditions, under the influence of external factors, a shortage of raw materials was formed with an increased demand for raw materials from enterprises of the fat and oil industry.

The combination of these negative factors and the lack of regulation of exports by the state led to a sharp unjustified increase in the price of sunflower seeds in the domestic market, the price indicator for which, for agricultural producers, was not the price of sunflower oil in the domestic consumer market, but the price offered by exporters focused on the interests of foreign companies. So, the price of sunflower seeds for a month from October 2020, in the Southern Federal District, grew to 43–44 rubles/ton without VAT, and in the Volga Federal District and Central Federal District this was 41–42 rubles/ton without VAT, which is almost three times higher than the price level of the 2019 season. A similar situation arose in the beginning of the new agricultural season in 2021/22 in the territory of the Rostov region. Due to climatic conditions, the sowing of industrial crops, primarily sunflower, lagged behind the planned level by an average of three weeks. So, on 26 April 2021, in this region, sunflower was sown on 8.5 thousand hectares, which is 26 times less than in the previous period. At the same time, the cold spring and hot summer will significantly affect the yield of sunflower, both in the Rostov region and in the Southern Federal District. These external factors will lead to a shortage of resources for the processing enterprises of the oil industry. As a result, by the beginning of the new harvest in 2021/22, an increased demand for sunflower raw materials from raw processors will be formed on the market, with a low level of offers from agricultural producers, which will lead to an unreasonable increase in prices.

In the current conditions, previously unidentified risks and "blind" zones are beginning to actively manifest themselves, forming new risk profiles, primarily in the informal part of the internal control system, requiring the improvement of control procedures.

5. Discussion and Conclusions

Thus, in the course of the study, methodological recommendations were developed aimed at improving the monitoring of the external environment for the purpose of internal control of the procurement process, involving the use as an information database provided by Rosstat, the Federal Customs Service of the Russian Federation, operational data of ICAR monitoring, and conducted on their basis an enlarged scheme involving: (1) an analysis of the structure of per capita consumption of seed oils and fats in the world

and the dynamics and structure of the world production of seed oils and oil production in the Russian Federation; (2) an analysis of sunflower yield by federal districts in the Russian Federation and the dynamics and structure of the gross harvest of oilseeds by type; (3) an analysis of the dynamics and structure of seed oil production in the Russian Federation; (4) an analysis of operational information on sunflower sowing for grain and data on the sowing of sunflower for grain in farms of all categories in the Russian Federation; (5) an analysis of the market conditions for oilseeds (sunflower), which involved an analysis of prices for sunflower seeds, sunflower oil, sunflower stocks by agricultural organizations, and shipments of sunflower seeds. The use of the proposed analytical procedures contributes to the adoption of rational decisions regarding procurement in order to achieve higher efficiency with regard to the process of procurement in business. In the context of digitalization in commercial organizations, it is necessary to use big data and business analytics when monitoring the external environment for the internal control of the procurement process when developing a digital platform.

Understanding the current state of the sunflower market and the results of external monitoring allows the players of the fat and oil market to strengthen their positions on the basis of developing a strategy that takes into account the peculiarities of the external environment. The use of big data and business analytics contributes to the improved effectiveness of internal control and the achievement of the strategic goals of the organization, allowing it to develop competitive advantages.

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References

Aaker, David. 2003. *Strategic Market Management*. Saint Petersburg: Peter Publishing, 544p.

Abramov, Ruslan. 2015. Management functions of integrative formations of differentiated nature. *Biosciences Biotechnology Research Asia* 12: 991–97.

Abramov, Ruslan. 2016. Regional economic policy based on industrial sector clustering in the context of sustainable development. *Research Journal of Pharmaceutical, Biological and Chemical Sciences* 2: 2100–6.

Abramov, Ruslan, and Maxim Sokolov. 2017. Current challenges and competitive advantages of national innovation systems (NIS) of the countries-participants of the union state up to 2030. *Journal of Advanced Research in Law and Economics* 8: 1031–39.

Abramov, Ruslan, Sergei Tronin, Alexander Brovkin, and Khin Choo Pak. 2017. Regional features of energy resources extraction in eastern Siberia and the far east. *International Journal of Energy Economics and Policy* 8: 280–87.

Adamov, Nikolai, and Marina Gorbacheva. 2018. Oil and fat industry: Current state and development prospects. Cerevitin's Readings. Paper present at the V International Conference, Seoul, Korea, August 27; pp. 3–6.

Akhmetshin, Elvir, Ivan Morozov, Albert Pavlyuk, Alexey Yumashev, Natalya Yumasheva, and Sergey Gubarkov. 2018. Motivation of personnel in an innovative business climate. *European Research Studies Journal* 21: 352–61. [CrossRef]

Alekseeva, Irina, Elena Evstafieva, Marina Charaeva, and Viktoria Mosentseva. 2019. Development Path of Agricultural companies' Internal Control System. *International Journal of Economics and Business Administration* VII. Available online: https://www.scopus.com/sourceid/21100890303 (accessed on 11 June 2021).

Ariba Network. 2020. Procurement-Powered Performance. Available online: https://www.ariba.com/procurement-insights-research?campaigncode=CRM-PR21-XIP-ARIBAPR (accessed on 25 June 2021).

Baboshkina, Anastasia, Natalia Savina, and Ivan Morozov. 2018. Management processes in the development of the socio-economic environment of the region. *Journal of Advanced Research in Law and Economics* 9: 376–85.

Block, Joern, Thurik Roy, and Zhou Haibo. 2013. What turns knowledge into innovative products? The Role of Entrepreneurship and Knowledge Spillovers. *Journal of Evolutionary Economics* 23: 693–718. [CrossRef]

Bogataya, Irina, Elena Evstafyeva, and Denis Lavrov. 2021. Technique for Internal Control of Company's Equity. In *Advances in Digital Science. ICADS 2021*. Edited by T. Antipova. Advances in Intelligent Systems and Computing. Cham: Springer, vol. 1352. [CrossRef]

Bulgakov, Sergey. 2020. Features of internal control of the procurement business process based on digital techniques/ S.A. Bulgakov// Statistics in the modern world: Methods, models, tools. Paper present at the Materials of the International Scientific and Practical Conference, Rostov-on-Don, Russia, May 28; pp. 206–11.

Bulgakov, Sergey. 2021. Methodology for Developing an Information Model of Internal Control of the procurement Business Process with the Use of Digital Techniques Based on a Risk-Oriented Approach//Bulletin of the Altai Academy of Economics and Law. No. 9-1. pp. 28–36. Available online: https://vaael.ru/ru/article/view?id=1835 (accessed on 22 September 2021).

Cangemi, Michael. 2016. Views on internal audit, internal controls, and internal audit's use of technology. *EDPACS* 53: 1–9. [CrossRef]

Charmaine, Barbara, Dominic Cortis, Roberta Perotti, Claudia Sammut, and Antoine Vella. 2017. The European Insurance Industry: A PEST Analysis. *International Journal of Financial Studies* 5: 1–20.

Chernova, Irina. 2015. The state and prospects for the development of the oil and fat industry in Russia. The strategy of innovative development of the agro-industrial complex in the context of the globalization of the economy. Paper present at the Materials of the International Scientific and Practical Conference, Krasnoyarsk, Russia, April 7; pp. 277–82.

Choo, Chun Wei. 1999. The Art of Scanning the Environment. *Bulletin of the American Society for Information Science and Technology* 25: 21–24. [CrossRef]

Competition. 2019. Available online: http://www.premia-zakupki.ru/award/2019/ (accessed on 10 May 2021).

Del Bosco, Barbara, Roberto Chierici, and Alice Mazzucchelli. 2018. Fostering entrepreneurship: An innovative business model to link innovation and new venture creation. *Review of Managerial Science* 13: 1–14. [CrossRef]

Delen, Dursun, and Sudha Ram. 2018. Research challenges and opportunities in business analytics. *Journal of Business Analytics* 1: 2–12. [CrossRef]

Deloitte. 2019. International Study "Common Service Centers"-2019. A Brief Overview. Available online: https://www2.deloitte.com/ru/ru/pages/operations/articles/shared-services-survey-2019.html (accessed on 10 July 2021).

Efremov, Viktor. 2001. *Strategic Planning in Business Systems*. Moscow: Finpress Publ, p. 240.

Ertz, Myriam, Shouheng Sun, and Imen Latrous. 2021. The Impact of Big Data on Firm Performance. In *Advances in Digital Science. ICADS 2021*. Edited by T. Antipova. Advances in Intelligent Systems and Computing. Cham: Springer, vol. 1352. [CrossRef]

Feichter, Christoph, and Isabella Grabner. 2020. Empirical studies of management control-an overview and new trends. Business Administration Z Schmalenbach. *Forsch* 72: 149–81. [CrossRef]

Fleisher, Craig, and Babette Bensoussan. 2009. *Strategic and Competitive Analysis: Methods and Techniques for Analyzing Business Competition*. Moscow: Binom, p. 541.

Ghazinoory, Sepehr, Mansoureh Abdi, and Mandana Azadegan-Mehr. 2011. Swot Methodology: A State-of-the-Art Review for the Past, A Framework for the Future. *Journal of Business Economics and Management* 12: 24–48. [CrossRef]

Grabner, Isabella, and Frank Moers. 2013. Management control as a system or a package? Conceptual and empirical issues. *Accounting Organizations and Society* 38: 407–19. [CrossRef]

Grant, R. M. 2008. *Modern Strategic Analysis*. Saint Petersburg: Peter Publ, 560p.

Grover, Varun, Roger Chiang, Ting-Peng Liang, and Dongsong Zhang. 2018. Creating strategic business value from big data analytics: A research framework. *Journal of Management Information Systems* 35: 388–423. [CrossRef]

Haugom, Erik. 2020. *Essentials of Pricing Analytics: Tools and Implementation with Excel*. London: Routledge, 290p.

Inoue, H. 2021. Propagation of International Supply-Chain Disruptions between Firms in a Country. *Journal of Risk and Financial Management* 14: 461. [CrossRef]

Izvarina, Natalia, Margarita Kovaleva, and Lyudmila Vorozhbit. 2020. Strategic risk analysis of the company as the basis of management decisions for business. *The Eurasian Scientific Journal*, 12, (Online).

Kaya, Idil, Destan Akbulut, and Koray Ozoner. 2018. Big data analytics in internal audit. *PressAcademia Procedia (PAP)* 7: 260–62. [CrossRef]

Khorin, Alexander, and Ekaterina Voronova. 2021. The role of visuals in the communication process. *Filosofija, Sociologija* 32: 69–75. [CrossRef]

Kimura, Fukunari, and Mitsuyo Ando. 2005. Two-dimensional fragmentation in East Asia: Conceptual framework and empirics. *International Review of Economics & Finance* 14: 317–48.

Koshkin, Andrey, Ruslan Abramov, Ekaterina Rozhina, and Andrey Novikov. 2018. Role of social representations in student motivation for acquiring further education. *Interchange* 49: 313–41. [CrossRef]

Kyshtymova, Evgenia, Natalia Parushina, Natalia Lytneva, Andrey Polyanin, and Vladimir Plotnikov. 2018. The value of the company and transformation of its evaluation under the influence of informatization. Paper present at the 32nd International Business Information Management Association Conference, IBIMA 2018-Vision 2020: Sustainable Economic Development and Application of Innovation Management from Regional Expansion to Global Growth, Seville, Spain, November 15–16; pp. 4395–407.

Lee, Alastair. 2021. How to Identify and Monitor External Threats. Available online: https://www.thebci.org/news/how-to-identify-and-monitor-external-threats.html (accessed on 22 August 2021).

Leyden, Dennis. 2016. Public-sector entrepreneurship and the creation of a sustainable innovative economy. *Small Business Economics* 46: 553–64. [CrossRef]

Malerba, Franco, and McKelvey Maureen. 2018. Knowledge-intensive innovative entrepreneurship integrating Schumpeter, evolutionary economics, and innovation systems. *Small Business Economics* 2018: 1–20. [CrossRef]

Martin, Kelly, Abhishek Borah, and Robert Palmatier. 2016. The dark side of big data's effect on firm performance. In *Marketing Science Institute Working Paper Series*. New York: MSI Publishing, pp. 16–104.

McKelvey, Maureen, Olof Zaring, and Stefan Szücs. 2019. Conceptualizing evolutionary governance routines: Governance at the interface of science and technology with knowledge-intensive innovative entrepreneurship. *Journal of Evolutionary Economics* 30: 1–18. [CrossRef]

McMaster, May, Charlie Nettleton, Christeen Tom, Belanda Xu, Cheng Cao, and Ping Qiao. 2020. Risk Management: Rethinking Fashion Supply Chain Management for Multinational Corporations in Light of the COVID-19 Outbreak. *Journal of Risk and Financial Management* 13: 173. [CrossRef]

Morozov, Ivan, Yulia Potanina, Sergey Voronin, Natalia Kuchkovskaya, and Mapo Dare Siliush. 2018. Prospects for the development of the oil and gas industry in the regional and global economy. *International Journal of Energy Economics and Policy* 8: 55–62.

Ni, Hao, Xiao Zhou, Sherry Hoskinson, and Donald F. Kuratko. 2017. Innovative Pathways for University Entrepreneurship in the 21st Century. *Higher Education* 74: 1117–20. [CrossRef]

Pech, Robert. M. 2016. Achieving the innovative edge in technology, engineering design, and entrepreneurship. *Journal of Innovation and Entrepreneurship* 5: 1–6. [CrossRef]

Popovich, Ales, Ray Hackney, Rana Tassabehji, and Mauro Castelli. 2018. The impact of big data analytics on firms' high value business performance. *Information Systems Frontiers* 20: 209–22. [CrossRef]

Protiviti. 2017. Internal Audit Capabilities and Needs Survey. Available online: https://www.protiviti.com/sites/default/files/united_states/insights/2017-internal-audit-capabilities-and-needs-survey-protiviti.pdf (accessed on 12 July 2021).

Quendler, Erika, and Mangirdas Morkūnas. 2020. The Economic Resilience of the Austrian Agriculture since the EU Accession. *Journal of Risk and Financial Management* 13: 236. [CrossRef]

Ryzhkova, Svetlana, and Valentina Kruchinina. 2016. The Russian market of fat and oil products in a competitive environment. *Voronezh State University of Engineering Technologies Bulletin* 2: 314–22. [CrossRef]

Spann, Martin, and Bernd Skiera. 2020. Dynamic Pricing in the Digital World. *Business Administration Z Schmalenbach, Forsch* 72: 321–42. [CrossRef]

Sukhocheva, Nadezhda. 2018. Formation of business processes in the fat-and-oil subcomplex as a factor in providing the region with food. *Bulletin of Agrarian Science* 1: 100–6. [CrossRef]

Sun, Zhaohao, Lizhe Sun, and Kenneth Strang. 2018. Big data analytics services for enhancing business intelligence. *Journal of Computer Information Systems* 2: 162–69. [CrossRef]

Suyts, Viktor, Aleksander Khorin, and Yulia Potanina. 2019. Change from economic analysis to operational analytics and corporate analysis in innovative entrepreneurship. *Academy of Entrepreneurship Journal* 15: 1.

Sykes, Nathan. 2020. 5 Companies Using Big Data and AI to Improve Performance. Available online: https://www.kolabtree.com/blog/5-companies-using-big-data-and-ai-to-improve-performance/ (accessed on 18 August 2021).

Tabuena, Jose. 2021. What Every Internal Auditor Should Know About Big Data. Available online: https://www.complianceweek.com/what-every-internal-auditor-should-know-about-big-data/15849.article (accessed on 18 August 2021).

Tang, Fengchung, Carolyn Norman, and Valaria Vendrzyk. 2017. Exploring perceptions of data analytics in the internal audit function. *Behaviour & Information Technology* 11: 1125–36.

Thompson, Arthur, Jr., and Alonzo Strickland III. 2002. *Strategic Management: Concepts and Cases*. Moscow: Publ. House Williams, p. 928.

Vázquez, M., S. Peter van der, and Jose Fernando. 2010. Innovative and creative entrepreneurship support services at universities. *Service Business* 4: 63–76. [CrossRef]

Wissema, Hans. 2000. *Strategic Management in Entrepreneurship: Opportunities for Future Prosperity*. Moscow: Finpress, 272p.