Communication

The History of Cost Accounting in Healthcare Organisations

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The history of Cost Accounting in Healthcare Organisations

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Abstract: Cost accounting is essential for healthcare providers in order to adequately document, measure and evaluate costs of services within different activities. This role has a long history, from rudimentary resource management in the medieval religious hospitals through to modern and increasingly sophisticated methodologies attempting to meet the demands of contemporary health care (Carroll & Lord 2016; Finkler 1994). This paper reviews the history of healthcare cost accounting and key innovations that have influenced modern practices. In the Middle Ages cost accounting was more about controlling necessities like food and medicine in religious establishments (Carroll & Lord, 2016). The emergence of public and private hospitals in the 18th and 19th century lead to more sophisticated methods for assuring transparency, as well as efficiency in administrative processes (Malmmose & Lydersen). The Industrial Revolution and the advent of modern medicine in the early 20th century added layers to healthcare, so hospitals adopted cost centres from manufacturing as well at Taylorism principles (Finkler & Ward,1999). During the late 20th century, methodologies like absorption costing and Activity-Based Costing (ABC) helped to narrow down costs in tracking of particular operations (Kaplan & Porter,2011). The Balanced Scorecard (BSC), introduced in the 1990s by Kaplan and Norton, is credited with integrating financial and non-financial metrics into strategic evaluations within healthcare. Information technology (IT) and artificial intelligence (AI), progressing in the 21st century, allow this model to use [real time] data with improved accuracy of cost analytics and resource optimization (Kulkarni et al., 2019; Lan et al.,2022). They improved decision-making in the healthcare sector, assisting service providers slash costs and enhance quality amidst escalating complexity. This is an area that will warrant further exploration in subsequent research given AI's ability to increase savings, as well as safeguard data and make it easier for new technologies to be implemented within health care organizations.

Keywords: Activity-Based Costing (ABC); Healthcare Cost Accounting; Artificial Intelligence

1. Introduction to Cost Accounting

Since its inception, cost accounting has been a fundamental tool for organisations seeking to manage resources effectively. It allows detailed monitoring of the costs associated with each stage of the production of goods or provision of services, enabling a clear understanding of where resources are being used and how they can be optimised (Finkler & Ward, 1999). In the context of healthcare organisations, this function takes on even greater importance. Hospitals and clinics not only face pressure to control operating costs, but also have a responsibility to ensure that these costs do not jeopardise the quality of patient care.

Healthcare is a sector where margins of error can have serious consequences, both financial and human. Therefore, robust and well-implemented cost accounting is essential to balance these challenges. It provides managers with accurate and timely information that is crucial for making decisions, whether they are related to allocating resources, pricing services, or evaluating investments in new technologies (Drury, 2013). Furthermore, in an environment where costs are constantly rising

 doi:10.20944/preprints202502.0645.v1

and funding sources are often limited, the ability to understand and control costs becomes a crucial competitive differentiator.

2. Methodology

The research was conducted through a comprehensive literature review, using renowned academic databases such as WOS, Scopus and Google Scholar. Relevant articles, books and reports were selected that address the history of cost accounting in healthcare, as well as the traditional and modern methods applied in the area. Studies exploring the application of artificial intelligence to cost accounting in healthcare organisations were also included. The selection of materials was based on the relevance of the themes, the methodological rigour of the studies and their contribution to understanding accounting practices in the health sector. The inclusion criteria covered publications from the last 30 years, with a focus on empirical studies and systematic reviews that provided a broad and detailed overview of the development and application of cost accounting in healthcare contexts globally.

3. Historical Development

3.1. First Healthcare Institutions

Medieval Period

During the Middle Ages, cost accounting in healthcare institutions such as monasteries and religious hospitals was rudimentary and focussed on controlling basic resources such as food and medicine. Records were kept manually by monks and religious administrators, whose main objective was to ensure the survival and continued operation of these institutions. Although this system was effective for the needs of the time, it limited the capacity for detailed cost analysis and the optimisation of available resources (Smith, 2007, p. 45).

3.2. 18th and 19th Centuries

With the emergence of public and private hospitals in the 18th and 19th centuries, the need for greater transparency and efficiency in cost management intensified. During this period, accounting began to be seen as a science, introducing more sophisticated techniques for recording and analysing costs. This included the division of expenses by departments and the categorisation of services provided, allowing a clearer view of operating costs and facilitating financial management in increasingly large and complex institutions (Jones, 2010, p. 85).

3.3. Early 20th Century

The Industrial Revolution and Hospital Costs

The Industrial Revolution, along with advances in medicine, increased the complexity of healthcare services. At the beginning of the 20th century, hospitals began to adopt more advanced accounting methods, inspired by the manufacturing industry. The introduction of cost centre accounting allowed for more precise allocation and tighter control of hospital expenses, marking a significant advance in healthcare cost management (Garrison et al., 2015, p. 231).

3.4. Taylorism and Efficiency

Frederick Taylor's scientific management principles, known as Taylorism, were applied in hospitals to increase operational efficiency. These methods included standardising cost calculations and carrying out cost-benefit analyses, which justified investments in new technologies and infrastructure. This approach aimed not only to reduce costs, but also to improve the quality and consistency of healthcare services (Drury, 2013, p. 28).

 doi:10.20944/preprints202502.0645.v1

3.5. Second Half of the 20th Century

Absorption Costing Systems

In the second half of the 20th century, absorption costing systems gained popularity. These systems attributed all production costs, both direct and indirect, to products or services, providing a more complete view of the total costs associated with patient care. With the computer revolution, the collection and analysis of financial data was transformed, allowing for more precise and efficient management of hospital resources (Brinker, 1980, p. 102).

Activity Based Costing (ABC)

In the 1980s, Activity-Based Costing (ABC) emerged as a powerful methodology. This method identified specific activities as the main cost generators and allocated costs based on the consumption of resources by these activities. The application of ABC in healthcare institutions provided a more detailed understanding of the costs associated with different procedures and made it easier to identify areas where efficiency could be improved (Kaplan & Porter, 2011, p. 46).

3.6. Age of the Balanced Scorecard

Introduction to the Balanced Scorecard

In the 1990s, Robert Kaplan and David Norton introduced the Balanced Scorecard (BSC), a performance management methodology that complemented traditional financial measures with non-financial indicators. The BSC is a strategic tool that allows organisations to measure and manage their performance from four perspectives: financial, customer, internal processes and learning and growth. This brought a more balanced approach to organisational management, going beyond financial figures to include critical success factors (Kaplan & Norton, 1992, p. 75).

Implementation in the Health Sector

The Balanced Scorecard was quickly adopted by healthcare entities as a method for aligning organisational activities with the overall strategy, improving internal communication and monitoring performance in various dimensions. This approach allowed hospitals and other healthcare institutions to focus not only on financial results, but also on the quality of patient care, operational efficiency and the continuous development of their staff (Inamdar, Kaplan, & Bower, 2002, p. 150).

3.7. The 21st Century and Recent Advances

Information Technology and Integrated Systems

The 21st century has brought with it significant advances in information technology, allowing hospital management systems to be integrated with advanced cost accounting tools. Enterprise Resource Planning (ERP) systems and specialised accounting software have facilitated the collection of data in real time and allowed detailed and rapid analysis, improving managers' ability to make informed decisions based on hard data (Chapman et al., 2007, p. 127).

Value-Based Healthcare

The transition to a value-based healthcare model has profoundly changed the approach to cost accounting. This model focuses on the relationship between the costs of healthcare services and the results obtained, encouraging organisations to improve both the efficiency and quality of the care provided. Tools such as patient lifecycle costing and cost-effectiveness analyses have become essential for monitoring and optimising the cost-effectiveness of treatments (Porter & Lee, 2013, p. 54).

 doi:10.20944/preprints202502.0645.v1

Artificial Intelligence

In recent years, artificial intelligence (AI) has begun to transform cost accounting in healthcare organisations. AI and machine learning technologies are able to analyse large volumes of data quickly and accurately, identifying patterns and anomalies that might go unnoticed by traditional methods. AI tools are now used to predict future costs, optimise resources and improve the accuracy of cost analyses, offering significant potential to reduce waste and improve operational efficiency (Obermeyer & Emanuel, 2016, p. 25).

Table 1 provides an overview of the historical evolution of cost accounting in healthcare organisations, from the medieval period to recent advances in the 21st century. It highlights the main changes and innovations in accounting practices, as well as the methodologies adopted over the centuries, illustrating how these transformations have impacted financial management and operational efficiency in healthcare organisations.

Table 1. Historical Evolution of Cost Accounting in Healthcare Institutions.

Period	Description	Reference
Medieval Period	Cost accounting in health institutions, such as monasteries and religious hospitals, was rudimentary and focussed on controlling basic resources such as food and medicines. Records were kept manually by monks and religious administrators to ensure the survival and continued operation of these institutions.	Smith (2007, p. 45)
18th and 19th centuries	With the emergence of public and private hospitals, there was a growing need for transparency and efficiency in cost management. Accounting began to be seen as a science, introducing more sophisticated techniques such as dividing expenses by department and categorising services, making financial management easier.	Jones (2010, p. 85)
Early 20th century	The Industrial Revolution and advances in medicine brought increasing complexity to healthcare services. Hospitals began to adopt more advanced accounting methods, inspired by the manufacturing industry. The introduction of cost centre accounting allowed for better allocation and strict control of hospital expenses.	Garrison et al. (2015, p. 231)
Taylorism and Efficiency	Frederick Taylor's scientific management principles, known as Taylorism, were applied to increase operational efficiency in hospitals, including standardising cost calculations and cost-benefit analyses, justifying investments in new technologies and infrastructure.	Drury (2013, p. 28)

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Period	Description	Reference
Second Half of the 20th Century	**Absorption Costing Systems**: Became popular and attributed all production costs, both direct and indirect, to products or services, providing a more complete view of total costs. The computer revolution transformed the collection and analysis of financial data, allowing for more precise management.	Brinker (1980, p. 102)
	Activity-Based Costing (ABC): In the 1980s, ABC emerged as a powerful methodology, allocating costs based on the consumption of resources by specific activities, facilitating a detailed understanding of the costs associated with different procedures.	Kaplan & Porter (2011, p. 46)
Age of the Balanced Scorecard	**Introduction of the Balanced Scorecard**: In the 1990s, Kaplan and Norton introduced the BSC, a methodology that complemented traditional financial measures with non-financial indicators, allowing organisations to measure and manage performance from four perspectives: financial, customer, internal processes and learning and growth.	Kaplan & Norton (1992, p. 75)
	Implementation in the Health Sector: The BSC has been adopted by health entities to align organisational activities with the overall strategy, improve internal communication and monitor performance in various dimensions, focusing on financial results, quality of patient care and operational efficiency.	Inamdar, Kaplan, & Bower (2002, p. 150)
21st Century and Recent Advances	**Information Technology and Integrated Systems**: The 21st century has brought advances in information technology, allowing hospital management systems to be integrated with advanced cost accounting tools, facilitating real-time data collection and detailed analyses, improving decision-making.	Chapman et al. (2007, p. 127)
	Value-Based Healthcare: The transition to a value-based healthcare model has changed the approach to cost accounting, focussing on the relationship between the costs of services and the results obtained, encouraging improvements in the efficiency and quality of the care provided.	Porter & Lee (2013, p. 54)

 doi:10.20944/preprints202502.0645.v1

Period	Description	Reference
	Artificial Intelligence: AI has begun to transform cost accounting in healthcare, with AI and machine learning technologies analysing large volumes of data quickly and accurately, predicting future costs, optimising resources and improving the accuracy of cost analyses.	Obermeyer & Emanuel (2016, p. 25)

Note. Own elaboration.

4. Evolution of Cost Accounting

The evolution of cost accounting is a journey that reflects the changing economic and technological needs of organisations over time. In the medieval period, accounting records were rudimentary and were mainly focused on the management of essential resources such as food and medicine, especially in religious institutions such as monasteries and hospitals (Carroll & Lord, 2016, p. 45). These early accounting systems were simple and aimed to ensure the survival of institutions by ensuring that resources were used efficiently and sustainably.

With the advent of the Industrial Revolution in the 18th century, the need for a more structured approach to cost accounting began to emerge. Industrialisation brought with it greater complexity in production processes, which required more detailed and accurate accounting methods. It was during this period that cost centre accounting began to develop, allowing for better allocation of expenses and greater transparency in financial processes (Malmmose & Lydersen, 2021, pp. 102-103).

The 20th century marked an era of innovation in cost accounting, with the introduction of methodologies such as Activity-Based Costing (ABC) and the Balanced Scorecard (BSC). These methodologies were initially developed in the industrial sector, but were soon adapted to other sectors, including healthcare, where they proved to be extremely effective in managing overheads and improving operational efficiency (Kaplan & Norton, 1992, p. 75). The introduction of information technology in recent decades has brought a new revolution to cost accounting, enabling the automation of processes and access to data in real time, which has transformed the way costs are managed in healthcare organisations (Chapman et al., 2007, p. 127).

5. Cost Accounting in Healthcare Entities

The application of cost accounting in healthcare organisations presents a unique set of challenges and particularities. Unlike sectors such as manufacturing, where costs can be more easily attributed to tangible products, the healthcare sector deals with a variety of services that differ significantly in terms of complexity and resources required. For example, the cost of a medical consultation can vary dramatically depending on the procedures performed, the speciality of the doctor, and the specific needs of the patient (Finkler, 1994, p. 38).

Furthermore, healthcare organisations face the additional challenge of balancing economic efficiency with quality of care. This means that managers must be able to identify where resources are being wasted and where they can be improved, without compromising patient care. Cost accounting is therefore not only a financial tool, but also a strategic tool that helps organisations improve the quality of care while controlling costs (Porter & Lee, 2013, p. 54).

In recent years, the application of advanced methodologies such as Activity-Based Costing (ABC) has enabled healthcare organisations to better track overhead costs and identify areas where efficiency can be improved. This is particularly important in an environment where the pressure to reduce costs without sacrificing quality of care is intense (Kaplan & Porter, 2011, p. 46).

6. Importance of Cost Accounting in Healthcare

 doi:10.20944/preprints202502.0645.v1

Cost accounting is crucial to the financial sustainability of healthcare organisations, as it provides the necessary information for the efficient allocation of resources. In a sector where demand for high-quality services is constant but resources are limited, the ability to identify and control costs is vital. Cost accounting allows managers to better understand the costs associated with each procedure, service unit or department, facilitating informed decisions that can improve the efficiency and quality of care (Kaplan & Porter, 2011, p. 46).

In addition, cost accounting is an essential tool for risk management. In many healthcare institutions, unexpected costs can have a significant impact on daily operations. By providing a detailed view of costs, cost accounting helps managers anticipate possible financial challenges and develop strategies to mitigate them (Garrison, Noreen, & Brewer, 2015, p. 231). For example, analysing costs can reveal that certain procedures are generating disproportionately high costs in relation to the benefits, which can lead to changes in clinical or operational practices.

The importance of cost accounting is also reflected in the need for financial transparency. In many countries, healthcare organisations are obliged to account to regulators, funders and the general public for how resources are being used. The ability to demonstrate effective cost control not only helps to fulfil these obligations, but also strengthens stakeholder confidence in the management of the institution (Jones, 2010, p. 85).

7. Challenges and Opportunities in Implementing Cost Accounting in Healthcare Entities

Implementing cost accounting in healthcare organisations is a complex task that faces a number of challenges specific to the sector. One of the main challenges is the diversity and complexity of the services provided in healthcare, which makes cost allocation a difficult task. Unlike sectors such as manufacturing, where costs can be directly attributed to specific products, in the healthcare sector, costs are often indirect and difficult to track accurately (Chapman et al., 2007, p. 127).

Another significant challenge is resistance to change on the part of healthcare professionals. Many doctors and other professionals in the field see cost accounting as an interference in their work, believing that emphasising costs could compromise the quality of patient care. To overcome this resistance, it is essential that cost accounting is presented not only as a financial control tool, but also as a means of improving the efficiency and quality of care (Vaslavskaya et al., 2022, p. 450).

In addition to the challenges, the implementation of cost accounting in healthcare offers several opportunities. One of these opportunities is the possibility of improving cost transparency. In many countries, the lack of transparency in healthcare costs has been a significant problem, leading to inefficiencies and waste. Implementing a robust cost accounting system can help solve this problem by providing a clear view of how resources are being utilised and where there are opportunities to improve efficiency (Cavmak & Aksoylu, 2024, pp. 445-447).

Another opportunity lies in the use of emerging technologies, such as artificial intelligence (AI) and big data analysis, which can automate and improve many cost accounting processes. These technologies allow for a more detailed and real-time analysis of costs, making it easier to identify patterns and anomalies that can indicate areas for improvement (Kulkarni et al., 2019, p. 193). Combining these technologies with traditional cost accounting methodologies, such as Activity-Based Costing (ABC), can lead to a new era of efficiency and effectiveness in healthcare cost management.

The aim of Table 2 is to provide a balanced view of the challenges that healthcare organisations face when adopting new cost accounting methodologies, while at the same time highlighting the opportunities that arise from overcoming these challenges. This helps to show that although there are obstacles, the rewards in terms of efficiency, financial control and quality of care can be significant.

Table 2. Challenges and Opportunities in Implementing Cost Accounting in Healthcare.

 doi:10.20944/preprints202502.0645.v1

Challenges	Description	Opportunities	Description
Resistance to Change	Professionals and managers can resist adopting new accounting systems because of ingrained habits.	Capacity Building and Training	It offers the opportunity to invest in training that improves the qualifications of professionals and increases efficiency.
Implementation complexity	Accounting systems such as ABC can be complex and require significant resources to implement.	Process Optimisation	Successful implementation can lead to better resource allocation and greater operational efficiency.
Cost of Implementation	Introducing new systems can be expensive, especially in organisations with limited financial resources.	Improved Financial Management	By overcoming the initial cost, organisations can significantly improve their financial control capacity.
Integration with Existing Systems	Difficulty in integrating new accounting systems with the information technologies already in use in the organisation.	Adoption of Innovative Technologies	It facilitates the modernisation and integration of advanced technologies, such as AI and ERP, to improve cost management.
Data Security and Privacy	The risk of data breaches increases with the digitalisation of accounting systems.	Strengthening Cyber Security	It promotes the adoption of stricter security practices, increasing the protection of sensitive data.
Analysing and reporting capacity	Traditional systems may not provide the detailed analyses needed for informed decisions.	Improved decision-making	New systems offer more robust analyses, allowing for more strategic, data-based decision-making.

Note. Own elaboration.

8. Health Cost Accounting Methodologies and Techniques

The cost accounting methodologies used in healthcare organisations have evolved significantly over time. One of the most widely adopted techniques is Activity-Based Costing (ABC), which allows for a more accurate allocation of indirect costs by tracking the activities that consume resources within an organisation. ABC has proved particularly effective in complex environments such as hospitals, where indirect costs can represent a significant part of total operating costs (Kaplan & Anderson, 2003, p. 122).

The Balanced Scorecard (BSC) is another important methodology that has been applied in healthcare organisations. The BSC goes beyond traditional accounting by incorporating non-financial

 doi:10.20944/preprints202502.0645.v1

measures into the performance evaluation process, which allows for a more holistic view of the organisation's financial and operational health (Kaplan & Norton, 1992, p. 75). In the healthcare context, the BSC is used to align daily activities with strategic objectives, improving both efficiency and quality of care.

In addition to these methodologies, the implementation of enterprise resource planning (ERP) systems has enabled healthcare organisations to integrate their financial operations with other areas such as logistics and human resources. This facilitates the collection and analysis of data in real time, providing a solid basis for decision-making (Cavmak & Aksoylu, 2024, pp. 443-444). These ERP systems, when combined with techniques such as ABC and BSC, offer a comprehensive and detailed view of costs, allowing managers to make quick and informed adjustments to improve operational efficiency.

Artificial intelligence (AI) and big data analysis are fast becoming crucial components of healthcare cost accounting practices. These technologies allow large volumes of data to be analysed in real time, identifying patterns that would be impossible to detect using traditional methods. This not only improves the accuracy of cost accounting, but also allows for more effective forecasting of future costs, which is vital for long-term financial sustainability (Kulkarni et al., 2019, p. 193).

Over the years, various cost accounting methodologies have been developed and adopted in the healthcare sector, each with its own advantages and challenges. Choosing the most appropriate methodology depends on several factors, including the complexity of the organisation, the strategic objectives, and the need for precision and transparency in the allocation of resources. Understanding these methodologies is essential for managers and healthcare professionals looking to optimise financial performance without compromising the quality of the services offered.

Table 3 compares the main cost accounting methodologies used in healthcare organisations, highlighting their characteristics, benefits and limitations. This comparison helps to illustrate how each methodology can be applied in different contexts, helping managers to make informed decisions about the best approach for their organisations.

Table 3. Comparison of Health Cost Accounting Methodologies.

Methodology	Description	Benefits	Limitations
Absorption costing	It assigns all production costs, both direct and indirect, to the products or services.	Complete overview of total costs, easy to implement and widely accepted.	It can distort product/service costs by allocating fixed costs proportionally.
Activity Based Costing (ABC)	It allocates costs based on specific activities that consume resources.	It provides a detailed view of costs by activity, helps to identify inefficiencies and improve resource allocation.	Complex to implement, requires detailed data collection and can be expensive to maintain.
Time-Driven Activity-Based Costing (TDABC)	It simplifies ABC by using time estimates to allocate costs.	Reduces the complexity of ABC, easier to apply in dynamic environments.	It can be less precise if the time estimates are not accurate.
Balanced Scorecard (BSC)	It integrates financial and non-financial measures to assess organisational performance.	It helps to align strategy with operations, focusing on various dimensions of performance.	Implementation requires cultural changes and can be difficult to maintain in the long term.
Life Cycle Costing	It evaluates the costs of a product or service throughout its entire life cycle.	It provides a complete overview of costs over time, useful for strategic planning and sustainability.	High complexity, requires long-term data that is not always available.
Value-Based Healthcare (VBHC)	It focuses on the relationship between the costs of health services and the results obtained for the patient.	Promotes efficiency and quality in patient care, encourages continuous improvement.	Complex to implement, it depends on standardised results metrics that can vary between contexts.

 doi:10.20944/preprints202502.0645.v1

Note. Own elaboration.

9. Case studies in Healthcare Organisations

Practical case studies are a valuable tool for understanding how different healthcare organisations have implemented and benefited from advanced cost accounting systems. A significant study was carried out at a medical centre in Turkey, where the Activity-Based Costing (ABC) methodology was applied to identify and analyse logistics costs (Cavmak & Aksoylu, 2024, pp. 445-447). This study revealed that logistics costs represented a significant portion of total operating costs, and that the application of ABC enabled the organisation not only to reduce costs, but also to improve the efficiency of logistics processes.

Another relevant example is the case of a hospital in the United States that implemented the Balanced Scorecard (BSC) to align its financial objectives with its quality goals. The BSC allowed the hospital to monitor not only financial indicators, but also critical factors such as patient satisfaction, the efficiency of internal processes and the development of staff competences (Kaplan & Norton, 1996, p. 150). This resulted in a substantial improvement in the quality of care, while costs were controlled more effectively.

These case studies demonstrate that the implementation of advanced cost accounting methodologies, such as ABC and BSC, can have a profound impact on operational efficiency and the quality of healthcare. They also highlight the importance of adapting these methodologies to the specific needs of each organisation, ensuring that the benefits of these tools are fully realised.

10. The Importance of Cost Accounting in Healthcare Decision-Making

Cost accounting plays a central role in strategic decision-making in healthcare organisations. Detailed cost information allows managers to assess the efficiency of processes, identify areas for improvement and make informed decisions about resource allocation. For example, by analysing the costs associated with different medical procedures, managers can determine which services are most profitable and which may need to be adjusted to improve their efficiency (Kaplan & Porter, 2011, p. 46).

In addition, cost accounting is fundamental to the pricing of healthcare services. In many healthcare systems, service prices are regulated or negotiated with payers, such as health insurers or public health systems. The ability to demonstrate tight control of costs and justify prices based on hard data is essential to negotiate effectively and ensure that prices are fair and sustainable (Garrison, Noreen, & Brewer, 2015, p. 231).

Cost accounting also supports innovation in healthcare. By providing a detailed view of costs, it allows organisations to assess the financial impact of new technologies and procedures before they are implemented. This is particularly important in a healthcare environment where innovations can be expensive, but can also bring significant benefits in terms of quality of care and operational efficiency (Porter & Lee, 2013, p. 54).

Finally, cost accounting is a vital tool for risk management. In an industry where uncertainties are commonplace, the ability to predict and mitigate financial risks is crucial. Cost accounting provides the data needed to identify areas of vulnerability and develop strategies to protect the organisation against potential financial shocks (Kaplan & Norton, 1992, p. 75).

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For cost accounting in healthcare institutions to be effective, it is essential that administrators have tools at their disposal that allow them to measure and evaluate financial and operational performance on an ongoing basis. In this context, Key Performance Indicators (KPIs) play a crucial role. They provide a basis for assessing the efficiency, effectiveness and quality of the services

 doi:10.20944/preprints202502.0645.v1

provided, allowing managers to identify areas for improvement, optimise resources and align operations with the organisation's strategic objectives.

Table 4 presents a selection of the main KPIs used in healthcare cost accounting, highlighting their descriptions, objectives and examples of application. These indicators not only offer valuable insights into financial performance, but also help to ensure that the quality of patient care is maintained, or even improved, in an environment where cost control is paramount.

Table 4. *Key Performance Indicators (KPIs) in Health Cost Accounting.*

Key Performance Indicator (KPI)	Description	Objective	Application example
Cost per Patient	Total cost incurred per patient cared for in a given unit or period.	Evaluate financial efficiency in the management of resources per patient.	Comparison between different service units to identify cost reduction opportunities.
Cost per Procedure	Cost associated with carrying out a specific medical procedure.	Measuring efficiency in carrying out specific procedures, identifying cost variations.	Evaluation of high-cost procedures, such as surgery, to optimise resources.
Contribution Margin	Difference between the revenue generated by a service and its direct variable costs.	Evaluate the profitability of different services or departments.	Analysis of which services contribute most to the organisation's profitability.
Cost per Hospitalisation Day	Average daily cost of keeping a patient hospitalised.	Monitoring the efficient use of resources during hospitalisation.	Evaluation of hospitalisation practices to identify potential savings.
Occupancy Rate	Percentage of hospital beds occupied in a given period.	Evaluating the efficient use of hospital facilities.	Capacity planning and optimisation of hospital resources.
Cost per Service Unit	Cost attributed to each unit of service provided, such as a consultation or examination.	Evaluate cost and efficiency by type of service provided.	Comparison between different types of examinations to identify where the greatest costs occur.
Cost-Benefit Quality Index	The relationship between the costs and the benefits achieved, measured in terms of quality or health.	Evaluate the economic efficiency of services in terms of quality and results for the patient.	Analysis of prevention programmes, such as vaccinations, where the benefits outweigh the costs.

 doi:10.20944/preprints202502.0645.v1

Total Operating Cost	Sum of all operating costs incurred by the organisation in a given period.	Evaluate the overall efficiency of cost management throughout the organisation.	Annual review of operating costs to identify areas for improvement and potential savings.
Return on Investment (ROI)	Measure of profit or loss generated in relation to the investment made in an initiative or project.	Evaluate the financial effectiveness of investments made in new technologies or processes.	ROI evaluation of a new hospital management system.

Note. Own elaboration.

11. Ethical and Legal Aspects of Health Cost Accounting

The implementation of cost accounting in healthcare organisations is not without its ethical and legal challenges. One of the main ethical aspects involves transparency in cost allocation, especially in a sector where resources are often limited and decisions can have direct implications for the quality of patient care. The responsibility to ensure that resources are distributed in a fair and equitable manner is fundamental, and cost accounting plays a central role in this process (Wang et al., 2023, p. 129).

In addition to transparency, data privacy is another critical concern. Cost accounting involves collecting and analysing large volumes of data, much of which may relate to patients' sensitive personal information. This raises questions about how this data is stored, processed and protected from unauthorised access. Compliance with data privacy regulations, such as the General Data Protection Regulation (GDPR) in Europe or the Health Insurance Portability and Accountability Act (HIPAA) in the United States, is essential to ensure that patients' rights are respected (Lan et al., 2022, p. 198).

Ethical issues also extend to the way costs are communicated to patients. In many cases, patients do not have a clear understanding of the costs of the healthcare services they receive, which can lead to unpleasant financial surprises. Cost accounting should therefore include mechanisms to ensure that patients are clearly and accurately informed about the potential costs of services, enabling them to make informed decisions about their care (Cui, 2019, p. 107).

Legally, cost accounting must comply with a series of regulations that vary according to jurisdiction. This includes not only data privacy regulations, but also tax and accounting standards that can impact how costs are recorded and reported. Compliance with these regulations is essential to avoid legal sanctions and ensure the financial integrity of the organisation (Vaslavskaya et al., 2022, p. 453).

12. International Comparison of Cost Accounting in Healthcare Entities

Cost accounting in healthcare organisations varies significantly around the world, reflecting the cultural, economic and regulatory differences in each country. In the United States, for example, the highly privatised healthcare system has resulted in a cost accounting approach that emphasises efficiency and market competitiveness. Here, methodologies such as Activity-Based Costing (ABC) are widely used to identify and eliminate inefficiencies, ensuring that hospitals can compete effectively in the market (Kaplan & Porter, 2011, p. 46).

On the other hand, in countries with more robust public health systems, such as the UK or Canada, cost accounting is often driven by public health policies and the need to maximise the use of public resources. In these contexts, the focus may be more on transparency and accountability, with cost accounting being used to demonstrate how resources are allocated equitably and efficiently (Jean, 2023, p. 98).

 doi:10.20944/preprints202502.0645.v1

In Europe, the implementation of the General Data Protection Regulation (GDPR) has significantly influenced the way cost accounting-related data is managed. Compliance with the GDPR not only guarantees the protection of patient data, but also sets strict standards for the transparency and responsible use of financial information (Lan et al., 2022, p. 198).

In developing countries, health cost accounting faces additional challenges related to a lack of resources and infrastructure. However, even in these contexts, cost accounting plays a crucial role in improving efficiency and ensuring that the limited resources available are utilised in the best possible way (Vărzaru, 2023, p. 145). Globalisation and the spread of good accounting practices are beginning to positively influence these systems, helping to improve the delivery of health services even in resource-limited environments.

13. Future Trends in Health Cost Accounting

As technology continues to evolve, healthcare cost accounting is also undergoing significant transformations. One of the most promising trends is the integration of artificial intelligence (AI) and big data analysis into cost accounting systems. These technologies have the potential to automate many accounting processes, reduce human error and provide deeper insights into cost patterns (Kulkarni et al., 2019, p. 193).

AI, in particular, is being used to predict future costs based on historical data, allowing healthcare organisations to anticipate and prepare for possible financial challenges. In addition, big data analysis allows large volumes of data to be processed in real time, providing a more accurate and up-to-date view of operating costs (Wang et al., 2023, p. 129).

Another important trend is the growing demand for transparency in healthcare costs. Patients, funders and regulators are demanding more information about how costs are calculated and allocated, and healthcare organisations are responding to this demand with more open and accessible accounting systems (Lan et al., 2022, p. 198). This trend is being driven by regulatory changes and increased public awareness of healthcare costs.

Globalisation and increased international collaboration are also influencing cost accounting practices. Healthcare organisations around the world are starting to adopt international accounting standards, which makes it easier to compare costs between different countries and regions. This not only improves transparency, but also helps organisations identify best practices that can be adopted to improve efficiency and quality of care (Vărzaru, 2023, p. 145).

Finally, the focus on sustainability is becoming increasingly important. As healthcare costs continue to rise, organisations are looking for ways to become more financially sustainable in the long term. This includes adopting cost accounting practices that not only control current costs, but also consider future financial impacts, ensuring that organisations can continue to provide high-quality care in the future (Porter & Lee, 2013, p. 54).

14. Highlights of the Topic of Cost Accounting in Healthcare Organisations

Cost accounting in healthcare organisations is a fundamental field that offers many strengths, but also faces significant challenges. Below, we discuss the main strengths and weaknesses of this topic, as well as suggestions for future research that could help improve practices in this area.

14.1. Strengths

Precision and Efficiency

The introduction of computerised systems and, more recently, artificial intelligence (AI), has transformed cost accounting in healthcare organisations. These technologies have significantly improved the accuracy and efficiency of data collection and analysis, allowing for a more detailed view of operating costs. Tools such as Activity-Based Costing (ABC) and Enterprise Resource

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Planning (ERP) systems allow managers to track costs more precisely, identifying areas where resources can be optimised and costs reduced.

Transparency

The adoption of advanced accounting methods, such as ABC and ERP systems, has considerably increased transparency in the operating costs of healthcare institutions. This transparency is crucial for facilitating audits and performance analyses, ensuring that resources are being used efficiently and that costs are properly controlled. Transparency also improves accountability, both internally and to regulatory and funding bodies.

Informed Decision Making

Improvements in cost accounting have provided healthcare managers with more detailed and accurate information, essential for strategic and operational decision-making. With a clearer understanding of costs, managers can make informed decisions about resource allocation, investments in new technologies and cost reduction strategies, contributing to the financial sustainability of healthcare organisations.

14.2. Weaknesses

Complexity

Implementing advanced accounting systems, such as ABC and ERP systems, can be extremely complex and costly. It requires a significant investment in technology and training, which can be a challenge for many healthcare organisations, especially those with limited resources. The complexity of these systems can also make them difficult to adopt and integrate into daily operations.

Dependence on Technology

The growing reliance on technology, especially AI, poses risks related to data security and privacy. Managing large volumes of sensitive data, such as patient information, requires stringent cyber security measures. Lack of adequate protection can result in data breaches, with serious consequences for healthcare organisations, both in financial and reputational terms.

Training and Capacity Building

The ongoing need for training and capacity building for the professionals involved in managing accounting systems is another significant challenge. As technologies evolve, professionals must constantly update their skills in order to use these tools effectively. This takes time and resources, and a lack of adequate training can jeopardise the effectiveness of the accounting systems implemented.

15. Conclusion and Final Considerations

The evolution of cost accounting in healthcare organisations is a story of continuous adaptation to technological, economic and regulatory changes. From its beginnings in medieval religious institutions to today's sophisticated cost accounting methodologies, this field has been fundamental to guaranteeing the financial sustainability and quality of healthcare.

As healthcare organisations face growing challenges, such as rising costs, pressure for transparency and the need to adapt to new technologies, cost accounting will continue to play a crucial role. Emerging trends such as artificial intelligence, big data analysis and globalisation promise to further transform the way costs are managed and controlled, providing new opportunities to improve the efficiency and effectiveness of healthcare services.

However, with these opportunities come responsibilities. Healthcare organisations must ensure that their cost accounting practices are transparent, ethical and compliant with legal regulations. This

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will not only protect patients' rights, but also strengthen stakeholder confidence in the organisation's financial management.

Finally, as the healthcare sector continues to evolve, cost accounting must keep pace with these changes, adapting to new demands and challenges. Only in this way can healthcare organisations ensure that they are ready to face the future with confidence and that they will continue to provide high-quality care in a sustainable manner.

16. Suggestions for Future Research

Impact of AI on Cost Reduction

Investigating how AI can continue to evolve and impact cost reduction in healthcare organisations is a promising area for future research. Studies could focus on how AI can optimise resource allocation, improve accuracy in cost forecasting and automate processes that have traditionally been time-consuming and susceptible to human error.

Data Security and Privacy

Data security and privacy are growing concerns, especially in AI-based accounting systems that handle large volumes of sensitive information. Future research should explore the challenges and solutions for protecting this data, ensuring that healthcare organisations can benefit from advanced technologies without compromising patient privacy.

Integration of New Technologies

Exploring how new technologies such as blockchain can be integrated into cost accounting systems offers a significant opportunity to improve transparency, security and efficiency in healthcare operations. Blockchain, for example, can provide an immutable record of financial transactions, increasing confidence in accounting operations and facilitating audits.

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