

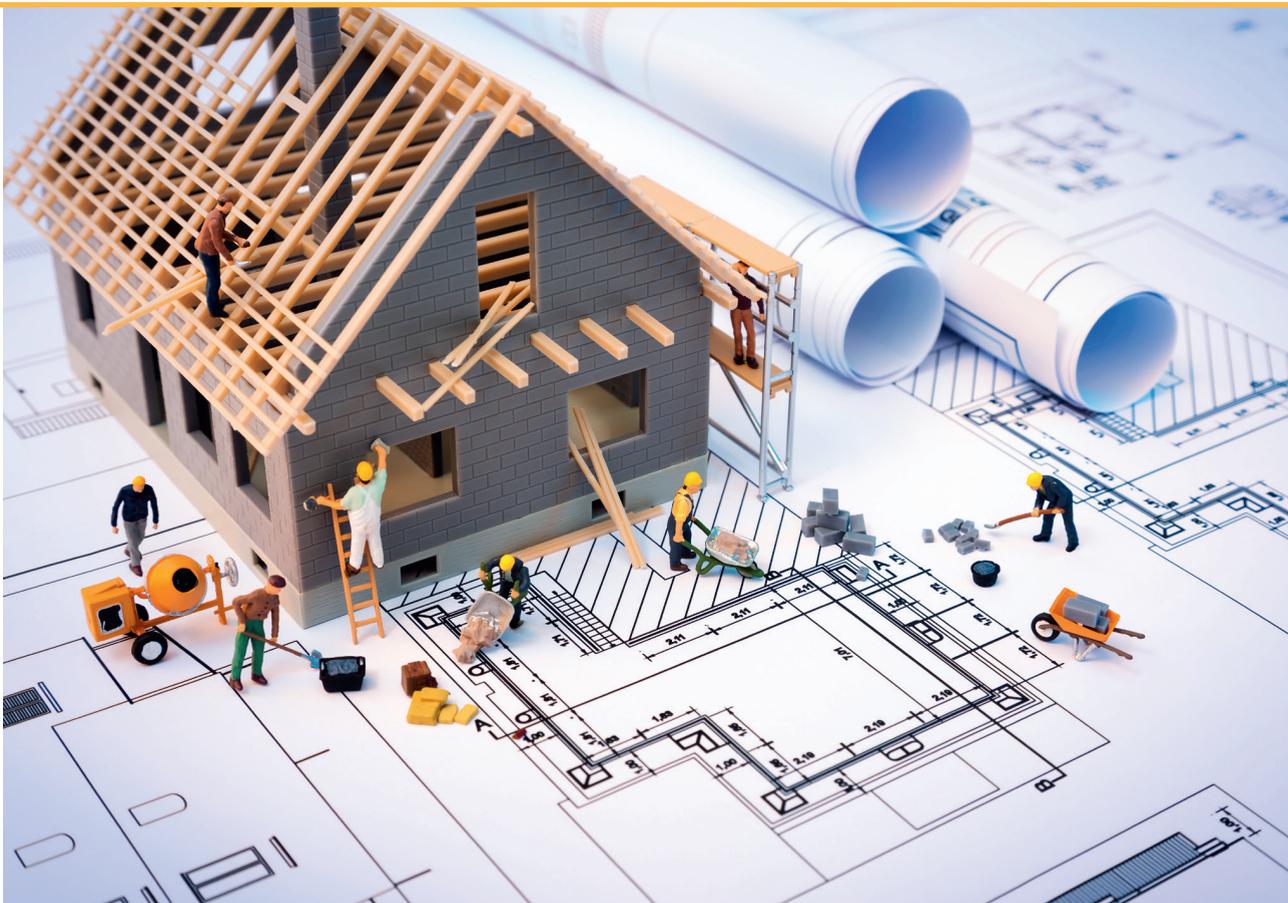


RIGA TECHNICAL  
UNIVERSITY

Iveta Amoliņa

# MANAGEMENT SYSTEM OF MULTI-APARTMENT RESIDENTIAL BUILDINGS IN THE CONTEXT OF SUSTAINABLE CONSERVATION

Summary of the Doctoral Thesis



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RIGA TECHNICAL UNIVERSITY  
Faculty of Engineering Economics and Management  
Institute of Civil Engineering and Real Estate Economics

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Professor Dr. oec.  
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# DOCTORAL THESIS PROPOSED TO RIGA TECHNICAL UNIVERSITY FOR THE PROMOTION TO THE SCIENTIFIC DEGREE OF DOCTOR OF SCIENCE

To be granted the scientific degree of Doctor of Science (Ph. D.), the present Doctoral Thesis has been submitted for the defence at the open meeting of RTU Promotion Council on 18 March 2022 at 10 a.m. at the Faculty of Engineering Economics and Management online in Zoom.

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## DECLARATION OF ACADEMIC INTEGRITY

I hereby declare that the Doctoral Thesis submitted for the review to Riga Technical University for the promotion to the scientific degree of Doctor of Science (Ph. D.) is my own.

I confirm that this Doctoral Thesis had not been submitted to any other university for the promotion to a scientific degree.

Iveta Amoliņa \_\_\_\_\_ (signature)

Date: \_\_\_\_\_

The Doctoral Thesis has been written in Latvian. It consists of an introduction, four parts, 12 chapters, 11 subchapters, conclusions and proposals, 38 tables, 53 figures, 11 appendices; the total number of pages is 287. The bibliography contains 197 titles.

# Contents

List of Abbreviations.....	5
Introduction.....	6
1. Theoretical Aspects and Legal Environment of Multi-Apartment Residential Building Management .....	17
2. Multi-Apartment Residential Building Management System and the Affecting Theoretical Factors and Problems.....	20
3. Decision-Making Methods Used in Multi-Apartment Residential Building Management.....	35
4. Integrated Information-Analytical Management Process and Management Systems Approach Methodology for the Management of Multi-Apartment Residential Buildings.....	37
Conclusions and Proposals.....	49
Bibliography.....	53
Appendix 1 .....	55

## List of Abbreviations

ALTUM – Latvian Development Finance Institution ALTUM  
AHP – analytic hierarchy process  
UN – United Nations  
BIS – Building Information System  
SCCB – State Construction Control Bureau  
CSB – Central Statistical Bureau  
CLI-MA – from housing manager to climate manager  
EU – European Union  
ESCO – energy service company  
ESC – energy supply contract  
EUR – euro  
ICT – information communication technologies  
SDG – sustained development goals  
AMALH – Association of Management and Administration of Latvian Housing  
CM – Cabinet of Ministers  
IP – insolvency process  
MWh – megawatt hour  
OECD – Organisation for Economic Co-operation and Development  
SF – Structural Funds  
Systems approach – information-analytical management process and management systems approach to multi-apartment residential building management  
W – watt  
m<sup>2</sup> – square metre

# Introduction

Housing policy and multi-apartment building management are linked to a number of sectoral policies interrelated in a single system: construction, real estate operations, financial and insurance activities, energy, gas supply, heating and air conditioning, water supply, sewerage, waste management and remediation activities, provision of information and communication services, delivery of professional, scientific and technical services, operation of administrative and support services, public administration and protection, compulsory social security, provision of welfare of the population, introduction of economic activities, environmental impact, implementation of sustainable development principles, etc.

Thus, it can be stated that by describing the management system of multi-apartment residential buildings one can characterise the development of the country as a whole. In order to organise the successful management of multi-apartment residential buildings, it is necessary to take into account the main management and maintenance functions and their characteristics.

Availability of secure, decent and sustainable housing that meets such criteria as healthy conditions, affordable prices, and the provision of basic services to the population is one of the goals set by the United Nations, calling on the Member States, including Latvia, to take action to achieve this goal (European Parliament, 2021).

Since the beginning of the 1990s, Latvia has not developed a unified state housing policy that addresses issues related to the renovation and maintenance of buildings. The last housing policy planning document was adopted in 1996 and has long since lost its relevance. Although significant changes have taken place in this area since then, it is clear that management services are still at high technical, socio-economic, environmental and political risk. This is evidenced by the audit report of the State Audit Office for 2020, which concludes that since denationalisation, there has not been an effective approach to housing security in the country. A large part of the Latvian housing stock is degrading to the condition of a slum (Valsts kontrole, 2020).

Until the beginning of 2019, the arrangement of the management sector of multi-apartment residential buildings has not been on the politicians' agenda in Latvia. Nevertheless, one of the most important socio-economic issues in the country is the provision and management of housing for all social groups.

In the Government Declaration of 23 January 2019, the government led by Krišjānis Kariņš singled out the housing policy and construction as a separate sector of the economy and stipulated the promotion of housing quality improvement stating: "We will ensure the housing quality improvement by enhancing the management decision making, stimulating the renovation of buildings and facilitating the availability of financial resources" (Cabinet of Ministers, 2019).

The National Development Plan of Latvia for 2021–2027 indicates that adequate housing in a safe living environment is considered to be a basic human need, as such individual needs as security, protection, privacy and warmth are associated with housing. The state investments in housing, ensuring the improvement of housing quality, are crucial for national development, as they promote better employment opportunities and improve labour mobility in the country. One of the priorities is "Quality Living Environment and Territorial Development", which characterises the quality, accessibility, environment and cleanliness of the most important services (transport, housing, electricity, digital services) (Cabinet of Ministers, 2020).

Currently, the only regulatory enactment regulating the field of management of multi-apartment residential buildings, where activities related to the management of residential buildings are defined, is the Law on Administration of Residential Houses and the resulting regulations of the Cabinet of Ministers and binding regulations of municipalities. Although the regulatory enactments provide for mandatory professional qualifications for persons involved in the sector, there is no mechanism in the country to verify this requirement in practice. There is no unified database that would provide data on the entire multi-apartment housing stock, its quality, and the managers involved in the administration of buildings.

The topicality of the research can be substantiated by researching broader goals that have been set outside Latvia. In 2015, the UN General Assembly adopted a resolution “Transforming Our World: The 2030 Agenda for Sustainable Development”. The resolution sets out 17 Sustainable Development Goals (SDGs). SDGs are balanced in three dimensions: economics, social aspects and the environment. The most important goals that can be attributed to the field of research of the Doctoral Thesis are the following: to ensure access to water and sanitation for all and sustainable management; to ensure access to reliable, sustainable and modern energy for all at affordable prices; to promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all; building resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation. SDG 11 is also worth noting, which states: “Make cities and human settlements inclusive, safe, resilient and sustainable”, and stipulates “to ensure access for all to adequate, safe and affordable housing and basic services, and upgrade slums by 2030” (Cross-Sectoral Coordination Centre, 2021).

One of the functions of the state is to ensure a socially responsible and sustainable housing policy. According to the Ministry of Economics, “the aim of housing policy is to promote the quality and availability of housing by providing a regulatory framework for the efficient management of multi-apartment buildings, promoting the establishment of rental housing in municipal areas, and supporting energy-saving measures in residential buildings” (Ekonomikas ministrija, 2021). The most significant achievements are the implementation of the housing guarantee programme, the study of the mechanical strength and stability of the structures of multi-apartment residential buildings, the clarified procedure for the distribution of the water consumption difference and the extended verification term for meters (Ekonomikas ministrija, 2021).

In its 2019 report, the State Audit Office states: “Safe buildings are the result of many elements. They are heavily influenced not only by policies but also by other closely related areas and processes, such as construction, credit, migration, demographic situation, social security; and these impacts are not always predictable and manageable” (Valsts kontrole, 2020).

The author believes that the main problem of residential building management is related to the shortcomings of the multi-apartment residential building management system and the execution of its processes, as a result of which it is not possible to provide an effective approach to the implementation of the management service, housing security and sustainability. The management system of multi-apartment residential buildings consists of several elements and it is influenced by various factors; however, currently each of its elements is studied separately, without their mutual synergy. Although appropriate regulatory enactments have been developed, requirements for stakeholders involved in the housing management process have been established, databases and registers have been created, all these elements are not connected in a single strategic management system that would promote the development of multi-apartment residential building management.

The topicality is also substantiated by the repeated reports of the State Audit Office on the critical situation related to the safety of multi-apartment residential buildings and their management. In Latvia, housing policy is mainly focused on addressing social issues in order to reduce social tensions, which mainly concern the legal relationship of tenancy and support for increasing the energy efficiency of multi-apartment buildings. Legislation in the field of multi-apartment buildings has developed the privatization and denationalisation of the housing stock, but it is still not being promoted to enhance the systemic development of housing management.

**Hypothesis:** The use of a common methodological systems approach to the management of multi-apartment residential buildings can have a significant impact on the provision of a coherent, high-quality, socially responsible, safe and sustainable service and is closely linked to the goals and objectives of multi-apartment residential management, and it provides the opportunity to improve the monitoring of the management process and promote the sustainable preservation and security of property.

**The aim of the research** is to develop an integrated information-analytical systems approach methodology of the multi-apartment residential building management process for the purposeful implementation of residential building management services and sustainable maintenance of housing.

## To achieve the goal of the Doctoral Thesis, the following tasks have been set:

1. To study the scientific and theoretical foundations of multi-apartment residential building management, providing a theoretical and analytical analysis of the management process.
2. To find out the main processes of the multi-apartment residential building management system and their influencing factors.
3. To identify and assess the impact of the managers of multi-apartment residential buildings and apartment owners involved in the management process on the effective management process and the satisfaction of the parties with the management service.
4. To investigate decision support methods, integrating them into the implementation of multi-apartment residential building management process.
5. To develop information-analytical multi-apartment residential building management methods and management systems approach and its practical use methodology.

**The object of the research** is the multi-apartment residential building management system and the related processes. **The subject of the research** – the internal and external environments of the multi-apartment residential building management system and their influencing factors.

**Place of research** – Latvia.

**The question of the Doctoral Thesis:** Does the existing multi-apartment residential building management system in Latvia ensure safe maintenance of buildings and their sustainable preservation?

**The theoretical and methodological foundation of the Doctoral Thesis** consists of general and scientific literature on real estate and organisation management published in Latvia and abroad, scientific articles, databases, industry research, data of the Central Statistical Bureau of the Republic of Latvia, data of the Ministry of Economics, rules and regulations of the Republic of Latvia, Internet resources, as well as the analysis and conclusions of the author's scientific research.

## Theories and methods used in the Doctoral Thesis

The Doctoral Thesis is based on two scientific theories: the systems theory and PEST method.

The main theory of the Doctoral Thesis is the systems theory, which gives an idea of the scientific explanation as the division of a problem into simple parts, which must be considered individually.

PEST analysis was used for the investigation of external factors. It is an analysis of political, economic, social and technological factors, as a result of which it is evaluated how external factors influence the process. This theory was developed by Professor of Harvard University Francis Aguilar in 1967.

The research conducted within the framework of the Doctoral Thesis is also based on new institutional economics foundations, which analyse institutions, studying their activities in social, political, legal and economic processes, as well as examining the norms of behaviour and views that promote socio-economic development. The scientific literature uses the term “institutional environment” to describe the factors influencing economic development, where social, political, cultural and psychological aspects are considered to have a significant impact on economic processes (Williamson, 1994).

Within the framework of the research, the following methods have been used:

- *the general qualitative methods of economics and management:* survey, observation, induction, literature review, content analysis of literature;
- *sociological research methods:* document analysis, study of normative documents, collection and analysis of statistical data;
- *quantitative research methods:* analysis and synthesis, information collection and analysis, decision support methods – Analytic Hierarchy Process (AHP) and the laws of conditions.

To put forward and prove the hypothesis, a qualitative research method has been used – a focus group, for the implementation of which industry experts have been chosen.

The main categories of the residential building management process and the influencing factors have been examined in the following way:

- by performing a content analysis of scientific literature sources during which 100 different scien-

tific articles related to the building management process have been studied;

- by organising focus groups of industry experts;
- by publishing 19 scientific articles in full-text conference proceedings and academic journals, the validity of which is supported by reviews of foreign experts;
- by presenting research findings at the 62nd International Scientific Conference of Riga Technical University in 2021, where within the working group (participants: experts from Latvia, Germany, Poland) of the international project “From Housing Manager to Climate Manager (CLI-MA)” the results have been approbated and validated.

In order to find out the interrelation of the elements of the multi-apartment building management system and their impact on the longevity and quality of the building life cycle, a survey method has been used to obtain information regarding the psychological climate among apartment owners and other users, their assessment of the technical condition of the property, the possibilities for its improvement, readiness to attract financing for investing in the long-term renovation of the property, as well as to perform an assessment of the availability of information on legal and management activities in general. The author has summarised the obtained data with the help of diagrams and checked the data correlations.

Chapters 2, 3 and 4 address the question of the research: “Does the existing multi-apartment residential building management system in Latvia ensure the maintenance of socially responsible, safe buildings and their sustainable preservation?” The research concludes with the development of an information-analytical management process and management systems approach to the management of multi-apartment residential buildings.

In general, the most significant results of the research have been presented in focus groups and in a working group at an international conference, discussed and positively evaluated in industry associations.

**Limitations of the research.** The study analyses the multi-apartment residential building management system, its processes, elements and the influencing factors in Latvia. In the Doctoral Thesis, the author uses her research findings in the field of multi-apartment residential building management from 2010 to 2021, working in the multi-apartment residential building management industry as an expert, participating in multi-apartment residential building renovation projects, developing the strategy for multi-apartment residential building management companies, working in the education sector as a lecturer, as a researcher as well as an expert in the following projects: ESF project 8.5.2.0./16/I/001 “Improvement of the Sectoral Qualification System for the Development of Vocational Education and Quality Assurance” and ESF project 8.5.2.0./16/I/001 “Development of the Content of Professional Qualification Examinations in the Construction Sector “House Manager”, “Master of House Management”, “Master of Cleaning Works” (VISC 2018/45 Part 4)”.

The role of landowners is not analysed in the Doctoral Thesis; the environmental factors, including ecological ones, and their impact on the climate are not studied in depth. Environmental elements are narrowly studied by evaluating the technical elements of the system, studying energy efficiency issues, which are one of the important factors in improving the environment. The limited availability of statistical data has determined the elements of the system selected for analysis, their technical and economic indicators.

In the Doctoral Thesis, decision-making methods are analysed by studying only the method of hierarchical analysis (Analytical Hierarchy Process, AHP) and the laws of conditions (also called expert laws).

To answer the research question, a research design and procedures have been developed using qualitative and quantitative research methods. The research question, aim and tasks provide for a specific research plan and activities.

The first stage is the study of the research methodology and conceptual framework. The research question: “Does the existing multi-apartment residential building management system in Latvia ensure safe maintenance of buildings and their sustainable preservation?” The research stage includes:

- a) the analysis of the scientific literature to identify the research issues;
- b) the development of the research methodology – formulating the aim and tasks, the research object and subject, as well as drawing up the research plan and choosing appropriate research methods.

The second stage involves the identification of external and internal factors, their impact on the multi-apartment residential building management process and the determination of problems in the sector. The research stage includes:

- a) the analysis of regulatory enactments, research on technical depreciation of housing stock, information available in municipalities on the availability of co-financing, anonymised court rulings of the Latvian court e-service portal [www.manas.tiesas.lv](http://www.manas.tiesas.lv), data collected by the Development Finance Institution Altum, Central Statistical Bureau, State Construction Control Bureau, and Lursoft;
- b) a survey of apartment owners, residents and experts in the field of residential building management;
- c) the study of decision support methods that could be effectively used in the field of multi-apartment residential building management.

As a result of the research, external and internal factors have been identified and their impact on the multi-apartment residential building management process and the identified problems has been revealed, as well as the decision support methods (Analytic Hierarchy Process (AHP)) and laws of conditions (expert laws) have been recommended.

The third stage is the development of an integrated information-analytical management process and management systems approach methodology for the management of multi-apartment residential buildings.

The fourth stage is the approbation of the integrated information-analytical management process and management systems approach methodology for the management of multi-apartment residential buildings.

### Theoretical significance and scientific novelty of the research

The scientific novelties of the Doctoral Thesis:

1. The terminology used in the multi-apartment residential building management system has been systematized and the definitions of the concept of real estate and the multi-apartment residential building management system have been developed.
2. The scientific and theoretical aspects of multi-apartment residential building management have been evaluated by systematizing the processes based on the process sets identified as a result of content analysis.
3. Indicators characterising the role of the psychological climate in multi-apartment residential building management have been identified and their impact on the operation of the industry has been determined.
4. The most significant problems within the multi-apartment residential building management system have been identified by evaluating the elements of the management system and identifying internal and external factors.
5. In the multi-apartment residential building management system, it is proposed to use the method of hierarchical analysis and the laws of conditions in decision making when objective justifications for the choice of alternatives are not defined.
6. The integrated information-analytical management process and management systems approach methodology for the management of multi-apartment residential buildings has been developed and a systematic solution for its implementation has been provided.
7. A trilemma model has been presented by distinguishing three main pillars, which enable the legislator to assess the existing problems in the country, to determine development trends and

the need to improve the technical condition of buildings. Using the trilemma model, the legislator would systematically assess the progress towards achievement of goals, housing policy and sustainability.

The results obtained within the framework of the Doctoral Thesis supplement the theoretical and scientific knowledge base for multi-apartment residential building management, which is necessary to promote the efficiency of the industry. The results of the research can be used by state and municipal institutions for the development of housing policy, including multi-apartment residential building management policy guidelines and recommendations, for the evaluation of multi-apartment building management system operation and its development planning, as well as for establishing the cooperation with other industry experts and interest groups, including associations, in the field of multi-apartment residential building management.

## The approbation of research results

The results of the Doctoral Thesis have been reported in 18 scientific conferences (16 international and 2 local); and 20 scientific articles have been published. The developed information-analytical management methods and management systems approach has been presented to the students of Riga Technical University and the College of Law during lectures and seminars. The data obtained within the framework of the Doctoral Thesis have been approbated in focus groups of industry experts and international conferences. With regard to the theme of the Doctoral Thesis and the results of the research, the author has developed the following publications:

1. Upītis, M., Amoliņa, I., Geipele, I., Zeltiņš, N. (2020). Measures to Achieve the Energy Efficiency Improvement Targets in the Multiapartment Residential Sector. *Latvian Journal of Physics and Technical Sciences*, Vol. 57, No. 6, pp. 40–52. ISSN 0868-8257. e-ISSN 2255-8896. doi:10.2478/lpts-2020-0032.
2. Amoliņa, I., Zīra, M., Geipele, I. (2019). Identification and Monitoring of Degraded Real Estate in the Context of Urban Environmental Analysis and Development Planning in the City of Riga. *IOP Conference Series: Materials Science and Engineering*. Vol. 660, Iss. 1, 5 December 2019, No. 012043, doi: 10.1088/1757-899X/660/1/012043.
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8. Pudzis, E., Ādleris, Ā., Puķīte, I., Geipele, S., Zeltiņš, N. (2018). Identification of Maritime Technology Development Mechanisms in the Context of Latvian Smart Specialisation and Blue Growth. *Latvian Journal of Physics and Technical Sciences*, ISSN 0868-8257.

9. Puķīte, I., Geipele, I., Puķītis, A. (2018). Rental and Management Policy of Municipal Residential Buildings: A Case Study in Riga (Part Two). *Baltic Journal of Real Estate Economics and Construction Management*. Vol. 6, pp. 48-61. e-ISSN 2255-9671. doi:10.2478/bjreecm-2018-0004
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1. Amoliņa, I., Geipele, I. Housing policy in Latvia. In: *Scientific Problems of Engineering Economics of Construction and Real Estate Management, Regional and Territorial Development ICEREE'2021*, 30-30 October 2021, Rīga, Latvia.

2. Amoliņa, I. Multi-apartment residential house management system and its influencing factors. In: *Scientific Problems of Engineering Economics of Construction and Real Estate Management, Regional and Territorial Development ICEREE'2021*, 30–30 October 2021, Riga, Latvia.
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## Teaching aids

1. Geipele, I., Amoliņa, I., Fedotova, K. (2019). *Nolikums bakalaura darba izstrādāšanai un aizstāvēšanai profesionālā bakalaura studiju programmā "Nekustamā īpašuma pārvaldība"*. Rīga: RTU, 33 p.
2. Geipele, I., Amoliņa, I., Fedotova, K., Kočanova, R. (2019). *Nolikums studiju projekta izstrādāšanai un aizstāvēšanai studiju kursā "Nekustamā īpašuma pārvaldīšana un apsaimniekošana" (studiju projekts)*. Rīga: RTU, 14 p.
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## Thesis statements to be defended:

1. Since the beginning of the 1990s, Latvia has not developed a unified state housing policy that would address the issues related to the management and technical maintenance of multi-apartment residential buildings. Management services are within a high technical, socio-economic, environmental and political risk area, which indicates that there is no effective approach to housing security in the country.
2. Sustainability and security issues of multi-apartment residential buildings are not included in the Sustainable Development Strategy of Latvia until 2030 and the National Development Plan of Latvia for 2014–2020, which is the most important national development planning document. This shows that the tasks related to the sustainable preservation and security of multi-apartment residential buildings have not been set as a priority.
3. Secure multi-apartment residential buildings are the result of many factors that affect them. They are greatly influenced not only by the policy and legal framework in the field, but also by other closely related areas and processes, such as construction, credit, migration, demographic situation, social security and the psychological climate. However, successful management and technical maintenance is based on the determination of precise, efficient and socially responsible duties and support measures directly for owners, managers and supervisors monitoring the implementation of this service.
4. The multi-apartment residential building management system and processes consist of several elements and are influenced by various factors; however, currently each of its elements is studied separately, without their mutual synergy. Although appropriate regulatory enactments have been developed, requirements for stakeholders involved in the housing management process have been formulated, databases and registers have been established, all these elements are not connected in a unified strategic management system that would promote the development of multi-apartment residential building management.

## Contents of the Doctoral Thesis

### INTRODUCTION

1. THEORETICAL ASPECTS AND LEGAL ENVIRONMENT OF MULTI-APARTMENT RESIDENTIAL BUILDING MANAGEMENT
  - 1.1. The Nature and Concept of Residential Building and Apartment Property
  - 1.2. Principles of Civil Law
  - 1.3. The Nature of Housing Policy and Development Trends
    - 1.3.1. Development of Housing Policy in Latvia
    - 1.3.2. Foreign Experience in Housing Policy Development
  - 1.4. Interaction of Economy, Environment and Ecology
2. MULTI-APARTMENT RESIDENTIAL BUILDING MANAGEMENT SYSTEM AND THE AFFECTING THEORETICAL FACTORS AND PROBLEMS
  - 2.1. The Goal and Operating Principles of the Multi-Apartment Residential Building Management System
  - 2.2. External Factors Affecting the Multi-Apartment Residential Building Management System
    - 2.2.1. Economic Environment and Factors
    - 2.2.2. Technical, Information Technology and Environmental Factors
    - 2.2.3. Legal Factors
    - 2.2.4. The Role of Social Responsibility and Psychological Climate in Multi-Apartment Residential Building Management
  - 2.3. Internal Factors Affecting the Multi-Apartment Residential Building Management System
    - 2.3.1. Internal Environment of Residential Building Management Companies
    - 2.3.2. Behaviour and Actions of Multi-Apartment Residential Building Apartment Owners – Clients
  - 2.4. Evaluation of Multi-Apartment Residential Building Management Service
    - 2.4.1. Evaluation of Apartment Owners as Respondents and Verification of its Reliability
    - 2.4.2. Evaluation of Residential Building Management Specialists – Experts as Respondents and Verification of its Reliability
    - 2.4.3. Comparative Evaluation of Residential Building Owners and Industry Specialists – Experts
3. DECISION-MAKING METHODS USED IN MULTI-APARTMENT RESIDENTIAL BUILDING MANAGEMENT
  - 3.1. Use of Analytic Hierarchy Process in the Decision-Making Process
  - 3.2. Use of Laws of Conditions in the Decision-Making Process
4. THE INTEGRATED INFORMATION-ANALYTICAL MANAGEMENT PROCESS AND MANAGEMENT SYSTEMS APPROACH METHODOLOGY FOR THE MANAGEMENT OF MULTI-APARTMENT RESIDENTIAL BUILDINGS
  - 4.1. The Concept for the Possibilities of Application of the Information-Analytical Management Process and Management Systems Approach in the Development and Implementation of Housing Policy
  - 4.2. Participation of Persons Involved in Multi-Apartment Residential Building Management in the Approbation of the Methodological Solution

### CONCLUSIONS AND PROPOSALS

### BIBLIOGRAPHY

### APPENDICES

The Doctoral Thesis consists of an introduction, four parts, 12 chapters, 11 subchapters, conclusions and proposals, bibliography, and 11 appendices.

The introduction of the Doctoral Thesis substantiates the topicality of the research, presents the research hypothesis, puts forward the aim and tasks, states the research subject and object, formulates

the methodological solution of the research, defines research limitations, presents scientific novelty and approbation of research results.

Part 1 of the Doctoral Thesis analyses the theoretical aspects and the legal environment of multi-apartment residential building management. In Part 2, the author of the Doctoral Thesis performs the research and analysis of the multi-apartment residential building management system and the influencing theoretical factors. Part 3 evaluates the decision-making methods used in multi-apartment residential building management. Part 4 reflects the developed information-analytical management method and management systems approach to the management of multi-apartment residential buildings and the application of its operation.

At the end of the Doctoral Thesis, the author provides conclusions and proposals for the improvement of the multi-apartment residential building management system and processes in order to ensure the implementation of the principles of good governance and sustainable preservation of property.

# 1. Theoretical Aspects and Legal Environment of Multi-Apartment Residential Building Management

Much attention is paid to the management and maintenance of multi-apartment residential buildings in both the scientific and practical literature. The concept of real estate is used in the economic and legal system of each country. However, when examining the explanations of the term in different sources, it can be concluded that they are different. Before clarifying the concept of a residential building, first, the terms “property” and “real estate” are considered.

Examining different types of explanations about real estate, several features that characterise real estate can be identified:

1. Real estate is a physical phenomenon rather than an abstract or imaginary one.
2. Real estate includes not only land as such but also infrastructure on it – buildings, roads, ponds, incl. conditionally fixed infrastructure functionally attached to the land.
3. Real estate has a location and environment – population, transport network, environmental improvement, landscaping, etc.
4. Real estate has a legal and fiscal character – property rights, purpose and value of use (Auziņš, 2016).
5. Real estate has its own geographical coordinates – for land, for objects that are part of the land, certain coordinates exist as long as the objects are related to the land. In particular, in the event of a breakdown of liabilities, such as the felling of trees or the demolition of a building, the separated property becomes movable property, or in the case of relocation to another plot of land, it legally becomes an entity belonging to another plot of land and, hence, another real estate (Viesturs & Geipele, 2017).
6. Real estate is also classified as a financial asset (Fisher & Martin, 2003). It has a material value because it includes various types of objects (land, buildings, structures, plants, minerals, etc.) that are used either as an investment or as functional for own use.
7. Real estate is characterized by its functionality, purpose of use, which is related to the planning of each territory and economic trends.

**Residential building** is one of the types of real estate. According to the Law on Administration of Residential Houses, a residential house is “a building that has been put into service and, in accordance with the cadastral survey file, is a residential house (also apartment property house), buildings (structures) belonging thereto, land, on which it is situated, if the land together with the residential house form a single immovable property or is in the composition of apartment properties forming a residential house, or a building, which has been put into service and, in accordance with the cadastral survey file, is a residential house, buildings (structures) belonging thereto and the land attached to a residential house” (Law on Administration of Residential Houses, 2009).

Within the framework of the research, based on the explanations of real estate available in the scientific literature and regulations in Latvia and other countries, as well as taking into account the results of the research provided in the Doctoral Thesis, the author proposes a more detailed explanation of the concept of real estate: “*Real estate is the land and all immovable property on it – buildings, outbuildings, engineering structures, engineering systems, all additions, improvements, trees, airspace above this property and also the subsoil, and all the benefits that this property may bring, in its possession and use*”.

**Civil law principles** are the basic ideas expressed in the norms of civil law, according to which the regulation of property and personal non-property relations takes place. In the management of multi-apartment residential buildings, the author distinguishes 7 civil law principles:

- 1) the rights shall be exercised and the duties shall be performed in good faith;
- 2) the principle of the inviolability of property;
- 3) the principle of respect for public interests;

- 4) the principle of equality of participants in civil law relations;
- 5) compliance of subjective rights with legal obligations;
- 6) the principle of relative autonomy of the participants in civil law relations;
- 7) the principle of prevention of infringement of rights and judicial protection.

Examining the development of housing policy, it can be concluded that it can be divided into 3 models:

- Model 1 envisages active state and municipal activity in the field of housing development. This means that most of the housing stock is provided by the state and municipalities. This includes both the construction of housing and the provision of public services. The functioning of the private market in this model is minimal. The problem of housing provision is solved by constructing residential buildings, using state or municipal funding, allocating dwellings on the basis of adopted regulatory enactments, setting different criteria for receiving them.
- Model 2 operates in the field of private market relations, with minimal state and municipal intervention in housing development, construction, management and the public service sector. Housing problems are addressed through the construction of new buildings, the privatization of state and municipal housing stock and the transfer of management services to the private sector. Problems may arise when limiting state support for housing construction will increase the shortage of economy-class housing and increase the cost of moderately expensive or expensive housing that a large proportion of the population will not be able to afford.
- Model 3 envisages the availability of both the private market mechanism and state and municipal support in housing construction, maintenance and public service sector.

Each of these models is mutually exclusive, they can operate separately in one country, and two or all three models can operate in a country at the same time.

Having examined and analysed the housing policy and its development trends, it is concluded that the interaction between the economy, environment and ecology comes to the fore. The interplay between the economy, environment and ecology plays an important role in housing policy. Substances and products resulting from the production and provision of services are returned to the environment as waste. Throughout this process, the following natural resources are used: water, sun, depths of the earth.

An element characterising ecological awareness is the awareness of the population about the factors that degrade the environment, and this includes knowledge of environmental issues in general (Bikša, 2013).

Summarising the issues researched in Chapter 1, the following problems can be identified in the process of managing multi-apartment residential buildings:

1. In practice, dishonest and irresponsible attitudes of managers in the provision of services and non-transfer of funds to service providers are established; as a result, there is an increased risk for owners that public utilities can be disrupted.
2. During the denationalisation process, the multi-apartment residential buildings were returned to the former owners or their heirs. During the privatization process, many residents bought apartments, becoming owners. At that time, a large part of the housing stock was already morally and physically degraded because even during the Soviet era, proper maintenance of multi-apartment residential buildings was not carried out. Since the start of the denationalisation and privatization processes, there is virtually no effective approach to housing security and sustainable maintenance in the country.
3. One of the important responsibilities and also the rights of the owners of multi-apartment residential buildings is to make decisions, which indicates that the owners have decision-making power but the manager is only the executive power. In practice, the owners do not show much activity in this area. As a result, more and more cases appear when the technical condition of the property begins to endanger the environment, a large part of the Latvian housing stock is

degraded to the condition of a slum.

According to the collected and analysed information, there is a need to identify the management system of multi-apartment residential buildings and to analyse its processes, determining the factors influencing the system, its operating principles and methodology.

## 2. Multi-Apartment Residential Building Management System and the Affecting Theoretical Factors and Problems

The multi-apartment residential building management system is a set of interconnected elements that form a whole in their interaction. The whole system is based on the aim, tasks to be achieved, certain results or indicators that are typical of the residential building management industry Puķīte & Geipele, 2015).

The system is based on the presence of several elements, including legislation, where through an interaction a set of different elements and methods fulfills the functions specified in the management of residential buildings. The most important elements are service provider, customer, object, service, demand, supply, choice of alternatives, resources (Fig. 2.1).

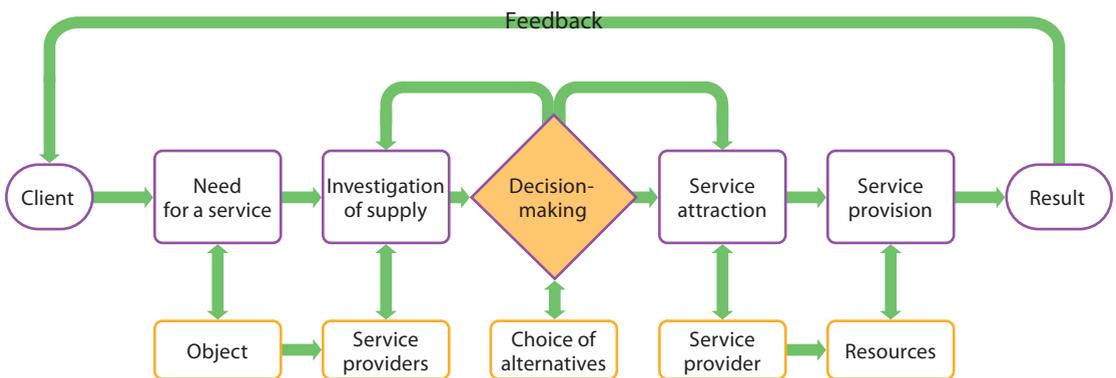


Fig. 2.1. Operation of the residential building management system and its processes (created by the author).

The multi-apartment residential building management system and its processes (Fig. 2.1) represent the main stages of obtaining information feedback that affects its operation. The technical, moral and visual quality of an object or multi-apartment residential building influences the demand from apartment owners, and the analysis of the industry market helps to make decisions for the efficient choice of resources.

The management system consists of two parts: the management system or management subject and the managed system or management object. The subject under research here are persons operating in the sector: managers, customers (apartment owners, tenants, lessees), service providers, state and municipal institutions, non-governmental organisations and other stakeholders; and the object – multi-apartment residential buildings.

The management environment of multi-apartment residential buildings involves several stakeholders – the state, municipalities and companies that provide the necessary services, as well as households that are the main customers of the service.

The policy-maker, including in the multi-apartment residential building management area, is first and foremost the state. In Latvia, policy is developed by the Saeima, the Cabinet of Ministers, and state institutions of various profiles. The Ministry of Economics is responsible for housing policy.

Municipalities act as decision-makers and executives in the multi-apartment residential building management area. The main legal act that regulates the activities of municipalities is the Law on Local Governments.

There are many different legal entities in the industry that directly or indirectly affect the external and internal environment. The direct subjects in the industry are multi-apartment residential building management companies that provide management services.

In order to identify the factors affecting the multi-apartment residential building management sys-

tem, the author of the Doctoral Thesis has performed a content analysis of scientific literature sources, during which 100 different scientific articles related to the building management process have been studied. Authors of scientific articles from various countries (Latvia, Lithuania, the USA, Great Britain, Germany, China, Malaysia, Saudi Arabia, Sweden, etc.) published these works in the period from 1997 to 2017.

As a result of the content analysis, 8 sets of processes have been identified, to which the authors of scientific articles point as important factors, and which are mentioned in at least 10 (10 %) articles. The process sets distinguished as a result of the content analysis of the articles and their evaluations isolated are summarised in Table 2.1. Process sets have been divided into three levels according to frequency: low – 10 % and less; medium – from 10 % to 30 % and high – 30 % and more.

Table 2.1

**List of the Selected Main Process Sets (developed by the author)**

No	Process sets	Frequency, %	Level
1.	Management and planning	42	High
2.	Monitoring	32	High
3.	Maintenance activities	30	High
4.	Construction, renovation and repairs	30	High
5.	Building management software, databases	12	Medium
6.	Management and maintenance costs	11	Medium
7.	Modern technology	10	Low
8.	Legal and technical standards, legislation	10	Low

The operation of the residential building management system takes place in a micro and macro environment, which is affected by internal and external factors and where certain processes can be identified that directly or indirectly influence the operation of the entire management system.

The multi-apartment residential building management area is affected by external environmental factors and related problems and their causes. The author of the Doctoral Thesis distinguishes **4 factors influencing the external environment in the multi-apartment residential building management system**:

- 1) economic factors;
- 2) legal factors;
- 3) technical, information technology and environmental factors;
- 4) social and psychological factors.

The interrelationships and interactions of these different environments and the factors that affect them influence the whole management process. The influence and interaction of external factors provides the parties involved in multi-apartment residential building management with the information and tools to effectively implement the necessary measures and to promote the extension of the life cycle of the managed objects and their sustainable maintenance.

Each of the factors influencing the management system interacts with each other, thus affecting each other, increasing or decreasing the efficiency of management activities. The relationship between these factors and the system is shown in Fig. 2.1.

Economic factors	Legal factors	Technical, information technology and environmental factors	Social and psychological factors
<ul style="list-style-type: none"> <li>● Customer income, solvency</li> <li>● Employment rate</li> <li>● The amount of remuneration for all parties involved in the process</li> <li>● Income level of management companies</li> <li>● Level of competition</li> <li>● Solvency of companies</li> <li>● Expenses for maintenance of residential buildings</li> <li>● Availability of credit</li> <li>● Availability of municipal, state, European Union co-financing</li> <li>● Marketing policy</li> </ul>	<ul style="list-style-type: none"> <li>● Housing policy</li> <li>● Construction policy</li> <li>● Regulation of regulatory enactments</li> <li>● Case law</li> <li>● Tax policy</li> <li>● Subsidies, state guarantees</li> <li>● International cooperation</li> <li>● Political will</li> </ul>	<ul style="list-style-type: none"> <li>● Technical condition of residential buildings, depreciation</li> <li>● Equipment, technical modernization</li> <li>● Availability of equipment and appliances</li> <li>● Monitoring of meter reading results</li> <li>● Maintenance</li> <li>● Repair, renovation, reconstruction works</li> <li>● Climate change</li> <li>● CO<sub>2</sub> emissions</li> <li>● Waste management</li> <li>● Environmental pollution</li> <li>● Development of new energy sources</li> <li>● Climatic factors</li> </ul>	<ul style="list-style-type: none"> <li>● Customer attitude towards the object</li> <li>● Relationships among co-owners</li> <li>● Relationships between owners and managers</li> <li>● Availability of information</li> <li>● Communication skills</li> <li>● Feedback from stakeholders involved in the management process</li> <li>● Attitudes of the parties towards the environment, ecology</li> <li>● Education level</li> </ul>

Fig. 2.1. Schematic representation of the factors affecting the multi-apartment residential building management system and process (created by the author).

## Economic factors

These factors include management and maintenance costs as well as sources of income (e.g., object maintenance costs, taxes, utility costs, repair costs, rental income, etc.). Social factors are related to customer communication, feedback, communication skills, and marketing policy.

The availability and amount of finance depend on the solvency of the owners themselves, their willingness to invest in their property, and the models of financial sources available in the financial environment. Investments in the maintenance and renovation of multi-apartment residential buildings take place continuously, the only difference is the amount of funding, availability, purpose of use.

## Technical, information technology and environmental factors

In the distribution of residential buildings according to their main type of use in Latvia, the largest share is occupied by single-apartment houses, followed by three- and more-apartment or multi-apartment buildings. In Latvia, there is a relatively small number of two-apartment houses registered in the Cadastre Information System – only 13 473 or 3.8 % of the total number of residential buildings, but the share of residential houses of various social groups is only 642 or 0.2 %. According to the information provided by the State Land Service, the total depreciation rate of residential buildings is 38.9 % (Ekonomikas ministrija, 2021).

Significant research was conducted in the period of 2010–2011. In the course of the research, buildings of 103, 104, 316 and 318 series were examined. In general, the technical depreciation of residential buildings was set at 50 %, but in more detail for each building element (COWI, 2010):

- 1) foundations of buildings, load-bearing walls and beam openings, basement, mezzanine, attic cover – 30 %;
- 2) roof elements – 40 %;
- 3) heating, water supply and sewerage systems – 50 %;
- 4) depreciation of power supply systems and equipment – 100 %.

In 2016, on behalf of Riga City Council, the Municipal Agency “Riga City Architects’ Office” organised a study on the technical condition of multi-apartment residential buildings in the city of Riga. In total, 132 standard buildings of different series in the city of Riga were surveyed. In the course of the research, monotonous, non-renovated building facades were observed, with different solutions for filling the new window cases. Significant problems were identified regarding the technical condition of balconies, often including fenced, built-up and chaotically glazed loggias or balconies. The external wall panels of the buildings are damaged due to the leakage of the joints, worn out engineering networks were detected, the thermal insulation of the pipelines was damaged, the shut-off valves were worn out, as well as the external rainwater drainage networks were in unsatisfactory condition (Riga City Architects’ Office, 2016).

The author of the Doctoral Thesis has used the data published by ALTUM, performing an analysis of the energy efficiency situation of multi-apartment residential buildings up to the measures of increasing energy efficiency. Within the research, multi-apartment residential buildings are divided into five groups from I to V, in each of them the division is made according to the heated area:

- Group I – up to 1000 m<sup>2</sup>;
- Group II – from 1000 m<sup>2</sup> to 2000 m<sup>2</sup>;
- Group III – from 2000 m<sup>2</sup> to 3000 m<sup>2</sup>;
- Group IV – from 3000 m<sup>2</sup> to 4000 m<sup>2</sup>;
- Group V – more than 4000 m<sup>2</sup>.

The energy consumption for heating of the buildings covered in the research is indicated for the last 5 years before the building was registered for the energy efficiency improvement program, determining the average consumption for heating during this period. For buildings with a smaller heating area, the specific energy consumption for heating is more than 160 kWh/m<sup>2</sup> per year, and as the heated area of a building increases, the specific energy consumption for heating decreases to 116 kWh/m<sup>2</sup> per year for buildings with a heated area over 4000 m<sup>2</sup>.

It indicates that (Fig. 2.2):

- 1) there is a clear trend in average consumption – consumption decreases with an increasing area;
- 2) maximum consumption decreases with an increasing area, but some groups of buildings need to be highlighted here;
- 3) differences in minimum consumption in different groups of buildings are less than the differences in maximum and average consumption between groups of buildings.

It can be concluded that the groups of buildings with a smaller area tend to consume more, while buildings with a larger area have a relatively lower consumption.

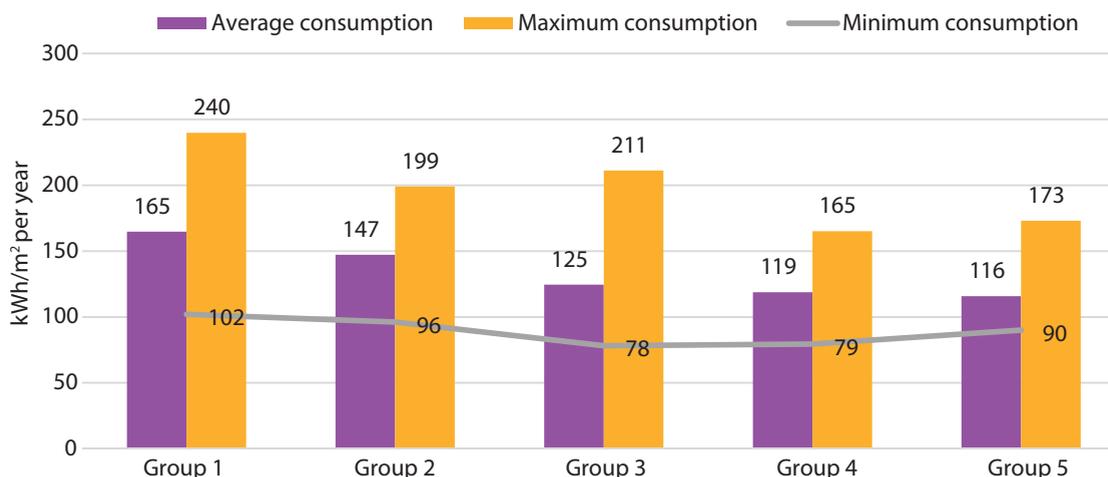


Fig. 2.2. Energy consumption for heating in different groups of buildings (created by the author using data published by ALTUM).

In general, all surveys allow concluding that multi-apartment residential buildings need general renovation.

Regulations of the Cabinet of Ministers No. 907 “Regulations Regarding the Survey, Technical Servicing, Current Repairs and Minimal Requirements for Energy Efficiency of the Residential House” determine the service life limitation of multi-apartment buildings. Although the regulatory enactments determine the average service life of residential buildings, they do not provide a specific action plan and explanation of what these time limits determine for the owner of a residential building. There are two possibilities: 1) normative service life = the period of time after which the relevant house element or utilities must be inspected (existing regulation); 2) normative service life = the period of time after which the relevant house element or utilities are replaced.

Directive 2012/27/EU of the European Parliament and of the Council stipulates that “in multi-apartment buildings heated by a centralized source, a centralized supply network or a central source serving several buildings shall also be equipped with individual heat meters that count the heat consumption per unit, if it is technically possible and cost-effective. In buildings where heat meters are not a technically feasible or cost-effective solution for space heating, so-called heat cost allocators mounted on each radiator must be used instead, unless the Member State concerned demonstrates that the installation of such heat cost allocators would not be cost effective” (European Parliament and Council, 2012). In order for the Directive to be implemented in Latvia as well, Cabinet Regulation No. 730 of 16 December 2020 “Minimum Requirements for the Energy Performance of Existing Buildings” came into force.

The heat cost distributor or allocator is an electronic device, with the help of which the proportionality of the heat energy radiated by the radiator in each apartment is determined. The calculation of the fee for heat energy is performed by dividing the total heating costs in proportion to the allocator measurements. Remote data collection systems are used for data collection and aggregation (Laicāns, Puķīte, Geipele, Zeltiņš, & Greķis, 2018).

Researchers in many countries have studied and analysed the validity of this requirement on the basis of the directive issued. Studies show that the installation of individual meters is financially justified and commensurate with the potential energy savings, (Celenza, Dell’Isola, Ficco, Palella, & Riccio, 2015), (Grasmanis, Talcis, & Greķis, 2015), (Siggelsten & Olander, 2013), (Siggelsten, 2014), (Wang & Li, 2015). Studies show that the behaviour of the population in their dwellings differs, and the level of comfort and fluctuations in indoor temperature lead to different heat consumption (Gafsia & Lefebvre, 2003). To solve the problem of erroneous enumeration, users can set a maximum permissible error for heat distribution systems and devices, which must not exceed, for example,  $\pm 5\%$  (Ficco, Celenza, Dell’Isola, & Vigo, 2016); therefore, many researchers have concluded that the charging system must be able to detect static heat flux (Pakanen & Karjalainen, 2006), (Gafsia & Lefebvre, 2003).

In recent years, the problem of degraded buildings has become topical. The technical condition of such multi-apartment residential buildings is the result of the fact that the properties have not been technically maintained for years, no investments have been made in the renovation of the houses, their elements and communications, as a result of which the properties begin to lose their value and start to degrade. At present, there are no uniform criteria and methodology for the identification and assessment of the degraded territories in Latvia. Consequently, the information on degraded territories is different in municipal planning documents.

### Information technology environment

An important factor in the management process of multi-apartment residential buildings is the development of information technology. With the increasing process of globalization, the availability of information, new technologies and inventions is increasing. It also contributes to the development of the management process.

The aim of the information technology system is to provide an opportunity for owners, house man-

agers, other technical staff involved in the process, and public service companies to operate in a single technological solution. The use of a modern information technology solution (system) in ensuring the residential building management process is of great importance in ensuring the level of customer satisfaction.

In fact, all information systems currently used in real estate management processes perform the same tasks: provide management companies with data maintenance (data on customers, objects, service providers), run cost algorithms and perform calculations, issue invoices, calculate penalties, draw up estimates and reports, submit readings, provide statistics on the results of management activities.

The process of developing information technology knowledge takes place with the involvement of both the system developer, who sometimes also acts as an intermediary between the users of the information system (real estate manager and the client), creating a demand, providing databases or networks. The main task of this process is demand. (Novickis, Mitasiunas, & Ponomarenko, 2016).

To ensure the efficient operation of real estate management companies, resource and document management (human resource management, financial management, accounting, document management), the performance of management tasks that provide the information technology infrastructure functions necessary for the operation of the company (e-mail, file sharing, computer network user authentication, control of access rights, hosting of information resources, maintenance of the website, management, storage and backup of database systems), it is necessary to develop a system of interaction of information system components.

The establishment of the information system is aimed at improving the efficiency of the multi-apartment residential building management system processes, promoting the development of processes and improving the quality. Thus, the component system of information system focuses on the processes: service provider management, customer management, governance process management, financial management, and technical management, which are performed using information systems.

The author offers a conceptual scheme of the system, where solutions for the introduction of electronic service can be considered from several aspects:

1. Electronic services sharing platform, where all the created files required by the management company are combined.
2. Electronic service provision sharing platform, where all the created files required by the clients are combined.
3. Electronic service provision sharing platform that combines all the created files shared by the client and the manager.
4. Electronic service provision sharing platform that ensures mutual communication as follows: clients – company; client – client; company – company.

When organising the implementation of electronic services in accordance with the conceptual system scheme (see Fig. 2.3) with the above-mentioned variants, user groups are identified, and their profiling is performed. Each user group may have different solutions for receiving or providing electronic services taking into account factors such as usage intensity, user skill level, regularity of use, level of availability, duplication of solution support functionality, workload and cost of solution development and maintenance. These factors will be different for each user group.

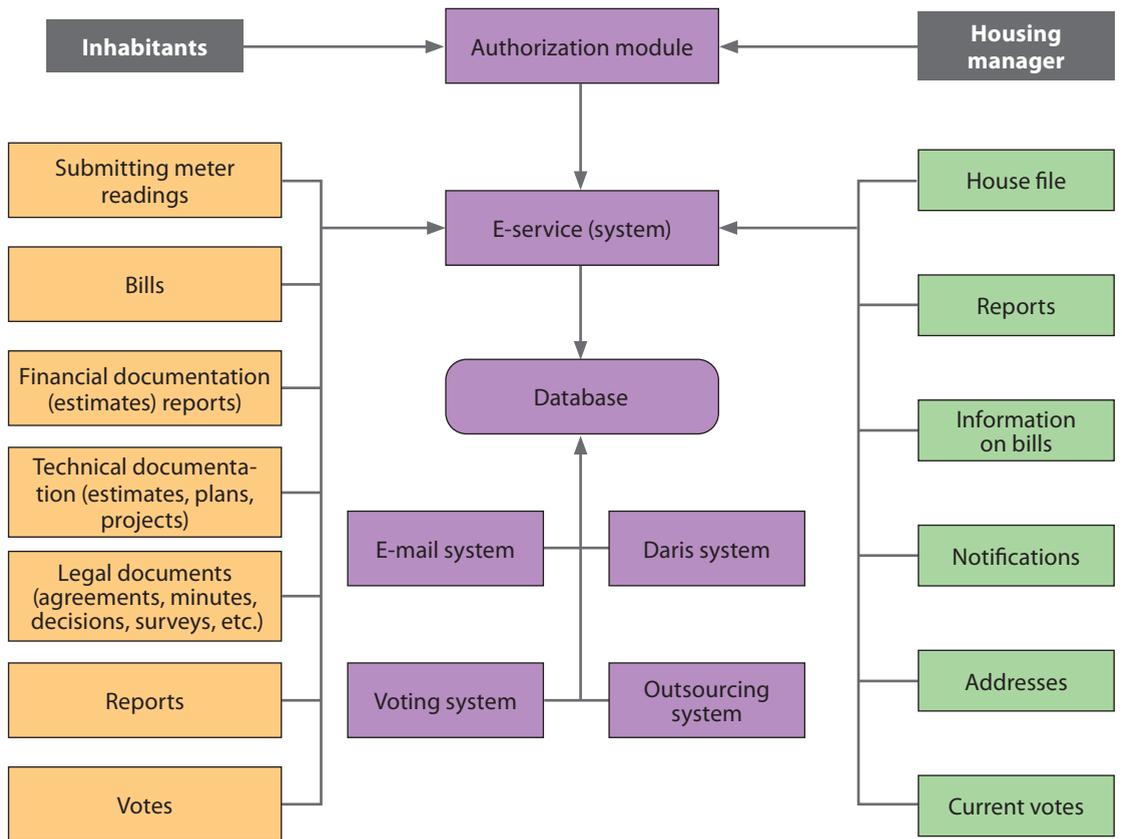


Fig. 2.3. Conceptual scheme of the information exchange system (created by the author).

When developing the conceptual system scheme, two criteria should be taken into account:

1. Public access data: no specific requirements for confidentiality. The data are available to all users who are included in the customer list of the specific object.
2. Restricted data: confidentiality of information – protection of information against unauthorized access; availability of information – authorized access to information at the required time and place; information integrity – maintaining the invariance of the content and structure of information.

In the case of a conceptual system scheme, there must be a clearly defined user model that represents the user's goals, objectives, interests, needs, functions, and other characteristics that allow the system to differentiate users.

## Legal factors

*Regulatory framework.* The legal environment is one of the main elements for functioning of the system. The impact of the regulatory framework on the management system, compliance with it or, on the contrary, ignoring or breaching it plays an important role in the sector development. The regulatory framework applies to the maintenance of property, the services to be supplied, the evaluation of the technical condition and its improvement opportunities, the availability of financial sources, decision-making and the implementation of many other issues.

The sector of management of multi-apartment residential buildings is regulated by a number of regulatory enactments. The main ones are special regulatory enactments such as “Law on Administration of Residential Houses” and “Law on Residential Properties”. In the management sector, laws are

developed mostly following the European Union regulations or directives, such as the Energy Efficiency Directive, the Waste Framework Directive, etc.

The legislator has developed mandatory management activities to be performed, which result in the owner's mandatory obligation to perform these activities. However, with account of the fact that there are situations when owners are prepared to partially perform their own activities, such as sanitary maintenance, the legislator allows the owners to assign the manager to perform all or only part of such activities. Still, in the event of such a partial transfer of responsibilities to the managers, owners should be aware that measures that are not assigned to the manager must be taken by the owners in their own capacity. Without these compulsory management activities, there is a risk of exposing public to threats, which pertain to human life, health, property and the environment.

*Elements characterising the scope of multi-apartment residential building management are statistics, educational requirements and registers.*

As of 1 January 2021, the Register of Residential Home Managers maintained by the Ministry of Economics has 785 registered specialists who have at least one building management contract and the right to manage this property (Ekonomikas ministrija, 2021). When viewing the Lursoft database, according to the NACE classification, code 68.32 "Management of Real Estate on a Fee or Contract Basis", as of 31 August 2019, there were 4105 companies, 1215 of which were active companies in Riga alone. Having evaluated economically active companies in this sector, it can be concluded that every year there is a tendency towards an increase in the number of such companies – their number has increased by 41 % since 2013.

When evaluating the companies that are economically active in the sector, it is certainly required to examine the basic indicators regarding the size and potential role of the sector companies on the market. One of the fundamental indicators is equity, which shows how much of the company property belongs to the company owners. Since 2014, equity capital has gradually increased in the sector enterprises, with a slight downturn in 2020 (see Fig. 2.4). The determining factor ( $R^2 = 0.859$ ) also indicates that this relationship is true and very likely to continue growing unless the period of pandemic in the state causes too serious consequences.

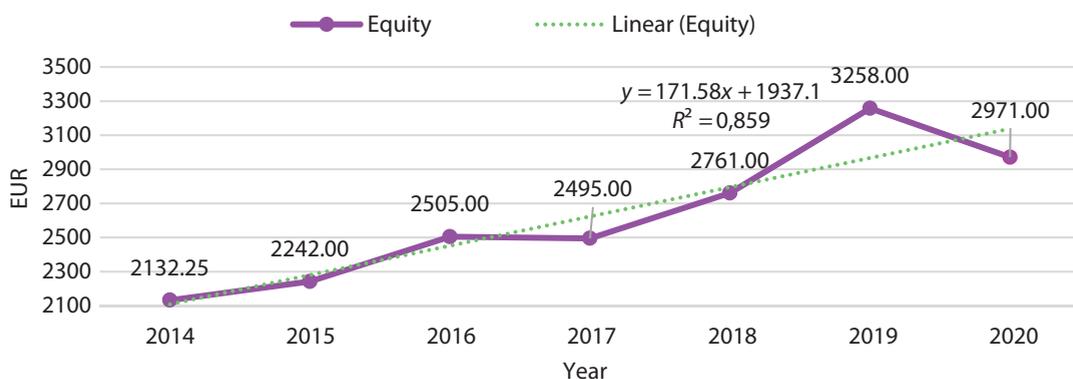


Fig. 2.4. Equity indicators of the sector companies from 2014 to 2020 (Lursoft database, created by the author).

In view of the fact that the object of the research is multi-apartment residential buildings, interest is arisen by two- and more apartment residential buildings, as well as residential buildings of different social groups, as they are classified as multi-apartment residential buildings which have professional managers. This housing group comprises a total of 54 091 objects which should be administered.

In view of the aforementioned, assuming that there are 54 091 multi-apartment residential buildings in Latvia, which are administered by 4105 legal persons who have registered their activity in the field of real estate management and administration, there are, on average, 13 residential buildings administered per legal person who have registered their activity in the Register of Enterprises (the author's

estimates based on available information from the Lursoft database).

There are four higher education establishments in Latvia, where students can obtain the qualification of House Manager (the 4<sup>th</sup> professional qualification level). These are: Riga Technical University, the College of Law, Jekabpils Agrobusiness College, Riga International School of Economics and Business Administration (RISEBA).

By examining the information on the number of natural and legal entities and their corresponding qualifications, which can be found in the Register of Residential Home Managers of the Building Information System (BIS), for which the State Construction Control Bureau of Latvia is currently responsible, comparing the results with the data of the Register of Managers, where it is stated that only 56 legal persons have the 5<sup>th</sup> professional qualification level, it can be concluded that a large number of graduates with the respective education have not registered in the Register. The importance of the Register of Residential Home Managers is much debated – whether it should be public or, as it is now, informative.

When checking the data of the Register of Residential Home Managers, it can be concluded that they are incomplete, as only a small number of managers have registered there. The system is currently being assessed as incomplete also in terms of data reliability, since the exact number of managers cannot be determined, the currently registered data of legal entities may be duplicated by the number of individuals, which means that there is an overlay of trained specialists in the Register. No information is also available from the Register data on the number of residential multi-apartment buildings which are managed by persons registered in the Register of Residential Home Managers. The Register of the Building Information System is based on legislation, however it is merely informative and does not require to register.

## Legal proceedings

During the management process of multi-apartment residential buildings, various types of disputes may arise between the parties involved. As any dispute, the dispute between the owner of the immovable property and the manager may also be settled outside the court or in court in the course of civil proceedings. The legislator has provided for a number of types of dispute settlement, both outside the court and by filing a claim before the court, so that each of the parties concerned can choose the way that is best suited to its interests.

Within the framework of the Doctoral Thesis, 78 judgements of the Department of Civil Cases of the Supreme Court of the Republic of Latvia that pertain to the management of multi-apartment residential buildings have been researched and analysed. The judgements to be analysed have been selected using the anonymised judgement seeker of the e-service portal of Latvian courts [www.manas.tiesas.lv](http://www.manas.tiesas.lv), in which “civil cases”, “cassation instance” and keywords “management of residential houses” were indicated as selection criteria. The selected judgements cover the period from 2014 to 2017.

The collected information shows that proceedings are mainly initiated for the collection of debts arising from the provision of management services and public utilities. These are debts incurred mainly as a result of payments not made by the recipient for financial or other reasons, but not payments for which there is a dispute. The second most common form of non-payment is cases where the occurrence of debts is the debtor’s deliberate non-payment due to the loss caused by the manager’s party or because the debtor has its own legal assessment of the situation.

The level of payment discipline acts as an unrecognised integrated indicator of the success of managing multi-apartment residential buildings. If it is significantly lower than 95 % and losses resulting from non-payments cannot be compensated either from tariffs or from the budget, then business in the area of multi-apartment residential buildings and public utilities (services) is becoming unprofitable and, in the course of time, more companies turn out to be insolvent.

The summarised results show that the average duration of proceedings in cases resolved by the court is five years and four months, where the fastest consideration of a case is three years and six months and the longest – nine years and six months. On average, the duration of proceedings is five years in 22 %

of cases and five years and six months in 26 % of cases. Cases where proceedings have lasted for more than six years in management cases can be considered as exceptions. There are only 12.5 % of such cases overall.

In general, when analysing the duration of all cases examined, it can be stated that, first of all, individual categories of cases considered in the course of a written procedure (formerly small claim cases) can be completed on average two years earlier than the claims resolved in the court hearings. Secondly, it can be concluded that the risk of an unforeseeable longer litigation in the court proceedings is higher. Although this is a seemingly small number of cases – 12 %, the proceedings in these cases lasted for up to nine years and six months, which, in view of the need of the parties for the final settlement of the dispute as quickly and fairly as possible, is considered to be too long, which may have adverse consequences for the parties and their legitimate interests.

## The role of social responsibility and psychological climate in the management of multi-apartment residential buildings

High social responsibility and a healthy psychological climate at a company are undoubtedly a powerful environment in the area of multi-apartment residential building management. Not only the professional education of employees, but also the emotional intelligence plays a significant role in everyday work with apartment owners and other tenants. The higher such indicators are, the better results are achieved by the company.

Environmental challenges have become a priority in recent years, with social responsibility activity increasing. This approach makes it possible to ensure a balance between working conditions and social relations, on the one hand, and environmental issues, on the other. The social responsibility approach focuses on a variety of prevention measures related to environmental pollution, noise suppression (Martínez & Rodríguez del Bosqu, 2016) preventing global warming (Holcomb, Upchurch, & Okumus, 2007), thus thinking about ensuring sustainability.

When summarising information on social responsibility provided in scientific literature, documents of the European Union and national documents, the author has distinguished the following principles:

- 1) ethics and honesty (Park, Joon, & Kwon, 2017);
- 2) integration of environmental and social considerations;
- 3) respect for the environment, environmental management (Rahmann, 2011);
- 4) introduction of environmentally-friendly technologies;
- 5) openness (Yoon, Gürhan-Canli, & Schwarz, 2008);
- 6) consumer awareness of responsible production and service provision (Kang, Lee, & Huh, 2010);
- 7) activities exceeding those specified in regulatory enactments and contracts (Park, Joon, & Kwon, 2017);
- 8) fight against corruption, respect for all stakeholders;
- 9) reducing discrimination in society;
- 10) promoting gender equality.

In view of the broad range of principles for developing a social responsibility strategy, which would also ensure sustainable performance, key stakeholders should be identified with which good quality relations are developed. This ensures the loyalty of the parties and effective operation in the future. The introduction of socially responsible principles depends on the expectations of management (Lapiņa, Maurāne, & Stariņeca, 2014).

The scope of social activity should be assessed from both the perspective of society and the business and ecological environment. Therefore, both the various types of charity opportunities and the education of society, which should involve both businesses and public and local authorities, as well as observation of environmental requirements and eco-friendly attitudes, are being assessed. This kind of cooperation among stakeholders ensures the implementation of the principles of good governance, ensuring sustainability.

When implementing socially responsible strategies and shared values, it is necessary not only to define the groups involved in the activities, but also to find methods that would help to work with these groups as effectively as possible in the interests of both enterprises and society. A new, higher level of thinking is the creation of a shared value where social responsibility is integrated into the general strategy of an enterprise (Lapiņa, Maurāne, & Stariņeca, 2014).

The purpose of the operation of management companies of multi-apartment residential buildings is to ensure the management and technical maintenance of property. However, there are companies that, in addition to the contract provisions, also invest in informational training seminars for their clients. Such trainings are organised free of charge, with the participation of authorised persons of residential buildings or “senior tenants”, where up-to-date information on the regulatory framework for the sector management is provided, including the types of decision-making and the limits of responsibility and technical measures.

All these activities are organised on a voluntary basis and are implemented by companies in cooperation with service-affecting interest groups – customers, suppliers, public and local authorities. In general, social activity is ensured in relations and interaction with the state and society, investors, managers, employees, suppliers and consumers. The principles of social responsibility are an essential element in the sustainable development strategy.

### **The role of a psychological climate in multi-apartment residential building management**

The psychological climate within the company is one of the essential elements of the management system. The more positive it is, the higher results can be achieved. This means ensuring mutual trust, openness in one’s activities, willingness to cooperate with all parties involved, and satisfaction with both their community of apartment owners and their current house manager. To ensure the management of multi-apartment residential buildings in order to achieve a positive psychological climate, the following aspects should be evaluated:

1. Organisational aspects, i.e., how the managers perform their duties, including providing customers with information, i.e., feedback (notifications of general meetings, surveys, information statements on the measures taken, reports on the work performed and the use of financial resources, decisions taken, schedules for their implementation, etc.).
2. Psychological factors – the relations between the owners and all tenants of the house, the relations between the tenants and the manager, their psychological compatibility.

The psychological climate is composed of many factors, some of which can be affected whereas others cannot, as they can arise from different random features. Among the factors affecting the psychological climate among individuals in the community of apartment owners, including other apartment users, the following can be mentioned: age groups of the tenants; nationalities and mentality of the tenants; gender groups; income, its differences; the duration of their residence in the dwelling; being familiar with each other or not; understanding of the needs for the maintenance of their dwellings; technical and construction characteristics of multi-apartment residential buildings (year of construction, new projects, special projects, location in the estate territory); the level of education of the tenants; personality of the authorised persons/ senior tenants of the residential building; the style of mutual cooperation; the decision-making style and mutual communication.

The psychological climate is equally important at a company that provides management services. These include such factors as the structure of the company, the composition of the employees at the company, the specific nature of the work to be performed, the level of education of the manager and employees, age of employees, gender of employees, the personality of the head of the company as a leader, the style of management, motivation of employees, type of mutual behaviour and skills to work in a team. Assuming that there are two main parties in the subject of the research – the tenants and the manager, a climate is also formed in this mutual cooperation model, which is affected by the aforementioned factors.

A psychological climate can be favourable or unfavourable. Looking at the climate between tenants and the management company, the author of the Doctoral Thesis has identified a number of factors (see Table 2.2).

Table 2.2

**Indicators Characterising Favourable or Unfavourable Climate**

No.	Favourable psychological climate	Unfavourable psychological climate
1.	Mutual trust	Lack of trust to activities of the manager and/or authorised persons of the house
2.	Readiness to cooperate	Unwillingness to cooperate: <ul style="list-style-type: none"> <li>- distrust regarding the performed work;</li> <li>- low interest in the maintenance of one’s property;</li> <li>- low motivation of the company employees.</li> </ul>
3.	Successful decision-taking	Low level of decision-taking: <ul style="list-style-type: none"> <li>- busyness of apartment owners, unwillingness to participate in general meetings, organised surveys or other decision-making forms;</li> <li>- distrust to solutions offered by the manager;</li> <li>- fears on the side of apartment owners regarding high payments;</li> <li>- low activity of the company employees;</li> <li>- low capacity and professionalism of the company employees.</li> </ul>
4.	Satisfaction with belonging to the specific company or a group of residents	Dissatisfaction with belonging to the specific company or a group of residents: <ul style="list-style-type: none"> <li>- dissatisfaction of apartment owners with the management company;</li> <li>- mutual dissatisfaction of apartment owners with their neighbours, feeling fear;</li> <li>- low level of loyalty of the company employees to their company.</li> </ul>
5.	Positive atmosphere in mutual communication	Negative atmosphere in mutual communication: <ul style="list-style-type: none"> <li>- mutual manifestations of hatred;</li> <li>- unwillingness to listen to each other;</li> <li>- threatening to bring conflict outside the residential building, involvement of mass media.</li> </ul>
6.	No complaints against each other	Availability of complaints against each other: <ul style="list-style-type: none"> <li>- complaints of residents against their neighbours;</li> <li>- complaints of residents against employees of the management company;</li> <li>- complaints of employees of the management company about the attitude of tenants towards their property, against them as the staff.</li> </ul>

In the event of a favourable climate between employees or tenants, as well as their interaction, there is mutual trust, readiness to cooperate and take decisions, satisfaction with belonging to the specific company or a group of residents (see Table 2.2). Whereas, in the event of an unfavourable climate, there is mutual tension; dissatisfaction with each other – tenants with the work of the manager, the manager with the inability of apartment owners to take decisions; caution on the part of apartment owners regarding the activities performed by the manager; mutual manifestations of hatred, increasing conflicts and unwillingness to listen to each other.

Emotional intelligence is the ability to monitor one’s and others’ feelings and emotions, use this information to guide one’s thinking, perceptions and actions. It is the ability to recognise, adjust, understand and manage emotions regarding oneself and others (Anjali Daisy, Vijayabanu, & Bonaparte, 2017).

One of the reasons in formation of a negative climate can also be the level of stress, which will be different for each apartment owner and the rest of the tenants. Stress can be influenced by both external and internal factors.

In scientific literature, too, different categories are raised for the identification of stress factors. For example, customer factor, life events, day-to-day difficulties. Own income, remuneration, level of employment, career, occupational insurance are important factors in working conditions, which also have a direct impact on the level of personal stress (Corsini, Wisensale, & Caruso, 1988).

When summarising the research results provided in Chapter 2, several problems have been identified:

1. The obligation of municipalities to manage buildings is terminated; however, no regulatory enactment specifies responsibility for the takeover of buildings into possession and management. The Ministry of Economics have no up-to-date information at their disposal, as the procedures for providing information to the responsible institution have not been specified.
2. The technical condition of residential buildings is deteriorating every year, with energy performance indicators declining, creating an increased risk to housing safety and the environment climate.
3. The Register of Residential Home Managers currently has an informative function. It is not monitored on the part of the state whether the statutory requirement – compulsory vocational education is being fulfilled. This, in turn, demonstrates that the service can be provided by persons who do not have the necessary theoretical knowledge and professional competence.
4. In the process of management of multi-apartment residential buildings, legal proceedings are initiated primarily for the collection of debts, which have occurred in respect of the provided management services and public utilities, as well as claims for indemnifying damages.
5. The level of payment discipline is significantly lower than 95 % in many places, and losses resulting from non-payments cannot be compensated either from tariffs or from the budget. In such a case, business in the area of multi-apartment residential buildings and public utilities (services) is becoming unprofitable and, in the course of time, more companies turn out to be insolvent.
6. The low interest of apartment owners in the maintenance of their property, low activity in decision-making increases the risk in the preservation of a multi-apartment residential building, endangering technical condition of the buildings and causing harm to the health and even life of other persons.
7. Psychological factors – human thinking, behavioural peculiarities – play an important role in the management process of multi-apartment residential buildings; however, in practice, insufficient attention has been paid to these, increasing the risk that the parties involved in the process cannot agree with each other and reach a common decision or compromise.

### **Internal Factors Affecting the Multi-Apartment Residential Building Management System**

*Internal environment of residential building management companies.* The author of the Doctoral Thesis has examined the internal factors influencing the management system of multi-apartment residential buildings:

- 1) strategy of management companies;
- 2) operation of management companies;
- 3) employees of management companies;
- 4) internal standards of management companies;
- 5) operation of management processes and changes in companies;
- 6) company partners, service providers;
- 7) internal communication flow;
- 8) technologies, information systems;
- 9) quality of management service.

### **Behaviour and Actions of Multi-Apartment Residential Building Apartment Owners – Clients**

The multi-apartment residential building management system is also influenced by internal factors

of apartment owners and other tenants of the building as clients of management companies. The author of the Doctoral Thesis has distinguished some of them:

- 1) awareness and interest in the management service;
- 2) satisfaction with the service and contact with the surrounding residential environment;
- 3) decision-making capacity and participation in the management process;
- 4) psychological climate among owners;
- 5) use and availability of information;
- 6) willingness to develop and invest in the property.

### Comparative Evaluation of Residential Building Owners and Industry Specialists – Experts

In general, examining the evaluation of both apartment owners and industry experts of the management service and of the management of multi-apartment residential buildings, shows that the average evaluation of the surveyed industry specialists is 6.31 points (on a scale of 1 to 10). Their rating by individual categories is shown in Fig. 2.5.

The analysis of the survey data of both apartment owners and industry experts shows that the average assessment of respondents for different management activities is very similar and the differences are minimal. This means that the situation in the residential building management market is assessed objectively by both sides; however, the average result is recognised as low. This shows lack of quality, good governance, and social responsibility in the industry.

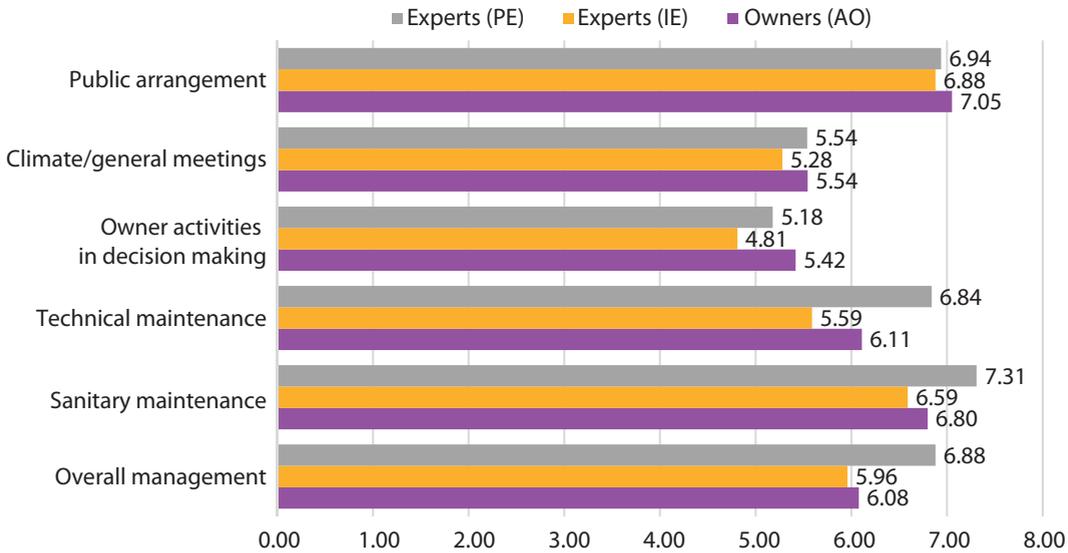


Fig. 2.5. Evaluation of management service by apartment owners (AO), professional industry experts (PE), and other industry experts (IE).

The results of the surveys point to shortcomings in the management industry strategy profile, clearly showing the factors that can and will strongly affect the competition among management companies, business and customer values, the life cycle of buildings and their sustainable preservation both now and in the future.

The operation of the multi-apartment residential building management system is influenced by several factors. In general, it can be concluded that there are problems in the industry related to the following issues:

1. The management service is provided at an average level of its quality.
2. The availability of information related to the scope, costs and justification of the provided services is insufficiently ensured. Insufficient information is provided at the level of responsibility for

the execution of the management service.

3. There is no unified systemic approach that would allow identifying problems, planning a strategy for management activities, taking into account certain principles. There is no threshold at what point state or municipal institutions should intervene if significant problems are identified in the management system of multi-apartment residential buildings.

To conclude, after evaluating the research results obtained in Chapter 2, including the explanations of the concept of residential building management available in the scientific literature, the author proposes an updated definition of the residential building management system in accordance with the residential building management system developed within the framework of the Doctoral Thesis:

“Multi-apartment residential building management is a process of functional interaction that is provided on a continuity basis to implement a set of organisational, economic, engineering, legal, political, social, technological and information activities aimed at effective management in order to achieve the life cycle extension and safe operation of the building, as well as to ensure the compliance with the human health and safety, and environmental protection principles in the context of sustainable conservation.”

### 3. Decision-Making Methods Used in Multi-Apartment Residential Building Management

In order to successfully implement the process of managing a multi-apartment residential building, it is important to evaluate the decision-making opportunities related to the satisfaction of the mutual wishes and needs of different interest groups or individuals, the division of influence spheres of the parties. Within the context of the Doctoral Thesis, the author believes that the following decision support methods would be effective in the field of management:

- 1) analytic hierarchy process (AHP) (Saaty T. L., 1980);
- 2) laws of conditions (also called expert laws).

There are studies in the scientific literature where the AHP method is used to evaluate and decide on the purchase of real estate. In turn, in the process of managing multi-apartment residential buildings, the use of this method has been proposed for the first time.

Important aspects in the management of multi-apartment residential buildings are the degree of effectiveness of cooperation, compliance with legal requirements, and proper document management. The decision should take into account the impact of the issues under consideration and future actions in the management process, the extension of the life cycle of the building. At this stage, great importance is given to facts, available data, availability and comprehensibility of information, its impact on the final result.

When making a decision, various alternatives are often considered, facts, data, calculations are evaluated and a decision is made as a result. Therefore, an important indicator of management in the implementation of the process is decision support methods. Decision support methods are a set of methods and approaches that provide the decision maker with an opportunity to evaluate alternatives widely, including obtaining a numerical assessment of the benefits (effectiveness) of the alternative.

#### Use of Analytic Hierarchy Process in the Decision-Making Process.

The analytic hierarchy process is an effective tool for solving multi-criteria decision-making tasks. By simplifying the decision-making process to sequentially compare pairs and summarise the results, the hierarchical analysis method helps to include both subjective and objective aspects in the decision-making process. The method involves four basic steps (Saaty T. L., 1980), which are shown in Fig. 3.1.

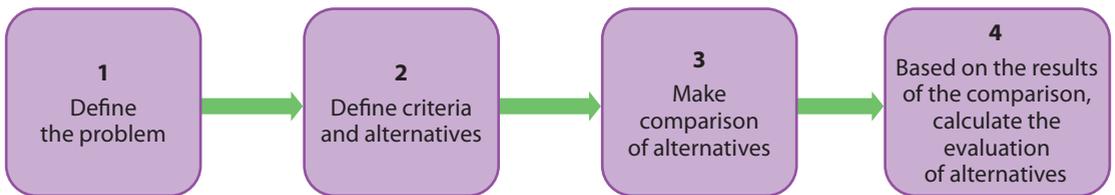


Fig. 3.1. Basic steps of the analytic hierarchy process.

The classic tasks of multi-apartment residential building management, which could be solved by the method of hierarchical analysis, are planning renovation or repair works, selection of contractors, change of manager and other related optional tasks, which include several alternatives and criteria.

## Use of Laws of Conditions in the Decision-Making Process

The creation of laws of conditions is mainly based on expert knowledge and includes the following steps:

1. Defining the problem. The problem environment and possible solutions to the problem are defined – alternatives or decision variants.
2. Defining the factors that influence the solution. Factors that influence the decision-making process for a particular task are defined. In fact, the selection criteria are defined. For each criterion, possible conditions are defined, the fulfillment or non-fulfillment of which results in one of the decisions. The number of conditions must be at least 2, otherwise the criterion can be removed from the list, as it does not allow making choice.
3. Setting priorities for the defined criteria. In the classic version, the selected criteria are ranked according to their priority in the form of a comparison of pairs based on the experience and advantages of the expert.
4. Developing the laws of conditions, starting with the most important criterion.

This method is suitable for the implementation of the multi-apartment residential building management process. Laws of conditions and their visualization in a decision tree can be used effectively to structure conditional processes and rules so that a decision can then be made easily and quickly in a particular situation. Three basic elements are used to visualize a set of rules of conditions: choice, condition, and decision.

There are rare cases where it is possible to foresee all possible criteria and their conditions; therefore, a set of conditions must provide for the action to be taken if none of the laws are met. It must also be taken into account that as the external environment and the criteria influencing the decision change, the set of laws of conditions and the decision tree will also change.

The laws of conditions or expert methods should be used in planning the strategy of the management process stages, setting goals and activities.

It depends on the decisions made whether the organisation of the management process will be efficient and, ultimately, whether the life cycle of the building will be extended and meet the sustainability criteria. Based on the above research, the author believes that the proposed system should be supplemented with another element that combines decision support methods.

The following findings have been obtained during the research and will be used in the further development of the Doctoral Thesis:

- 1) adherence to the principles of stable, good governance and social responsibility is a prerequisite for the development of a residential building management service;
- 2) the need for staff development to increase competitiveness in the industry;
- 3) environmental management service provision and development, observing more than specified in regulatory enactments, reducing the negative impact on the environment;
- 4) provision of a socially responsible service;
- 5) adherence to the principles of good governance, improving the quality and efficiency of service provision;
- 6) promoting volunteering by taking part in charity projects;
- 7) development of stakeholder relations, following strategic and socially responsible management, integrating economic principles, marketing and management service rights through mutual communication among the management company, clients and collaboration service providers;
- 8) business ethics observance in the provision of the service.

## 4. Integrated Information-Analytical Management Process and Management Systems Approach Methodology for the Management of Multi-Apartment Residential Buildings

The efficiency of the multi-apartment residential building management service is determined by the processes and operating principles listed in Chapters 1 and 2, as well as by external and internal factors and evaluations of the multi-apartment residential building management industry, and decision-making methods that form the whole management process. In order to evaluate the management system, it is first necessary to determine the goals of its operation at each stage of the service execution cycle (Table 4.1).

Table 4.1

**Priority Goals and Objectives of Multi-Apartment Residential Building Management Processes**

Goals Objectives	Completion of mandatory management work	Completion of other management and maintenance work	General refurbishment
Strategic analysis, forecasting and planning	Analysis of internal and external factors, data monitoring, visual and technical inspections, identification of defects and problems, analysis of causes. Development of management plan	Clarification of clients' wishes for other activities, work planning	Energy audit, technical survey development, analysis, technical project development
Satisfaction of customer needs	Clarification of customer needs, fulfillment of management contract clauses / or incorporation of new contract clauses / or amendments to the contract (changes in service frequency)	Implementation of other management activities according to the client's will and solvency	Development of a technical project in compliance with the regulations and according to the client's will and solvency
Financial management	Determining the management fee according to the services provided, their frequency, economic justification and cost optimization. Development of the current year's budget, analysis of financial data	Analysis of clients' solvency, implementation of works in accordance with the decisions made and payments made by clients	Financial planning, analysis of clients' solvency, attraction of co-financing, project management
Internal environment management	Implementation of the company's and/ or apartment owner community's goals, development and implementation of internal communication processes, delegation of work, decision-making, personnel management, company culture	Implementation of the company's goals, implementation of internal communication processes, delegation of work, decision-making, market survey, preparation of price inquiries, procurements, offers	Implementation of internal communication processes, delegation of work, decision-making, market survey, preparation of price inquiries, procurements, offers, choice of builder and credit institution
Technical maintenance	Technical maintenance and repair of a residential building, its equipment and communications, provision of minimum energy efficiency requirements	Carrying out maintenance and repair works	Renovation of the object in accordance with the technical design, commissioning

Table 4.1 Continued

Goals Objectives	Completion of mandatory management work	Completion of other management and maintenance work	General refurbishment
Material and technical support	Purchase of material and technical equipment, its use in the performance of service, maintenance of tools and equipment	Purchase of material and technical equipment, its use in the performance of service, maintenance of tools and equipment	Purchase of material and technical equipment, its use in the performance of service, maintenance of tools and equipment or involvement of the builder during the warranty period
Project management	Market analysis, co-financing research, project idea generation, delegation of powers	Co-financing, project application development, project implementation, project progress monitoring and evaluation	Concluding contracts with financial institutions, contractors, project application development, project implementation, project progress monitoring and evaluation
Quality management	Development of quality policy, determination and implementation of basic principles	Development of quality policy, determination and implementation of basic principles	Author's supervision, construction supervision, implementation of internal quality management
Human resource management	Personnel and/or apartment owner community management, organisational structure optimization, development and implementation of motivation system, acquisition of new skills and knowledge	Personnel management, optimization of organisational structure, implementation of motivation system, acquisition of new skills and knowledge	Personnel management, optimization of organisational structure, implementation of motivation system, acquisition of new skills and knowledge
Change management	Change of management service provision work style, introduction of modern, environmentally-friendly technologies	Change of management service provision work style, introduction of modern, environmentally-friendly technologies	Change of management service provision work style, introduction of modern, environmentally-friendly technologies, observance of ecological environment, sustainability principles

Based on the collected information and the results of the research conducted within the Doctoral Thesis, the author has developed an information-analytical management process and management systems approach for the management of multi-apartment residential buildings (hereinafter – systems approach) (Fig. 4.1), which can be used by state, municipal and multi-apartment residential building management specialists to improve the real estate sector and increase work efficiency.

The need for a systems approach is also determined by the finding of the State Audit Office – safe buildings will always be based on the definition of precise and effective obligations and support measures directly for building owners, managers and safety controllers (Valsts kontrole, 2020).

The aim of the multi-apartment residential building management systems approach is to provide precise unified methodological steps, ensuring the management of multi-apartment residential buildings, defining the main tasks and operating principles, thus resulting in a socially responsible and high-quality multi-apartment residential building management service.

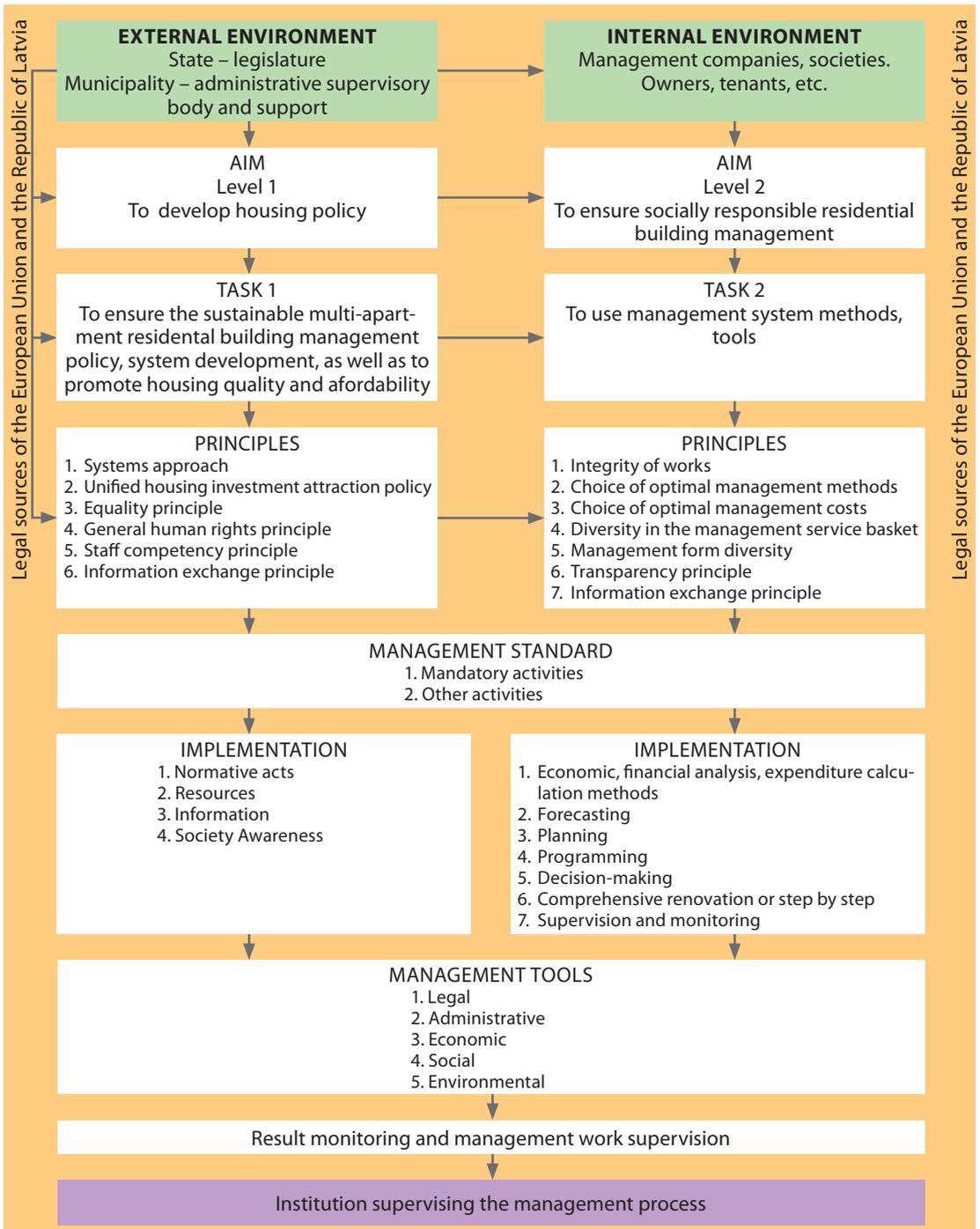


Fig. 4.1. The integrated information-analytical management process and management systems approach methodology for the management of multi-apartment residential buildings.

The main subjects of the systems approach module are the state and municipalities (Fig. 4.1). The state and municipalities are the ones that would play the main decisive role in the management of the housing stock. The topicality is confirmed by the report of the State Audit Office in 2019, where the

conclusion on the situation in the management sector of multi-apartment residential buildings is a confirmation of the need to develop a housing policy in the country, which would also be effectively implemented. The housing stock, as indicated by both industry experts and the State Audit Office, is in a critical condition and it is one of the most significant problems that should be addressed urgently in the country.

The subjects specified in the systems approach, in addition to the state and municipalities, are management companies, owners, tenants, public service providers and non-governmental organisations, such as the Association of Management and Administration of Latvian Housing, the role of which is as important as that of the state and municipalities. The only difference is that these subjects make decisions and act on the basis of the principles developed by the state and municipalities, using the management implementation methods and tools offered to them.

### The Concept for the Possibilities of Application of the Information-Analytical Management Process and Management Systems Approach for the Management of Multi-Apartment Residential Buildings in the Development and Implementation of Housing Policy

Guided by the developed systems approach and being aware of the factors influencing the management processes, it becomes possible to develop a concept of its operation. The main focus of this concept should be placed on the quality of service, efficiency, productivity, client satisfaction, workforce diversity management, as well as compliance with security requirements.

The aim of the first level is to develop housing policy. The development of housing policy plays an important role in the whole process of managing multi-apartment residential buildings. It is, therefore, important to develop housing policy at a level that works in practice, i.e., the aims and principles set out should be implemented in practice.

### Principles

**Social responsibility and the principles of good management practice** are one of the preconditions for the process to be implemented in accordance with the level of housing management and its quality set by the state, as well as for the provision of a quality management service that meets the client's wishes and solvency. The *systems approach* is used throughout the housing policy implementation process, i.e., residential building as an object, management service and related elements of a multi-apartment residential building management system as a subject.

**A unified housing investment attraction policy** envisages that the state and municipality shall continue to plan co-financing from their budgets for the preservation of property and the extension of the life cycle of housing. On 4 March 2020, Cabinet Order No. 95 "On Sectoral Policy Guidelines for Programming Period 2021–2027" came into force. One of the guidelines in the Order is "Housing Availability Guidelines 2021–2027. The priority is "Quality living environment and territorial development" (Cabinet of Ministers, 2020).

**Staff competency principle.** When operating in the multi-apartment residential building management sector, management service providers need to provide training and professional development for their employees. *Information exchange principle* is of equal importance. Effective management of residential buildings requires a high-quality and clear exchange of information among the parties involved.

The aim of the second level is to ensure socially responsible management of multi-apartment residential buildings. The owners themselves, the management companies of multi-apartment residential buildings, as well as other housing users and representatives of the industry are involved in achieving the aim. In order to achieve the aim, the task is set – to use management methods and tools. In order to perform this task, organisational work must be performed both by the owners themselves and by the building management companies if they have been given a task from the owners – to perform building management. In order to fulfill a certain aim and tasks, it is necessary to define the principles according

to which the planning and implementation of works is performed, as well as to take into account the standard of multi-apartment residential building management and various methods of management service provision.

## Principles

**Integrity of works** indicates the need for the analysis of management services, which is an indispensable prerequisite for planning, and based on financial indicators, it requires taking into account cost of works, solvency of the population, ability to pay bills, and as far as possible the ability to perform the set of works, thus saving both financial and time resources and achieving property preservation in shorter term.

**Choice of optimal management methods.** This principle implies that all parties involved in the management service must work together in a coordinated manner to provide the service in such a way as to preserve and improve the residential building exploitation value throughout its life cycle. **Choice of optimal management costs.** During the management process of multi-apartment residential buildings, an operational strategy is developed, where the results to be achieved are determined, a management plan is drawn up, and this approach is applied to each object separately, according to the technical condition of the object and the solvency of the owners.

**Diversity in the management service basket.** In practice, there are residential buildings that are not managed because the owners have not chosen a manager for them, as a result of which the property is not maintained, and over the years it begins to degrade and endanger the safety of the environment. All this indicates the need for the legislator to set a minimum basket of management services, and the state or municipal institutions should monitor the implementation of this process.

**Management form diversity.** The introduction of this principle gives apartment owners the opportunity to choose how to manage their property.

**Transparency principle** means a detailed presentation of the use of funds in a form that is comprehensible to the owners, so that they can trace the use of the deposited funds. The Consumer Rights Protection Centre also points to the principle of transparency, emphasising that the terms of the contract shall be formulated in a simple and comprehensible way.

**Information exchange principle.** In order to be able to manage residential buildings effectively, a high-quality and clear exchange of information among the parties involved is also needed at this stage.

## Implementation

In order to achieve the aim set, the legislator shall use the following implementation instruments: regulatory enactments regulating the sector (European Union directives, regulations, laws and regulations of the Republic of Latvia, etc.), human resources, financial resources, logistics resources, with particular emphasis on the latest trends in information technology in the areas of surveillance, data processing and information exchange. Both in the field of data analysis and in the field of education, it is necessary to ensure the availability of information on the development trends of the sector, the latest amendments to the regulatory enactments, the levels of responsibility of the parties, as well as public education must be one of the priorities (see Fig. 4.2).

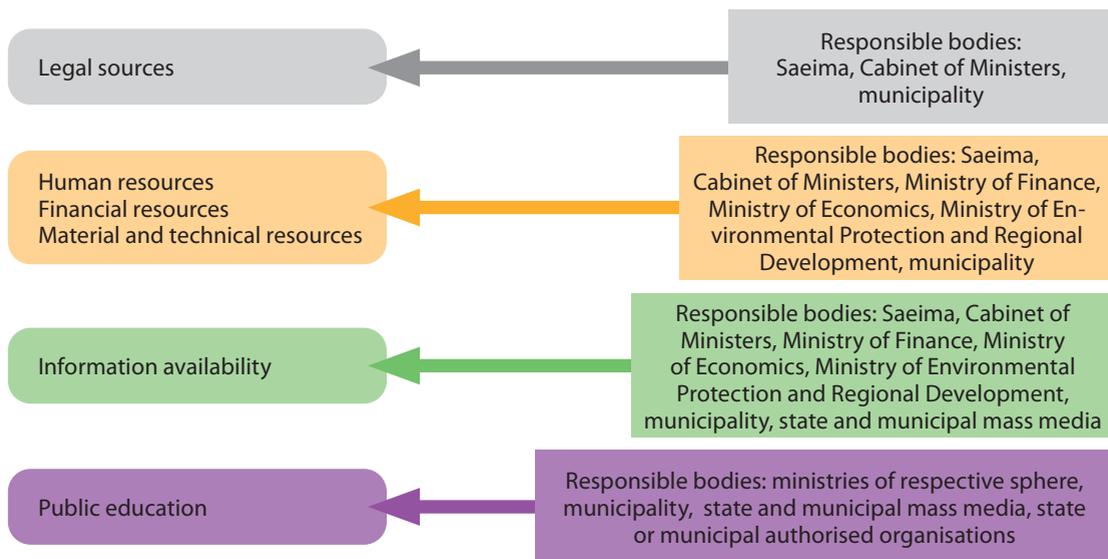
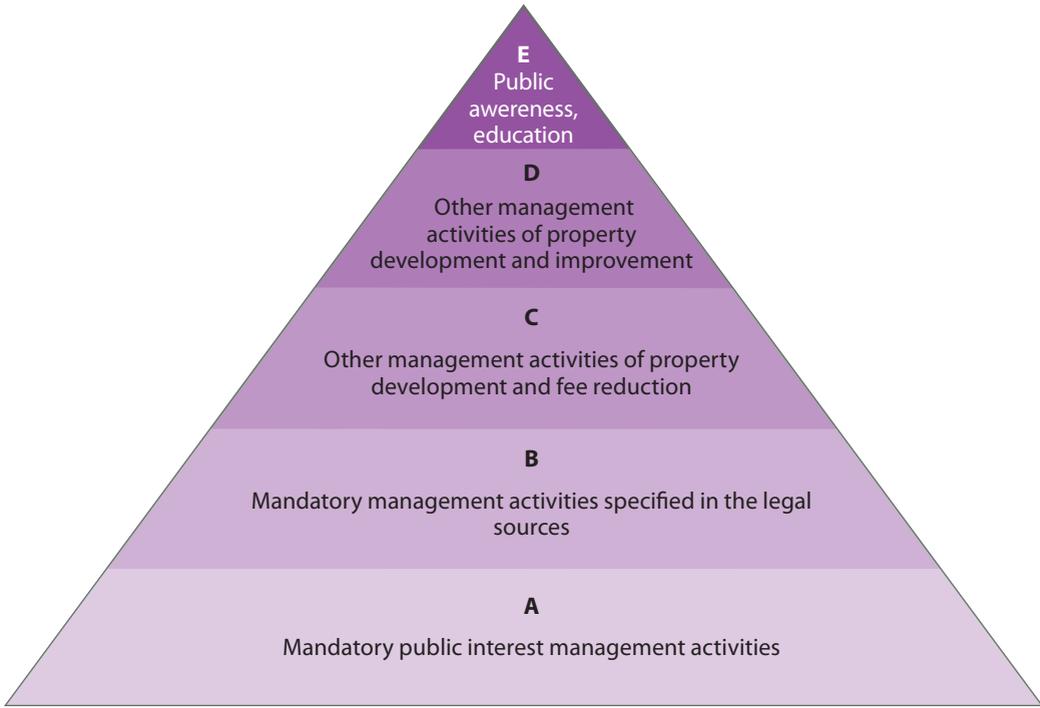


Fig. 4.2. Stages of implementation of housing policy development and the parties involved.

The legislator would need to identify specific responsible persons at each stage of implementation; thus, it would be ensured that each of the parties would assume their own level of responsibility – political, legal, social, administrative, civil liability. In order to achieve the intended result, the proper strategic sequence must be followed: the benefit to the owners of multi-apartment residential buildings, the society as a whole, the conditions for carrying out the management work, the costs and implementation.

### Standard of multi-apartment residential building maintenance

The need for a standard of multi-apartment residential building maintenance is determined by the already existing legal foundation and the implementation of practical management process. The legislator has determined the performance of the minimum work required by law, however, there are various differences of opinion regarding the implementation of this process and the determination of the level of responsibility among the parties.



**Fig. 4.3.** The standard of multi-apartment residential building maintenance (created by the author).

The introduction of a standard of multi-apartment residential building maintenance would indicate how to organise the management activities of multi-apartment residential buildings. The standard operation is based on the principle that all intended processes are hierarchically divided into primary and secondary operations according to their main results. In order to make changes in the quality of the living environment, it is necessary to ensure the functionality of the housing and the quality of the service (see Fig. 4.3). In turn, the division into categories determines the extent to which the owners and/or persons who provide building management services comply with the requirements specified in the standard (volumes of service provision). Compliance with the standard and statistics could be carried out by the institutions responsible for the sector.

The introduction of the standard of multi-apartment residential building maintenance would create preconditions for the organisation of management and maintenance in order to:

- 1) extend the life cycle of multi-apartment residential buildings and their constructions, separate elements and engineering systems, as well as to preserve their use properties;
- 2) prevent the occurrence of defects in the structural elements of buildings and engineering systems;
- 3) reduce service disruptions caused by technical systems;
- 4) reduce the risks related to the environmental safety of the premises;
- 5) preserve and improve the aesthetic qualities of the property;
- 6) increase the efficiency of staff in the organisation of real estate management and maintenance;
- 7) implement projects that would ensure the compliance of the residential building with the valid technical standards and principles of increasing energy efficiency;
- 8) develop an analysis system for the management and maintenance of multi-apartment residential buildings;
- 9) improve work execution methods and related management procedures.

## Implementation

In order for the provision of real estate management services to develop in the country, and for the manager to be competitive in the market of multi-apartment residential buildings, it is necessary to use certain management implementation methods.

One of the most important is *the method of economic analysis, including financial analysis*, as the solvency of customers is one of the most important indicators for the management process to be in line with the technical condition of housing and the necessary measures to improve it. Based on economic methods, forecasting and planning are performed, which would be implemented in the management process itself.

In the field of renovation, it would be much more successful to use complex renovation, but given the co-financing currently available from the state and municipalities, as well as from the European Union Structural Funds, it is clear that in many cases a step-by-step approach will be used to carry out repair works also in those dwellings where the owners have lower solvency. Decision-making priorities should be on the owner's side, free from state or municipal administrative or legal principles.

*Monitoring and supervision* are an integral part of the entire management service. It is necessary to examine the quality of the service, to identify deviations from the norm, defects, their causes. A customer transaction monitoring process is also required.

The most modern technologies and appliances help to ensure supervision and monitoring of the operation of technical equipment and its parameters, which allow using the obtained data to react quickly and prevent security risks, technical failures, interruptions and other important things. Long-term monitoring of the systems makes it possible to assess the technical condition of the equipment and the building as a whole, its cost-effectiveness and efficiency.

*Programming* is also becoming increasingly important in the provision of the service, as basically all calculations are performed using special computer programs that incorporate special algorithms. In order to ensure the compliance of the provided services with the requirements of regulatory enactments, the Ministry of Economics, the State Construction Control Bureau, the State Land Service and other industry professionals are working on the development of the Building Process and Information System (BIS) to implement the functionality of the information system, thus organizing and maintaining home electronic files.

## Tools

The state must regulate this business sector through various tools – economic, legal, administrative, environmental and social – and involve non-governmental organisations (NGOs) in promoting the use of these instruments. These tools are various self-regulatory levers that can either stimulate the entrepreneurs or can reduce the motivation of the entrepreneurs, as well as be beneficial or unbeneficial (Arbizăre, 2003).

In order to motivate apartment owners to improve their property in order to increase the working capacity of managers, the state can use the following tools:

1. Economic tools – reduction of real estate taxes for renovated buildings throughout the loan repayment period; determination of a favourable interest rate for domestic borrowing; an increase in the real estate tax for non-renovated buildings; the development of state support mechanisms for complex renovation of real estate.
2. Legal tools – they regulate how the management sector of multi-apartment residential buildings is being developed, stipulate the case law, determine its change, develop samples of legal documents and ensure their accessibility to those working in the sector, grant the right to establish non-governmental organisations, etc.
3. Administrative tools – service quality criteria for real estate managers are being developed; the quality requirements for the materials used in the renovation of buildings are determined, the duties are assigned. On 1 July 2020, the Law on Administrative Liability came into force, the

purpose of which was to protect the existing legal system, the legal interests of the society, the established administrative procedures, as well as to achieve a fair settlement of legal relations. The system of administrative liability consists of regulatory enactments, which prescribe administrative violations, administrative penalties and the process of administrative violations (Latvijas Republikas Saeima, 2018).

4. Social tools – various social services and social assistance for different groups of clients, implementing the competence of the municipality in the field of social services.
5. Environmental tools – reduction of emissions by monitoring the implementation and impact of climate policy and related measures, support for the construction of “zero” energy buildings, development of waste sorting, assessment of environmental pollution and people’s exposure to chemicals.

## The Monitoring of Results and the Supervision of Management Works

At the end of the systems approach, the monitoring of results and the supervision of management works are indicated. For monitoring to be credible, there must be objective data.

Business analysis is an indispensable prerequisite for planning. In order for a company to be able to reasonably plan its future operations, it is first necessary to analyse in detail the results of previous operations. The analysis should address the link between entrepreneurship, innovation and management. The analysis allows not only studying the success of a particular company, but also comparing it with similar companies.

Monitoring of results would allow both the state and the municipality to be informed about the potential improvement or deterioration of the current condition and situation of multi-apartment residential buildings, as well as to obtain basic information – whether the owners or their authorised persons manage and maintain the building in accordance with the requirements of regulatory enactments and the wishes of the owners.

The state must have a unified system of monitoring, forecasting and analysis of the housing sector, which collects data on residential buildings at the object level (construction year, materials used, number of apartments, existing communications, repairs performed, energy audits performed and their results, technical survey results, etc.), as well as on various housing-related processes – renovation of buildings, construction of new multi-apartment residential buildings, forms of housing ownership, municipal policy, available subsidies, etc.

The system of result monitoring and management work supervision is displayed in the form of a trilemma. The aim of the trilemma is to maintain the existing database on housing, supplementing it with new, up-to-date data, as well as to ensure the supervision of the multi-apartment residential building management service. This would allow for the targeted development of safe and efficient management and maintenance of multi-apartment residential buildings by analysing:

- 1) technical parameters of the building and engineering systems;
- 2) energy consumption in residential buildings;
- 3) the increase in energy efficiency of buildings and the improvement of the technical condition of the building;
- 4) the compliance of the multi-apartment residential building management services with the requirements of regulatory enactments;
- 5) the complaints of tenants regarding violations of managers of multi-apartment residential buildings;
- 6) disputes between owners and management and public (utility) service providers;
- 7) the latest trends and providing free consultations and recommendations on the organisation of apartment building management.

The monitoring system would allow supplementing the existing database with new and up-to-

date data. This would allow to purposefully directg the activities of municipalities and managers of multi-apartment residential buildings for the sustainable maintenance of multi-apartment residential buildings.

For the system to function and be monitored and supervised, three main pillars need to be put in place. Aims of the pillars:

1. Security – improving the living conditions of the population by ensuring safe and sustainable housing management, maintenance and conservation.
2. Economic sustainability – the ability of the economy to maintain a certain level of economic production indefinitely, long-term management services, providing conditions that promote social inclusion, support measures for housing renovation, improvement, access to credit and the use of information technology in processes.
3. Good, socially responsible governance – compliance with the law, the principles of good governance and social and environmental objectives, ensuring that stakeholders are educated, the decision-making process is facilitated and the action is taken.

The research findings and surveys conducted within the framework of the Doctoral Thesis show that a number of factors influence the management process of all multi-apartment residential buildings. Using the trilemma and studying the impact of pillars on the industry, it will be possible to balance the development of the industry, develop scenarios for future activities and provide a basis for state and municipal institutions to work on the development of regulatory enactments or amendments to them.

Evaluation criteria are set for each of the three main pillars. The whole system of evaluation criteria forms a useful and empirical or experience-based set (Appendix 1), the choice of which has been determined by the following indicators:

1. **Coverage:** the criteria for evaluating the trilemma are important from a methodological point of view and ensure that each criterion is fully supported by data availability and that at least 75 % of cases are understood by experts.
2. **Development:** the evaluation criteria are selected or developed to provide insight into situations of different processes and in the context of objectives.
3. **Balance:** the evaluation criteria for each of the three pillars reflect one or more, even different, problems.
4. **Comparability:** the indicators of the evaluation criteria have been determined according to the developed evaluation methodology (taking into account the survey of apartment owners and specialists in the field of multi-apartment residential building management conducted by the author) in order to ensure their comparability with other evaluations.
5. **Difference:** each evaluation criterion focuses on a different aspect of the research question.
6. **Reliability:** the data used are representative.
7. **Impact:** the importance of each evaluation criterion and its impact on each of the pillars – safety, good, socially responsible governance and social sustainability (awareness / or availability of a service) are determined by ranking the indicators.

Monitoring and supervising the multi-apartment residential building management system and processes, three questions have been answered, which can be further analysed on the basis of the identified pillars. By answering the questions “How much influence is there on the management process?”; “To what extent will the lack of information affect the management process in the future?” and “How relevant is it to tackle the challenges arising from a respective criterion?”, it will be possible to conclude which pillar to focus on: security, social sustainability or good, socially responsible governance. As a result, by obtaining and arranging data in groups, it is possible to start working on the concept and strategy of the multi-apartment residential building management, development of housing policy and drawing up of an action plan.

It is necessary to transfer the functions of result monitoring and management work supervision to a state institution, such as the State Construction Control Bureau or another state institution, instruct-

ing to ensure the supervision of the multi-apartment residential building management service and the settlement of disputes between the parties.

The aim of the survey conducted during the monitoring process is to obtain data on a regular basis in order to identify problems and their impact on the multi-apartment residential building management sector and to identify priority areas in the Latvian sector as a whole. Survey respondents – industry experts (multi-apartment residential building management companies, state and municipal institutions, credit institution experts, insurers, appraisers and others) working in the industry.

In order to evaluate the answers provided by the experts, it is necessary to provide a justification for the value criteria. The author of the Doctoral Thesis proposed the following criteria evaluation system (Table 4.2).

Table 4.2

**Substantiation of Value Criteria in the Evaluation of the Questionnaire  
(created by the author)**

Intensity of opinion	Topicality of the question	Evaluation
0 %–5 %	Low relevance	1
36 %–70 %	Topical	2
71 %–100 %	Highly topical	3

Before starting the survey, the minimum number of experts participating in the process evaluation has been determined. Evaluation:

1. If only up to 5 % of the total number of respondents evaluate the questionnaire question as “of low relevance” or “not topical”, the question is considered to be of low relevance and its assessment is 1.
2. If 36 %–70 % of the total number of respondents indicate that the significance of the question is “medium” or “urgent”, it is considered that the question is topical and its assessment is 2.
3. If more than 70 % of the total number of respondents indicate the importance of the question as “high” or “very urgent”, then it is concluded that the indicated criteria are highly topical. In this case, it is called a threshold, which indicates that it is time for state or municipal institutions to start working on this issue.

It is necessary to start assessing the role and impact of each evaluation criterion on each of the pillars, analyse social and management processes and take preventive or corrective measures by intervening in the management of multi-apartment residential buildings in order to identify problems, develop an action plan, amend regulations and ensure the process monitoring. As a result of monitoring, it will be possible to identify problems, define the results to be achieved in the future, and put forward the features of a successful management company. Benefits:

1. Clearly achievable performance indicators will be provided, which will include an explanation of successful management processes, defining a clear and socially responsible action plan, activities supported by the state or municipality, which would ensure the growth of management companies in accordance with the principles of good governance.
2. The plan for the supervision and monitoring of the activities of management companies will be developed, which will characterise the indicators to be achieved, including efficiency indicators.
3. A mechanism for a more flexible decision-making process will be developed.
4. Financial support will be provided for the management, renovation, improvement and other activities of multi-apartment residential buildings.
5. Qualitative requirements will be set for the technical and social maintenance and management of multi-apartment residential buildings. At the state and local government level, consultations and recommendations will be provided for better development of the economic activity of companies.

The Ministry of Economics, which is the leading institution in the multi-apartment residential building management and housing policy sector, needs a clear vision on setting the goal in the sector, implementing the principles of financial support mechanisms and knowledge development.

By delegating monitoring and supervision functions to a certain state institution, it will be possible to implement socially responsible and independent data collection and processing, perform their analytical inversion and develop action plans for future management activities of multi-apartment residential buildings.

## Conclusions and Proposals

During the development of the Doctoral Thesis, the theoretical aspects of multi-apartment residential building management have been studied and problems have been identified, the factors influencing the management system have been analysed, decision-making methods have been examined, as well as the information-analytical multi-apartment residential building management process and management systems approach and its evaluation system have been developed that can be used as a threshold, at which the state and municipality should intervene to ensure the availability of the service and its compliance with the requirements of regulatory enactments and safety measures. Theoretical findings of the research covered in the Doctoral Thesis and the results of the research substantiate that the aim of the Doctoral Thesis has been achieved and the hypothesis has been proven.

The hypothesis has been proven sequentially:

- 1) by studying the scientific literature;
- 2) by analysing the data obtained in surveys and focus groups;
- 3) by approbating the results of the research and the developed systems approach in scientific articles, conferences, as well as in focus groups and within the international project working group with industry experts.

The author has summarised the results of the research and formulated the main conclusions and the resulting proposals.

### Conclusions

1. The management system of multi-apartment residential buildings is a set of interconnected processes aimed at ensuring the implementation of complex measures that ensure the extension of life cycle and sustainable preservation of real estate. These processes are influenced by economic, legal, technical, information technology, social environment and psychological factors. The impact of factors on the management process is diverse and not always predictable.
2. For international and local scholars, the process of real estate management includes activities such as management and planning, monitoring, maintenance, construction, building management software, databases, management and maintenance costs, modern technology, legal and technical standards, legal acts.
3. Management processes of multi-apartment residential buildings shall be implemented in compliance with the principles of civil law. These are the basic ideas expressed in the norms of civil law, according to which the regulation of property and personal non-property relations takes place. The rules of good governance require the observance of civil law principles such as: the exercise of rights and the performance of duties in good faith; the principle of the inviolability of property, the principle of respect for public interest, the principle of equality of participants in civil law relations, compliance of subjective rights with legal obligations, the principle of relative autonomy of participants in civil law relations and the principle of infringement prevention and judicial protection.
4. The development of the multi-apartment residential building management system is hindered by an unsystematic and unstructured management process that does not promote the development of sustainable maintenance of multi-apartment residential buildings. By allowing excessive fluctuations in service provision, the inability to combine theoretical knowledge with practice threatens to provide an unbalanced service provision that can be an obstacle to a sustainable extension of the life cycle of housing. The development of the multi-apartment residential building management system needs to be planned in such a way that it increases the safety of housing and the efficiency of the service, thus improving the living environment, using all available resources rationally and purposefully and developing the management system in a balanced way. The management system must ensure its sustainable and stable development, the interconnection of decisions taken by the parties involved, coherence and synergy among all elements.

5. There is a lack of qualified and professional specialists in the residential building management sector to implement a high-quality and sustainable maintenance service.
6. In order to define and implement the requirements for multi-apartment residential building management, it is necessary to attract specialists who can understand not only the definition of the process but are also able to implement it from the system point of view, in synergy of various elements, being able to forecast and determine the prospects for the further development of the system, observing the principles of coherence and succession.
7. Along with the development of the multi-apartment residential building sector, more and more attention is being paid to the development and improvement of housing policy with the aim of improving the quality of multi-apartment residential buildings and the availability of a management service aimed at sustainable conservation.
8. The development trends of the management process show that systematization would provide an opportunity to ensure the complex maintenance of a multi-apartment residential building, its engineering system and the functionally necessary land plot, promoting the extension of its life cycle. The external and internal factors included in the system (economic, legal, technical, information technology, environmental and social) influence the management process, playing an important role in the further sustainable preservation of property.
9. The results of the survey of apartment owners and stakeholders involved in the sector, evaluating the multi-apartment residential building management service, show that there are problems in the sector related to the quality and responsible implementation of the service. The average rating for the management service is only 6.3 points, which is a low indicator and shows problems in this area.
10. The main benefits of implementing the information-analytical management process and management systems approach to the management of multi-apartment residential buildings will be: development of a forward-looking, sustainable management strategy; development of medium and short-term plans; balancing legal issues with economic opportunities; elaboration and approval of the technical and economic substantiation of renovation projects; analysis of the achieved results; quality assurance; introduction of monitoring and control; providing feedback; drawing up of mutually agreed regulatory enactments and making objective decisions.
11. When evaluating the multi-apartment residential building management system, its processes and the factors influencing it, the development trends of the management system indicate that the management and technological process in the environment is constantly increasing with the introduction of innovative solutions, the operation of which is affected by increasingly tightening framework of the legal environment, uneven economic indicators and the impact of the social and psychological environment on the achievement of the result.
12. Problems with access to information indicate the need for an information exchange system scheme, which has been also demonstrated by the results of the survey, where non-disclosure (172 respondents, 23.5 %) is one of the most mentioned factors, specifying the activities that are most unsatisfactory for the manager. 22.8 % of the respondents state that the availability of information to companies is very low, which, in turn, has the following consequences: mistrust on the part of the client, dissatisfaction and unwillingness to get involved in management processes.
13. The analysis of multi-apartment residential building management processes and the factors influencing them gives an idea of the need for a systematized and structured information-analytical management process and management systems approach to multi-apartment residential building management, with identified principles and implementation elements. By systematically organising the management of residential buildings, observing the set aims and tasks, determining the responsible persons, it is possible to ensure sustainable and efficient implementation of the management service, which would allow maintaining residential buildings in accordance with the guidelines in the real estate sector developed by Latvia and the European Union.
14. For the management system to function properly and to be monitored and supervised, three main

pillars need to be put forward: safety, social sustainability (awareness/or availability of service) and good, socially responsible governance. By studying the impact of the pillars on the industry, it will be possible to balance the development of the industry, develop scenarios for future activities and provide a basis for state and municipal institutions to work on the development of housing policy and its continuous improvement.

15. The use of a good management and social responsibility approach in the management of multi-apartment residential buildings is closely related to the rational professional knowledge, accumulation of capacity, the principle of sustainability, the assessment of the needs of society and customers, and the formation of one's own attitude.
16. The success of the proposed multi-apartment residential building management system will depend on the compliance with specific operating conditions, the defined legal framework and a balance between aspirations and professionalism. The approbation of the information-analytical management process and management systems approach to the management of multi-apartment residential buildings provides evidence of its suitability as a theoretical and practical framework in the context of sustainable housing preservation.

Based on the conclusions obtained within the framework of the Doctoral Thesis, the author has put forward several proposals on the use of information-analytical management process and management systems approach in multi-apartment residential building management.

## Proposals

The Ministry of Economics, the Ministry of Environmental Protection and Regional Development, the Ministry of Finance, municipalities, non-governmental organisations operating in the multi-apartment residential building management sector and multi-apartment residential building management service providers, in mutual cooperation, shall take into account the conclusions and implement the formulated proposals:

1. Having studied the concept of real estate, a clarifying explanation of the concept of real estate has been provided.
2. Having examined the multi-apartment residential building management system and its processes, an updated definition of the concept of building management has been proposed.
3. The use of the systems approach methodology will provide the **stakeholders involved in management** with the necessary information and implementation tools to effectively take the necessary measures and promote the extension of the life cycle of managed objects and their sustainability, as well as the **state and municipal institutions** shall improve the inter-sectoral policy planning coordination mechanism.
4. **The Saeima shall determine the responsible institution at the state level** which:
  - will carry out a unified observation, forecast and process analysis of the multi-apartment residential building sector, accumulating data on residential building at the level of objects and also on various processes related to housing;
  - will ensure the supervision and control of the residential building management service;
  - resolve disputes between the parties involved.
5. **The Ministry of Economics**, using the trilemma model, shall evaluate the existing problems in the country, the development trends, the need to improve the technical condition of buildings, as well as the capacity, development opportunities and social responsibility of persons working in the sector. The formulation of the problem and possible scenarios for its solution, the action plan would be used for the development of housing policy, including the field of sustainable preservation. Using the trilemma model, the legislator shall systematically assess progress towards achieving goals, developing housing policy and preserving sustainability.
6. **The State Audit Office** shall be delegated the function with the right to inspect state and municipal institutions in achieving the aim set within Level 1 of the systems approach methodology,

inspecting:

- whether the necessary legislation and/or amendments are being developed;
  - whether the public is provided with information on current events in the industry;
  - whether proposals for necessary improvements and/or amendments are submitted to the responsible authorities;
  - whether non-governmental organisations are attracted.
7. **The State Construction Control Bureau**, using the building information system, including the Register of Residential Home Managers, shall perform supervision so that the persons involved in the provision of the service have the necessary professional education, which is specified in the Law on Administration of Residential Houses.
  8. **The State Construction Control Bureau shall develop** guidelines on “Technological operation and processes of construction process and information system development” and implement information system functionality in residential building management and maintenance issues, ensuring electronic recording of building operation and exploitation activities, sending notifications and other information to apartment owners with the help of the BIS system, adopting community decisions in the form of a survey electronically, including the aggregation of results, the manual entry of data on the actual decisions of the owners, as well as other activities related to the management of the residential building.
  9. **Municipalities** shall create a new, state-of-the-art and feasible municipal property management model, thus promoting the improvement of security and energy efficiency of residential buildings.
  10. **Residential house managers** shall implement the conceptual information exchange system developed by the author in each company in order to ensure full-fledged service provision, involving all stakeholders in the process.
  11. **Educational institutions** shall use the results of the Doctoral Thesis in their study courses. It would be useful to include the theoretical foundation of the multi-apartment residential building management system, its processes and influencing factors, as well as the information-analytical management process and management systems approach to multi-apartment residential building management in the study courses “Legal Basics of Real Estate and Movable Property”, “Management and Maintenance of Real Estate”.
  12. The following basic principles of the residential building management system shall be determined:
    - a) a clear division of roles between the parties involved;
    - b) the orderliness of laws and regulations;
    - c) the delegation of the organisation’s strategy and financial activities;
    - d) feasibility calculations;
    - e) honesty, trustworthiness and ethics towards customers;
    - f) ensuring the flow of information and feedback;
    - g) the introduction of the latest technology in the provision of services;
    - h) the identification and management of operational risks;
    - i) the implementation of social responsibility principles in the provision of services;
    - j) a balance of interests, knowledge, experience and competence.
  13. The main focus of the information-analytical management process and management systems approach to multi-apartment residential building management should be placed on an effective approach to housing security, quality of service, efficiency, productivity, customer satisfaction, workforce diversity management, balancing the professional skills of the management service provider between theoretical knowledge and practical implementation of the work.

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# Appendix 1

## Ranking of Evaluation Criteria by the Importance Trilemma in 3 Pillar Groups

Please assess the importance of each criterion and the impact on each of the pillars – Security; Good, socially responsible governance, and Economic sustainability. Ranking from 1 to 13, where 1 is for the criterion that is most important or most influential, and 12 – for the least important and least influential.

Evaluation criteria	Ranking of criteria
<b>Security</b>	
Repair works performed in a residential building, their quantity, complexity	3
Renovation and/or reconstruction works on engineering systems	2
Renovation and/or reconstruction works on structures and facade	1
Performed energy efficiency works in a residential building	4
Environmental improvements in the residential area	9
Introduction of fire safety measures in residential buildings	5
Technical maintenance of children’s playgrounds and recreation areas	6
Implementation of traffic organisation events (road signs, “sleeping policeman”, etc. in a territory of a residential building, parking lots, etc.).	7
Technical maintenance of street and courtyard lighting	8
Cleanliness of stairwells	10
Cleanliness of the adjacent area	10
Public order in a residential building	12
<b>Good, socially responsible governance</b>	
Level of knowledge of the population about joint ownership, its composition, ownership and level of responsibility	1
Participation of apartment owners in decision-making on building management issues	2
Activity of apartment owners in decision-making on house management issues	3
Availability of information provided by the manager	4
Non-compliance with decisions taken	6
Challenging the decisions taken	5
Satisfaction of the population with the residential building management and administration services in general	10
Involvement of the management company in additional activities	9
Mutual cooperation with clients	11
Orientation of management company employees to an effective functional culture of the company	8
Orientation of the management company to professional qualities – knowledge, experience, initiative, purposefulness, prudence and quality of work	7
Adherence to business ethics	12

Evaluation criteria	Ranking of criteria
<b>Economic sustainability</b>	
Solvency of owners	1
Level of readiness of apartment owners to invest financial resources in the renovation of their dwelling	2
Automated control system	7
Electronic access to information (building file)	6
Availability of e-service to clients	8
Computerised customer service	11
Computerised (electronic) decision-making	4
Information provided by the media on current issues of residential building management	10
Availability of co-financing from the state, municipality, European Union funds	3
Lending policy for residential building renovation	5
Use of the most modern and innovative technologies in residential building management	8
Waste sorting	9



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