Interdisciplinary Description of Complex Systems 24(5), 650-663, 2026

A SYSTEMIC APPROACH TO HOSPITAL MANAGEMENT: EVIDENCE FROM THE G. CHAPIDZE EMERGENCY CARDIOLOGY CENTER IN TBILISI

Nika Kuridze[1, *], Revaz Jorbenadze[1], Teona Gorgadze[2] and Ineza Gagnidze[3]

[1]G. Chapidze Emergency Cardiology Center, Caucasus University
Tbilisi, Georgia

[2]G. Chapidze Emergency Cardiology Center
Tbilisi, Georgia

[3]Ivane Javakhishvili Tbilisi State University
Tbilisi, Georgia

DOI: 10.7906/indecs.24.5.9
Regular article

Received: 5 December 2025.
Accepted: 20 July 2026.

ABSTRACT

In the era of modern digital transformation, development is based on networks that emerge only through the formation of a system. And so, the formation of systems and the construction of networks are the prerequisites for development in any direction. The literature review in the article includes an analysis of the system's properties and the importance of a systemic approach in healthcare; it also describes the challenges to effective hospital management. With the ongoing global digital transformation, many jobs are expected to disappear, and new ones are expected to replace them. The insights in the reports of research organizations have identified several trends: 1) Individual attitudes towards IT have not turned out to be as accepting as predicted; 2) There is fear and anxiety among the population about the expected changes in the labour market; 3) The world's population is both growing and aging, which increases the demand for medical services; 4) AI is unlikely to replace the work of doctors. In such conditions, the effective management of each institution in the healthcare system is of great importance. The analysis in the manuscript is developed based on the case of the G. Chapidze Emergency Cardiology Center (Tbilisi, Georgia). The authors of the article compared the system's features with the hospital's operational purpose and identified the critical units. They developed a system to validate the effectiveness of a systemic approach in hospital management.

KEY WORDS

systemic approach, healthcare, hospital management

CLASSIFICATION

JEL: I15, M10, P46

*Corresponding author, η: nika.kuridze@yahoo.de; +995 322402322;
N. Javakhishvili #1, GE – 0159 Tbilisi, Georgia

INTRODUCTION

The world economy is in an era of rapid change, driven by its digitisation. Reputable research organisations predict the disappearance of many jobs and the emergence of new specialities [1-3]. The Future of Jobs Report 2025 estimates that, by 2030, on current predictions, new job creation and job displacement due to macrotrends will account for 22% of today's total (formal) jobs. Specifically, macrotrend-driven job creation is estimated at 170 million jobs, equivalent to 14% of today's total employment" [4, p.18]. In addition, "economic, health and geopolitical trends have created divergent outcomes for labour markets globally in 2023. The human-machine frontier has shifted, with businesses introducing automation into their operations at a slower pace than previously anticipated" [5, pp.5-6] In parallel with the described picture, on the one hand, the world's population is growing, "aging and declining working-age populations also appear to drive growth in roles for Nurses, Sales and Hospitality professionals" [4, p.31]. Added to this is the fact that "supporting employee health and well-being is expected to be a top focus for talent attraction, with 64% of employers surveyed identifying it as a key strategy to increase talent availability" [4, p.6].

On the other hand, according to a 2013 study conducted at Oxford University, the likelihood that artificial intelligence will replace the following specialties as a result of digital transformation is minimal: recreational therapists, first-line supervisors of mechanics and repairers, emergency management directors, mental health and substance abuse social workers, audiologists, occupational therapists, orthotists and prosthetists, healthcare social workers, oral and maxillofacial surgeons, and fire service supervisors [6].

Thus, the latest (and relatively early) studies confirm that artificial intelligence is unlikely to replace doctors' work, and demand for doctors is growing. In such conditions, great importance is attached to the effective management of medical institutions, including hospitals. The reason is that they serve not only to support patient recovery but also to share the knowledge and experience accumulated at the hospital. Hospitals offer specialised educational training and advanced courses. Hospital doctors are actively involved in pedagogical activities at medical universities. Thus, effective hospital management is a significant challenge, and, as a prerequisite, the authors discuss a systemic approach.

After the introductory part of the manuscript, a brief review of the literature is provided, which is divided into several subchapters, namely: a description of the properties of the system and its use in healthcare; Identifying the challenges of effective functioning of healthcare systems and hospital management using examples from different countries around the world. This is followed by a methodology, which formulates 2 research questions. The remainder of the article is devoted to a review of the activities of the G. Chapidze Emergency Cardiology Center (EEC). Based on the authors' system, the effectiveness of a systemic approach to EEC management is substantiated. The article ends with brief conclusions.

LITERATURE REVIEW

SYSTEMS THEORY AND SYSTEMS – A BRIEF LITERATURE REVIEW

As stated, the authors tried to find a connection between hospital management and a systemic approach. To this end, it was considered necessary to review the work of recognised researchers across several areas. First, the emphasis was on the system's features and the advantages of a systems approach in healthcare. The following subsections analysed the challenges to the effective functioning of healthcare systems and hospital management across different countries worldwide.

Systems thinking is a holistic approach to examining complex problems and systems, focusing on interactions among system components and the patterns that emerge from those interactions [7]. This approach stems from the concept of a system. "A system is a group of two or more related parts (sometimes referred to as elements, components, or stocks) that interact over time to form a whole that has a purpose or function" [8, p.9].

Ackoff suggests that "a system is a set of two or more interrelated elements with the following properties: 1) each element affects the functioning of the whole, 2) each element is affected by at least one other element in the system, and 3) all possible subgroups of elements also have the first two properties" [9, pp.15-16].

According to Meadows: "a system is an interconnected set of elements coherently organised to achieve something. If you look at that definition closely for a minute, you can see that a system must consist of three kinds of things: elements, interconnections, and a function or purpose. A football team is a system composed of players, a coach, a field, and a ball. Its interconnections are the rules of the game. The purpose of the team is to win games, or have fun, or get exercise, or make millions of dollars, or all of the above" [10, p.11].

Many authors have attempted to link systems approaches to healthcare. Silburn illustrates how systems thinking informs the creation of evidence-based policy, improves stakeholder coordination, and mitigates challenges [11]. There are alternative methods that explicitly characterise and model complex systems, and epidemiologists and public healthcare practitioners are increasingly working in multidisciplinary groups to apply these methods to capture the complexity and dynamics of human populations and systems. Trochim et al. "identified 100 key challenges to implementation of systems thinking and modelling in public healthcare work [12]. According to these authors, a health care system can be defined as a set of connected or interdependent parts or agents - including caregivers and patients - bound by a common purpose and acting on their knowledge" [13, pp.538-539]. Berry et al. outline "current thinking on climate change and mental health and discuss crucial limitations in modern epidemiology in examining this issue. A systems approach, complemented by a new style of research thinking and leadership, can help align the needs of this emerging field with existing research policy agendas" [14, p.282]. von Foerster discusses the relation as an identity through the systemic approach [15]. Curiel and Perkins argue that "identity may be designed by leadership or evolve without design, more by accident. However, if it occurs by accident, it will lack clear, shared direction. For a system to sustain, regardless of how it started, it must become formalised to have a long lifespan" [16, p.520].

Kiefer et al. "encourage scholars and practitioners to adopt an event-oriented approach and to leverage event system theory to illuminate further theoretical and practical insights into the effective management of organisational change" [17, p.26].

Thus, this part of the literature review has shown that there is solid evidence to substantiate the idea expressed in the article's title.

CHALLENGES TO THE EFFECTIVE FUNCTIONING OF THE HEALTHCARE SYSTEM

"Health is a foundational investment in human capital and economic growth - without good health, children are unable to attend school and adults are unable to work. In other words, financing health care is not an expenditure; it is an investment in human capital" [18, p.2]. The concept of health system efficiency may seem beguilingly simple, represented as a ratio of resources consumed (health system inputs) to some measure of the valued health system outputs they produce. By bridging the gap among medical staff, patients, and administrators, healthcare managers ensure the system runs smoothly and effectively address challenges such as resource allocation, patient satisfaction, and compliance [19].

Bose argues two important concepts of healthcare systems efficiency, namely: Technical efficiency: 1) a health system is technically efficient when the least possible amounts of inputs are used to produce a given amount of output; and 2) it involves making sure that the right mix of inputs such as health workers, medical equipment and supplies, and health facilities are used to produce a good or service. Allocative efficiency: 1) the idea captures whether health inputs are allocated in a way that produces the optimal mix of health outputs to maximise the health of society; and 2) when there is more than one output being produced, how inputs are distributed among the production of each output becomes significant [20].

At the same time, "a cross-sectional study involving 118 countries found that "political stability with a clear policy and commitment, transparency, efficiency, a health system which is accountable and equitable, would achieve universal health coverage that could be sustainable" [18, p.6].

According to the World Health Organisation (WHO), public health governance typically involves multiple actors from different sectors across society who plan, finance, and implement Essential Public Health Functions (EPHFs) and public health services, including governmental and non-governmental stakeholders in health and allied sectors [21, p.6]. Kaabi et al. note that "as countries move toward universal health coverage, private healthcare and private health insurance are also becoming more popular. In the private healthcare system, there are numerous ethical issues, including limited access to healthcare, unfair competition with non-profits, viewing healthcare as a commodity, poor physician-patient relationships, reduced quality of care, diminished value of medical education, and undue influence on public healthcare policy" [22, p.6].

Abbas et al. outline "several key findings about the impact and potential of Public-Private Partnerships (PPPs) in healthcare in the USA. First, these partnerships thrive on clear communication, transparency, and trust among stakeholders. Second, the sustainability of PPPs depends on well-structured financial models, regulatory support, and community engagement. Third, there are successful case studies demonstrating how PPPs can directly address healthcare disparities in underserved communities by providing targeted interventions that improve access to essential services" [23, p.1336].

Dorgan et al. "collected data for all 152 healthcare payors and 53 million residents in England to explore the relationships between payor management practices and the performance of the healthcare system. The authors found that better healthcare payor management practices were strongly associated with better healthcare system performance across the domains of quality and value for money. Additionally, they found positive associations between payor management practices and specific metrics of healthcare effectiveness, safety, and value for money" [24, pp.8-9].

It is noteworthy that "before the COVID-19 pandemic, mental health problems already affected roughly 84 million people in the EU, i.e. one in every six citizens, for EUR 600 billion or 4% of GDP. According to the WHO, the global prevalence of anxiety and depression increased by 25% in the first year of the COVID-19 pandemic" [25, p.2]. This indicates that many countries' healthcare systems are still struggling to cope with the pandemic's consequences.

CHALLENGES OF HOSPITAL/EMERGENCY CENTER MANAGEMENT

The COVID pandemic has posed a major test for the healthcare systems of countries around the world and their interconnections. Hospitals have played a crucial role in overcoming the challenges that have arisen during this difficult period. It is noteworthy that within each country, some links have coped effectively with the difficulties, while others have not shown the desired resilience. Rao, in his discussion paper, finds no conclusive evidence that any one ownership model (i.e., public, private, or mixed) is intrinsically more efficient than the others, regardless of how efficiency is defined. Instead, the literature suggests that service provision

efficiency depends on the type of service (e.g., health, education) and other specific contextual factors (e.g., regulation, market competition) [26, p.4]. Ogbeivor and Ogbeivor argue that poor relationships between doctors and hospital managers are a common feature of many healthcare systems worldwide. Their qualitative systematic study found considerable evidence of organisational factors that contribute to poor working relationships between doctors and managers [27]. Spanos et al. highlight the inherent interdependence of leadership requirements and healthcare system complexity. Future leadership roles and competencies were related to four key themes: innovation and adaptation (e.g., flexibility and vision setting), collaboration and communication (e.g., relationship and trust building), self-development and self-awareness (e.g., experiential learning and self-examination), and consumer and community focus (e.g., public health messaging) [28].

Al Khatib et al. found ten key challenges that are typically encountered by stakeholders in healthcare operations management, namely: resource allocation, cost control, patient flow and waiting times, data management and technology integration, regulatory compliance and quality assurance, staffing and workforce management, supply chain management, patient engagement and satisfaction, emergency preparedness and disaster management, encouraging a culture of innovation and continuous improvement [29]. Mane et al. identify "successful strategies employed in public hospitals to enhance efficiency, namely: the application of information technology and advanced data analytics, process reengineering, lean management practices, and quality improvement programs. Success stories and positive results of implementing these strategies also come from various countries, such as Karnataka and Kerala in India, Latvia and Britain in Europe, among others" [30].

Ciminelli et al. argue that guideline-directed medical therapy (GDMT) for heart failure reduces adverse events, but is underused. Global barriers to GDMT optimisation include low visit frequency, clinician inertia, and poor patient knowledge, which may be mitigated by digital health interventions [31]. Feibert and Jacobsen identified 17 factors influencing the decision to adopt technologies in a healthcare logistics context at five Danish hospitals. The impact factors were ranked, and the most important were identified as those related to quality, employees' working *conditions,* and *employee engagement* [32].

The convergence of blockchain and AI in healthcare systems significantly influences the resolution of critical issues, including data silos, interoperability, and patient data protection. Systems with blockchain capabilities may close this gap by guaranteeing safe, open, and legal data transfers. AI makes blockchain-enabled systems more usable by facilitating scalable data analytics while maintaining anonymity [33, pp.101-102]. Based on Crisan and Alin, when considering a digital transformation paradigm, management practices related to information technology adoption projects should be complemented by practices for continuous organisational change and the readaptation of organisational strategy to benefit from the advantages that information systems offer [34].

METHODOLOGY

Based on a review of numerous scientific sources, the authors adopted a systemic approach to the effective management of the healthcare system and its individual institutions/units. Georgia introduced a universal healthcare system in 2013. Different demographics benefit from additional services. The Diagnostic Related Group (DRG) system and reference prices for medicines have improved access for citizens. However, many challenges remain in the system.

The manuscript discusses effective hospital management, using the case of the ECC in Tbilisi, Georgia. The authors of the article compared the properties of this system with those of the hospital's elements and interconnections, and identified the leading links. A systemic model is proposed to substantiate the effectiveness of the systemic approach in hospital management.

Based on the aforementioned, the following research questions are formulated:

RQ_1: Is the hospital characterised by its system's properties?
RQ_2: Is using a systemic approach effective in managing the ECC?

G. CHAPIDZE EMERGENCY CARDIOLOGY CENTER – ONE OF THE LEADING HOSPITALS IN GEORGIA

Georgia, located at the crossroads of Europe and Asia, has been a state for 3 000 years. Artefacts discovered in this country attest to a continuous 8 000-year history of the agricultural use of wine and wheat. The three unique Georgian alphabets used in Georgia, along with others, are included on the UNESCO World Heritage List. The classic of the history of medicine, K. I. Sprengel (18th century), in his five-volume fundamental work "Cura Mediana" (Medea's Treatment), recognises the antiquity of Colchian-Iberian medicine and medical art. Medea (the daughter of the king of Colchis, the western part of Georgia) was the first to discover the principle of obtaining poison by concentrating the active ingredient from a natural resource and preparing a medicine by diluting it. This is the basis of today's pharmacy and medicine [35].

Since 2013, a universal healthcare system has been operating in Georgia [36]. The list of services provided by this system is growing from year to year. A major part of the available treatments is provided free of charge to the population over retirement age. The DRG system has also been rolled out. Through it, patients can benefit from VIP services in clinics without leaving the universal healthcare program [37]. To increase access to medicines, reference prices have been set since 2023. The state has set a maximum price limit for medicines, above which their sale is prohibited. Reference prices were initially set for medicines used to treat chronic diseases. Currently, the price regulation mechanism has been extended to other groups of medicines. The main challenges of the healthcare system in Georgia are the large share of private clinics in the market, the provision of primary healthcare services in the regions, and the integration of these services with hospitals.

According to data in 2024, the number of hospital beds in Georgia was 15 000 (a 22% decrease compared to 2020), the number of doctors was 24 000 (a 4% decrease compared to 2020), the number of nursing staff was 21 000 (a 5,4% decrease compared to 2020), the number of doctor visits increased by 15,4% during the analysis period (which is not a good indicator, since 2020 was the period of the Covid pandemic, when the number of visits to doctors increased significantly) [38].

ECC is a large diagnostic, treatment, and rehabilitation center with important educational and scientific functions [39].

The mission of the center is to improve the population's health by providing a full cycle of preventive, diagnostic, therapeutic, and rehabilitative services for patients with cardiovascular diseases, grounded in evidence-based medicine and modern technologies.

The mission of the center is to improve the health of the population by providing a full cycle of preventive, diagnostic, therapeutic, and rehabilitative services for patients with cardiovascular diseases, grounded in evidence-based medicine and modern technologies.

Cardiology was the first link in the history of the ECC. The foundation was laid for the establishment of the infarction department, then for the creation of a full-fledged cardiointensive department, which led to the establishment of interventional cardiology, cardiac surgery, cardiac electrophysiology/rhythmology, angiology, and cardiac rehabilitation departments.

Today, the ECC is Georgia's clinical structure with the greatest experience in this field, offering a wide range of the latest technologies and unique intellectual resources. The departments of

internal medicine and pulmonology have been operating in the clinic since 2015 to develop modern treatment principles and introduce correct clinical practice in internal medicine.

The ECC has extensive experience performing cardiological surgical procedures. In recognition of their great contribution to the development of interventional cardiology in Georgia, the clinic's staff has received a state award. The department combines two international-standard cardiovascular catheterisation laboratories, equipped with the latest angiographic and echocardiographic equipment. The use of this equipment ensures patient radiation safety and the highest-quality diagnostic images, which are necessary prerequisites for accurate diagnosis and safe coronary stenting. The clinic operates a state-of-the-art computed tomography machine that, in addition to confirming other diagnoses, enables interventional research.

The Department of Cardiac Surgery was established in 2001 and is the largest of its kind in Georgia. The department has extensive experience across the entire spectrum of adult cardiac surgery. The Ozaki method procedure (aortic valve reconstruction – AV-Rec aims to reconstruct the aortic valve with autologous pericardium, offering an alternative to AVR) is successfully performed in clinics around the world. In Georgia, this method has been performed only at the ECC from 2001 to the present.

To ensure a high level of professional, objective service to patients at the center, the results of invasive examinations are evaluated by a group of highly qualified experts: cardiologists and cardiac surgeons. Accordingly, the conclusions and recommendations regarding the patient's condition and the optimal treatment method are characterised by high objectivity and professional level. One of the authoritative cardiological institutions in Germany, the Bad Krozingen Heart Center, and its specialists provide methodological support, consultations, and quality monitoring of the results of invasive and interventional procedures.

The ECC operates a medical emergency department that prioritises emergency cardiovascular medicine, focusing on modern diagnostics and treatment of patients with chronic therapeutic profiles, aiming to be an innovation center. Moreover, one of the main problems of modern cardiology is the associated (co-morbid) conditions: heart and diabetes, combined pathology of the heart and lungs, cardio-renal syndrome, heart failure and liver pathology, heart pathology in rheumatic and systemic diseases, etc. Such an approach will allow us to accurately classify acute and chronic pathology, identify complex diseases and provide modern treatment. The clinic successfully navigated the challenges of the COVID-19 pandemic [40, 41].

The clinic employs about 350 employees, including 105 medical and 116 nursing staff. The aforementioned personnel are employed in the departments shown in the organisational charts in Figures 1-3.

The ECC actively collaborates with clinics and research centers worldwide, including Germany, the USA, Austria, Russia, and Turkey. Among them, the long-term cooperation with the "Herz-Zentrum Bad Krozingen" in Germany is particularly noteworthy. The project, whose foundation was laid in 1994, led to the establishment of the first Georgian-German Heart Center in 2011, making it one of the most successful international joint medical projects ever implemented in Georgia.

The medical and non-medical staff of the clinic actively undergo training at the Freiburg University Hospital and the Bad Krozingen Heart Center; the medical staff actively participates in international and local scientific conferences. The quality of the work of the ECC has been assessed by the German company "Cooperation in Healthcare Transparency and Quality" since 2016, at three-year intervals, which once again confirms sustainable development, the introduction of high technologies, the high level of human resource education, and the high level of integration with our partner European medical centers [42, 43].

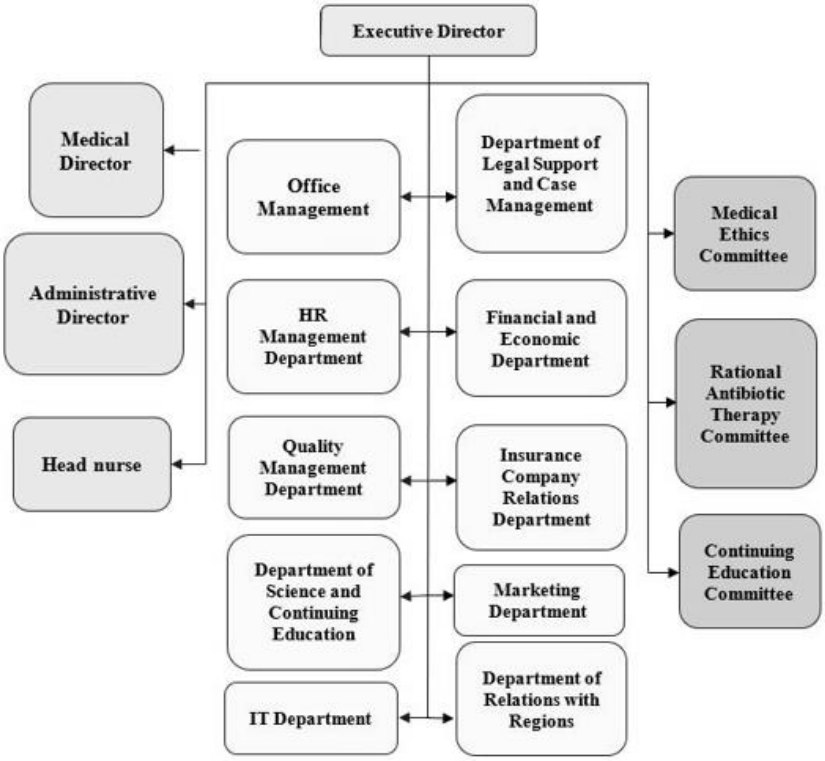


Figure 1. General organigramme of the ECC.

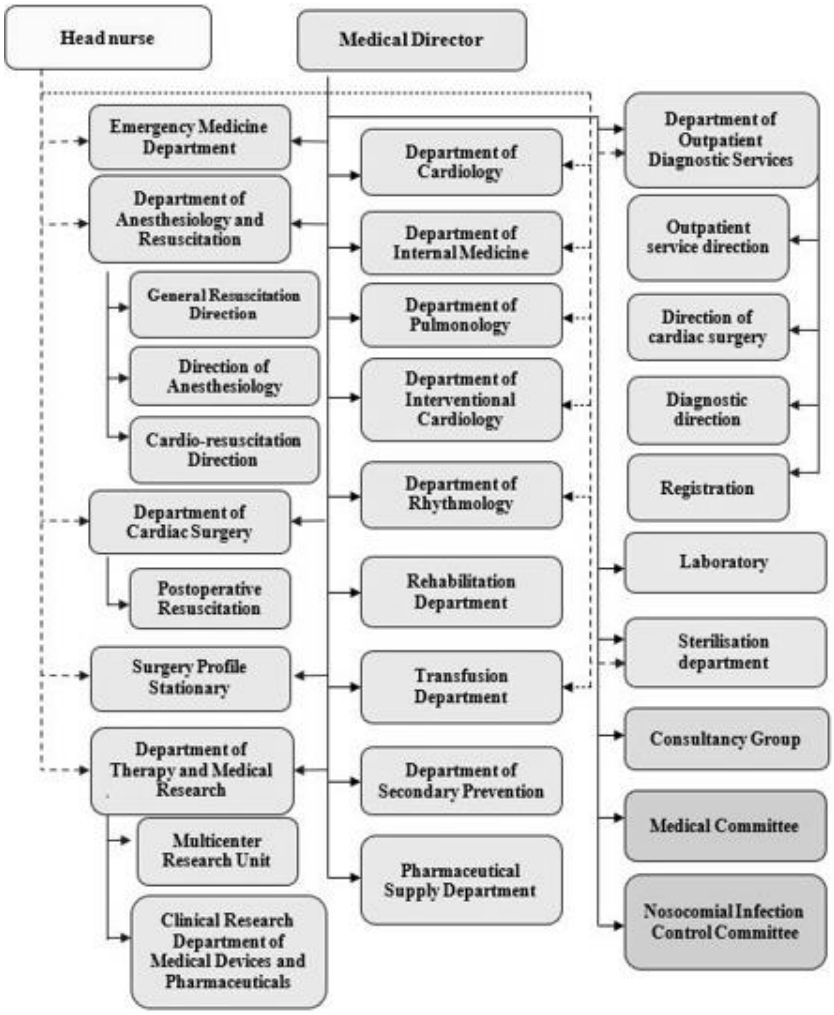


Figure 2. Departments under the supervision of the Medical Director and Head Nurse in the ECC.

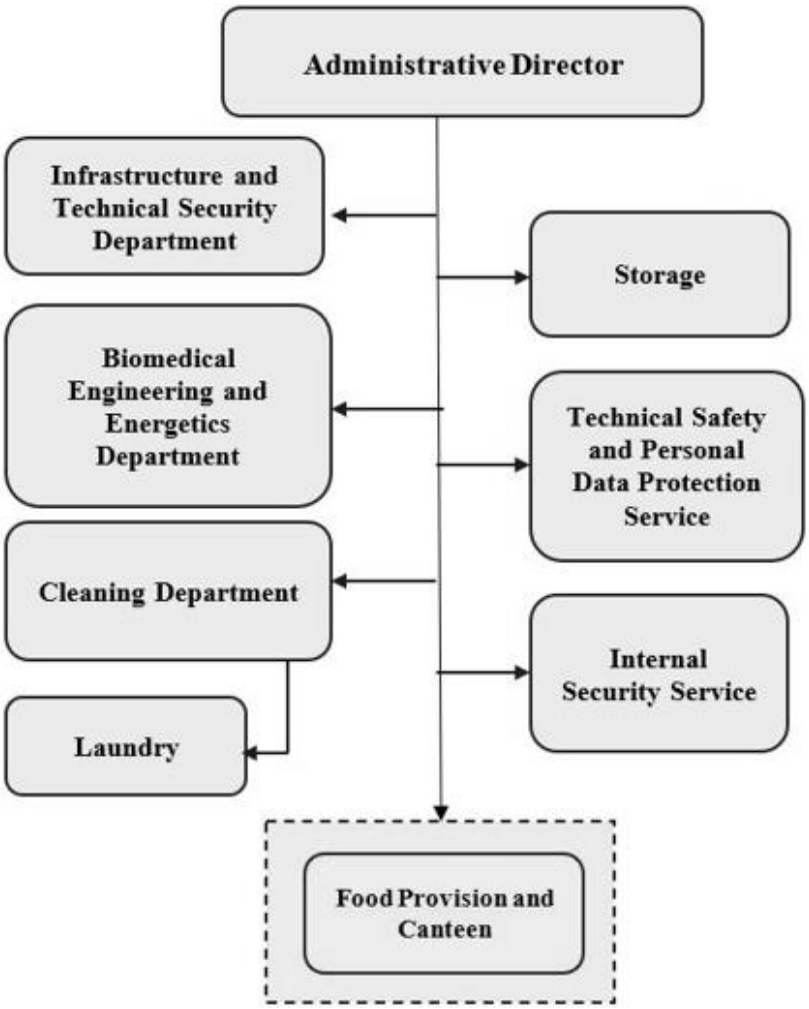


Figure 3. Departments under the supervision of the Administrative Director in the ECC.

The positive result of the ECC accreditation is based on the systems implemented at the institution, which ensure a safe, continuous treatment process. These systems include: digital medical documentation, such as Labor Information System and Hospital Information System, digitalised quality management indicators, such as Risk Adjusted Morbidity and Risk Adjusted Mortality, Critical Incident Reporting System, Clinic Information System, international handover systems in therapeutic hospitals, such as *I Pass the Batton* (WHO), safe standards in high-risk areas, namely Team-time-Out, Sign In, Sign Out- documentation.

The center serves as an academic base for medical students from Caucasus University and Ivane Javakhishvili Tbilisi State University. Students in the Bachelor's Program in Nursing at the University of Georgia complete clinical practice at the center, while students in the Bachelor's and Master's Programs in Healthcare Administration at the same university complete internships. The center offers residency programs in cardiology and cardiac surgery for students of Tbilisi State Medical University.

The center finances continuing education courses for its own personnel, programs to master related specialities, and employees' travel abroad to learn new methods and technologies in diagnostics and treatment.

An annual training program is developed in accordance with internal regulations, taking into account employees' wishes and aligning with the center's goals. Various textbooks, additional literature, guidelines, and international and local scientific journals are available to all employees.

The majority of the clinic's patients are citizens of Georgia, although patients from Azerbaijan, Armenia, Russia, and Ukraine are also treated there.

THE EFFECTIVENESS OF A SYSTEMIC APPROACH IN HOSPITAL MANAGEMENT

As mentioned, according to Betley et al. [8] and Meadows [10], a system must consist of three things: elements, interconnections, and a function or purpose. In the ECC case, the links/elements are shown in Figure #1. In a hospital, interconnections are the relationships established to provide patient care. The purpose of a clinic is to provide emergency care, surgical intervention if necessary, rehabilitation, and preventive examinations and consultations at set intervals. Thus, according to the definitions by Betley et al. [8] and Meadows [10], an ECC is a system. Also, the ECC meets the definition of Acoff [9], which emphasises the influence of elements on each other and on the whole. The same is true for a clinic. For proper functioning, the activity of each link is necessary.

This argument suggests that the ECC meets the definition of a system and is, in fact, a system. This means that the answer to **RQ1** is positive.

The authors want to add that not all ECC departments may be involved in treating many patients due to the specificity of the diseases. However, the Emergency Medicine Department and the Rehabilitation Department are most likely to treat most patients. The qualifications of doctors in these departments should be particularly high. They need to develop individualised, specific approaches to patient treatment. Patient treatment in these departments, in particular, requires a systematic approach (a detailed discussion of this issue is the topic of another paper and would deviate from the issues defined by the research questions).

As noted above, the authors emphasise that in the ECC, certain departments perform more complex tasks whose proper functioning largely determines the hospital's final results. The authors presented all this as a system, emphasising, based on a simple model, the role of these departments as important units/subsystems within a larger system (hospital), Figure 4.

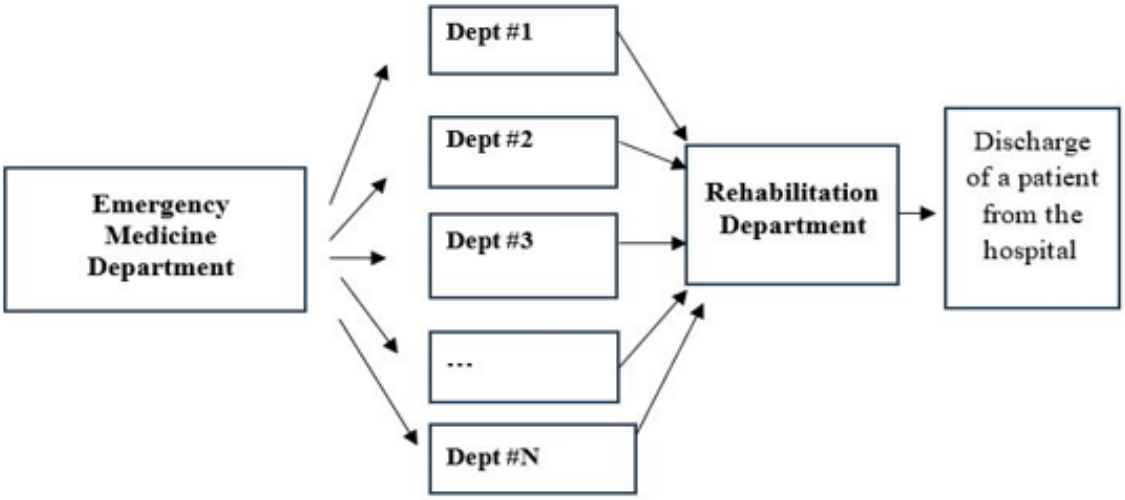


Figure 4. General scheme of patient services at the ECC.

Thus, based on that, we can conclude that the answer to research question **RQ2** is positive. Since the ECC is a system, managing it using a systemic approach is effective.

CONCLUSIONS

The expected fluctuations in the labour market resulting from the rapid digital transformation of the global economy will affect the vast majority of jobs. The exception to the general picture is employees in the medical services field. According to current forecasts, the demand for them is growing [44]. For patients, it is important to provide effective services. Also, the training of

highly qualified specialists is important. An effectively managed hospital within the healthcare system is a link that addresses both of these challenges.

In the article, the authors discussed effective hospital management through a systemic approach, using the G. Chapidze Emergency Cardiology Center in Tbilisi, Georgia, as a case study.

The ECC provides European-quality medical services. A systemic approach to hospital management eliminates the obstacles identified in the literature review presented in this work. As a result, the reasoning developed in it confirmed the positive answer to two research questions, namely, 1) all the properties of a system characterise a hospital, and therefore it is a system; 2) the use of a systems approach in hospital management is effective.

A systemic approach improves hospital management outcomes by treating the hospital as an interconnected system of processes rather than a collection of isolated departments. This perspective allows management to identify relationships between clinical, administrative, and logistical processes and to optimise them simultaneously. Systemic approaches have reduced the frequency of prolonged hospitalisations and hospital-acquired infections, and increased the continuity of guideline-directed treatment from patient admission to clinic discharge.

Specifically, the systemic approach contributes to improved outcomes in several ways:

- Better coordination of processes – By analysing the entire care pathway (admission, diagnostics, treatment, discharge), systemic management reduces fragmentation and improves continuity of care.
- Identification of bottlenecks and inefficiencies – Systems analysis helps detect delays, duplication of work, and resource misallocation across departments.
- Improved patient safety and quality control – Standardised protocols and integrated quality monitoring across the system reduce medical errors and care variability.
- Data-driven decision-making – System-level indicators (clinical outcomes, patient flow, resource utilisation) allow managers to implement evidence-based improvements.
- Enhanced adaptability – Viewing the hospital as a dynamic system allows faster responses to changes in patient demand, epidemiological conditions, and resource availability.

Overall, the systemic approach shifts management from reactive problem-solving towards proactive optimisation of the entire healthcare delivery process, ultimately improving efficiency, quality of care, and patient outcomes.

Although the work is based on a discussion of a single successful clinic in Georgia, it is limited because only that clinic was studied. However, this study will be useful for other hospital administrations. They should identify the key links in the system in clinics and establish appropriate systemic connections to ensure effective functioning.

In future studies, the authors will try to discuss several hospital cases and identify the challenges that hinder the implementation of a systems approach.

REFERENCES

[1] Cazzaniga, M. et al.: *Gen-AI: Artificial Intelligence and the Future of Work.* Staff Discussion Notes **2024**(001), 2024, http://dx.doi.org/10.5089/9798400262548.006,

[2] International Labour Organisation: *Navigating the future; skills and jobs in the green and digital transitions: scenario-based insights.* International Labour Organization, Geneva, 2024, http://dx.doi.org/10.54394/VGNR3350,

[3] McKinsey & Company: *The future of work is agentic*. https://www.mckinsey.com/capabilities/people-and-organizational-performance/our-insights/the-future-of-work-is-agentic,

[4] World Economic Forum: *The Future of Jobs Report*. https://reports.weforum.org/docs/WEF_Future_of_Jobs_Report_2025.pdf, accessed 18th November 2025,
[5] World Economic Forum: *The Future of Jobs Report*. https://www3.weforum.org/docs/WEF_Future_of_Jobs_2023.pdf, accessed 18th November 2025,
[6] Nuttall, G.: *The revolution is coming:* are we *ready.* 2018, https://www.nicva.org/article/the-revolution-is-coming-are-we-ready, accessed 18th November 2025,
[7] York, S.; Lavi, R.; Dori, Y.J. and Orgill, M.: *Applications of systems thinking in STEM education.* Journal of Chemical Education **96**(12), 2742-2751, 2019, http://dx.doi.org/10.1021/acs.jchemed.9b00261,
[8] Betley, E.; Sterling, E.J.; Akabas, S.; Paxton, A. and Frost, L.: *Introduction to systems and systems thinking*. Lessons in Conservation **11**, 9-25, 2021, http://dx.doi.org/10.5531/cbc.linc.11.1.2,
[9] Ackoff, R.L.: *Creating the Corporate Future*. John Wiley, New York, 1981,
[10] Meadows, D.:*Thinking in systems: International bestseller*. Chelsea Green Publishing, 2008, http://radicalteacher.com/uploads/MeadowsIntroOne.pdf,
[11] Silburn, A.: *Systems thinking in public health policy development.* Frontiers in Health Services **5,** No. 1555284, 2025, http://dx.doi.org/10.3389/frhs.2025.1555284,
[12] Giabbanelli, P.J. and Page, A.: *Systems Thinking and Models in Public Health.* Systems **12**(3), No. 101, 2024, http://dx.doi.org/10.3390/systems12030101,
[13] Trochim, W.M.; Cabrera, D.A.; Milstein, B.; Gallagher, R.S. and Leischow, S.J.: *Practical challenges of systems thinking and modelling in public health.* American Journal of Public Health **96**(3), 538-546, 2006, http://dx.doi.org/10.2105/AJPH.2005.066001,
[14] Berry, H.L.; Waite, T.D.; Dear, K.B.G.; Capon, A.G. and Murray, V.: *The case for systems thinking about climate change and mental health*. Nature Climate Change **8**(4), 282-290, 2018, http://dx.doi.org/10.1038/s41558-018-0102-4,
[15] von Foerster, H.: *On constructing a reality.* Adolescent Psychiatry **15**, 77-95, 1988,
[16] Curiel, J. and Perkins, R.K.: *Using systems theory to analyse management styles, market, and product competition between Tesla and legacy carmakers*. International Journal of Innovation and Business Strategy **8**(1), 519-527, 2022, http://dx.doi.org/10.20533/ijibs.2046.3626.2022.0066,
[17] Kiefer, T., Barclay, L.J. and Conway, N.: *Applying event system theory to organisational change: The importance of everyday positive and negative events.* Journal of Management **51**(3), 1066-1095, 2025, http://dx.doi.org/10.1177/01492063241237221,
[18] Ranabhat C.L.; Jakovljevic, M.; Dhimal, M. and Kim, C.B.: *Structural Factors Responsible for Universal Health Coverage in Low- and Middle-Income Countries: Results From 118 Countries.* Frontiers in Public Health **7**, No. 414. 2020, http://dx.doi.org/10.3389/fpubh.2019.00414,
[19] Singh, S.: *Healthcare Management: Key Roles and Benefits*. https://health.theceo.in/healthcare-services/the-importance-of-healthcare-management-key-roles-and-benefits, accessed 18th November 2025,

[20] Bose, B.: *A Guide to Assessing the Efficiency of Health Systems.* Report No. 27. India Health Systems Project, Harvard Chan School of Public Health, 2021,
[21] World Health Organisation: *Governance for public health across the health and allied sectors*. https://iris.who.int/server/api/core/bitstreams/6f4304e2-fe9f-407c-8136-9f54226f4d95/content, accessed 18th November 2025,
[22] Kaabi, S.A.; Varughese, B. and Singh, R.: *Public and Private Healthcare System in Terms of both Quality and Cost: A Review.* Journal of Clinical & Diagnostic Research **16**(8), IR01-IR08, 2022, http://dx.doi.org/10.7860/JCDR/2022/55387.16742,
[23] Abass, L.A., et al.: *Public-private partnerships to enhance healthcare access and affordability.* International Journal of Multidisciplinary Research and Growth Evaluation **5**(4), 1327-1344, 2024, http://dx.doi.org/10.54660/.IJMRGE.2024.5.4.1327-1344,
[24] Dorgan, S.J.; Powell-Jackson, T. and Briggs, A.: *Healthcare payor management practices are associated with health system performance and population health.* Social Science & Medicine **368**, No. 117780, 2025, http://dx.doi.org/10.1016/j.socscimed.2025.117780,
[25] Council of the European Union: *Council conclusions on mental health*. https://data.consilium.europa.eu/doc/document/ST-15971-2023-INIT/en/pdf, accessed 18th November 2025,
[26] Rao, S.: *Is the private sector more efficient? A cautionary tale*. Discussion paper NO. 10. UNDP Global Centre for Public Service Excellence, Singapore, 2015, https://www.undp.org/sites/g/files/zskgke326/files/publications/GCPSE_Efficiency.pdf,
[27] Ogbeivor, C. and Ogbeivor, P.E.: *Poor Working Relationship between Doctors and Hospital Managers - A Systematic Review.* Biomedical Journal of Scientific & Technical Research **43**(3), 34623-34636, 2022, http://dx.doi.org/10.26717/BJSTR.2022.43.006910,
[28] Spanos, S., et al.: *Healthcare leaders navigating complexity: a scoping review of key trends in future roles and competencies*. BMC Medical Education **24**(1), No. 720, 2024, http://dx.doi.org/10.1186/s12909-024-05689-4,
[29] Al Khatib, I.; Shamayleh, A. and Ndiaye, M.: *Challenges of Healthcare Operations Management: A Literature Review.* In: *14th Annual International Conference on Industrial Engineering and Operations Management*. IEOM Society, Dubai, 2024, http://dx.doi.org/10.46254/AN14.20240597,
[30] Mane, M.; Mohanty, B. and Tomar, P.K.: *Innovative Strategies for Improving Healthcare Management Efficiency in Public Hospitals.* Health Leadership and Quality of Life **1**, No. 119, 2022, http://dx.doi.org/10.56294/hl2022119,
[31] Ciminelli, A.L., et al.: *Digital health intervention to optimise heart failure management after hospital discharge in Brazil (OPT-HF): a randomised clinical trial protocol.* BMJ Open **15**(4), No. e091046, 2025, http://dx.doi.org/10.1136/bmjopen-2024-091046,
[32] Feibert, D.C. and Jacobsen, P.: *Factors impacting technology adoption in hospital bed logistics*. The International Journal of Logistics Management **30**(1), 195-230, 2019, http://dx.doi.org/10.1108/IJLM-02-2017-0043,
[33] Gummadi, J.C.S.: *Blockchain-Enabled Healthcare Systems: AI Integration for Improved Patient Data Privacy.* Malaysian Journal of Medical and Biological Research **9**(2), 101-110, 2022,

[34] Crisan, E.L. and Alin, M.: *Health-care information systems adoption – a review of management practices.*
VILAKSHAN - XIMB Journal of Management **20**(1), 130-139, 2023,
http://dx.doi.org/10.1108/XJM-04-2021-0121,

[35] Georgian National Academy of Sciences: *I. Abashidze Main Scientific Editorial Office of the Georgian Encyclopedia*.
http://www.georgianencyclopedia.ge, accessed 18th November 2025,

[36] Verulava, T.; Jorbenadze, R.and Barkalaia, T.: *Introduction of universal health program in Georgia: Problems and Perspectives.*
Georgian Medical News **262**(1), 116-120, 2017,

[37] Verulava, T. and Jorbenadze, R.: *The Impact of DRG-Based Payment Reform on the Efficiency of Medical Care for Patients with Myocardial Infarction: Evidence from Georgia.*
Hospital Topics, 1-6, 2024,
http://dx.doi.org/10.1080/00185868.2024.2433243,

[38] National Statistics Office of Georgia: *Healthcare*.
https://www.geostat.ge/ka/modules/categories/54/jandatsva, accessed 18th November 2025,

[39] G. Chapidze Emergency Cardiology Center: –.
https://www.chapidze.ge/#item-2, accessed 18th November 2025,

[40] Burjanadze, G.; Kuridze, N.; Goloshvili, D.; Merkviladze, N. and Papava, M.: *Biochemical aspects of symptomatic treatment in patients with COVID-19 (Review).*
Georgian Medical News **307**, 149-154, 2020,

[41] Kuridze, N.; Okuashvili, I.; Tsverava, M. and Minadze, E.:*Tietze syndrome as a cause of chest pain in the post-COVID-19 period*.
Cureus Journal of Medical Sciences **15**(4), No. e37360, 2023,
http://dx.doi.org/10.7759/cureus.37360,

[42] Gorgadze, T. and Vasadze, O.: *Perspectives for improvement of medical services in Georgia through accreditation of hospitals.*
Caucasus Journal of Health Sciences and Public Health **1**(1), 50-56, 2017,

[43] Gorgadze, T. and Vasadze, O.: *Managers' Opinion About the Implementation of Hospital Accreditation in Georgia*.
Health Policy, Economics & Sociology **3**, 2019,
https://heconomic.cu.edu.ge/index.php/healthecosoc/article/view/6381,

[44] Gagnidze, I.: *Labor Market Challenges and the Role of the University in the Digital Era. A Systemic Approach.*
In: Vătămănescu, EM. and Dominici, G., eds.: *Great Reset-Opportunity or Threat*? Springer Proceedings in Business and Economics. Springer, Cham, pp.171-185, 2024,
http://dx.doi.org/10.1007/978-3-031-76406-6_9.