Journal of Economics and Management Research. Vol. 7, 2018
DOI: http://doi.org/10.22364/jemr.7.02

OPPORTUNITIES FOR ASSESSMENT OF HEALTH CARE SYSTEM'S EFFICIENCY: THREE-LEVELS EVALUATION MODEL

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Abstract

The efficiency of health care systems becomes crucial in circumstances of the rising costs of health technologies and strictly limited resources allocated from the public budget. Within the framework of this research, the authors evaluate the opportunities to assess the efficiency of health care systems. To achieve the goal of the research, the methods of the theoretical research (literature analysis, content analysis, and electronic resources analysis) are used alongside the methods of the empirical research (data collection methods: document analysis and database statistical analysis). For data processing and analysis, methods of economic analysis and statistical analysis are used. To perform this research the authors have created a three-level performance evaluation model based on macro-level evaluation (policy impact assessment), meso-level evaluation (system analysis, functional and economic efficiency measuring) and micro-level evaluation (production function, allocative and technical efficiency measures, market analysis). The measures of the macro impact results, policy outcomes and performance outputs are tested to evaluate the efficiency of health care system. The ex-post pilot-evaluation of the Latvian health care reform leads to conclusion of its temperate low functional effectiveness, but substantial productive efficiency in scores of the reorganisation of institutional framework. The general conclusion concerning to the health care services and reimbursement system of medicines and medical devices shows the tendency to move towards technical efficiency, rather than total economic efficiency (technical and allocative efficiency), as the treatment alternatives (nutrition programs, physician's time by consultation, complementary therapy etc.) are not sufficiently taken into account. The suggested methodology for efficiency assessment of health care system has substantial theoretical and practical implication for decision-making process on health care organisation and financing.

Key words: Latvia, health care system, organisational theories, risk management, efficiency, assessment

JEL code: H51, I11, I18

INTRODUCTION

Promoting good health is an integral part of *Europe 2020*, the European Union's 10-year economic-growth strategy (European Commission, 2010). The

Declaration on the Intended Activities of the Cabinet of Ministers of Latvia has defined that the health care system in Latvia receives significantly less funding from the state budget than those of other European Union countries. Therefore, the proportion of patient co-payments for health care services is one of the highest in Europe. This has a substantial negative impact on access to health care and is a factor contributing to inequalities in health. The health care financing system needs to be reformed in order to preserve and improve people's health, which is the basis for long and productive working lives, as well as to increase the birth rate and promote employment in the country, thus ensuring sustainable economic development. Development of a sustainable health care funding system to improve access to services at all levels of health care has been defined as a one of the priorities of the Government of Latvia (Cabinet of Ministers, 2016).

In spite of the government-defined priorities, the European Commission, at *Country Report Latvia 2018*, has identified the challenged tendencies. According to the above-mentioned report, Latvia has implemented a major tax reform and is pursuing reforms in other key areas like healthcare, education and public administration, but their effectiveness varies, particularly (European Commission, 2018):

- public administration reforms have advanced little over the previous years, with several proposals presented, but few adopted. Ideas for increasing efficiency of public administration were tabled in 2016 and the Government in 2017 adopted the revised proposal. The reform hinges on high-level targets for reducing staff numbers in central government allowing for wage increases.
- the poor health outcomes are linked to the low public expenditure, while other European Union (EU) countries with similarly modest spending per capita have better results. This underlines the need to both expand public health services and increase their efficiency.

To perform the structural reforms, Latvia receives significant EU investments. Latvia has requested technical support from the *Structural Reform Support Service* (SRSS) to help implement reforms in various areas such as public administration, growth and business environment, public financial management, health and the financial sector. In particular, the SRSS provides support for improving tax administration, increasing the cost-effectiveness and access to healthcare, developing Latvian capital markets, and providing anti-money laundering training. At the same time, Latvia is a beneficiary of significant *European Structural and Investment Funds* (ESI Funds) support and can receive up to EUR 5.6 billion until 2020. Latvia has also received support from the *Youth Employment Initiative* to combat youth unemployment. Latvia is advancing the take up of the *European Fund for Strategic Investments* (EFSI). More specifically, 6 projects involving Latvia have been approved so far under the *Infrastructure and Innovation Window* (including 3 multi-country projects), amounting to

EUR 164 million in *European Investment Bank* (EIB) financing under the EFSI. In addition, funding under *Horizon 2020*, the *Connecting Europe Facility* and other directly managed EU funds is additional to the ESI Funds, for instance, by the end of 2017, Latvia has signed agreements for EUR 267 million for projects under the *Connecting Europe Facility* (European Commission, 2018).

The efficiency of investments becomes topical in circumstances of available investments and low performance effectiveness, particularly in field of health care. Latvia's health care system is under a process of unceasing reforms since 1990s, but planned outcomes are only reached partly. At the same time, comprehensible and transparent measures of efficiency of performed activities are not available. Taking into account the actuality of structural reforms in health care of Latvia and strictly limited recourses allocated from the public budget, the authors define the aim of this research as evaluation of opportunities to provide a model for assessment of efficiency of health care system in the context of performed reforms.

For more detail investigation of theoretical background and practical applicability, the tasks of this research are defined as follows:

1) identify the most suitable elements of management theories applicable to the health care organisation;
2) examine health care management as an executive part of public administration;
3) evaluate the cohesiveness of health care management with risk management approach;
4) create the levels-based model for evaluation of efficiency of health care organisation; and
5) test the created model on measuring efficiency of health care in Latvia.

To achieve the aim of the research, the methods of theoretical research (literature analysis, content analysis, and electronic resources analysis) are used alongside the methods of empirical research (data collection methods: document analysis and database statistical analysis). For data processing and analysis, the statistical analysis methods (comparison, grouping, calculation of average quantities) and methods of forecasting are used. The theme of this research touches upon a sphere, which has not been sufficiently investigated in Latvia yet and presents a pilot-evaluation of the health care reform and its efficiency measuring.

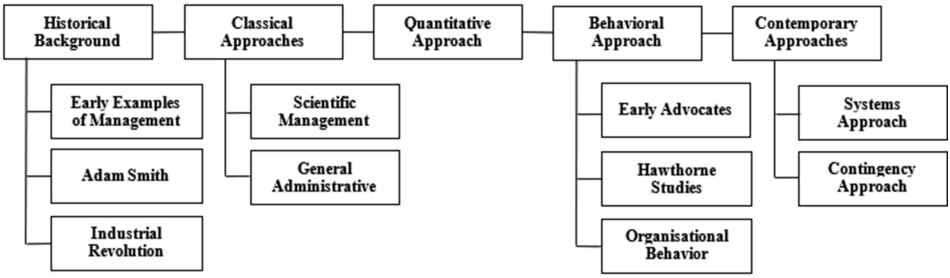
The authors assume health care management as a part of public administration, taking into account that the public expenditures for health care compose more than 11% of the general government budget expenditures (Ministry of Finance, 2018). Population health represents one of the factors influencing the development of all branches of economy to support work efficiency. In this research, particular attention is paid to the period from 1990s up to now considering that in this period the reform of the health care system was assumed which is still continuing.

RESEARCH RESULTS AND DISCUSSION

Theoretical background

Overview of management theories applicable to the health care organisation

In this research, the authors look at four major approaches to management theory: classical, quantitative, behavioural, and contemporary (Figure 1).



Source: Robbins S. P. and Coulter M., 2016

Fig. 1. **Major Approaches to Management**

The greatest contributions to organisational theory have been collected with the focus on task performance and structure. In the following, four different theoretical contributions, which are central to the understanding of organisations that focus on task performance and structure, are reviewed with theoretical schools:

- Taylor – Scientific Management
- Fayol – Administrative Theory
- Weber – Bureaucracy and Organisational Structure
- Simon – Administrative Behaviour

The first formal studies of management, often called the **classical approach**, emphasised rationality and making organisations and workers as efficient as possible. Two major theories comprise the classical approach: *Scientific Management* and *Administrative Theory*. *Scientific Management* originated in the beginning of the 20th century, and Frederick Winslow Taylor was the primary contributor. Scientific Management was based on an idea of systematisation where attempts were made to enhance the efficiency of procedure to best effect via scientific analyses and experiments. Taylor believed that it was possible to prescribe the processes that resulted in maximum output with a minimum input of energy and resources (Lægaard and Bindslev, 2006). Frederick W. Taylor became the 'father' of *Scientific Management*, studied manual work using scientific principles – that is, guidelines for improving production efficiency – to find the one best way to do those jobs. His most prominent followers and important

contributors to *Scientific Management* theory were Frank and Lillian Gilbreth. The Gilbreths' primary contribution was finding efficient hand-and-body motions and designing proper tools and equipment for optimizing work performance (Robbins and Coulter, 2016). Nowadays managers use the concepts of *Scientific Management* to analyse basic work tasks to be performed, use time-and-motion study to eliminate wasted motions, hire the best-qualified workers for a job, and design incentive systems based on output.

The two most important contributors to *General Administrative Theory* were Henri Fayol and Max Weber. Around the same time as Taylor, Henri Faylor developed another approach within the rational perspective, which inverts the focus of Scientific Management, and, administrative processes rather than technical processes were rationalised. The administrative principles in the form of the management's hierarchical pyramid structure were to function as the basis of the part of the organisation that involved activities, i. e. a top down approach. Several different theoretical contributions to this administrative approach are concerned with overall principles – coordination and specialisation. Thus, coordination is based on a hierarchical pyramid structure in which the members of the organisation are linked to each other, and there must be clarity in the administrative structure. Specialisation, on the other hand, is concerned with ways of grouping the organisation's activities most effectively in separate entities. As it appears from both coordination and specialisation, they express a high degree of formalisation, which is one of the principal themes of the rational perspective (Lægaard and Bindslev, 2006). Fayol described the practice of management as something distinct from accounting, finance, production, distribution, and other typical business functions. His belief that management was an activity common to all business endeavours, government, and even the home led him to develop 14 principles of management – fundamental rules of management that could be applied to all organizational situations (Robbins and Coulter, 2016). Faylor and others were pioneers in the creation of *Administrative Theory*, and therefore, they were later subjected to criticism for over-simplifying administrative conditions. The main critic was Herbert Simon who later represented the theory of *Administrative Behaviour*. Simon forced the field into a period of introspection that eventually led to a countertrend that embraced the importance of value-based issues for the profession (Handbook of Organizational Theory, 2006).

Max Weber is described as a 'father' of sociology, and he developed an understanding and theory of *Bureaucracy and Organisational Structure*. Weber is different from Taylor and Fayol in that he has a broader approach to organisations as he includes the social and historical perspective. He believes that the understanding of organisations and their structure can be found in the historical context, and he develops a normative ideal for bureaucracy, which is reflected in his view of e.g. the public employee. According to Weber, the public employee must act as if the superior's interests were his own and thus stay in his bureaucratically assigned role. Bureaucracy must consist of neutral professional public employees so that the organisational hierarchy can function as smoothly

and effectively as possible. Additional to the emphasis on the hierarchical aspect of obedience, Weber perceives goal-rational action as the optimum form of behaviour. Acting goal-rationally is an ideal approach, which considers goals, means and side effects. These three factors must be weighted in relation to each other; means in relation to goals, goals in relation to side effects, and finally, different possible goals in relation to each other. In doing so, factors of emotion and value are not included in decision-making but are underlying rationality perceptions with a lower degree of rationality (Lægaard and Bindslev, 2006). In modern society, *General Administrative Theory* is used to perform the functions of management and structure the organizations so that resources are used efficiently and effectively.

The **quantitative approach** involves applications of statistics, optimization models, information models, and computer simulations to management activities. Today's managers use the quantitative approach, especially when making decisions, as they plan and control work activities such as allocating resources, improving quality, scheduling work, or determining optimum inventory levels. Total quality management – a management philosophy devoted to continual improvement and responding to customer needs and expectations – also makes use of quantitative methods to meet its goals (Robbins and Coulter, 2016).

Although a number of individuals in the early twentieth century recognised the importance of people to an organisation's success, four stand out as early advocates of the **organisational behavioural** approach: Robert Owen, Hugo Munsterberg, Mary Parker Follett, and Chester Barnard. Their contributions were varied and distinct, yet all believed that people were the most important asset of the organisation and should be managed accordingly. Their ideas provided the foundation for such management practices as employee selection procedures, motivation programs, and work teams. The Hawthorne Studies dramatically affected management beliefs about the role of people in organisations, leading to a new emphasis on the human behaviour factor in managing (Robbins and Coulter, 2016).

Herbert Simon has attempted to clarify the above-mentioned characteristics of the rational perspective – goal specificity and formalisation – and explain their connection to rational behaviour (1976). He moves in an individual-psychological level in that he criticises the individual understanding, which lies in e.g. Taylors's studies. It is a matter of studies of organisations from the macro level. This conforms to the historical development in the use of analysis levels where the social-psychological level was the one used most frequently in early organisational research. Simon's criticism of Taylor's studies means a clash with the 'Economic Man', who Simon makes more human by stating that even though the individual seeks his own interests, he is not always of his basic interests. Therefore, the individual no longer experiences complete rational action but only limited rational action. Simon emphasises that it is easy to criticize the rational model for its lack or realism. The problem is not to find points to object to in the

model, but to proceed in the understanding of what happens in organisations when decisions are made. The behavioural patterns that is characteristic for Simon is the behavioural model, which he designs and terms 'Administrative Man' (limited rational action) in contrast to 'Economic Man' (rational action). Limited rationality includes the two key elements in the rational system – the existence of specific objectives, which reduce of the individual's decision opportunity in choice situations via setting of objectives on several levels, and formalised structure (Lægaard and Bindslev, 2006).

Drawing on logical positivism, Simon and others strengthened the belief among many that public administration could and would become a true science by following empiricist principles. This belief has manifested itself in a variety of ways, including an emphasis on behavioralist social science in the 1950s and 1960s, and an emphasis on policy analysis, cost-benefit analysis, management science, and systems analysis in the 1960s and 1970s. While this faith in the development of an empirical science of public administration is perhaps somewhat diminished nowadays, it remains an important element in the thinking of mainstream public administration (Handbook of Organizational Theory, 2006). The behavioural approach has largely shaped in management of contemporary organisations and created base for many current theories of motivation, leadership, group behaviour and development, and other behavioural issues.

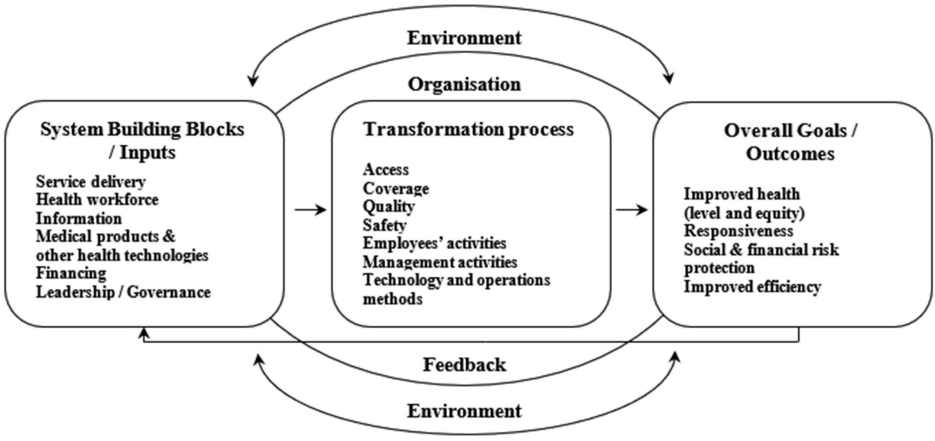
Most of the earlier approaches focused on managers' concerns *inside* the organisation. Starting in the 1960s, management researchers began to look at what was happening in the external environment *outside* the boundaries of the organisation. Two **contemporary approaches** – *systems approach* and *contingency approach* – are part of these management perspectives. Systems theory is a basic theory in the physical sciences, but had never been applied before to organised human efforts. A *system* is a set of interrelated and interdependent parts arranged in a manner that produces a unified whole. The two basic types of *systems* are closed and open. *Closed systems* are not influenced by and do not interact with their environment. In contrast, *open systems* are influenced by and do interact with their environment (Robbins and Coulter, 2016). Actually, when an organisation is described as a system, it means *open system*. What this means is that as managers coordinate work activities in the various parts of the organisation, they ensure that all these parts are working together so the organisation's goals can be achieved.

The early management theorists came up with management principles they generally assumed to be universally applicable. Later research found exceptions to many of these principles. For example, bureaucracy is desirable in many situations, but in other circumstances, other structural designs are *more* effective. Management is not (and cannot be) based on simplistic principles to be applied in all situations. Different and changing situations require managers to use different approaches and techniques. The *contingency approach* (sometimes called the *situational approach*) assumes that organisations are different, face different situations (contingencies), and require different ways of managing. Managers

must look at their situation and determine that *if* this is the way situation is, *then* this is the best way to manage. Management researchers continue working to identify the situational variables, such as organisation size, routineness of task technology, environmental uncertainty and individual differences (Robbins and Coulter, 2016).

Health care management as an executive part of public administration

Initially the term 'health care system' should be specified, that in accordance with the definition of World Health Organisation (WHO) 'consists of all organisations, people and actions whose primary intent is to promote, restore or maintain health' and its goals are 'improving health and health equity in ways that are responsive, financially fair, and make the best, or most efficient, use of available resources' (World Health Organisation, 2007). In referring to the individual components of health systems, this research uses the current WHO 'Framework for Action' on health systems, which describes six clearly defined Health System Building Blocks that together constitute a complete system. Therefore, it could be assumed, that the health care organisation operates as an *open system* (Figure 2).



Source: authors' construction based on (World Health Organisation, 2007; Robbins and Coulter, 2016)

Fig. 2. **Health care organisation as an open system**

The health care organisation, as an *open system*, takes in inputs (resources) from the environment and transforms or processes these resources into outputs that are distributed into the environment. The organisation is 'open' to and interacts with its environment. In this way, managers can recognise that organisations are not self-contained, but instead rely on their environment for essential inputs and as outlets to absorb their outputs.

The World Health Organisation defines the System building blocks (inputs) of a health care organisation as follows (World Health Organisation, 2007):

- *Service delivery*: including effective, safe, and quality personal and non-personal health interventions that are provided to those in need, when and where needed (including infrastructure), with a minimal waste of resources;
- *Health workforce*: responsive, fair and efficient given available resources and circumstances, and available in sufficient numbers;
- *Health information*: ensuring the production, analysis, dissemination and use of reliable and timely information on health determinants, health systems performance and health status;
- *Medical technologies*: including medical products, vaccines and other technologies of assured quality, safety, efficacy and cost-effectiveness, and their scientifically sound and cost-effective use;
- *Health financing*: raising adequate funds for health in ways that ensure people can use needed services, and are protected from financial catastrophe or impoverishment associated with having to pay for them;
- *Leadership and governance*: ensuring policy frameworks combined with effective oversight, coalition building, accountability, regulations, incentives and attention to system design.

The building blocks alone do not constitute a system, any more than a pile of bricks constitutes a functioning building. It is the multiple relationships and interactions among the blocks – how one affects and influences the others, and is in turn affected by them – that convert these blocks into a system.

One of the most topical of the System building blocks is medical and health technologies, as these technologies require substantial financial recourses. The International Network of Agencies for Health Technology Assessment (INAHTA) offers one of the widely used definitions of health technology: 'Any intervention that may be used to promote health, prevent, diagnose or treat disease, or for rehabilitation or long-term care. This includes pharmaceuticals, devices, procedures and organisational systems used in health care' (Network of Agencies, 2017). The European Union official network for evaluation of health technologies EUnetHTA has defined *health technology assessment* (HTA) as 'a multidisciplinary process that summarizes information about the medical, social, economic and ethical issues related to the use of a health technology in a systematic, transparent, unbiased, robust manner. Its aim is to inform the formulation of safe effective, health policies that are patient focused and seek to achieve best value' (EUnetHTA, 2008).

The international professional organisations, academies and national competent authorities currently use different approaches for covering of health technologies' taxonomy and therefore different scope of the HTA. These dissimilarities make it harder to compare the HTA results, its completeness and quality.

Theoretically is defined that the health technologies include pharmaceuticals, medical devices, diagnostic and treatment methods, rehabilitation and prevention methods; as well as organisational, financial, delivery and support systems. At the same time, the HTA is defined as a multidisciplinary field of policy analysis, which studies medical, social, ethical and economic implications of development, diffusion and use of health technology. Practically, by international survey results it can be observed that HTA is applied mostly for pharmaceuticals and medical devices, which is defined as a comprehensive national HTA system. However at these systems there are lack of methods and policy analysis, which studies medical, social, ethical and economic implications, for instance, of specific health care financing and managerial models, as well as the impact of interaction the HTA system's parts.

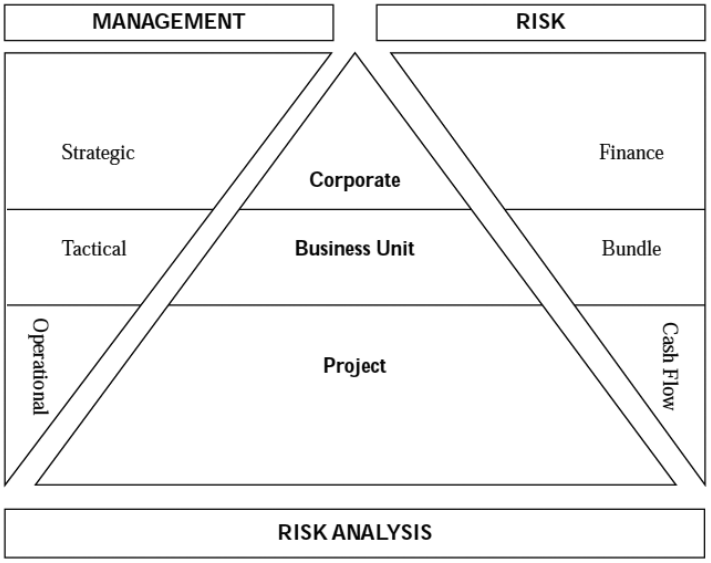
Overall goals (outcomes) of health care organisation are defined in different documents produced by the World Health Organisation and the Word Bank, as follows:

- *Improved health*: health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (World Health Organisation, 1946). Universal health coverage (UHC) means that all people and communities can use the promotive, preventive, curative, rehabilitative and palliative health services they need, of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user to financial hardship (World Health Organization and the International Bank for Reconstruction and Development / The World Bank, 2017).
- *Responsiveness:* in the case of the health system, the main aim is to produce a health in the population that is equitably distributed. However, the population also expects the health system to treat people with dignity. Within this framework, health system responsiveness was given the formal definition of 'the ability of the health system to meet the population's legitimate expectations regarding their interaction with the health system, apart from expectations for improvements in health or wealth' (World Health Organisation, 2000). The population's legitimate expectations were defined in terms of international human rights norms and professional ethics. The concept of responsiveness was developed as part of World Health Organisation's broader conceptual framework on health systems developed in 2000, which identified three focuses for health system goals: health, responsiveness and financing fairness. The framework's underlying reasoning behind including responsiveness was that as a social system, the health system, like other social systems (e. g. justice, education), was expected by its populations to meet a core goal plus, common social goals expected of all social systems, in addition to their main aim.
- *Social and financial risk protection*: social protection in scope of health care mostly associated with previously mentioned equity and social goals;

financial protection is at the core of universal health coverage and one of the final coverage goals. Health financing policy directly affects financial protection. Financial protection is achieved when direct payments made to obtain health services do not expose people to financial hardship and do not threaten living standards (World Health Organization, 2000).

- *Improved efficiency*: The World Health Report (2010) estimated that from 20% to 40% of all health spending is wasted through inefficiency. Reducing this waste would greatly improve the ability of health systems to provide quality services and improve health. Investing these resources more wisely can help countries move much closer to universal coverage without increasing spending (World Health Organization, 2010).

Concerning *financial risk protection,* the authors assume to evaluate the risk management approach, as it provides the conceptual framework for risk management process and levels of responsibility (Figure 3).



Source: Merna and Al-Thani, 2008

Fig. 3. **The risk management process**

Figure 3 conceptualises the risk management process. Risk management looks at risk and the management of risk from each organisational perspective, namely strategic, tactical and operational perspectives. Organisations have different levels with different objectives. Risks specific to each level should be identified using risk identification techniques and then analysed with purpose to reduce negative impact. Risk management should be a continuous process over the whole life cycle of the investment. Many project management procedures place considerable stress on the quantification of risk. However, at the strategic

business and corporate levels a significant proportion of the risks are not quantifiable and thus favour less formal risk management. The emphasis placed on the quantification processes often leads to a failure at the corporate and strategic business levels to prompt a manager to take account of other types of risk more difficult or impossible to quantify (Merna and Al-Thani, 2008).

In light of project management, project risk is an uncertain event or condition that, if it occurs, has a positive or a negative effect on a project's objectives. This definition includes two key dimensions of risk: uncertainty and effect on a project's objectives. The uncertainty dimension may be described using the term 'probability' and the effect may be called 'impact' (though other descriptors are possible, such as 'likelihood' and 'consequence'). The definition of project risk also encompasses uncertain events, which could have a negative effect on a project's objectives, as well as those, which could have a positive effect. These two types of risk are called, respectively, threats and opportunities. This allows for the gain of synergies and efficiencies such as addressing both in the same analyses and coordinating the responses to both if they overlap or can reinforce each other (Project Management Institute, 2009).

According to the authors, the risk management approach is applicable for health care organisations, and financial risk is the responsibility of the strategic level of management, however, as mentioned previously, at the strategic and corporate levels a significant proportion of the risks are not monitored and thus favour a less formal risk management. At the same time, the strategic level of health care management and its decision-making provides the most significant impact to society.

Concerning to the item of *improved efficiency,* the authors assume to look the health care organisation and its management as an executive part of public administration. One of the imperatives of public administration is the achievement of efficiency at all levels. Public organisations are responsible to provide the necessary public goods and services to the citizens without any discrimination specifically based on affordability. Therefore, the multidimensional objectives of public administration demand that performance not only is limited to cost–benefit analysis, but also incorporates the essential element of providing value to citizens.

A common definition of efficiency is embedded in more technical terms whereby it is a measure of the ratio of output to input. This is also known as technical efficiency and it obscures that efficiency in public administration is to be assessed in the light of public values. Efficiency as signifying the necessity of having capable operative administrative agents constitutes one of the, if not the, core value of the field (Rutgers and van der Meer, 2010); it is acceptable when one is dealing within a system of well-quantifiable measures of inputs and outputs. However, efficiency takes on a completely new perspective when one tries to study it in an environment of traditionally measured quantities in a system that is heavily based on values, inspirations, and human perceptions. This addition of

'value' dimension gives a unique perspective to efficiency in public administration (Manzoor, 2014).

For comparison and goal setting, an organisation needs to evaluate its performance; measurement of performance has always related to its mission and activities, as well as the environment in which it is operating. It is fairly straightforward for business organisations to measure performance because the sole criterion is well defined and easy to measure goal of maximizing profit. This is based on monetary terms and as such provides a clear and simple basis for comparison and evaluation. In contrast, performance measures for an organisation whose purpose of existence is other than profit are open for deliberation. Although inputs may generally take monetary form, the outputs are not readily measurable in monetary terms and further have a value base where profit maximization may not be the ultimate goal for existence. This is reason enough to be careful in exploring the concept of efficiency in the world of public administration (Manzoor, 2014). This approach is completely applicable for evaluation of health care organisation, as it takes significant monetary resources without clear and measurable evidence of results.

From a theoretical view, there exist two very distinct schools of thoughts on the notion of efficiency in public administration domain. First view is based on the previously mentioned Max Weber's theory of *Bureaucracy and Organisational Structure* and argues that public organisations are structured as bureaucracies, which provides rational and efficient organisation structures to public organisations. In contrast, the other school of scholars sees public organisations as pursuing multiple value-based goals in a democratic system (Manzoor, 2014).

Founder of the *Scientific management* approach Fredrick Winslow Taylor on one hand placed emphasis on quantity of output with time and motion study, and finding one best way of doing the job. On the other hand, it also called for dividing the responsibilities between management and workers. Therefore, some later researchers regarded scientific management as 'paradigmatic call for efficiency', further emphasizing its impact on public administration in the form of 'New Public Management (NPM) as Neo-Taylorism' (Rutgers and van der Meer, 2010).

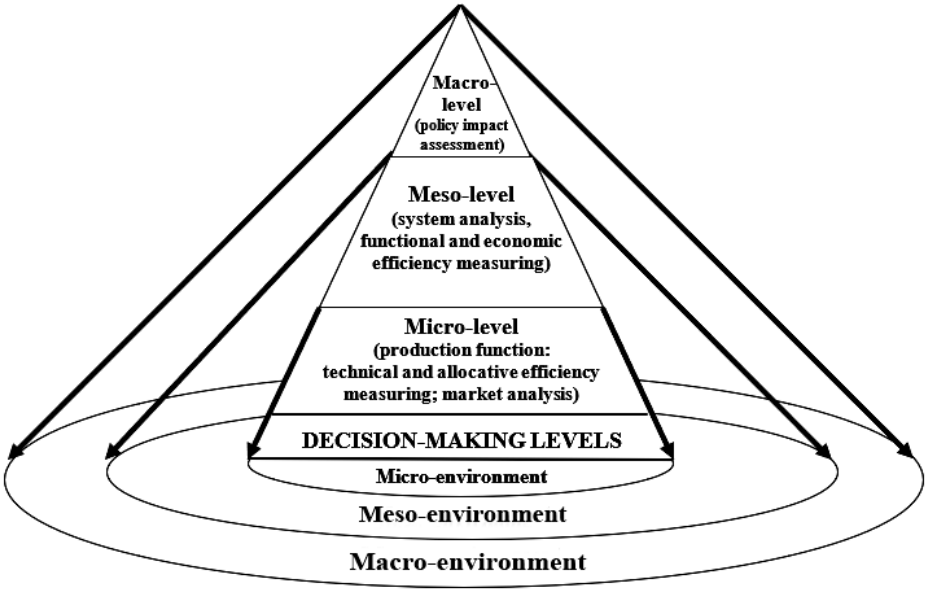
Additionally, the Organisation for Economic Co-operation and Development (OECD) proposes the impact analysis as a component of the policy or programming cycle in public management, where it can play two roles (Organisation for Economic Co-operation and Development, 2014):

- *Ex ante impact analysis*. This is part of the needs analysis and planning activity of the policy cycle. It involves doing a prospective analysis of what the impact of an intervention might be, so as to inform policymaking – the policymaker's equivalent of business planning;
- *Ex post impact assessment*. This is part of the evaluation and management activity of the policy cycle. Broadly, evaluation aims to understand to what extent and how a policy intervention corrects the problem it was intended to address.

Impact assessment focuses on the effects of the intervention, whereas evaluation is likely to cover a wider range of issues such as the appropriateness of the intervention design, the cost and efficiency of the intervention, its unintended effects and how to use the experience from this intervention to improve the design of future interventions.

PRACTICAL APPLICATION

Taking into account the results of theoretical research, the authors propose the levels-based model for evaluation of efficiency of health care organisation, as an open system (Figure 4).



Source: authors' construction

Fig. 4. **Three-level performance evaluation model for assessment of health care system**

In the authors' opinion, the above described management theories are more or less applicable to a health care organisation. Each of the four approaches contributes to overall understanding of management, but each is also a limited view of what it is and how to best practice it. The *Scientific Management* approach, founded by Frederick Winslow Taylor, was based on an idea of systematisation where attempts were made to enhance the efficiency of procedure to best effect via scientific analyses and experiments. This approach is suitable for research of health care, as a medicine is mostly based of experiments and scientific analyses. The *Administrative Theory*, contributed by Henri Fayol, provides the principles

of rationality, coordination and specialisation, with management's hierarchical pyramid structure, is applicable to a health care organisation due to high level of responsibility in this kind of management. Thus, coordination is based on a hierarchical pyramid structure in which the members of the organisation are linked to each other, and there must be clarity in the administrative structure. Specialisation, on the other hand, is concerned with ways of grouping the organisation's activities most effectively in separate entities, e.g. specialisations of health providers and health care institutions. The theory of *Bureaucracy and Organisational Structure*, described by Max Weber, has provided the initial view on public administration and public servants' behaviour and measuring of public administration effectiveness and efficiency. The importance of people is completely associated with health care organisation, so the *organisational behavioural* approach is quite important for health care management. Herbert Simon has attempted to clarify the above-mentioned characteristics of the rational perspective – goal specificity and formalisation – and explain their connection to rational behaviour. He introduced the term of limited rationality, which includes the two key elements in the rational system – the existence of specific objectives that reduce of the individual's decision opportunity in choice situations via setting of objectives on several levels, and formalised structure with emphasis on policy analysis, cost-benefit analysis, management science, and systems analysis. The *quantitative approach*, including applications of statistics, optimization models, information models, and computer simulations to management activities, is supportive and topical for nowadays health care organisation.

The most appropriate of the *contemporary approaches* for a health care organisation is a system approach, as a health care organisation represents all attributes of open system, that is, as described in above. Open systems are influenced by and do interact with their environment. It should be taking into account, that a health care organisation, especially, its highest level of management and its decision-making, significantly influences the society and real patients, so the risk management approach and 'value' dimension of efficiency in public administration, as well as the OECD approach for impact assessment, were emphasised in this research.

Taking into consideration the previously mention arguments, the authors created a three-level performance evaluation model for assessment of the efficiency of health care organisations, based on macro-level evaluation (policy impact assessment), meso-level evaluation (system analysis, functional and economic efficiency measuring) and micro-level evaluation (production function, allocative and technical efficiency measures) (Figure 4). The appropriate measures of the macro impact results, policy outcomes and performance outputs should be defined to evaluate the efficiency of health care system. As it shown in Figure 4, the higher level management's decisions influence a larger part of environment and provides more sufficient risks for society in case of inappropriate decisions.

In the scope of delimitation of this research, the authors provide some not expanded examples of assessment on macro-level, meso-level and evaluation of applicable methods of analyses for micro-level. In assessment of *macro-level* particular attention is paid to the period from 1991 up to now considering that in this period the reform of the health care system was assumed which is still continuing. The problems are identified that interfere with effective and rational implementation of reform's goals, which were sufficiently logically defined at the beginning of this process. At the Table 1, the three initial principal policy-planning documents of 1990s related to the health care financing in Latvia are

Table 1

Examples of the principal policy-planning documents and legislative acts of 1990s drafted in the course of the health care reform related to the sources of health care financing in Latvia, and their current stage of implementation

Policy-planning documents and legislative acts	Strategic directions	Current stage of implementation
1	2	3
Resolution No. 146 of 24 December 1992 by the Ministry of Welfare of Latvia 'On development and operation of the Cash Office	Based on this order, a Cash Office of the Ministry of Welfare (from 1996 to 1999 – State Sickness Fund; from 1999 to 2009 – State Agency of Mandatory Health Insurance; from 2009 to 2011 – Health Payment Centre) was established in 1993, with the principal purpose of its operation to lead the healthcare financing reform in the country in a methodical and organisational way. Municipal cash offices were formed in all districts of the country at the same time.	The National Health Service, which was established on the base of Health Payment Centre in 2011, does not have functions to lead the healthcare financing reform.
Basic principles 'On health care financing' prepared by the Ministry of Welfare and adopted by the Cabinet of Ministers on 1 November 1994	Equal access to healthcare services regardless of the social status and income of an individual was laid down as the main principle. According to the basic principles, it was planned to introduce a health tax already in 1995, payable in equal parts (three per cent of the taxable income of an employee) by the employee and the employer; it was also planned to ensure that voluntary health insurance would cover 20% of the total costs of healthcare.	State-funded health services are set to be linked to the payment of social contributions from 2019. Population groups excluded from the full access to public services can make voluntary health contributions. The standard social security contribution rates are increased by 0.5% for both employees and employers, resulting in a 1% rate allocated to healthcare as an additional financial resource.
Concept 'On State mandatory health insurance' prepared by the Ministry of Welfare and adopted by the Cabinet of Ministers on 28 May 1996	According to the concept, state mandatory health insurance was seen as a component of the state social insurance system, the purpose of the introduction of which is to enable residents to receive quality healthcare services so as to create preconditions for a gradual improvement of the health condition of the population and stabilisation of the demographic situation.	

Source: authors' collection based on (Ministry of Welfare, 1992; Cabinet of Ministers, 1994; Cabinet of Ministers, 1996)

indicated. The ex-post evaluation shows that the defined goals, e.g., equal access to healthcare services regardless of the social status and income of an individual; introduction a health tax already in 1995; and state mandatory health insurance as a component of the state social insurance system, come into force more than 20 years later – in 2018 and 2019.

These data lead to the considerations about temperate low functional effectiveness of the Latvian health care reform. At the same time, the reform shows the substantial productive efficiency in scores of the institutional reorganisation by decreasing the number of subordinated institutions and employees, but these issues are not evaluated in detail within scope of the research paper. Taking into account that the health care is only one of the mechanisms to achieve the public health goals, the author**s** assume that the macro impact results are specified for public health, the policy outcomes are determined to the health care, as well as the pharmacy, while the performance's out-puts are representative for detail analysis of each level.

To test the applicability of the model for assessment of *meso-level*, the authors choose the reimbursement system for medicinal products and medical devices. The procedures for reimbursement are a set of measures that provide patients with an opportunity to acquire medicinal products and medical devices, the expenditures for the acquisition of which are completely or partially covered by funds from the state budget for the current year. At the Table 2 the state budget allocated for reimbursement of expenditures of medicinal products; number of patients

Table 2

State budget allocated for reimbursement of expenditures of medicinal products; number of patients treated; average cost per patient; and reimbursed medicines consumption data in Latvia, 2013–2016

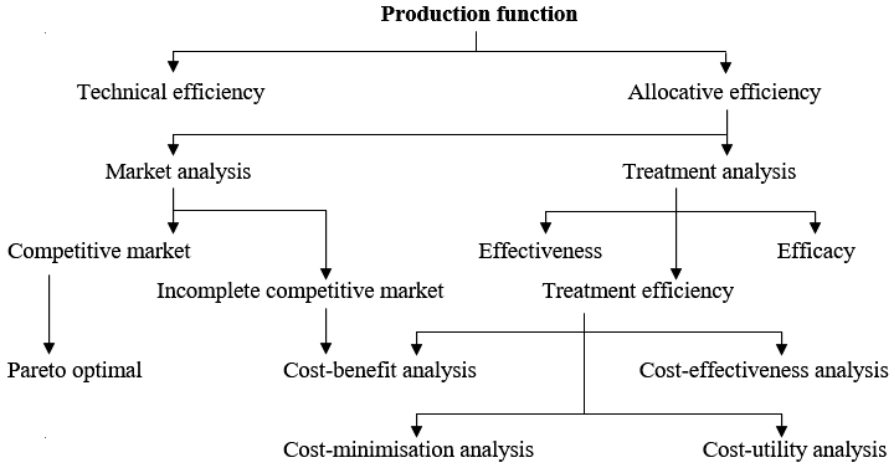
	2013	**Increase, %**	**2014**	**Increase, %**	**2015**	**Increase, %**	**2016**
1	2	3	4	5	6	7	8
Budget allocated (EUR)	11369391.7	4.60	118928460.7	4.52	124302576.7	16.52	144834157.5
Number of patients treated	576290	4.24	600696	3.95	624437	6.16	662889
Cost per patient (EUR)	**197.286**	**0.35**	**197.984**	**0.54**	**199.063**	**9.76**	**218.489**
DDD/1000 inhabitants/ day	**423.028**	**6.46**	**450.351**	**5.56**	**475.375**	**5.87**	**503.303**

Source: authors' calculations based on National Health Service of Latvia database

treated; average cost per patient; and reimbursed medicines consumption data in Latvia, 2013–2016, are indicated. The authors made calculations based on the National Health Service database, choosing the trends of the average cost per patient and reimbursed medicines consumption data as the most appropriate indicators of system's efficiency for testing of the model in limitation of the research scope. The analysis of medicines consumption was performed using the World Health Organisation recommended ATC/DDD classification system that allows standardising the categorisation of medicines and using the international units of medicines consumption – DDD (Defined Daily Doses)/1000 inhabitants/day.

The data of the Table 2 shows that the state budget allocated for the reimbursement system, as well as the number of patients treated, increase annually. The indicator of efficiency – cost per patient – was relatively stable in 2014 and 2015, but significantly increased in 2016. At the same time, the consumption of medicines in natural units increased almost two times lower, that indirectly indicates, that significantly more expensive medicines were used in 2016, in comparison with 2015. These testing considerations lead to assumption that reimbursement system of medicines and medical devices shows the tendency to move towards technical efficiency, rather than total economic efficiency (technical and allocative efficiency), as the treatment alternatives (nutrition programs, physician's time by consultation, complementary therapy etc.) are not sufficiently taken into account, but treatment alternatives are not observed in detail within the scope of this research.

For assessment of *micro-level,* the authors propose production function, technical efficiency and allocative efficiency with further derivatives (Figure 5).



Source: authors' construction

Fig. 5. **Authors' proposed the most applicable methods of analyses the efficiency at the micro-level of the health care system**

The allocative efficiency in health economics is also associated with the market efficiency and effectiveness of the treatment process. There are no perfect competition market conditions for health care products and services, so it is necessary to use the additional methods of economic analysis, such as the cost-benefit analysis, which is one of the most appropriate methods in consideration to the health care.

CONCLUSIONS

1. Europe's health systems face several challenges, such as population ageing, a rise in chronic conditions, declining workforces and increasing cost pressures. Health systems research can help decision-makers address the challenges they face and provide scientific evidence to inform policies and practices, thus resulting in more effective policy measures and health care systems that are both efficient and responsive to the needs of European citizens.
2. The health care management can be investigated as a part of public administration, taking into account that the public expenditures for health care take significant amount of the general government budget. Population health represents one of the factors influencing the development of all branches of economy due to support the work efficiency.
3. The management theories are applicable to health care organisation. The *Scientific Management* approach, founded by Frederick Winslow Taylor, was based on an idea of systematisation where attempts were made to enhance the efficiency of procedure to best effect via scientific analyses and experiments. This approach is suitable for research of health care, as a medicine is mostly based of experiments and scientific analyses. The *Administrative Theory*, contributed by Henri Fayol, provides the principles of rationality, coordination and specialisation, with management's hierarchical pyramid structure, is applicable to health care organisation due to high level of responsibility in this kind of management. The theory of *Bureaucracy and Organisational Structure*, described by Max Weber, has provided the initial view on public administration and public servants' behaviour and measuring of public administration effectiveness and efficiency. The importance of people is completely associated with health care organisation, so the *organisational behavioural* approach is quite important for health care management. Herbert Simon has attempted to clarify the above-mentioned characteristics of the rational perspective – goal specificity and formalisation – and explain their connection to rational behaviour. The *quantitative approach*, including applications of statistics, optimization models, information models, and computer simulations to management activities, is supportive and topical for nowadays health care organisation.
4. The most appropriate of the *contemporary approaches* for health care organisation is system approach, as health care organisation represents all

attributes of open system. The systems approach says that an organisation takes in inputs (resources) from the environment and transforms or processes these resources into outputs that are distributed into the environment. This approach provides a framework to help managers understand how all the interdependent units work together to achieve the organisation's goals.

5. The risk management approach is applicable for health care organisation, and financial risk is responsibility of the strategic level of management, however, at the strategic and corporate levels a significant proportion of the risks are not monitored and thus favour less formal risk management. At the same time, the strategic level of health care management and its decision-making provides the most significant impact to society.
6. The efficiency in public administration is more than a technical relationship between resources and output; it has another dimension that incorporates outputs in relation to values and accountability as an inherent quality of governance. Furthermore, efficiency in private organizations is merely an indicator of revenue maximization; however, it may not be a viable indicator to access performance based on revenue generation in public organisations.
7. The ex-post pilot-evaluation of the Latvian health care reform leads to the conclusion of its temperate low functional effectiveness, particularly taking into consideration the long exemption period to reach a number of planed measures and some inconsistencies in the formulation of the expected outcomes. At the same time, the reform shows the substantial productive efficiency in scores of the reorganisation of the institutional framework.
8. The testing results lead to the assumption, that the reimbursement system of medicines and medical devices shows a tendency to move towards technical efficiency, rather than total economic efficiency (technical and allocative efficiency), as the treatment alternatives (nutrition programs, physician's time by consultation, complementary therapy etc.) are not sufficiently taken into account, but treatment alternatives are not observed in detail within the scope of this research.

PROPOSALS AND RECOMMENDATIONS

1. The health system research tools should be used more effectively to evaluate the performance of the health care tasks, as well as the results of the health care systems reforms. Taking into account the results of theoretical research, the authors propose the levels-based model for evaluation of efficiency of health care organisation, as an open system. The authors created a three-level performance evaluation model for assessment of the efficiency of a health care organisation, based on macro-level evaluation (policy impact assessment), meso-level evaluation (system analysis, functional and economic efficiency measuring) and micro-level evaluation (production function, allocative and technical efficiency measures, market analysis).

2. The appropriate measures of the macro impact results, policy outcomes and performance outputs should be defined to evaluate the efficiency of health care system. To develop a common approach and avoid misunderstandings it could be recommended that:
   - firstly, to consider the possibility to define the medical technologies as a subgroup of health technologies, which are directly used in treatment process (pharmaceuticals, medical devices, diagnostic and treatment methods) and for which full Health technology assessment (HTA) are applied;
   - secondly, to clarify the separation of diagnostic, medical and surgical procedures from pharmaceuticals and medical devices, as there is not a common approach for their assessment separately or as a part of medical procedure (for pharmaceuticals) or diagnostic and surgical procedure (for medical devices); and
   - thirdly, to continue the development of specific HTA methodologies for assessment of health care financing, delivery, and managerial models, prevention activities and complementary medicine, rehabilitation programs and long-term care, and for other health technologies' subgroups.

The common approach for health technologies' taxonomy and appropriate assessment methods could soften the HTA challenges and improve the credibility and value of its results.

3. The open systems are influenced by and do interact with their environment. It should be taking into account, that the health care organisation, especially, its highest level of management and its decision-making, significantly influences the society and real patients, so the risk management approach and 'value' dimension of efficiency in public administration, as well as the impact assessment, should be emphasised. The higher-level management's decisions influence larger part of environment and provides more sufficient risks for society in case of inappropriate decisions.

The theme of this research touches upon the sphere which has not been sufficiently investigated in Latvia yet and presents suggestions with regard to substantiated use of the health system research principles for decision-making in questions related to organisation and financing of the national health care system.

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