

Sustainable Logistics Management of Public Procurement of Medical Equipment

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Abstract. The relevance of the study is determined by the fact that the increasingly dynamic and competitive nature of the market requires companies to provide high quality logistics services, especially in the field of medical equipment. The purpose of the study is to analyze and identify key factors influencing the efficiency of medical equipment logistics. Among the methods used were analytical method, statistical method, functional method, system analysis method, deductive method, synthesis method and comparative method. During the research, the logistics system was analyzed. The study summarizes current trends and provides practical recommendations. The practical significance of the results is to improve logistics processes and improve the quality of services.

Introduction

The process of regulating government procurement of medical equipment is one of the most complex types of procurement. This is due to the need for in-depth knowledge of regulations and assortment on the market. Any shortcomings in the documentation, errors and controversial issues must be legally documented and corrected within the established regulations. Since most medical equipment is installed directly in the healthcare facility, the equipment supplier is required to have a license to set up and install, which creates significant barriers to new market entrants.

Government procurement of medical equipment is carried out through competitive tendering procedures and mandatory usage of the bidding documents with approved contracts conditions.. Any changes to such contracts must be justified and agreed upon with the authorized bodies. Procurement is carried out through electronic tenders or auctions. Medical equipment is complex and high-tech in production, which leads to a number of difficulties in the preparation and generation of documentation. One of the common mistakes is the inclusion of technologically different products in one lot, which makes it difficult to assess equipment compatibility.

At the moment, there is no algorithm to determine the performance of medical equipment in combination with similar products. This problem is solved using subjective assessment of medical personnel. Moreover, contracts often stipulate specific conditions

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that correspond to the equipment of only one manufacturer, creating a monopoly in the market.

Various methods are used to determine the upper and lower limits of the contract price, including statistical analysis of past purchase prices. However, this method does not take into account inflation and the global rise in prices of raw materials caused by the recent coronavirus pandemic and other geopolitical dynamics. If government price regulation is established for medical equipment this may cause significant problems for attracting qualified suppliers in the country.

The purchase of high-tech medical equipment raises many questions and requires transparency in the process. Despite numerous procedures aimed at ensuring transparency, this does not always give the desired result. A significant number of violations forces the introduction of new restrictions in order to reduce the amount of wasted funds. Medical equipment has many characteristics that are difficult for people outside the medical field to understand, making it difficult for regulatory authorities to determine minimum requirements and assess the quality of the equipment.

Goods can be classified as high-tech equipment if they are designed and manufactured by enterprises in knowledge-intensive industries, production occurs using technological equipment, and highly qualified specialists work in production. However, there is no list of high-tech equipment. To allocate funds from the state budget, it is necessary to prove the priority and necessity of specific medical equipment. To do this, you need to answer two questions: whether the lack of this equipment threatens the patient's life and whether the new equipment will improve the quality of diagnosis or service. Employees of a medical organization should provide all relevant documentation to service specialists to obtain an expert opinion on the maintainability and reliability of the equipment, and also obtain the consent of the chief engineer for the possibility of installing it. These documents provide justification for the purchase of medical equipment and confirm the amount of funds requested.

Hartati D. A., Tasnim T., Sunarsih S. note that medical equipment plays a key role in the implementation of measures for the prevention and treatment of diseases. The lack of medical equipment negatively affects the quality of medical services provided to patients [2].

Pang S. H. writes that interviews with key stakeholders involved in the medical equipment procurement process revealed several critical issues. These include the lack of a centralized procurement body for medical equipment, insufficient market research, and inconsistent local knowledge about contracting processes [4].

Akoko K.O. says medical supply agents are increasingly using technology to quantify, manage and forecast inventory. This, in turn, has a positive effect on the efficiency of the supply chain [1].

Vecchi V., Cusumano N., Boyer E. J. believe that the strategic role of procurement should be recognized, as well as expanding the powers of officials responsible for procurement, and emphasizing the importance of stimulating the economic market to diversify the production of necessary materials and ensure a more risk-resistant supply chain [7].

Materials and methods

Most experts associate government procurement of medical equipment with corruption. For example, G. Said and J. S. Kohler, in their paper "Corruption in Medical Equipment

Procurement,” highlight that corruption in this sector is particularly harmful due to its direct impact on public health outcomes. [5].

Some authors express concern that the main health problem in Kyrgyzstan is the ever-increasing gap between rising health care costs and the state’s ability to finance it at a sufficient level [9,10]. In our opinion, the outdated physical infrastructure, acute shortage of medical personnel, obsolescence of medical equipment, chronic underfunding, and the constant increase in prices for medicines, consumables, and utility tariffs pose an insoluble problem for many medical organizations.

As a rule, experts note that inadequate management of equipment will lead to financial losses and deprive the population of expected benefits. [3]. So, improper inventory management since excess or insufficient stocks of equipment can lead either to the expenditure of additional funds for storage and maintenance, or to shortages and untimely provision of medical services.

In their analysis of the medical equipment market in Kazakhstan, the authors emphasize that today the problem of developing a domestic supplier of medical equipment and service is urgent. [10,11].

Researchers in medical equipment logistics propose the concept of creating an integrated information and logistics system for the production of medical goods. This concept involves a departure from the traditional approach to information systems in logistics, which are designed solely to automate individual logistics tasks and perform individual logistics functions. Typically, such systems are not combined into a single system within the organization and are not linked to the information systems of external contractors. [8].

Researchers have focused on analyzing the implications of outsourcing for healthcare supply chains. Impacts on supply chain structure and performance are examined using a conceptual framework from previous literature. Thus, the results provide recommendations for managers and policy makers, and increase knowledge about outsourcing in the public health sector [7].

Therefore, effective management of medical equipment procurement and logistics is critical to improve the healthcare system and minimize financial losses. The implementation of integrated information and logistics systems and the fight against corruption can significantly improve the quality of medical services and the population’s access to the necessary equipment.

Results and discussion

In modern conditions, the budget occupies a central place in any financial system.

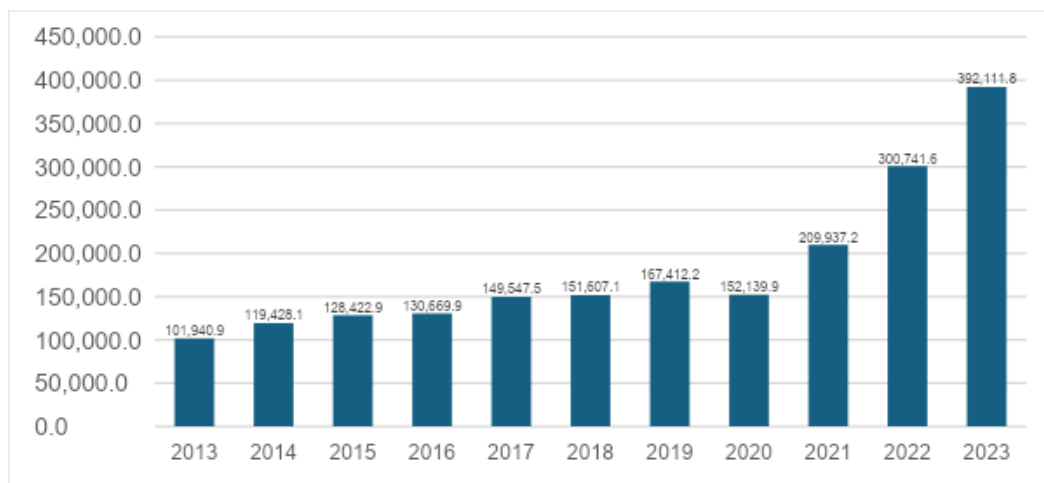


Fig. 1. State budget revenues (million soms) [12]

However, it is important to note that between 1990 and 1995, Kyrgyzstan used money creation to cover budget deficits, which led to inflation. It would be unfair to assume that Kyrgyzstan has experienced the same political upheavals and changes as the 1990s. Maintaining political stability had an impact on the country's economic and financial system, but required significant effort and sacrifice.

For the first time in recent years in the Kyrgyz Republic, the republican budget was executed with a surplus.

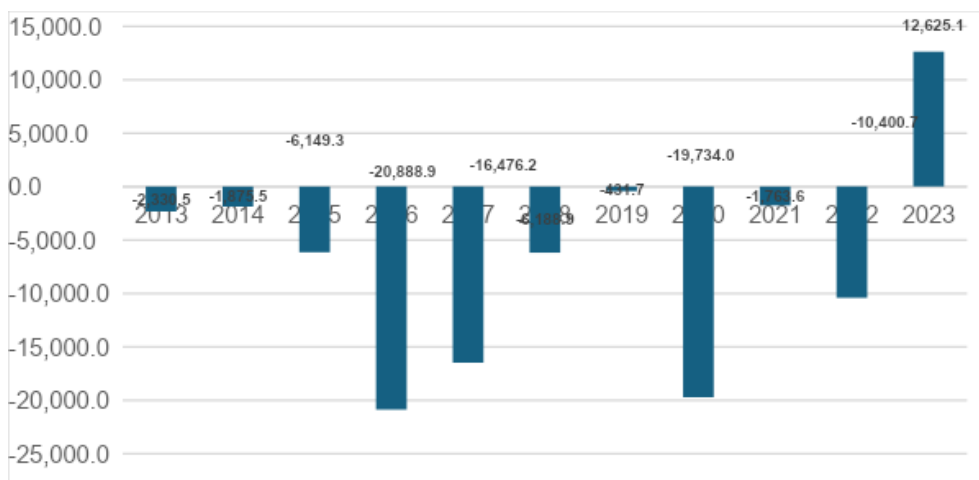


Fig 2. Deficit (-), surplus of the state budget (*million soms*) [12]

At the same time, compared to the previous year, the member states of the Eurasian Economic Union (EAEU) experienced an increase in almost all tax items allocated to the consolidated budget. The change in tax revenues in the EAEU is not the same everywhere; in Russia there was a decrease in income from foreign economic activity (FEA) by 28.8%. There is also a negative value of excise taxes, which is associated with the use of reverse excise tax on petroleum raw materials with a damping component.

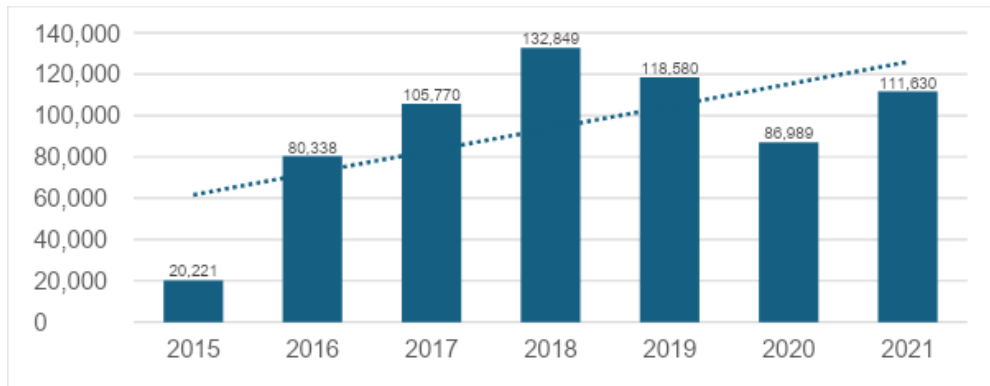


Fig 3. Number of procurement announcements [12]

Starting from May 2015, all public procurement in the republic began to be carried out electronically, with the exception of cases provided for by the Law of the Kyrgyz Republic “On Public Procurement”. This contributed to an increase in the number of procurement announcements. Thus, according to the diagram of the figure, one can clearly trace the abrupt changes since 2015 towards an increase in the number of indicators of announcements in public procurement in the Kyrgyz Republic, which are the result of the implementation of the digitalization program, namely the scale of use of information technologies of the Kyrgyz Republic in accordance with the national program “Digital Kyrgyzstan-2040” and the Roadmap for the implementation of the Concept of digital transformation “Digital Kyrgyzstan, 2019-2023”. The decrease in the number of announcements on public procurement in 2019-2020 is associated with the pandemic period, which negatively affected the dynamics of indicators.

In foreign countries, they are resorting to the following measure - digitalization of all processes that are involved in the formation of the purchase of medical equipment. Currently, control of procurement activities takes place within the framework of its own legislation. It is necessary to take into account the exchange of experience with colleagues from other countries and regions, as well as guidance from management and best practices prepared as a result of joint thematic events and within the framework of the activities of multilateral organizations.



Fig 4. Fragment of the digital model of medical equipment procurement logistics drawing

In Fig. figure 1 shows a diagram of the digital model for the purchase of medical equipment. It includes key components: warehouse management system (WMS), transportation management system (TMS), supply chain management (SCM) and quality management system (QMS). The flows between these components are shown, from purchase order (SCM) to quality control (QMS).

Nowadays, countries and governments recognize the importance of addressing corruption in public procurement, a topic frequently highlighted in news outlets and various programs. Instances of government officials being detained for bribery have garnered public interest and undermined people's trust in the governance system. Combating such corruption is significant globally and within the context of Kyrgyzstan.

Conclusion

Regulation of public procurement of medical equipment is one of the most complex types of procurement due to the need for in-depth knowledge of regulations and market assortment. This complexity is compounded by the requirement for suppliers to have installation licenses, which creates significant barriers to new market entrants. Public procurement is carried out through framework contracts and electronic tenders, and the complexity of medical equipment further complicates the preparation of documentation. Procurement errors can lead to financial losses and reduced quality of services.

Many experts suggest that there is a correlation between government procurement and the risk of corruption, which can have significant implications for public health. In Kyrgyzstan, the main health problem is the growing gap between rising health care costs and the state's ability to adequately finance them. In addition, aging infrastructure, staff shortages and rising costs pose significant challenges.

The introduction of e-procurement in Kyrgyzstan since May 2015 has increased transparency and efficiency. However, the transition to electronic systems requires organizations to adapt to new technologies. Effective inventory management and supply chain optimization are essential to reduce costs and improve service quality.

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