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CURRENT ECONOMIC ISSUES IN THE CONTEXT OF GLOBALISATION: MATHEMATICAL MODELLING IN THE MANAGEMENT OF ECONOMIC SYSTEMS AND ECONOMIC POTENTIAL

АКТУАЛЬНІ ПРОБЛЕМИ ЕКОНОМІКИ В УМОВАХ ГЛОБАЛІЗАЦІЇ: МАТЕМАТИЧНЕ МОДЕЛЮВАННЯ В УПРАВЛІННІ ЕКОНОМІЧНИМИ СИСТЕМАМИ ТА ЕКОНОМІЧНИМ ПОТЕНЦІАЛОМ

Petro G. Pererva, Doctor of Economics, Professor
National Technical University "Kharkiv Polytechnic Institute", Kharkiv, Ukraine
Higher School of Labour Safety Management – WSZOP, Poland
 ORCID: 0000-0002-6256-9329
 Email: pgpererva@gmail.com

Serhii M. Pohorielov, PhD, Professor
National Technical University "Kharkiv Polytechnic Institute", Kharkiv, Ukraine
 ORCID: 0000-0003-0868-2002
 Email: Serhii.Pohorielov@kphi.edu.ua

Stanislav V. Suslikov, PhD, Assistant Professor
National Technical University "Kharkiv Polytechnic Institute", Kharkiv, Ukraine
 ORCID: 0000-0001-5779-7610
 Email: Stanislav.Suslikov@kphi.edu.ua

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Перерва П.Г., Погорелов С.М., Сусліков С.В. Актуальні проблеми економіки в умовах глобалізації: математичне моделювання в управлінні економічними системами та економічним потенціалом. Науково-методична стаття.

У статті досліджено актуальні проблеми функціонування економічних систем в умовах глобалізації та обґрунтовано необхідність застосування математичного моделювання для ефективного управління економічним потенціалом. Автори підкреслюють роль кількісних методів у процесі прийняття управлінських рішень, прогнозування економічної динаміки та адаптації до викликів зовнішнього середовища. Здійснено аналіз сучасних підходів до побудови економіко-математичних моделей, їх застосування в макро- та мікроекономічному контекстах, а також визначено напрямки вдосконалення моделювання у цифрову епоху. Запропоновано інтегрований підхід до математичного моделювання управління економічними системами та економічним потенціалом забезпечує багаторівневу аналітику, системну гнучкість і високий ступінь адаптивності до зовнішніх викликів. Зроблено висновок про доцільність інтеграції математичних моделей у систему стратегічного управління для забезпечення сталого розвитку економіки.

Ключові слова: глобалізація, актуальні проблеми, економічні системи, економічний потенціал, математичне моделювання, прогнозування, економіка

Pererva P.G., Pogorielov S.M., Suslikov S.V. Current Economic Issues in the Context of Globalisation: Mathematical Modelling in the Management of Economic Systems and Economic Potential. Scientific and methodical article.

The article deals with the current issues of the functioning of economic systems in the context of globalisation and substantiates the need to apply mathematical modelling for effective management of economic potential. The authors emphasise the role of quantitative methods in the process of managerial decision-making, forecasting economic dynamics and adaptation to the challenges of the external environment. The analysis of modern approaches to constructing economic and mathematical models, their application in macro- and microeconomic contexts, as well as directions for improving modelling in the digital era, has been made. An integrated approach to mathematical modelling of managing economic systems and economic potential has been proposed, which provides multilevel analytics, system flexibility and a high degree of adaptability to external challenges. The study concludes that integrating mathematical models into strategic management systems can significantly contribute to sustainable economic development.

Keywords: globalisation, current issues, economic systems, economic potential, mathematical modelling, forecasting, economics

An the modern context of globalisation, the economy is undergoing qualitative transformations accompanied by growing interdependence between countries, dynamic development of market processes, increased competition and uncertainty in the external environment. Globalisation processes encompass all the areas of human activity, including the economy, which necessitates the formation of new approaches to the management of economic systems [1]. These challenges necessitate a rethinking of approaches to economic system management, as well as the development of new methodological tools for analysis, forecasting and management decision-making. Globalisation is leading to increased competition, changes in market structures, increased international financial flows and more complex logistics and production chains. In such conditions, issues related to improving the effectiveness of economic management based on objective, quantitatively sound

methods of analysis and forecasting become particularly relevant. The application of mathematical modelling in economics is becoming particularly relevant, as it allows not only to simulate the functioning of complex systems, but also to optimise management at both the macro and micro levels. Mathematical models provide a formalised approach to the analysis of economic processes, contributing to the improvement of public administration, the development of innovative activities and scientific projects [1, 2]. Mathematical modelling as a management tool allows identifying patterns in the functioning of complex economic systems, assessing their potential and forming effective development strategies. It ensures decision-making based on systematic analysis, taking into account the interrelationships between subsystems and the influence of the external environment. The application of models is particularly important during periods of instability, transformational change and crisis, when traditional management tools lose their effectiveness [3, 4].

Modern economic science faces the task of integrating quantitative analysis methods into the processes of strategic planning, risk assessment, and development scenario planning [5, 6]. In the conditions of uncertainty and rapid change, modelling allows the creation of adaptive management systems capable of responding effectively to global challenges. Meanwhile, scientific projects, which are playing an increasingly important role in the innovation economy, require tools for accurate performance assessment, resource optimisation and forecasting of results, which can also be achieved through mathematical modelling [7]. Thus, research into current economic issues in the context of globalisation using mathematical tools is extremely important and timely. It opens up new horizons for the effective management of economic systems, forms the basis for scientifically sound decision-making, and promotes the development of interdisciplinary research in the fields of economics, mathematics and management. The relevance of the research is determined by the need to improve the tools for managing the economy in the context of globalisation, increase the accuracy of forecasting the dynamics of economic processes, and utilise the economic potential of regions and states as a whole. This requires a systematic scientific approach to researching the issues and opportunities of mathematical modelling in economics.

Analysis of recent researches and publications

The study of current issues in the Ukrainian economy is at the centre of scholarly attention for many researchers. In [1], a systematic approach to economic mathematical modelling is proposed as an autonomous field, which, through its scientific and applied nature, links "economic theory – economic policy – economic practice – economic potential". The author emphasises the importance of creating "model passports" to unify and organise models as research subjects. The researcher D.B. Oleksenko [8] reveals classical methods – linear, integer, dynamic programming and econometric modelling as a tool for making managerial decisions in conditions of risk and uncertainty. The publication [9] offers a mathematical model of economic potential with an open economy, which is dedicated to the dynamics of non-equilibrium processes in global systems. The article by L.V. Kovalenko [10] uses the analysis of world trade networks with personalised PageRank to model the international spread of crises. The authors reveal that taking indirect trade links into account significantly increases the accuracy of assessing economic shock transmission. The study [6] examines the modelling of human capital development in the context of globalisation. Economic and mathematical modelling is used to identify incentives and barriers to investment in human capital in Ukraine, such as the demographic crisis, migration, educational inequality, etc. The results are recommended to be taken into account when formulating public policy for the sustainable development of an innovative economy.

A number of works [2, 7, 11] focus on authors who propose techniques for making transformational and managerial decisions: adaptive-rational forecasting, system-dynamic modelling of economic potential, genetic algorithms in supply chains, modelling of financial potential, tax equalisation of regional disparities, etc. Thus, an analysis of existing publications reveals a clear potential for interdisciplinary research that integrates econometrics, network analysis, system dynamics, and management modelling, drawing on best practices from both global and local contexts.

Unsolved aspects of the problem

Despite the availability of a significant number of studies and publications, the current disclosure of the article's subject matter has certain limitations. Firstly, there is a disconnect between the local and global perspectives: Ukrainian models are mainly applied at the local level, while foreign publications are not adapted to the Ukrainian context. Secondly, the interdisciplinary approach is fragmented – the full integration of mathematical modelling into the management of scientific projects and economic potential has not yet been developed. Thirdly, there is a lack of standardisation of tools – there was a desire to introduce a 'model passport' as a structural attribute, but its imperative nature has not yet been formally established. That is why the proposed article aims to combine the conceptual achievements of local research with global approaches (trade networks, human capital modelling) and create a unified methodology for the mathematical management of economic systems and economic potential, including adaptive models, development scenarios, performance assessment tools, and model passports.

The aim of the article is to develop an integrated approach to the mathematical modelling of the management of economic systems and economic potential in the context of globalisation. Within the scope of this objective, it is planned to systematise modern methods of economic and mathematical modelling, adapt foreign models to the national economic context, create a structured management model that combines dynamic, probabilistic and optimisation elements, and justify the feasibility of using such models to improve the effectiveness of managerial decisions in complex systems.

Methodology. In the research process, a set of theoretical and applied methods was used, in particular, the method of system analysis – for the study of components of economic systems and their interrelationships; economic and mathematical modelling – to formalise resource management processes, projects and organisational structures; optimisation methods – to build decision-making models in the conditions of limited resources and multiple criteria; scenario analysis and risk modelling – to take into account uncertainty and assess possible options for the development of events; comparative analysis – to study existing scientific approaches to modelling at the national and international levels; data visualization and structural modelling – to graphically represent relationships and action sequences within the proposed model. The proposed approach is based on an interdisciplinary synthesis of economics, mathematics, management and information technologies, which allows for a reflection of real processes in the modern globalised environment as accurately as possible.

The main part

In the modern globalised world, economic systems are becoming increasingly complex and multifaceted. This necessitates new forms of management that are scientifically sound, adaptable to changes in the external environment and aimed at ensuring sustainable development. Mathematical modelling plays a special role in this process, allowing us to build formalised representations of complex socio-economic processes and make optimal decisions based on quantitative analysis. In this regard, an integrated approach is needed that combines different types of models, risk assessment tools, dynamic scenarios and knowledge management methods within a single scientific and methodological framework.

The main components of an integrated approach to mathematical modelling of economic systems and scientific projects in the context of globalisation are presented in Figure 1.

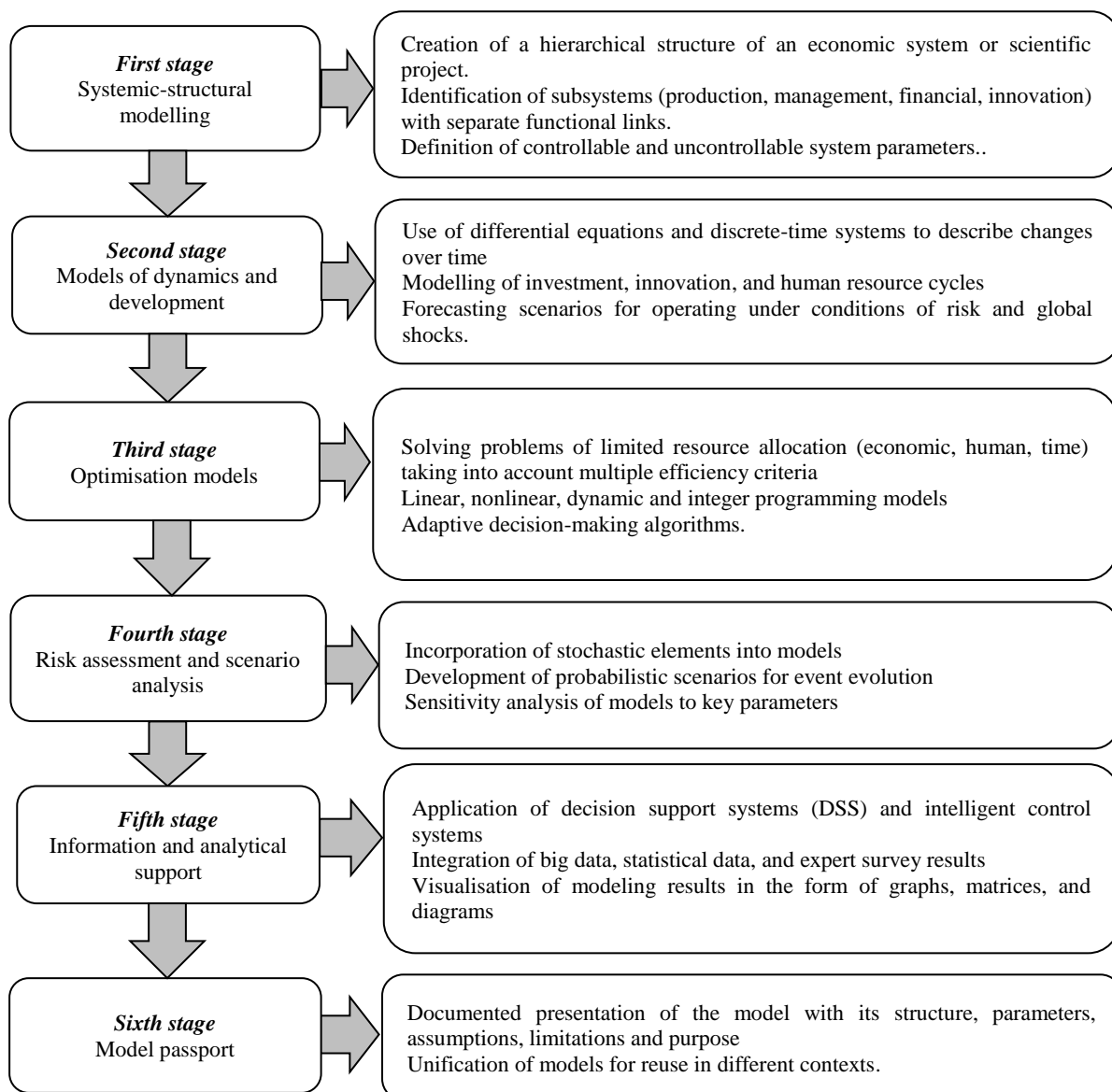


Figure 1. A Mathematical Model of Economic Systems and Economic Potential Management in the Context of Globalisation

Source: authors' own elaboration

Systemic-structural modelling is a basic element of an integrated approach to managing complex economic systems and scientific projects. Its essence lies in the formalised division of a holistic object into interconnected subsystems, the definition of their functions, structural interactions, and management hierarchy. This allows complex socio-economic entities to be modelled as controllable multi-level systems.

We propose that the main principles of systemic-structural modelling should include the following:

- the principle of integrity: the model covers all functional elements of the economic system – production, consumption, innovation, finance, management, human resources, etc.;
- the principle of hierarchy: the system is presented as a multi-level structure, where each level has its own goals, resources, and management tools;
- the principle of controllability: the parameters that can be influenced by the management entity (controlled variables) and those that are determined by the external environment (uncontrolled) are clearly distinguished.
- the principle of integration: the model takes into account not only the internal interaction of the system elements, but also their connection with the external globalised environment.

The structurally proposed model includes management entities (the state, enterprises, project managers, investors), management objects (the economic system or scientific project as a whole), subsystems (financial, production, organisational, innovative, informational), input variables (external factors and resources – capital, labour, technology), output parameters (efficiency, productivity, profitability, innovation), management goals (optimisation, sustainability, adaptability, and innovative development). At the same time, all subsystems are connected by feedback loops, the system structure forms information and resource flows, ‘decision centres’ are defined to coordinate actions within subsystems, and structural matrices (e.g., controllability matrix or influence matrix) are introduced to formalise the relationships between system components.

It is necessary to identify the basic advantages of using this system in the context of globalisation. In our opinion, these include scalability – the model can be adapted to different levels, from local enterprises to intergovernmental systems; flexibility – it allows responding to changes in the global environment by restructuring internal structures; management transparency – clearly defined relationships and hierarchies ensure better coordination between the system participants. The practical implementation of the model includes visual modelling – creating graphical diagrams of system structures; formalisation – describing system elements using mathematical logic and algebraic equations; scenario modelling: studying how changes in one subsystem affect the overall dynamics; stability analysis – assessing how resistant the system is to external influences. Thus, systemic-structural modelling acts not only as an analytical tool, but also as a conceptual framework within which economic processes and scientific projects can be optimally designed, adapted and managed in a changing globalised environment.

Models of dynamics and development are a key element of the mathematical tools used to analyse and manage economic systems and economic potential in the context of globalisation. Their essence lies in describing changes in the state of a system over time under the influence of both internal and external factors. Such models allow predicting system behaviour, evaluating the effectiveness of managerial decisions, identifying critical points of development, and forming adaptive response strategies. In our opinion, deterministic dynamic models are the most widely used. They are based on systems of differential or difference equations that describe changes in key indicators over time (e.g., production, investment, consumption, income; the Solow model for GDP growth, the optimal resource management model). Stochastic development models take into account the influence of random factors (global risks, political uncertainty, inflation, etc.). They are used to model the behaviour of systems in conditions of incomplete information or an unstable environment. Simulation models enable experiments to be conducted on a virtual copy of the system, allowing for the analysis of potential consequences of management decisions. In particular, agent-based modelling is used to analyse the interaction of project participants or the economic environment. Scenario-based development models are built on alternative hypotheses regarding external conditions (economic crisis, technological breakthroughs, changes in regulatory policy) and demonstrate how different strategies affect the dynamics of the system. The practical application of dynamic models makes it possible to predict the results of managerial decisions; identify bifurcation points, i.e. moments when radical changes in system behaviour are possible; adapt to changes in the global environment; and assess the long-term sustainability of projects and policies. Dynamic models are linked to the systemic-structural core of the general management model. They form the basis for modules for optimisation, risk assessment and decision-making. Through regular calibration based on real data (economic statistics, project metrics), dynamic models serve as a bridge between theory and practice. Thus, models of dynamics and development are a key strategic management tool that allows not only to analyse the current state of the system, but also to build its future, taking into account changes in the global context, internal transformations, and available managerial resources.

Optimisation models are an integral tool for mathematical modelling of economic systems management, especially in the context of globalisation, which is characterised by competition for resources, market instability and constant technological change. Their essence lies in finding the best (optimal) solution from a set of possible options, taking into account limited resources and specified management goals. Optimisation models allow maximising profit, productivity, and innovative potential; minimising costs, risks, and resource losses; balancing multi-criteria goals in systems with conflicting constraints (economic efficiency versus social stability, environmental safety, etc.). Various types of programming models are used as optimisation models. Linear programming is used for models where the objective function and constraints are linear. It is used for resource allocation, production planning, and logistics optimisation. Non-linear programming takes into account the

complex relationships between variables that are characteristic of economic models with economies of scale, synergies, or external influences. Dynamic programming is used in time-dependent tasks (investment strategies, phased project financing, human capital development). Integer programming is important for situations where variables only take integer values (e.g., number of departments, machines, people). Multi-criteria optimisation allows several objective functions to be considered simultaneously. For example, simultaneously increasing innovation activity and reducing the risk of bankruptcy.

The structural elements of optimisation models include the objective function: an economic variable to be optimized (profit, efficiency, productivity); constraints: resources, budgets, regulatory limits, technical or social conditions; controlled variables: parameters to be adjusted (investment volume, number of employees, share of innovation costs); global environment parameters: prices, exchange rates, customs barriers, risks. Optimisation models make it possible to assess the actual level of economic potential utilisation, identify optimal development directions (such as diversification, internationalisation, and automation), and define parameters for the effective growth of the economic system under external constraints.

It should be noted that optimisation models form the analytical basis for rational management of economic systems and development potential in conditions of constant global transformation. They provide a holistic view of the resource balance, promote the effective use of potential and create the conditions for sustainable economic growth.

In conditions of growing global instability, unpredictability of the external environment and rapid change, risk assessment and scenario analysis are becoming critically important components of mathematical modelling for managing economic systems and utilising their economic potential. Risk assessment is the process of quantitatively and qualitatively identifying, analysing and measuring probable negative events that may affect the functioning of the economic system or the realisation of economic potential. Exogenous risks (global crises, political conflicts, currency fluctuations, changes in external markets) are widely used in managing economic systems and economic potential, endogenous risks (internal organisational failures, inefficient resource management, personnel problems), innovative risks (failure of innovations, unprofitability of research projects), and systemic risks (chain reactions in interdependent subsystems). For their assessment, mitigation, and prevention, we propose using classic probabilistic assessment (determining the mathematical expectation of losses); the Monte Carlo modelling method (statistical simulation of a large number of scenarios); sensitivity analysis for identifying the most influential parameters of the system; SWOT, PESTEL, FMEA, i.e. qualitative approaches for identifying risk areas.

Scenario analysis is the construction of alternative models of events based on a combination of internal variables and external influencing factors. It makes it possible to forecast the consequences of various management strategies, adapt the system to uncertain conditions, and assess the boundaries of stable functioning of an economic system. Different types of scenarios are used, among which the most common are the following. Baseline (inertial) is the development along the current trajectory without changes; optimistic means maximum use of potential under favourable external conditions; pessimistic includes taking into account a deep crisis, reduction of resources and negative trends; stress scenarios model extreme conditions for testing the stability of the system. Using scenarios in modelling economic potential allows identifying the limits of potential utilisation under various external and internal conditions; allows the creation of adaptive management models that automatically respond to changes in scenario conditions; forms anti-crisis mechanisms and ways to maintain stability; ensures the reliability of forecasts that take into account not only the average value but also extreme cases.

In our opinion, risk assessment and scenario analysis within the system of managing economic systems and economic potential in the context of globalisation form a critically important module in the structure of modern mathematical models for managing economic systems. They ensure strategic predictability, anti-crisis readiness and a high level of adaptability in a globalised economic environment.

Information and analytical support is a key infrastructure for mathematical modelling, determining the completeness, reliability and timeliness of managerial decisions in a dynamic global environment. Within the structure of an economic system management model, information and analytical support performs the functions of integrating input data, conducting analytical processing, modelling scenarios, and delivering results to users in a convenient and practical form. The structural components of information and analytical support include data sources:

- official statistics (national statistics agencies, international economic databases); institutional sources (World Bank, IMF, OECD, WTO); internal information systems of enterprises; big data streams (Big Data): open APIs, economic sensors, behavioural data, financial platforms;
- technological infrastructure: decision support systems (DSS); databases and cloud storage; analytical platforms (Power BI, Tableau, Qlik); intelligent systems based on artificial intelligence (machine learning, neural networks);
- analytical tools: econometric packages (EViews, Stata, R, Python); time series analysis methods, regression models, clustering; visualisation of scenarios and process dynamics; dashboards for displaying KPIs and risks in real time.

The following can be identified as the most important functions of information and analytical support:

- data collection and validation – filtering, cleansing, and verifying data for compliance with standards;
- support for model parameterisation – adjusting mathematical models using current input values;

- automated monitoring – continuous observation of key indicators;
- scenario modelling – launching alternative scenarios with dynamic updates;
- deriving recommendations – transforming analytical results into practical management advice.

The role of information and analytical support in managing economic potential is centred on assessing the actual level of potential utilisation through analysis of resource, production, human resource and innovation indicators, analysis of imbalances and reserves to identify underutilised or inefficiently used resources, information support for strategic forecasting – identification of trends, growth points, global opportunities, risk management – early warning of critical deviations and threats.

Information and analytical support acts as the digital ‘nerve centre’ of the economic model, ensuring its adaptability, predictability and manageability in a globalised, dynamic, and risky environment. Effective information and analytical support is a prerequisite for the sustainable development of both local and national economic systems.

In the structure of modern mathematical models designed to manage complex economic systems and their development potential, the model passport acts as a formalised descriptive document that records the key characteristics, structure, operating logic and conditions of applying the relevant model. The model passport ensures its reproducibility, transparency, compatibility with other tools, and ease of implementation for users – from scientists to managers. The main purpose of the model passport is to standardise the description of models within a research or management environment; formalise model parameters, allowing it to be accurately reproduced, adapted or updated; control the compliance of the model with the tasks set and the type of system; simplify the transfer and use of the model among researchers, analysts and institutions.

Within the structure of modern mathematical models designed for managing complex economic systems and their development potential, the model passport serves as a formalised descriptive document that records the key characteristics, structure, logic of operation, and conditions for applying the respective model. The model passport ensures its reproducibility, transparency, compatibility with other tools, and ease of implementation for users – from scientists to managers. Table 1 provides a detailed description of the structural elements of the model passport, which can be universally applied to mathematical models used in the management of economic systems and economic potential.

Table 1. Detailing of Structural Elements of the Model Passport

Passport element	Detailed description
1. Model title	A formalised name that reflects the content of the model, the object and the type of task. For example: "Model for Optimising the Innovation Potential of an Industrial Cluster".
2. Author/developer	Name of an author (or a group), an academic supervisor, affiliation, and contact information. This makes it possible to identify the source of the development.
3. Purpose/objective of a model	The specific purpose for which the model was created: resource optimisation, forecasting dynamics, evaluating effectiveness, analysing risks, etc.
4. Object and subject of modelling	Object – what exactly is being modelled (economic system, project, industry); subject — what properties or processes are being studied (financial stability, investment efficiency, etc.).
5. Model class	The type of model is specified according to formal characteristics: linear/nonlinear, stochastic/deterministic, static/dynamic, single-stage/multi-stage
6. Construction method	Definition of the mathematical basis: system of equations, objective function, variable normalisation method, method of constructing constraints, etc.
7. Solution algorithm	Selected solution method: simplex method, dynamic programming, Lagrange method, genetic algorithm, machine learning, etc.
8. Input variables (input)	A complete list of input parameters with units of measurement, data source (statistics, expert assessments, automated sensors).
9. Controlled variables	These are the parameters that can be influenced during optimisation or management (for example, investment share, production volume, and number of employees).
10. Results (output)	The main results generated by the model are target function values, forecasts, performance indicators, and development scenarios.
11. Model limitations	A list of restrictions imposed on variables or goals – physical, regulatory, economic (e.g., budget, enterprise capacity, acceptable risks).
12. Hypotheses and assumptions	Formalised assumptions on which the model is based: consistency of certain parameters, ignoring factors, and simplification of structure.
13. Scope of application	Determining the conditions and tasks for which the model is recommended for use — strategic planning, industry analysis, and public policy.
14. Programme implementation	Clarification: in which environment is the model implemented (Excel, Python, R, MATLAB, AnyLogic, DSS systems). If possible, include a reference to the code or module.
15. Accuracy and validation	Model reliability assessment: errors, confidence intervals, methods of accuracy verification (calibration, verification, comparison with empirical data).
16. Date of creation and update	The initial development date and the most recent modification date are specified, which makes it possible to monitor the relevance of the model.
17. User interface (if available)	A brief description of user interaction, including whether the model takes the form of a calculator, web application, visualisation, or documentation.

Source: authors' own elaboration

Regarding recommendations for maintaining the passport, we emphasise that the model passport should be accompanied by brief instructions for use. It is important to periodically review and update the passport as changes occur in the structure or input assumptions. It is advisable to store the passport in PDF and editable DOCX formats for distribution among researchers or managers.

The role of the passport in the globalised management model is quite significant. It allows for the generalisation of approaches to modelling economic systems in different contexts (national, transnational, sectoral); due to its standardised description, the model can be applied within related industries (management, finance, ecology); it forms the basis for creating digital twins of economic systems with the possibility of modifications and scenario testing; the passport allows models to be audited for reliability, logical integrity and mathematical correctness.

The practical value of the model passport for managing economic potential lies in documenting the initial assumptions, which is critically important under conditions of external environmental change; in tracking the evolution of the model within the dynamic context of globalisation; and in organising models within knowledge management systems, analytical platforms, and decision support systems (DSS).

In our opinion, a model passport is an important tool for managing the model lifecycle. In a globalised world, where managerial decisions are made based on complex data and under conditions of high responsibility, the model passport ensures the reliability, scalability and communication convenience of mathematical tools.

Conclusions

Summarising the research results, it should be noted that mathematical modelling is a key factor in improving the efficiency of economic systems management in the context of globalisation. It allows not only to adequately describe the current state of the economy, but also to predict future changes, taking into account numerous internal and external factors. Introducing mathematical models into management practice contributes to more informed decision-making, the formation of adaptive strategies, the optimisation of resource potential and increased competitiveness of economic entities. In a global context, this is becoming a necessary condition for ensuring the sustainable development of both individual countries and the global economy as a whole.

The proposed integrated approach to mathematical modelling of managing economic systems and economic potential provides multi-level analytics, systemic flexibility and a high degree of adaptability to external challenges. This approach allows strategic planning, operational management, and crisis response to be combined into a single toolkit. Its implementation will contribute to improving the effectiveness of managerial decisions, the transparency of scientific planning, and the soundness of state economic policy in the context of globalisation. Further scientific studies should be aimed at adapting existing models to conditions of uncertainty, integrating economic and mathematical methods with digital technologies (Big Data, AI), and developing new methodological approaches to assessing economic potential and its effective application.

Abstract

The article examines the current issues of management of economic systems and the use of economic potential in the context of globalisation through the prism of mathematical modelling. Globalisation processes create a high level of economic interdependence, uncertainty and competition, which requires new approaches to analysis, forecasting and managerial decision-making. The authors propose an integrated approach to mathematical modelling, which covers six key components: system-structural modelling, models of dynamics and development, optimisation models, risk assessment and scenario analysis, information and analytical support, and the concept of the model passport.

The current issues of the functioning of economic systems in the context of globalisation have been investigated, and the need for using mathematical modelling for effective management of economic potential has been substantiated. The authors emphasise the role of quantitative methods in the process of managerial decision-making, forecasting economic dynamics and adaptation to the challenges of the external environment. The analysis of modern approaches to the construction of economic and mathematical models, their application in macro- and microeconomic contexts, as well as directions for improving modelling in the digital era, has been made. An integrated approach to mathematical modelling of managing economic systems and economic potential has been proposed, which provides multilevel analytics, system flexibility and a high degree of adaptability to external challenges. It has been concluded that it is expedient to integrate mathematical models into the system of strategic management to ensure sustainable development of the economy. Within the framework of systemic-structural modelling, a hierarchical decomposition of economic systems into functional subsystems with a clear definition of manageable and uncontrollable variables has been presented. Models of dynamics have been used to reflect temporal changes in economic processes, forecast development scenarios and adapt to global disturbances. Optimisation models allow formalising the tasks of resource allocation, effective potential management and strategic planning. Methods of quantitative risk assessment, the use of scenario analysis and the construction of alternative development options in conditions of uncertainty have been applied.

Information and analytical support is considered as an infrastructural modelling base that combines data sources, analytical platforms and visualisation tools. The implementation of the model passport is defined as a mandatory element for the unification, transparency, scalability and reproducibility of models in different

industries and at different levels of management. The article forms theoretical and applied foundations for the creation of adaptive management models that can be effectively used both in macroeconomic policy and in corporate strategising. The results obtained are of practical significance for specialists in economics, project management, public administration, and digital modelling, and they also provide a basis for further interdisciplinary research.

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