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Shum Alina
Doctor of Economic Sciences, Associate Professor,
Professor of Department of Accounting and Finance
National Technical University
"Kharkiv Polytechnic Institute", Kharkiv, Ukraine
2, Kyrpychova str., Kharkiv, 61002, Ukraine
e-mail: alina.shum@khpi.edu
ORCID ID: 0000-0003-2948-6238

Development of control and audit systems in the context of population aging: integration of risk management, socio-economic imperatives and adaptation strategies

Abstract.The article examines modern systems of internal control and audit in enterprises in the context of population aging. The research object covers corporate governance mechanisms, risk management, and internal audit, all of which play a key role in ensuring organizational resilience amid demographic changes. Special attention is given to the specific risks associated with age-related structural changes in personnel and their impact on management effectiveness.

Problem statement. The main problem lies in the fact that traditional systems of control and audit often prove inadequately adapted to new demographic challenges such as an aging workforce, which introduces cognitive, motivational, technological, and succession risks. This necessitates a revision of existing risk management and control approaches.

Unresolved aspects of the problem. Open questions remain regarding the integration of the demographic factor into risk management systems, as well as the development of adaptive internal control and audit mechanisms that would ensure flexibility and effectiveness amidst changes in the age structure of personnel.

Purpose of the article. The purpose of the article is to analyze the development of internal control, audit, and risk management systems in the context of population aging, as well as to identify ways to optimize these systems in order to improve the efficiency of enterprise management.

Presentation of the main material. The paper systematizes four major categories of risks inherent to aging personnel: cognitive, technological, succession, and motivational. Functional differences between internal control, risk management, and internal audit subsystems are described. The stages of the risk management process and the roles of governance bodies at each stage are outlined, as are European trends concerning the socio-economic challenges of population aging.

Conclusions. The research substantiates the feasibility of adapting control systems to demographic shifts, which can increase economic efficiency, reduce operational risks and costs, and improve employee satisfaction. Strategies for integrating risk management into corporate governance practice are proposed to prevent the negative consequences of age-related personnel changes.

Keywords: *risk management, internal control, internal audit, population aging, socio-economic challenges, risk governance, corporate governance, retirement age.*

JEL Classification: J11, M42, G32.

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Introduction. Modern demographic trends, characterized by the steady aging of the population, represent one of the most significant challenges for the socio-economic systems of developed countries. The decline in the share of the working-age population, increased pressure on pension systems, and the redistribution of budget expenditures in favor of social needs create a complex set of problems that require systemic solutions. In the context of these changes, improving mechanisms of internal control, audit, and risk management becomes especially relevant, as they are key elements in ensuring the sustainability of enterprises and the economy as a whole.

The research problem lies in the need to adapt existing control and risk management systems to new demographic realities. Traditional approaches oriented toward stable labor resources need to be reconsidered given the increasing role of older age groups in economic activity. The relevance of the topic is intensified not only by demographic shifts but also by their direct impact on corporate governance, financial stability, and social policy at all levels of public administration.

The purpose of this work is to analyze modern internal control and audit systems in the context of population aging and to develop recommendations for their optimization. Special attention is given to the integration of risk management, socio-economic imperatives, and adaptation strategies aimed at improving governance efficiency under changing population age structures.

The study relies on the theoretical foundations of internal control models such as the Three Lines Model, as well as on the analysis of statistical data and sociological research reflecting demographic trends in the EU and other developed countries. The results obtained may be of practical value for business leaders, auditors, policymakers, and civil servants who develop sustainable development strategies under conditions of population aging.

This work can contribute to solving a relevant scientific and practical problem by offering a comprehensive approach to adapting control and audit systems to the demographic challenges of the present.

Literature review. The issue of demographic aging and its impact on socio-economic systems, including corporate governance, control, and audit, is the subject of active study in modern academic literature. Research in this area covers a wide range of approaches—from the analysis of demographic trends to the development of adaptive models for risk management and internal control.

European and international organizations such as Eurostat and the OECD provide extensive data on demographic changes. For example, Eurostat [4] forecasts a significant increase in the proportion of the population over 65 in EU countries by 2070, which will lead to greater pressure on pension systems and a reduction in the share of the working-age population. The OECD [7] emphasizes that these trends require a revision of social and economic policies, including measures to increase labor productivity and adapt the labor force. These studies form the basis for understanding the macroeconomic challenges associated with population aging.

The theoretical foundations of internal control and risk management are developed in the works of authors such as Aebi, Sabato, and Schmid (2021), who analyze the relationship between corporate governance and organizational resilience in times of crisis. The Three Lines Model, proposed by The Institute of Internal Auditors (2024), is one of the most widely used concepts in this field. It provides for the division of control functions between operational management, the risk management function, and internal audit, offering a comprehensive approach to risk management. However, as Mikes (2016) points out, traditional models need to be adapted to new challenges, including demographic changes.

Empirical studies by Brandt (2024) show a rise in economic activity among individuals over 65 in Europe, driven by both financial motives and the desire to remain socially active.

The classification of risks associated with an aging workforce includes cognitive, technological, succession, and motivational aspects. Jamet and El-Atillah (2023) note that older workers often demonstrate high productivity, particularly under remote work conditions, but face

challenges in adopting new technologies. Power (2015) emphasizes the importance of organizational culture and adapting control systems to minimize these risks.

Studies by Seimuskane et al. (2017) and Vorslava et al. (2014) explore the socio-political dimensions of population aging, such as declining trust in government institutions and reduced electoral participation, which, although indirectly, significantly affect economic decision-making. In Japan, as shown by Statista (2025), the high level of participation by older people in the workforce is linked to cultural and economic factors, which necessitates consideration of regional and sectoral specifics in the development of management strategies.

The issue of population aging and its impact on control and audit systems is examined in a global context, taking into account a variety of theoretical and practical approaches. Key directions for future research may include the adaptation of internal control models to demographic challenges and the development of age-oriented strategies at various levels of governance, considering regional and sectoral characteristics. These studies may form the foundation for comprehensive solutions aimed at enhancing the resilience of economic entities and public institutions in the face of demographic changes.

Purpose, objectives and research methods. The purpose of this study is to develop approaches for adapting internal control, audit, and risk management systems to the conditions of demographic aging, ensuring the sustainable development of enterprises in changing socio-economic conditions.

The main objectives of the study:

– analysis of current demographic trends and their impact on corporate governance;

– assessment of the effectiveness of existing internal control models (particularly the Three Lines Model) in the context of an aging workforce;

– identification of specific risks associated with age-related changes in personnel structure;

– development of recommendations for modernizing risk management systems considering the demographic factor;

– formulation of strategic directions for adapting control, audit activities, and governance to new challenges.

The methodological framework of the research is based on an integrated approach combining:

– theoretical methods: a systematic analysis of internal control concepts (COSO, ISO 31000); analysis of internal control, internal audit, risk management, and corporate governance models; a review of contemporary theories of internal control, internal audit, and risk management;

– empirical methods: statistical analysis of demographic data (Eurostat, OECD, national statistical agencies).

The source base includes: 45 scientific publications (2015–2024) from peer-reviewed journals; 12 international reports on demography and corporate governance; regulatory documents (EU directives, audit standards).

A distinctive feature of the methodology is the integration of demographic and managerial approaches, which enables the development of comprehensive solutions that take into account both the economic and social dimensions of the issue.

Research results. The conducted study revealed the multifaceted impact of demographic aging of personnel on the effectiveness of internal control and risk management systems. There is a correlational relationship between the age structure of staff and the performance indicators of control activities. An increase in the proportion of employees over the age of 55 leads to longer execution times for control procedures, which is accompanied by a parallel increase in the frequency of documentation errors. This confirms the hypothesis that traditional control mechanisms need to be adapted to the changing demographic reality.

Of particular interest are the findings from the assessment of the Three Lines Model's effectiveness under conditions of workforce aging. The study identified a marked imbalance in the

distribution of control functions under demographic changes when applying the Three Lines Model: a decline in the effectiveness of the first line of defense (operational management) in teams dominated by older personnel, alongside a growing importance of the second line (risk management) and increased burden on internal audit services. These changes call for a reassessment of traditional approaches to the allocation of control powers and resources within organizations.

In our view, four key categories of specific risks characteristic of aging workforces can be identified: cognitive risks (related to age-associated changes in information processing speed); technological risks (due to resistance to digital transformation); succession risks (loss of expert knowledge when older personnel retire); motivational risks (declining engagement and professional activity).

Each of these categories requires the development of specialized control mechanisms and risk management procedures.

In response to contemporary demographic challenges, the modernization and adaptation of control and internal audit systems may include the implementation of rotational mentoring systems (demonstrating increased knowledge transfer effectiveness), the use of gamification elements in control procedures (which enhance staff engagement), and the employment of digital control assistants (which reduce the number of errors). These measures may have significant practical implications for organizations facing the issue of an aging workforce.

The economic efficiency of such measures may be reflected in the reduction of operational risks and lower costs of control procedures, along with increased employee satisfaction indexes. These findings support not only the organizational but also the economic feasibility of adapting internal control systems to demographic changes.

The outlined directions may be appropriate not only from an organizational perspective but also from an economic one in adapting internal control and internal audit systems to demographic shifts. The results obtained can contribute to the development of corporate governance theory, expanding the understanding of the relationship between demographic factors and control system effectiveness. The identified patterns lay the foundation for the creation of new, more adaptive internal control models that take current demographic trends into account.

Discussion. In recent years, the trend toward increasing complexity and acceleration of financial and economic activities and business operations at all levels has continued to intensify. This imposes specific requirements on management, which must align with rapidly changing conditions and respond promptly and appropriately to emerging challenges.

Alongside the development of management systems, control systems are also evolving. The control system is an integral part and a subsystem of the overall management system. The control system must fully correspond to the management system and address the tasks assigned to it. This is a fundamental requirement for an effective management system.

The establishment and effective functioning of an internal control and risk management system are aimed at ensuring the efficient operation of the overall management system, providing reasonable and sufficient assurance that the enterprise’s management objectives will be achieved within planned resource and time constraints, and ensuring proper control over the company’s operations and performance.

Currently, the internal control and risk management system built on the Three Lines Model has become widely adopted and used (Fig. 1).

Figure 1 presents the basic structure of the internal control and risk management system based on the Three Lines Model.

The first line consists of management, which is responsible for internal control and risk management of business processes.

The second line is the internal control and risk management function, aimed at monitoring and supporting management and helping to establish an effective internal control and risk management system within the organization.

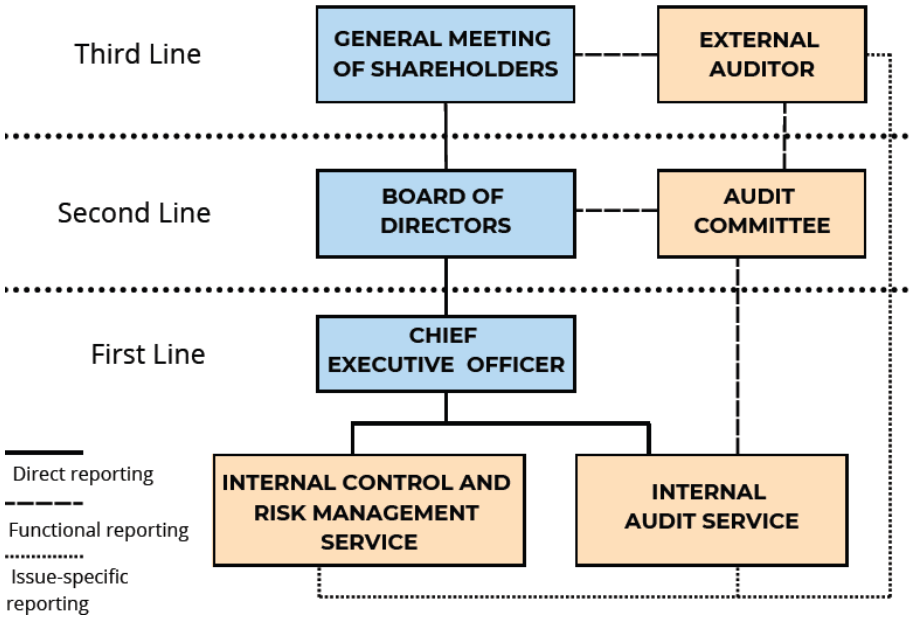

Figure 1. Diagram of the internal control and risk management system based on the Three Lines Model
Source: prepared by the author

The third line is the internal audit function, which provides an independent assessment of the internal control and risk management system.

The Audit Committee is a collegial advisory body of the Board of Directors. Its primary role and objective are to facilitate the effective performance of the Board of Directors' functions in overseeing the enterprise's financial and operational activities. In its operations, the Audit Committee and its members are guided by applicable legislation, the Regulations on the Audit Committee (approved by the General Meeting of Shareholders), and the internal documents of the enterprise.

The functions of the Audit Committee include:

– monitoring the completeness, accuracy, correctness, and reliability of the enterprise's accounting (financial) reporting;

– overseeing the reliability and effectiveness of the internal control and risk management system;

– ensuring the independence and objectivity of external and internal audits;

– supervising the effectiveness of mechanisms for identifying, preventing, and reporting to management any actual or potential cases of misconduct by company employees or third parties, as well as other violations occurring within both the internal and external environments of the enterprise.

The internal control and risk management unit is an independent structural division of the enterprise, operating in accordance with the Regulations on the Unit, the Internal Control Policy, the Risk Management Policy, internal corporate documents, and applicable legislation. The unit and its head report directly to the CEO (chief executive officer) of the enterprise. The head of the unit is appointed by the CEO. Functionally, the unit is connected to the Audit Committee.

The Internal Control and Risk Management Unit performs the following key functions:

– organizing and coordinating the internal control and risk management processes;

– identifying and monitoring violations and deviations from management decisions, risks and risk indicators, creating and maintaining an up-to-date risk map;

– assessing risks and developing proposals for risk prevention or management in cooperation with business process management;

– analyzing business processes to improve their control mechanisms.

The Internal Audit Unit is an independent structural division of the enterprise, operating in accordance with applicable legislation, the Internal Audit Policy, and internal corporate documents. The unit and its head are administratively subordinate to the CEO of the enterprise. The head of the unit is appointed by the CEO. Functionally, the unit is connected to the Audit Committee.

The Audit Committee reviews, develops, and approves policies in the field of internal audit, long-term and current internal audit plans, and together with the head of the internal audit unit, evaluates and approves the unit's resources and budget, and assesses the effectiveness of its activities.

The Internal Audit Unit carries out the following main functions:

– evaluating the effectiveness of the internal control and risk management system, as well as corporate governance;

– developing actions and recommendations to improve the internal control and risk management system, its procedures, and corporate governance, and assisting management in developing corrective measures based on audit results, including providing advisory support;

– monitoring the implementation of recommendations to eliminate deficiencies and violations identified during audits;

– delivering consulting services;

– providing methodological support for internal audit;

– executing audit plans.

The Audit Committee of the Board of Directors is responsible for submitting recommendations to the General Meeting of Shareholders regarding the appointment, reappointment, or dismissal of the external auditor. The Committee evaluates the candidates and remuneration of the external auditor, including their qualifications, independence, objectivity, and compliance with the principles governing the provision and combination of audit and non-audit services.

The management process is realized through various functions, including control. Control provides feedback between the subject and object of management. Together with accounting (recordkeeping), control creates the information base for management decision-making. Based on the essence of governance, the senior management of the enterprise is responsible for establishing and maintaining an internal control and risk management system and for informing stakeholders in a timely manner about all existing risks arising from the enterprise's activities.

Internal audit is an integral and essential part of the internal control and risk management system. It is closely linked to both the internal control system and the broader management system of the enterprise. These systems are interconnected, interdependent, and mutually reinforcing. However, in modern business practice, internal audit is usually an organizationally distinct and independent structure that performs its own functions within the unified internal control system – a subsystem of the overall management system.

Internal audit acts as an independent expert function on internal control and risk management at all levels. It also serves as a source of objective, independent information for the enterprise's owners and all levels of management, including senior executives.

In current practice, risk assessment is considered a process of identifying, classifying, and analyzing risks. Risk is inherent in all economic and financial activities at all levels. There is a wide variety of risks, many of which are interrelated, but all ultimately impact the enterprise's economic and financial performance, and therefore require evaluation and management. This necessitates the existence of an organizational structure capable of identifying risks in a timely manner and creating management mechanisms to eliminate their consequences or, at a minimum, reduce them to an acceptable level.

From a risk management perspective, the structural characteristics of risk (threat, exposure, vulnerability, risk interdependence) are considered within the context of the interaction between the internal and external environments of the enterprise – or more broadly, the business.

At the current stage of development of internal control and risk management theory, it is the internal and external environments of the enterprise, the internal and external risks, and their interactions that shape the internal audit environment. The extent and quality of risk management by the enterprise's management system are key indicators of management effectiveness. An organizationally distinct internal audit unit operates in accordance with current legislation, internal regulatory documents, job descriptions, and its own charter. Typically, the internal audit unit is responsible for monitoring and analyzing the enterprise's financial and business activities.

When establishing such a unit, it is important to define a broad set of strategic objectives and tasks and to develop general, localized, and specific audit objectives. A comprehensive analysis of the enterprise's activities and identification of weaknesses in internal control, risk management, and governance systems determines the role of the internal audit unit within the overall organizational structure and its level of integration and interaction with other departments.

For effective functioning, the internal audit unit requires the detailed development of local regulatory documents governing its operations [11], including: Internal Audit Charter; Operating Policy; Internal Audit Standards; Job descriptions for internal auditors and unit staff; Error classifiers and risk registries; and more.

Control measures must be prepared to such an extent and of such quality that they ensure clarity for each control action of the internal auditor, eliminating any ambiguity in the understanding of assigned goals and objectives.

It is important to recognize that decision-making and risk management lie within the competence of the enterprise's management system, while internal audit monitors and evaluates the effectiveness of management, internal control, and risk management systems.

From a risk management standpoint, the greatest effectiveness can be achieved when risks are clearly identified and defined, and specific procedures and methods can be applied to prevent, eliminate, or reduce their consequences to acceptable levels. In both theory and practice, three main approaches are distinguished:

– the first – developing a system of measures to monitor the internal and external environment in order to detect and identify risks for their prevention and avoidance;

– the second – minimizing or eliminating the effects of risks associated with economic activities. This is typically linked to the creation of internal and external reserve or insurance funds. However, it should be noted that this diverts resources from active operations and immobilizes them indefinitely, negatively affecting financial and economic results;

– the third – using managerial decisions to turn risk situations into additional income or competitive market advantages through innovative and unconventional strategies.

To build an adequate risk management system, enterprise leadership must have access to essential accounting and analytical control information, provided by the accounting system, internal control system, and internal audit. In turn, the internal control and risk management system and internal audit must not only provide data on existing and potential risks but also deliver recommendations to prevent, eliminate, or reduce those risks to acceptable levels.

The internal audit system should assess the reliability and effectiveness of the enterprise's management system, internal control system, and risk management system, including all their subsystems and the company's business processes. The internal audit system should contribute to achieving both the strategic and tactical objectives of the economic entity and ensure the identification and prevention of risks.

Any enterprise or activity – whether in business or another field – goes through different stages of maturity. At each stage of development, the owners and management set priorities for the list of goals relevant to that activity and allocate resources accordingly. Regardless of the scale and

type of activity, form of ownership, or business organization, every venture is subject to risks that may hinder the achievement of its goals. Therefore, these risks must be managed.

At the same time, both the implementation of strategy (or project) and the achievement of defined goals – as well as risk management itself – require resources whose use must be monitored. The main difference between internal audit and related fields such as internal control and risk management lies in its independence, which is the key prerequisite for the objectivity required of an auditor. The criteria applied to risk management, internal control, and internal audit are presented in Table 1**.**

Table 1. Criteria applied to risk management, internal control and internal audit

Criteria	Risk management	Internal control	Internal audit
Reporting line	Part of management, an integral part of the enterprise management system	A subsystem of management, part of the management system	Independent from management Evaluates the management system and provides recommendations for improving effectiveness
Maintaining internal control and risk management systems	Directly involved in maintaining internal control and risk management systems	Directly involved in maintaining internal control and risk management systems	Independently assesses the effectiveness of internal control and risk management procedures and systems overall
Improvement of internal control and risk management systems	Develops and implements improvement measures; responsible for them	Develops and implements improvement measures. Responsible for them	Develops recommendations. Provides consulting and expert support
Reporting	Reports to various levels of management	Reports to various levels of management	Reports to senior executive management, board of directors, and shareholders

Source: prepared by the author

The activities related to the organization and functioning of the internal control and risk management system, the internal audit system, as well as the rights, responsibilities, and accountability of the main participants in the risk management process, are presented in Table 2.

At present, no control system can fully (with 100% certainty) guarantee the detection and prevention of violations or deviations in financial and economic activities, nor can it ensure absolute accuracy and correctness of financial reporting. No control system is immune to collusion. The practice of economic and business activity confirms this. Violations of various types, including those with severe and far-reaching consequences, occur at all levels constantly and systematically. The operational experience of the "Big Four" auditing firms clearly illustrates this. Therefore, the improvement of control activities at all levels is one of the key tasks in both the theory and practice of control, and in economic and commercial activity as a whole.

One of the promising directions for improving the effectiveness of control activities is the upskilling of control personnel and the enhancement of their moral and ethical standards.

Currently, the population aging process continues, primarily in economically developed countries. This trend is strongly evident in EU countries, and it has negative economic, social, and other consequences.

According to EU reports from 2024, some well-substantiated development trends for EU countries up to 2070 can be clearly identified [4, 21]:

– there is a steady increase in the proportion of older population segments (65+), while the share of age groups under 45 in the overall working-age population is declining. The ratio of the working-age population to the non-working-age population is showing an extremely negative trend;

– public expenditures for social needs of the non-working population are rising, with pension payments accounting for a significant portion of these expenses;

– GDP growth in almost all EU countries is expected to rely primarily on increased labor productivity, which is projected at around 0.5–1.5%. This may not be sufficient to offset the growing costs of social spending, especially pensions.

Table 2. Stages of the risk management process and role of governance bodies

Process stage	Shareholders' meeting	Board of directors	Management	Internal control division	Risk management division	Internal audit
Strategic goal setting	Sets strategic goals; defines acceptable decision-making and resource use boundaries for the board and management	General oversight of the adequacy and effectiveness of internal control and risk management systems. Approval of the most significant decisions; ensuring the conditions necessary for creating an effective control environment. Administrative support for the management system, internal control system, and risk management system. Provision of resources to ensure the proper functioning of the management system, internal control system, and risk management system	Responsibility for setting strategic objectives, developing a plan to achieve them, and ensuring its implementation	Promotion of the internal control system. Supports and, within this framework, is responsible for achieving the objectives set by the enterprise's management system and management	Promotion of risk management systems; analysis of the relevance of strategic objectives	Promotion of the concept of the internal control system and risk management system; audits of methodologies and methodological support for systems and processes of risk identification, specification, scale, and probability
Risk identification and quantification			Identification and approval of risks, their magnitude, and probability	Provision of necessary information to management and risk management units, as well as other forms of support	Methodology and methodological support for systems involved in the risk identification process, their specification, scale, and probability	Promotes risk management and internal control methodology; audits systems and processes for identifying and quantifying risks
Defining goals and identifying risks			Breaking down strategic objectives into operational ones; risk identification and approval of the risk register	Informational and other support for management and risk management units	Risk identification methodology and detection of risks; analysis of operational objectives for alignment with the strategy	Audit and analysis of operational objectives for alignment with the strategy, their methodological support, and consultations
Risk assessment			Risk assessment and approval of assessment results	Informational and other support for management and risk management units	Risk assessment and assessment methodology	Independent evaluation of methodologies and risks during annual planning and specific audits
Response strategy development and risk management			Development and approval of measures	Informational and other support for management and risk management units; consultations when participation in activities is required	Development of measures, consultations during the development process, and analysis of the adequacy of selected measures	Consultations during the development of measures, and analysis of the adequacy of the selected measures

Table 2. (continued)

Implementation of the risk response strategy, introduction of risk management methods, and control of procedures			Implementation of measures	Informational and other support for management and risk management; participation in implementation and control of activities if necessary	Participation in the development of measures and control over their implementation	Control of implemented measures and analysis of the adequacy of the outcomes of those measures
Information and communication			Preparation of reports on the effectiveness of measures and their results, risk management system performance, and coordination of risk management across all levels of hierarchy and among all departments of the enterprise	Information support; preparation of reports on the effectiveness of activities and their outcomes, the performance of the risk management system, and coordination of risk management across all levels of hierarchy and between all departments of the enterprise	Preparation of reports; reporting on the effectiveness of measures and their outcomes, risk management system performance, and coordination of risk management across all levels of hierarchy and departments of the enterprise	Preparation of independent reports on the effectiveness of the enterprise management system, internal control system, and risk management system
Monitoring risk management systems			Preparation of improvement measures for the internal control and risk management system; implementation of corrective actions	Information support; preparation of measures to improve the internal control and risk management system; implementation of corrective actions	Monitoring of implemented measures; development of improvement measures for the internal control and risk management system; implementation of corrective actions	Monitoring of implemented measures; independent reports on the adequacy and effectiveness of internal control and risk management systems based on the results of the monitoring

Source: prepared by the author

It is important to note that this category of the population, in addition to significant material incentives for active economic participation, also has strong moral motivation, which can positively and significantly impact both their individual economic activity and the economy as a whole.

The decision of people aged 60 and over to continue working is driven by a number of factors. The main reason is the desire to remain physically and mentally active – 65% of respondents in the United Kingdom and 56% in Poland cited this as their primary motivation [9, 15]. Financial considerations also play an important role: in 2024, 63% of respondents in Germany named this as their main reason [17]. Social factors are also significant – 56% of German respondents wish to maintain social interaction [17]. However, similar trends can be observed to varying degrees in other EU countries and the EU as a whole [2, 3, 14, 16]. Many older adults (45% in the UK) simply enjoy their work [15]. Concerns about insufficient pension benefits also motivate continued employment – 30% of Britons and 44% of Poles mentioned this [9, 15]. In Japan, there has been a rise in the participation of older people in the labor force – in 2024, 26.1% of the population aged 65 and over were still working [13]. Interestingly, in Canada, remote workers aged 51–64 were found to be more productive than their younger colleagues [18], which may further encourage older adults to continue their careers.

One more significant point can be noted, in our view. Namely, among older workers there is a higher proportion of self-employed individuals compared to other age groups. Thirty-eight percent of people aged 65–74 are either self-employed or independent employers, compared to 13% of those aged 25–64. The share of self-employed workers rises to 57% among those over 75 [5].

From our point of view, it is necessary to highlight and take into account several phenomena that lie within the social and political sphere, and the domain of state-building, but which significantly influence the economy at all levels – from macro to micro. These phenomena are interrelated and mutually reinforcing. The trends in question are as follows:

1. in many countries, there is growing concern over the decline in voter turnout across all types of elections [10];
2. public trust in state institutions and governance structures is low, including in European Union member states [20].

These trends have a substantial impact on economic decision-making at all levels of the economy and governance. The issue of population aging – the exclusion of a significant portion of the population (aged 65 and over) from active and social life – negatively affects the aforementioned trends, which in turn exacerbates economic challenges.

An increase in the economically and socially active segment of the population would, in any case, have a positive effect on the economic and social development of both the economy and society as a whole.

The reintegration of a portion of these individuals into active, including economic, life could bring several benefits – not only for the individuals themselves but also for the economy and society more broadly. In our view, the implementation of this approach could:

– significantly ease the burden of budgetary funding for the social sector;

– strengthen the economic position of this demographic group, which could stimulate and expand consumer goods and service markets, acting as a driver and accelerator of overall economic growth;

– the growth of the economically active population may positively impact business development and the economy as a whole.

The implementation of this approach could largely be achieved by educating this segment of the population in the advances of scientific and technological progress – primarily through digitalization, computer and gadget literacy, and the development of communication skills, including foreign language training. This education could be followed by employment opportunities, which would help solidify the acquired knowledge and skills, offset training costs, and serve as a stage for reintegration into professional, economic, and social life.

Conclusions. The conducted research has made it possible to formulate a number of fundamentally new propositions that contribute significantly to the development of the theory and practice of corporate governance. The scientific novelty of the study lies primarily in the development of the concept of age-adaptive internal control, which for the first time systematically incorporates the demographic factor as a key element of control system effectiveness. The established quantitative relationships between the age structure of personnel and the parameters of control activities represent a significant outcome that expands the understanding of organizational mechanisms in the context of an aging workforce. Of particular note is the classification of specific risks associated with age-diverse teams, which fills a previously existing theoretical gap in the research on the intersection of demography and risk management.

The theoretical significance of the study is manifested in several aspects. First, the work advances traditional models of internal control (specifically, the Three Lines Model), adapting them to contemporary demographic realities. Second, the findings enable a rethinking of the role of age diversity in organizational effectiveness, offering new avenues for research in human resource management. Third, the study contributes to the theory of organizational adaptation by demonstrating concrete mechanisms through which management systems adjust to external challenges.

The practical value of the research is confirmed by concrete economic outcomes resulting from the implementation of the proposed solutions. The introduction of age-oriented approaches to control organization enables companies not only to mitigate the negative impacts of demographic shifts but also to unlock the potential of older employees. The socio-economic effect of implementing the proposed measures includes: increased business resilience through optimized control processes, reduced costs associated with control errors and deficiencies, and improved organizational climate due to fuller utilization of the professional experience of older age groups.

Future research prospects can be identified in several directions. The issue of finding the optimal balance between automation of control processes and retention of expert judgment from senior specialists requires in-depth exploration. The study of industry-specific characteristics of the identified patterns, particularly in high-tech sectors, also merits attention. An important research direction is the development of comprehensive models for assessing the economic efficiency of age-adaptive control systems, taking long-term effects into account. Moreover, examining the impact of the proposed approaches on the innovative potential and competitiveness of organizations amid global demographic change appears highly promising.

This research opens new horizons for scholarly inquiry at the intersection of demography, management, and control theory, offering both theoretical concepts and practical tools for organizations facing the challenges of an aging workforce. The findings lay the groundwork for the development of a new academic field focused on adapting corporate governance systems to the demographic changes of the 21st century.

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Аліна Шум
доктор економічних наук, доцент
професор кафедри обліку і фінансів
Національний технічний університет
«Харківський політехнічний інститут»
вул. Кирпичова, 2, м. Харків, 61002, Україна
e-mail: alina.shum@khpi.edu
ORCID ID: 0000-0003-2948-6238

Розвиток систем контролю та аудиту в умовах демографічного старіння: інтеграція ризик-менеджменту, соціально-економічних імперативів та адаптаційних стратегій

Анотація. Стаття досліджує сучасні системи внутрішнього контролю та аудиту на підприємствах у контексті старіння населення. Об'єктом дослідження є механізми корпоративного управління, управління ризиками та внутрішній аудит, які відіграють ключову роль у забезпеченні організаційної стійкості в умовах демографічних змін. Особлива увага приділяється специфічним ризикам, пов'язаним зі структурними змінами в персоналі через вік, та їхньому впливу на ефективність управління.

Постановка проблеми. Основна проблема полягає в тому, що традиційні системи контролю та аудиту часто виявляються недостатньо адаптованими до нових демографічних викликів, таких як старіння робочої сили, що вводить когнітивні, мотиваційні, технологічні та ризики спадкоємства. Це вимагає перегляду існуючих підходів до управління ризиками та контролю.

Нерозв'язані аспекти проблеми. Відкритими залишаються питання щодо інтеграції демографічного фактора в системи управління ризиками, а також розробки адаптивних механізмів внутрішнього контролю та аудиту, які б забезпечували гнучкість та ефективність в умовах змін у віковій структурі персоналу.

Мета статті. Метою статті є аналіз розвитку систем внутрішнього контролю, аудиту та управління ризиками в контексті старіння населення, а також виявлення шляхів оптимізації цих систем з метою підвищення ефективності управління підприємством.

Виклад основного матеріалу. У статті систематизовано чотири основні категорії ризиків, притаманних старіючому персоналу: когнітивні, технологічні, ризики спадкоємства та мотиваційні. Описано функціональні відмінності між підсистемами внутрішнього контролю, управління ризиками та внутрішнього аудиту. Окреслено етапи процесу управління ризиками та ролі органів управління на кожному етапі, а також європейські тенденції щодо соціально-економічних викликів старіння населення.

Висновки. Дослідження обґрунтовує доцільність адаптації систем контролю до демографічних зрушень, що може підвищити економічну ефективність, зменшити операційні ризики та витрати, а також покращити задоволеність працівників. Запропоновано стратегії інтеграції управління ризиками в практику корпоративного управління для запобігання негативним наслідкам вікових змін у персоналі.

Ключові слова: *ризик-менеджмент, внутрішній контроль, внутрішній аудит, демографічне старіння, соціально-економічні виклики, управління ризиками, корпоративне управління, пенсійний вік.*

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