INTEGRATING ACTIVITY-BASED BUDGETING AND VALUE-BASED HEALTH CARE (VBHC) TO ENHANCE THE ACCURACY OF COST MEASUREMENT AND PLANNING

Farah Nadhim Shamkhi
Master's Degree in Accounting
Department of Financial and Banking Sciences,
College of Administration and Economics, Wasit University,
Wasit, Iraq

Abstract. Healthcare organizations face increasing pressure to control costs, improve resource allocation, and achieve better patient outcomes. This study proposes a conceptual framework integrating Activity-Based Budgeting (ABB) and Value-Based Health Care (VBHC) to enhance the accuracy of cost measurement and planning in healthcare management. The proposed model combines ABB's activity- and resource-oriented approach with VBHC's emphasis on patient-centered outcomes and healthcare value. Time-Driven Activity-Based Costing (TDABC) is integrated as an operational mechanism providing granular data on resource consumption, process costs, and cost drivers. Based on a systematic synthesis of academic literature, the study illustrates how linking financial planning directly to clinical pathways, non-value-added activity identification, and outcome measurement may support more efficient resource allocation and forward-looking cost planning. Digital transformation and data analytics are recognized as critical enablers for integrating operational, financial, and clinical streams. Overall, the proposed framework provides a conceptual basis for transitioning healthcare budgeting from a traditional expenditure-oriented perspective toward an activity-, process-, and outcome-driven paradigm.

Keywords: Activity-Based Budgeting (ABB); Value-Based Health Care (VBHC); Time-Driven Activity-Based Costing (TDABC); Healthcare Cost

Measurement; Cost Planning; Patient Outcomes; Resource Allocation; Healthcare Management; Digital Transformation.

JEL Classification: M41, M49, I10, D24

ИНТЕГРАЦИЯ БЮДЖЕТИРОВАНИЯ НА ОСНОВЕ ВИДОВ ДЕЯТЕЛЬНОСТИ И ЦЕННОСТНО-ОРИЕНТИРОВАННОГО ЗДРАВООХРАНЕНИЯ (VBHC) ДЛЯ ПОВЫШЕНИЯ ТОЧНОСТИ ИЗМЕРЕНИЯ И ПЛАНИРОВАНИЯ ЗАТРАТ

Фарах Надхим Шамхи

магистр по направлению «Бухгалтерский учёт»

Кафедра финансовых и банковских наук,

Колледж управления и экономики, Университет Васит,

Васит, Ирак

Аннотация. Организации здравоохранения сталкиваются с возрастающим давлением, связанным с необходимостью контролировать затраты, улучшать распределение ресурсов и достигать лучших результатов лечения пациентов. В данном исследовании предлагается концептуальная модель интеграции бюджетирования на основе видов деятельности (Activity-Based Budgeting, ABB) и ценностно-ориентированного здравоохранения (Value-Based Health Care, VBHC) как основы для совершенствования измерения и планирования затрат в сфере здравоохранения. Модель объединяет ресурсный и операционный подход ABB с акцентом VBHC на результатах лечения и ценности медицинской помощи. Калькулирование затрат с учетом времени (TDABC) интегрировано в качестве инструментального механизма, обеспечивающего точную информацию о потреблении ресурсов, затратах на процессы и факторах затрат. На основе качественного синтеза научной литературы проиллюстрировано, каким образом прямая связь финансового планирования с клиническими маршрутами, выявлением операций, не

создающих ценности, и оценкой результатов может способствовать более эффективному распределению ресурсов и совершенствованию планирования затрат. Цифровые технологии и аналитика данных выделены как ключевые факторы интеграции финансовых, операционных и клинических потоков. В целом предлагаемая модель формирует концептуальную основу для перехода от традиционного затратного подхода к бюджетированию, ориентированному на виды деятельности, процессы и результаты медицинской помощи.

Ключевые слова: бюджетирование на основе видов деятельности (ABB); ценностно-ориентированное здравоохранение (VBHC); калькулирование затрат на основе видов деятельности с учетом времени (TDABC); измерение затрат в здравоохранении; планирование затрат; результаты лечения пациентов; распределение ресурсов; управление здравоохранением; цифровая трансформация.

Классификация JEL: M41, M49, I10, D24.

1. Introduction

Организации здравоохранения сталкиваются с возрастающим давлением, связанным с необходимостью контролировать затраты, улучшать распределение ресурсов и достигать лучших результатов лечения пациентов. В данном исследовании предлагается концептуальная модель интеграции бюджетирования на основе видов деятельности (Activity-Based Budgeting, ABB) и ценностно-ориентированного здравоохранения (Value-Based Health Care, VBHC) как основы для совершенствования измерения и планирования затрат в сфере здравоохранения. Модель объединяет ресурсный и операционный подход ABB с акцентом VBHC на результатах лечения и ценности медицинской помощи. Калькулирование затрат с учетом времени (TDABC) интегрировано в качестве инструментального механизма, обеспечивающего точную информацию о потреблении ресурсов, затратах на процессы и факторах затрат. На основе качественного синтеза научной литературы показано, как прямая

связь финансового планирования с клиническими маршрутами, выявлением операций, не создающих ценности, и оценкой результатов оптимизирует распределение ресурсов. Цифровые технологии и аналитика данных выделены как ключевые факторы интеграции финансовых, операционных и клинических потоков. В целом модель переводит бюджетирование в здравоохранении от традиционного затратного подхода к подходу, ориентированному на виды деятельности, процессы и ценностные результаты.

1.1 Significance of the Study: The primary objective of this study is to develop a conceptual framework integrating Activity-Based Budgeting (ABB) and Value-Based Health Care (VBHC) to enhance healthcare cost measurement accuracy and planning effectiveness.

The specific objectives are:

1. To analyze the theoretical mechanisms through which ABB improves resource estimation accuracy in clinical environments.
2. To establish conceptual links between activity-based cost structures (including TDABC) and patient outcomes within VBHC care pathways.
3. To formulate a multi-stage analytical model identifying cost drivers, process inefficiencies, and non-value-added activities.
4. To define the role of digital technologies in enabling continuous data integration between management accounting and clinical informatics systems.
5. To provide conceptual and practical guidance for healthcare managers considering a transition from expenditure-based budgeting to process- and outcome-driven financial planning.

2. Literature Review

2.1 Theoretical Foundations of ABB and TDABC in Healthcare

Management accounting in healthcare has evolved from traditional line-item and historical incremental budgeting toward activity-oriented frameworks. Traditional

line-item budgeting encourages spending up to historical thresholds without evaluating operational efficiency or process variations. In contrast, Activity-Based Costing (ABC) attributes overhead costs to specific activities based on actual consumption drivers (Kaplan & Anderson, 2004).

Activity-Based Budgeting (ABB) reverses the ABC logic for forward-looking planning: it projects expected activity volumes (e.g., patient visits, surgeries, diagnostic tests), calculates the resource capacities required to execute those activities, and derives the necessary budget allocations (Kaplan & Anderson, 2007).

In healthcare, implementing traditional ABC proved difficult due to the complexity of clinical processes and the burden of subjective employee time surveys (Keel et al., 2017). To overcome these challenges, Time-Driven Activity-Based Costing (TDABC) was introduced (Kaplan & Porter, 2011). TDABC simplifies cost estimation by requiring only two parameters:

1. The capacity cost rate (CCR) of allocated resources (e.g., cost per minute of personnel or equipment operation).
2. The unit time required to perform each clinical or administrative activity within a patient care pathway.

Recent studies highlight TDABC's capacity to reveal cost drivers, identify process bottlenecks, and calculate complete care-cycle costs accurately (Shakya et al., 2025; Rognoni et al., 2023).

2.2 Value-Based Health Care (VBHC) and Cost Measurement

Value-Based Health Care, originally formulated by Porter and Teisberg (2006), defines value as patient health outcomes achieved relative to the total costs incurred across the complete cycle of care. Value is expressed conceptually as:

$$\text{Value} = \frac{\text{Patient Health Outcomes}}{\text{Total Cost of Care Across Clinical Pathway}}$$

While early VBHC literature focused heavily on outcome measurement, recent studies emphasize that value cannot be evaluated without precise, activity-level cost measurement (van der Poort et al., 2024; Leusder et al., 2022). Without accurate

costing, healthcare managers risk cutting costs in ways that compromise clinical quality or increasing spending on interventions that yield negligible patient benefit. Borzée et al. (2025) demonstrate that integrating outcome measures directly with activity-level costs creates a unified metric for evaluating health system performance.

2.2 Previous Studies

Author/Year	Objective	Methodology	Sample/Context	Main Findings	Limitations	Contribution to the Present Study
Etges et al. (2020)	Examine the use of TDABC in value-based healthcare.	Systematic literature review.	26 studies, mainly inpatient surgical settings.	TDABC improves cost transparency and supports resource allocation and identification of cost-saving opportunities.	Focused mainly on inpatient and surgical settings.	Supports the relationship between activity-based costing and VBHC.
Niñerola et al. (2021)	Review ABC and TDABC applications in healthcare performance improvement.	Literature review.	Healthcare studies published through 2019.	ABC and TDABC improve understanding of healthcare costs and resource utilization.	Literature search largely predates recent digital developments.	Provides theoretical support for using activity-based information in healthcare cost management.
Koster et al. (2023)	Address uncertainty in activity-time estimates in TDABC.	Methodological study using fuzzy logic.	Hospital cost-accounting context.	Uncertainty in activity time can affect the accuracy of healthcare cost calculations.	Focused mainly on methodological estimation rather than budgeting.	Supports the importance of accurate activity and resource estimation for ABB.
van der Poort et al. (2024)	Examine how costs can be incorporated into VBHC.	Real-world case analysis.	Healthcare organizations in the Netherlands.	Combining cost and outcome information can support value-based decision-making and continuous improvement.	Based on selected healthcare organizations.	Directly supports integrating cost information with patient outcomes.
Etges et al. (2024)	Examine the role of technology in TDABC and healthcare value.	Literature review.	Healthcare provider organizations.	Digital technologies increase the scale of patient-level cost analysis and support value-oriented decisions.	Focused primarily on TDABC rather than ABB.	Supports the role of digital technologies in integrating activities, costs, and outcomes.
Busschaert et	Review TDABC	Systematic	59 empirical oncology	TDABC is widely used	Limited complete-	Supports the need

al. (2025)	applications in oncology.	review.	studies.	for healthcare cost measurement, but methodological inconsistencies remain.	cycle-of-care analysis.	for comprehensive activity- and process-based cost measurement.
Shakya et al. (2025)	Review TDABC applications in health economic analysis.	Systematic literature review.	32 studies across healthcare settings.	TDABC supports cost measurement, identification of resource waste, and understanding of resource utilization.	Variation in methodologies and reporting.	Provides recent evidence supporting activity-based cost measurement within the proposed ABB VBHC framework.

2.3 Literature Gap

The reviewed literature demonstrates substantial research on ABC, TDABC, healthcare cost measurement, and VBHC. However, most previous studies have focused on measuring healthcare costs rather than using activity-based cost information for forward-looking budgeting and planning.

Furthermore, although VBHC emphasizes the relationship between costs and patient outcomes, relatively few studies have developed an integrated framework that connects activity-based budgeting, healthcare costs, resource allocation, care processes, and patient outcomes.

Therefore, the main gap addressed by this study is the limited integration between Activity-Based Budgeting (ABB) and Value-Based Health Care (VBHC). The proposed study seeks to bridge this gap by developing an integrated framework that can improve the accuracy of healthcare cost measurement and planning.

3. Methodology

3.1 Research Approach

This study adopts a descriptive-analytical approach to examine the potential integration of Activity-Based Budgeting (ABB) and Value-Based Health Care (VBHC) for improving the accuracy of healthcare cost measurement and planning.

The descriptive component is used to review and organize the theoretical and empirical literature related to ABB, ABC, TDABC, and VBHC. The analytical component is used to identify relationships among activities, resources, costs, healthcare processes, and patient outcomes and to develop an integrated conceptual framework.

Table 3.1: Research Approach and Its Application in the Study

Research Component	Application in the Present Study
Research approach	Descriptive-analytical
Main perspective	Management accounting and healthcare management
Main concepts	ABB, ABC, TDABC, and VBHC
Main focus	Healthcare cost measurement and planning
Analytical focus	Activities, resources, costs, care processes, and patient outcomes

Expected output	Integrated ABB–VBHC conceptual framework

Table 3.1 Interpretation: Table 3.1 shows that the study combines descriptive and analytical perspectives. The descriptive component provides an understanding of existing approaches to healthcare costing and value-based healthcare, while the analytical component examines how these approaches can be connected. The final output is an integrated framework linking activity-based resource planning with healthcare costs and patient outcomes.

3.2 Research Design

The study adopts a conceptual research design based on a structured review and analysis of academic literature. The design is appropriate because the primary purpose of the study is to develop an integrated framework rather than to test a specific intervention in a particular healthcare organization.

Table 3.2: Research Design and Main Stages

Stage	Description	Purpose
Stage 1	Review theoretical foundations	Establish the concepts of ABB and VBHC
Stage 2	Review empirical studies	Examine evidence on healthcare costing and value
Stage 3	Comparative analysis	Identify similarities, differences, and relationships
Stage 4	Identify research gap	Determine limitations in existing literature
Stage 5	Framework development	Integrate ABB and VBHC into a conceptual model

Table 3.2 Interpretation:

Table 3.2 illustrates the sequential design of the study. The research begins with theoretical foundations and progresses toward empirical evidence and comparative analysis. The identified research gap provides the basis for developing the proposed ABB–VBHC framework.

Any numerical examples presented later in the study are hypothetical and are included solely to illustrate the analytical application of the proposed framework. They do not represent empirical data and are not used to establish statistical significance, confirm hypotheses, or demonstrate the actual effectiveness of the framework.

3.3 Sources of Data

The study relies primarily on secondary data obtained from academic and scholarly publications. Recent studies published between 2020 and 2025 receive particular attention, while foundational studies are included when necessary to establish the theoretical basis of the research.

Table 3.3: Sources of Secondary Data

Source	Main Purpose
Peer-reviewed journal articles	Obtain recent theoretical and empirical evidence
Systematic literature reviews	Identify established findings and research trends
Academic books	Establish foundational concepts
Healthcare management literature	Examine healthcare costing and resource management
Accounting literature	Examine ABB, ABC, and cost-planning concepts
VBHC literature	Examine healthcare outcomes and value measurement

Table 3.3 Interpretation: The table demonstrates that the study uses multiple academic sources to provide a comprehensive basis for analysis. Peer-reviewed studies and systematic reviews represent the primary sources of recent evidence, while academic books and foundational literature are used to clarify the theoretical foundations of activity-based budgeting and value-based healthcare.

3.4 Literature Selection Criteria: The literature was selected according to its relevance to the research objectives, research questions, and conceptual variables.

Table 3.4: Literature Selection Criteria

Criterion	Selection Requirement
Relevance	Direct relationship with ABB, healthcare costing, TDABC, or VBHC
Publication period	Priority given to studies published between 2020 and 2025
Academic quality	Preference for peer-reviewed academic publications
Healthcare context	Application to healthcare organizations or healthcare services
Cost perspective	Studies addressing cost measurement, cost drivers, or resource utilization
Value perspective	Studies addressing patient outcomes and healthcare value
Technological perspective	Studies addressing digital technologies and healthcare data analytics

Table 3.4 Interpretation: The selection criteria ensure that the reviewed literature is directly relevant to the research problem. Particular emphasis is placed on recent peer-reviewed studies and research that connects healthcare costs with activities, resource consumption, and patient outcomes. This approach helps ensure that the proposed framework is based on contemporary evidence.

3.5 Data Analysis Method

The collected literature is analyzed using qualitative thematic analysis. The analysis identifies recurring themes and relationships relevant to the integration of ABB and VBHC.

Table 3.5: Main Themes Used in the Literature Analysis

Theme	Analytical Focus
Activities	Identification and classification of healthcare activities
Resources	Resources required to perform healthcare activities
Cost drivers	Factors influencing healthcare costs
Cost measurement	ABC and TDABC approaches
Budget planning	Estimation and allocation of future resources
Care processes	Relationship between activities and healthcare delivery
Patient outcomes	Health outcomes achieved through healthcare services
Value	Relationship between outcomes and costs
Digital technologies	Data integration, analytics, and information systems

Table 3.5 Interpretation: The themes in Table 3.5 provide the analytical structure for examining the literature. The first five themes mainly represent the activity-based and accounting perspective, while care processes, patient outcomes, and value represent the VBHC perspective. Digital technologies are considered an enabling factor that can connect these dimensions.

3.6 Conceptual Integration of ABB and VBHC

The conceptual framework developed by the study is based on the assumption that effective healthcare cost planning requires a connection between resources, activities, costs, and outcomes.

Table 3.6: Conceptual Relationship Between ABB and VBHC

Component	ABB Perspective	VBHC Perspective	Integrated Role
Resources	Estimates required resources	Considers resources used to achieve outcomes	Resource planning
Activities	Plans activities and activity volumes	Evaluates activities within care processes	Activity-based planning
Costs	Estimates activity-based budget costs	Relates costs to outcomes	Accurate cost measurement
Care processes	Supports planning of required activities	Evaluates value across care pathways	Process improvement
Patient outcomes	Not normally the primary focus	Central component	Outcome-oriented planning

Value	Indirectly considered	Outcomes relative to costs	Value-based resource allocation
Digital technologies	Supports budgeting data	Supports outcome and cost integration	Data integration

Table 3.6 Interpretation: Table 3.6 demonstrates the complementary nature of ABB and VBHC. ABB provides information about activities and the resources required to perform them, whereas VBHC adds an outcome-oriented perspective by relating costs to patient outcomes. Their integration can therefore provide a broader basis for cost measurement, resource allocation, and healthcare planning.

3.7 Proposed Analytical Model

Based on the reviewed literature, the study proposes the following analytical sequence:

Resources → Activities → Costs → Care Processes → Patient Outcomes → Value

ABB primarily contributes to the first stages of this sequence, while VBHC contributes primarily to the relationship between costs, outcomes, and value.

Table 3.7: Variables and Expected Relationships in the Proposed Framework

Variable/Dimension	Role in the Framework	Potential Contribution
Activity-Based Budgeting	Main planning component	May support more accurate resource and cost planning
Activity-Based Cost Measurement	Cost-information component	May provide more detailed information for cost measurement
Care Processes	Linking component	Connects activities and resource consumption with healthcare delivery
Patient Outcomes	Outcome component	Provides the outcome dimension for evaluating healthcare services
Value-Based Health Care	Value component	Relates healthcare costs and resource use to patient outcomes
Digital Technologies	Enabling component	May facilitate data collection, integration, and analysis
Resource Allocation	Management outcome	Represents a potential area of improvement within the proposed framework
Cost Planning Accuracy	Main expected outcome	Represents a potential outcome to be evaluated in future empirical research

Table 3.7 Interpretation: The proposed framework identifies ABB as the principal planning component and VBHC as the principal outcome-oriented

component. Activity-based cost measurement provides detailed information on resource consumption and healthcare costs, while care processes connect these resources and activities with healthcare delivery. Patient outcomes and VBHC introduce the outcome and value dimensions, and digital technologies may facilitate the integration of financial, operational, and clinical information. Resource allocation and cost planning accuracy are treated as potential management outcomes of the proposed framework. These relationships are conceptual and should not be interpreted as empirically established effects. Their magnitude and practical effectiveness require validation using actual empirical data.

3.8 Methodological Process: The overall methodological process of the study can be summarized in the following table.

Table 3.8: Research Methodological Process

No.	Research Activity	Output
1	Define the research problem	Research problem
2	Formulate research questions and objectives	Research direction
3	Review theoretical literature	Theoretical foundation
4	Review previous empirical studies	Empirical evidence
5	Analyze common themes and relationships	Analytical findings
6	Identify the research gap	Research justification
7	Integrate ABB and VBHC concepts	Conceptual relationships
8	Develop the proposed framework	ABB–VBHC framework
9	Formulate implications and recommendations	Practical implications

Table 3.8 Interpretation: Table 3.8 summarizes the methodological sequence followed in the study. The process begins with identifying the research problem and ends with developing the integrated framework and deriving practical implications. This sequence ensures consistency between the research problem, literature review, analytical process, and proposed framework.

3.9 Reliability and Validity: Because the study is conceptual and based on secondary literature, reliability and validity are addressed through systematic source selection, comparison of findings across studies, and the use of recent peer-reviewed research.

Table 3.9: Measures Used to Strengthen Research Quality

Quality Dimension	Measure Applied
Source reliability	Use of peer-reviewed academic studies
Literature relevance	Selection according to research objectives
Recency	Priority given to 2020–2025 literature
Conceptual validity	Alignment between research questions and framework
Analytical consistency	Thematic analysis across selected studies
Evidence triangulation	Comparison of findings from multiple studies

Table 3.9 Interpretation: The measures presented in Table 3.9 are intended to strengthen the academic quality of the study. Using multiple peer-reviewed sources and comparing findings across different studies reduces reliance on individual research findings and supports the conceptual validity of the proposed framework.

3.10 Ethical Considerations: The study is based on secondary academic sources and does not involve direct participation of patients, healthcare professionals, or other human subjects. No personal or confidential information is collected.

RESULTS AND ILLUSTRATIVE ANALYSIS

4.1 Introduction

This chapter presents an illustrative quantitative analysis designed solely to demonstrate how the proposed integration of Activity-Based Budgeting (ABB) and Value-Based Health Care (VBHC) could be examined in relation to healthcare cost measurement, resource allocation, and cost planning accuracy.

All numerical values presented in this chapter are hypothetical and were constructed exclusively for methodological and analytical illustration. No empirical survey was conducted, no actual respondents participated in the study, and no respondent-level data were collected. Accordingly, the numerical values should not be interpreted as empirical evidence, statistically significant findings, confirmation of hypotheses, or proof of the actual effectiveness of the proposed ABB–VBHC framework.

The illustrative analysis demonstrates how descriptive statistics and relationships among the proposed variables could be examined if empirical data were collected in a future study. The purpose is therefore to show the analytical structure

and possible interpretation of the proposed framework rather than to establish factual relationships between the variables.

For demonstration purposes, a hypothetical dataset representing 100 respondents working in healthcare organizations is assumed. A five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree is used only to illustrate how the proposed variables could be measured in a future empirical investigation.

4.2 Descriptive Analysis of the Main Study Variables

Table 4.1: Illustrative Descriptive Statistics of the Main Study Variables

Variable	N	Mean	Std. Deviation	Relative Importance (%)	Rank
Activity-Based Budgeting (ABB)	100	4.08	0.58	81.6	3
Activity-Based Cost Measurement	100	4.15	0.55	83.0	1
Value-Based Health Care (VBHC)	100	3.94	0.63	78.8	5
Digital Technology Integration	100	3.82	0.71	76.4	6
Resource Allocation	100	4.01	0.60	80.2	4
Cost Planning Accuracy	100	4.12	0.57	82.4	2
Overall	100	4.02	0.61	80.4	—

Note. ABB = Activity-Based Budgeting; VBHC = Value-Based Health Care. Relative importance = (Mean ÷ 5) × 100. All values are hypothetical and are presented solely for illustrative and methodological purposes. They do not represent empirical observations or actual responses from healthcare organizations. Prepared by the authors.

Illustrative Interpretation: The hypothetical values presented in Table 4.1 are intended to demonstrate how descriptive statistics could be interpreted if comparable patterns were observed in an empirical study. The illustrative overall mean is 4.02, corresponding to a relative importance of 80.4%. This value should not be interpreted as evidence of the actual level of adoption, effectiveness, or perceived importance of the proposed management practices in healthcare organizations.

Within the illustrative dataset, Activity-Based Cost Measurement has the highest hypothetical mean (4.15), corresponding to a relative importance of 83.0%. This value is used to illustrate the conceptual importance of detailed cost information within the proposed framework. From a theoretical perspective, accurate cost

planning requires information about the activities that consume resources and the costs associated with those activities. Without such information, budgeting may rely more heavily on historical expenditures than on projected resource requirements.

Cost Planning Accuracy has the second-highest illustrative mean (4.12). The proximity between the hypothetical means for Activity-Based Cost Measurement (4.15) and Cost Planning Accuracy (4.12) is included to demonstrate how these two dimensions might appear closely related in a future empirical analysis. However, no empirical association can be inferred from these illustrative values alone.

Activity-Based Budgeting has an illustrative mean of 4.08. Within the proposed conceptual framework, this value demonstrates how ABB could be positioned as an important component of forward-looking planning when budget allocations are linked to expected activities and resource requirements.

Value-Based Health Care has a hypothetical mean of 3.94. This lower illustrative value is used to demonstrate how cost and activity measurement could potentially be more developed than the integration of financial information with patient outcomes. This interpretation is conceptual only and does not represent an observed characteristic of actual healthcare organizations.

Digital Technology Integration has the lowest illustrative mean (3.82). This value is included to demonstrate how technological integration could be represented as a comparatively less developed dimension within a hypothetical analytical model. It should not be interpreted as evidence that healthcare organizations actually have a low level of digital development or integration.

Overall, the descriptive values in Table 4.1 serve only to illustrate how differences among the proposed dimensions could be presented and interpreted in a future empirical study. Actual relationships, levels of adoption, and practical effects would need to be established using real data collected from healthcare organizations.

4.3 Detailed Analysis of Activity-Based Budgeting

Table 4.2: Descriptive Analysis of Activity-Based Budgeting Dimensions

ABB Dimension	Mean	Std. Deviation	Relative Importance (%)	Rank
Identification of healthcare activities	4.18	0.61	83.6	1
Estimation of activity volumes	4.05	0.67	81.0	3
Estimation of resource requirements	4.12	0.59	82.4	2
Allocation of resources according to activities	4.02	0.64	80.4	4
Monitoring actual versus planned activities	3.91	0.72	78.2	5
Overall ABB	4.06	0.65	81.2	—

Note. ABB = Activity-Based Budgeting. The values are hypothetical and intended solely for illustrative purposes. They do not represent empirical observations or actual responses from healthcare organizations. Prepared by the authors.

Explanation: The hypothetical values show that the highest dimension of the ABB rating is the identification of healthcare activities, with an average of 4.18. This illustrative result is conceptually important because activity identification is the starting point for an activity-based budgeting system. Budgeting cannot be meaningfully linked to resource consumption unless the activities that generate this consumption are identified in advance.

The second highest dimension is the estimate of resource requirements, with an average of 4.12. The relatively high hypothetical score illustrates how activity-based budgeting can provide a mechanism for converting operational projections into financial requirements. For example, the projected increase in patient visits, diagnostic procedures, surgical interventions, or inpatient days should result in corresponding changes in work requirements, equipment, supplies, and facilities.

In the illustrative data, monitoring actual versus planned activities has the lowest average (3.91). This hypothetical difference is conceptually relevant from a managerial perspective and illustrates the possibility that setting up activity-based budgets may be easier than creating an effective feedback mechanism to compare planned activities with actual activity consumption. Conceptually, ABB should not be considered just a budgeting technique. Within the proposed framework, it can be represented as a continuous cycle:

Planned Activities → Planned Resources → Planned Costs → Actual Activities → Actual Resources → Variance Analysis → Revised Planning.

Such a cycle can support a shift from a static annual budgeting exercise toward a continuous management process.

4.4 Analysis of Activity-Based Cost Measurement

Table 4.3: Descriptive Analysis of Activity-Based Cost Measurement

Dimension	Mean	Std. Deviation	Relative Importance (%)
Identification of cost drivers	4.21	0.57	84.2
Measurement of resource consumption	4.19	0.60	83.8
Allocation of costs to activities	4.14	0.62	82.8
Measurement of care-process costs	4.09	0.64	81.8
Identification of non-value-added activities	4.05	0.68	81.0
Overall	4.14	0.62	82.8

Note. The values are hypothetical and are presented for illustrative purposes only. They do not represent empirical observations or evidence of actual organizational performance. Prepared by the authors.

Explanation: In the illustrative data, activity-based cost measurement has the highest overall average among the main dimensions of the study. The highest individual score is associated with the identification of cost drivers (4.21).

This illustrative result is important because the quality of cost planning depends not only on knowing the total expenses, but also on understanding the factors that cause the spending to change.

Patient size, treatment complexity, staff time, diagnostic procedures, length of stay, use of equipment, and frequency of clinical activities may affect healthcare costs differently.

The high hypothetical average of measuring resource consumption (4.19) also illustrates the importance of determining how an organization's resources are consumed by specific activities. This provides a stronger analytical basis for the budget because managers can estimate future costs from projected activity levels rather than simply inferring past expenditures.

The relatively low hypothetical score for identifying non-value-added activities (4.05) illustrates how difficulties in translating cost information into process improvement decisions could be examined in a future empirical study. This represents an important transition from traditional cost accounting to value-oriented management. Accordingly, the proposed framework can be represented by the following conceptual sequence:

Cost Measurement → Cost Driver Identification → Process Analysis → Waste Identification → Resource Reallocation → Improved Cost Planning.

4.5 Analysis of Value-Based Health Care

Table 4.4: Descriptive Analysis of Value-Based Health Care

VBHC Dimension	Mean	Std. Deviation	Relative Importance (%)
Focus on patient outcomes	4.11	0.62	82.2
Measurement of healthcare outcomes	4.02	0.65	80.4
Integration of cost and outcomes	3.89	0.71	77.8
Patient-centered care	4.05	0.61	81.0
Continuous improvement of care processes	3.96	0.68	79.2
Overall VBHC	4.01	0.65	80.2

Note. VBHC = Value-Based Health Care. The values are hypothetical and intended for illustrative purposes only. They do not represent empirical observations or actual levels of VBHC implementation in healthcare organizations. Prepared by the authors.

In-Depth Interpretation: In the illustrative data, the overall VBHC mean is 4.01, representing a relatively high hypothetical level of agreement with the value-oriented healthcare dimensions.

The highest hypothetical score is associated with focus on patient outcomes (4.11). This illustrates the conceptual importance of the outcome dimension within the value-based perspective. However, the lowest hypothetical score is associated with the integration of cost and outcomes (3.89).

The difference between these two hypothetical scores illustrates a potential conceptual and managerial gap that could be examined in future empirical research: organizations may recognize the importance of patient outcomes without necessarily

having an equally developed system for connecting those outcomes to the resources and costs required to achieve them.

This illustrative pattern reinforces the conceptual rationale for integrating ABB with VBHC. ABB answers the question:

What resources and activities are required to deliver healthcare services?

VBHC adds another question:

What outcomes are achieved from those resources and activities?

The integrated approach therefore seeks to answer a broader managerial question:

How should resources be planned and allocated according to both expected activities and expected patient value?

4.6 Relationship Between ABB and Cost Planning Accuracy

Table 4.5: Illustrative Correlation Between ABB Dimensions and Cost Planning Accuracy

ABB Dimension	Pearson's r	Relationship Strength
Identification of activities	0.68	Strong positive
Estimation of activity volumes	0.64	Moderate-to-strong positive
Estimation of resource requirements	0.72	Strong positive
Activity-based resource allocation	0.70	Strong positive
Monitoring actual versus planned activities	0.59	Moderate positive
Overall ABB	0.74	Strong positive

Note. Pearson's r values are hypothetical and are presented solely to illustrate the proposed analytical relationships. They do not represent empirical correlations or evidence of statistical significance. Prepared by the authors.

In-Depth Interpretation: The hypothetical results illustrate a strong positive correlation between ABB and Cost Planning Accuracy ($r = 0.74$). Within the illustrative dataset, this would indicate that higher levels of activity-based budgeting are associated with higher levels of perceived cost planning accuracy.

The strongest individual relationship is between estimation of resource requirements and cost planning accuracy ($r = 0.72$). This is theoretically consistent with the central role of resource estimation in budgeting. When healthcare managers

understand the resources required to perform expected activities, they can develop budgets that more closely reflect operational requirements.

The correlation between monitoring actual versus planned activities and cost planning accuracy (r = 0.59) is comparatively weaker. This may indicate that planning accuracy depends not only on preparing an activity-based budget but also on the quality of subsequent monitoring and feedback.

Therefore, the illustrative relationships are consistent with the conceptual view that ABB should be implemented as a complete management cycle rather than as a budgeting technique used only during the annual budget preparation stage.

4.7 Relationship Between Cost Measurement and VBHC

Table 4.6: Illustrative Correlation Between Activity-Based Cost Measurement and VBHC

Relationship	Pearson's r
Cost drivers ↔ Patient outcomes	0.62
Resource consumption ↔ Patient outcomes	0.66
Activity costs ↔ Patient-centered care	0.61
Care-process costs ↔ Continuous improvement	0.69
Non-value-added activities ↔ Healthcare value	0.64
Overall Cost Measurement ↔ VBHC	0.68

Note. The correlations are hypothetical and are provided solely to illustrate the proposed analytical relationships. They do not represent empirical correlations or evidence of statistical significance. Prepared by the authors.

In-Depth Interpretation: The overall correlation between Activity-Based Cost Measurement and VBHC is assumed to be 0.68, illustrating a relatively strong positive relationship within the hypothetical analytical model.

The strongest relationship is between care-process cost measurement and continuous improvement (r = 0.69). This suggests, within the illustrative model, that detailed information about the cost of care processes can potentially provide a basis for identifying opportunities for process redesign.

The relationship between cost measurement and patient outcomes is also illustrated as positive. However, the coefficients are not assumed to be close to 1.00.

This is intentional because cost and outcomes represent different dimensions of healthcare performance. A lower cost does not automatically mean greater value, just as higher expenditure does not necessarily imply better outcomes.

Therefore, the appropriate objective is not simply to minimize healthcare costs but to understand the relationship between:

Resources → Costs → Care Processes → Outcomes → Value.

4.8 Illustrative Multiple Regression Analysis

Table 4.7: Illustrative Regression Model for Cost Planning Accuracy

Predictor	**β**
Activity-Based Budgeting	0.31
Activity-Based Cost Measurement	0.28
Value-Based Health Care	0.24
Digital Technology Integration	0.16
Resource Allocation	0.27
R^2	0.68
Adjusted R^2	0.66

Note. β = standardized regression coefficient; R^2 = coefficient of determination. All values are hypothetical and intended for illustrative purposes only. They do not represent empirical estimates or evidence of statistical significance. Prepared by the authors.

In-Depth Interpretation: The hypothetical regression model produces an R^2 of 0.68. Within the illustrative model, this means that the five explanatory variables included in the model collectively account for approximately 68% of the hypothetical variation in Cost Planning Accuracy.

The remaining 32% would be attributable to other factors not included in the illustrative model, such as organizational structure, management competence, data quality, regulatory requirements, financial constraints, clinical complexity, external demand, and other environmental factors.

ABB records the largest standardized coefficient (β = 0.31). Within the illustrative model, this represents the largest hypothetical contribution to Cost Planning Accuracy among the included predictors.

Activity-Based Cost Measurement follows with β = 0.28. This is logically important because ABB depends on reliable information regarding activities and resource consumption. A budget based on inaccurate cost information cannot produce highly accurate planning outcomes simply by changing the budgeting technique.

Resource Allocation records β = 0.27, illustrating the importance of translating cost information into actual managerial allocation decisions.

VBHC has β = 0.24. Within the illustrative model, its coefficient reflects the importance of considering outcomes in the cost-planning process. However, the lower coefficient compared with ABB does not imply that VBHC is less important conceptually. Rather, VBHC addresses a different dimension of the planning problem: whether the resources being planned are directed toward activities that generate meaningful patient outcomes.

Digital Technology Integration has the smallest coefficient (β = 0.16). Within the illustrative model, this suggests that technology functions primarily as an enabling mechanism. Technology alone does not guarantee accurate cost planning; its contribution depends on whether financial, operational, clinical, and outcome data are effectively integrated.

4.9 Analysis of the Integrated ABB–VBHC Relationship

Table 4.8: Illustrative Integration of ABB–VBHC in Value-Oriented Cost Planning

Model	R	R^2	Adjusted R^2
ABB alone	0.74	0.55	0.54
VBHC alone	0.73	0.53	0.52
ABB + VBHC	0.81	0.66	0.65
ABB + ABC/TDABC + VBHC	0.84	0.71	0.70
Integrated ABB–VBHC + Digital Technology	0.85	0.72	0.70

Note. ABC = Activity-Based Costing; TDABC = Time-Driven Activity-Based Costing. The values are hypothetical and illustrate the proposed incremental analytical model. They do not represent empirical estimates or evidence of statistical significance. Prepared by the authors.

In-Depth Interpretation: Table 4.8 provides an important analytical illustration in the chapter. Within the hypothetical model, ABB alone is assigned an R^2 of 0.55, while VBHC alone is assigned an R^2 of 0.53. When ABB and VBHC are combined, the illustrative R^2 increases to 0.66. The addition of ABC/TDABC increases the illustrative R^2 to 0.71, while incorporating digital technology increases it further to 0.72.

The conceptual significance of this progression is that the components are presented as complementary rather than interchangeable.

ABB contributes the planning perspective.

ABC/TDABC contributes the detailed cost-measurement perspective.

VBHC contributes the outcome and value perspective.

Digital technologies contribute the information-integration capability.

Consequently, the integrated framework is conceptually broader because it addresses different stages of the healthcare management cycle rather than attempting to use one method for all managerial purposes. The hypothetical values are used only to illustrate this analytical structure and do not demonstrate the actual superiority or effectiveness of the integrated model.

4.10 Illustrative Assessment of the Proposed Relationships

Table 4.9: Illustrative Coefficients for the Proposed Relationships

Proposed Hypothesis	Proposed Relationship	Illustrative β / r
H1	ABB → Cost Measurement and Planning Accuracy	0.31
H1a	ABB → Cost Measurement Accuracy	0.29
H1b	ABB → Cost Planning Accuracy	0.31
H1c	Cost Information → Resource Allocation	0.35
H1d	Cost Information → Cost Driver Identification	0.38
H1e	Cost Information → Non-Value-Added Activity Identification	0.27
H1f	Digital Technology → Cost/Outcome Integration	0.24
H1g	ABB–VBHC Integration → Value-Oriented Cost Planning	0.42

Note. All numerical coefficients are hypothetical and are presented only to illustrate the proposed analytical relationships. They do not constitute hypothesis-

testing results, statistical significance, or empirical confirmation of the proposed hypotheses. Prepared by the authors.

Explanation: The illustrative coefficients presented in Table 4.9 demonstrate how the proposed relationships could be examined in a future empirical study. The largest illustrative coefficient is associated with ABB–VBHC integration and value-oriented cost planning (β = 0.42). This is consistent with the central conceptual proposition of the study that combining activity-based planning and outcome-oriented healthcare management may provide a broader basis for cost planning compared with treating budgeting and value measurement as separate systems.

The relationship between cost information and cost driver identification is also represented by a relatively high illustrative coefficient (β = 0.38). This is conceptually consistent with the role of detailed activity-based information in allowing managers to move from total cost analysis to understanding the causes of cost variation.

The relationship between digital technology and cost/outcome integration is represented by a comparatively lower illustrative coefficient (β = 0.24). Within the proposed framework, technology should not be interpreted as an empirically established key driver of value-based cost management. Instead, technology is conceptualized as an enabling mechanism that can help organizations collect, integrate, and analyze information generated by accounting and healthcare processes.

4.11 Overall Analytical Interpretation

Table 4.10: Integrated Interpretation of the Hypothetical Results

Analytical Dimension	Result	Managerial Meaning
ABB	Mean = 4.06	Activities can provide a basis for forward-looking budgeting
Activity-based cost measurement	Mean = 4.14	Detailed cost information can support resource planning
VBHC	Mean = 4.01	Patient outcomes can be incorporated into resource decisions
ABB–Cost Planning	r = 0.74	Illustrates a potentially strong relationship with planning accuracy
Cost Measurement–VBHC	r = 0.68	Illustrates how cost information may be linked to outcome-oriented management

Analytical Dimension	Result	Managerial Meaning
Integrated Model	$R^2 = 0.72$	Illustrates the potential explanatory structure of the combined model
ABB–VBHC Integration	$\beta = 0.42$	Illustrates a potentially strong relationship with value-oriented planning

Note. The results are hypothetical and are presented for methodological and analytical illustration only. They do not constitute empirical evidence of statistical significance or actual model effectiveness. Prepared by the authors.

Interpretation: The illustrative analysis suggests that healthcare cost planning can be considered as more than an isolated accounting activity. The hypothetical values are used to demonstrate how planning accuracy could be examined in relation to the availability of detailed activity-based cost information, the ability to translate activities into resource requirements, the integration of patient outcomes, and the use of digital information.

The conceptual framework also suggests that the central challenge is not just determining how much money a healthcare organization is asking for. Rather, the most important issue is to determine:

1. Which activities require resources?
2. How much resource consumption is associated with each activity?
3. What costs result from these activities?
4. How do these activities form complete care processes?
5. What patient outcomes result from these processes?
6. What value is generated relative to the resources consumed?
7. How should this information influence the next budget cycle?

This represents a conceptual shift from a traditional expenditure-oriented approach toward an integrated activity-, process-, cost-, and outcome-oriented approach.

Note. ABB = Activity-Based Budgeting; VBHC = Value-Based Health Care. The framework represents the conceptual interpretation of the hypothetical results and does not constitute empirical evidence. Prepared by the authors.

Interpretation: The framework illustrates how the proposed conceptual relationships can be organized into a continuous managerial cycle. The process begins with resources and activities, proceeds through activity-based cost measurement and care-process analysis, incorporates patient outcomes through VBHC, and returns to ABB for future budget planning.

The important feature of this framework is the feedback loop. Actual costs and outcomes should not merely be reported at the end of the budget period. Instead, they should be used to revise assumptions about future activities, resource requirements, and expected costs.

Therefore, the proposed approach conceptually shifts budgeting from:

Historical Expenditure → Budget

To:

Expected Activities → Required Resources → Activity-Based Costs → Care Processes → Expected Outcomes → Healthcare Value → Budget → Actual Results → Feedback → Revised Budget.

5. DISCUSSION

5.1 Discussion

The conceptual and illustrative analysis suggests that Activity-Based Cost Measurement, Cost Planning Accuracy, and Activity-Based Budgeting (ABB) may have an important role in healthcare cost management. Understanding healthcare activities and the resources required to perform them provides more detailed information for estimating and planning costs.

The proposed relationship between ABB and cost planning suggests that linking budgets to expected activities and resource requirements may improve the accuracy and relevance of budget information. This approach allows healthcare organizations to move beyond reliance on historical expenditure and develop more forward-looking cost plans.

The integration of activity-based cost measurement with Value-Based Health Care (VBHC) provides a broader perspective on healthcare costs. While activity-based approaches focus on resources, activities, and costs, VBHC emphasizes patient outcomes and the value achieved from healthcare resources. Combining these perspectives allows costs to be considered in relation to the outcomes they generate.

The main contribution of the proposed framework is therefore the integration of ABB and VBHC through activity-based cost information. The relationship can be summarized as:

Resources → Activities → Costs → Care Processes → Patient Outcomes → Healthcare Value → Budget Planning.

The framework can also support the identification of cost drivers and potentially non-value-added activities. This may help managers allocate resources more effectively and focus spending on activities that contribute to better healthcare outcomes.

Digital technologies can further support the proposed integration by connecting financial, operational, clinical, and outcome information. This may improve the availability and accuracy of information required for cost measurement and planning.

5.2 Conclusion of the Discussion

Overall, the conceptual and illustrative analysis suggests that integrating ABB with VBHC may provide a more comprehensive approach to healthcare cost management. The integration conceptually connects resources, activities, costs, care processes, and patient outcomes, thereby providing a basis for potentially improving resource allocation and forward-looking cost planning.

The proposed approach provides a conceptual basis for shifting healthcare budgeting from a predominantly expenditure-oriented perspective toward an activity-, process-, cost-, and outcome-oriented approach.

6. CONCLUSIONS, RECOMMENDATIONS, AND IMPLICATIONS

6.1 Conclusions

The study proposes that integrating Activity-Based Budgeting (ABB) with Value-Based Health Care (VBHC) may provide a comprehensive conceptual approach to improving healthcare cost measurement and planning. ABB connects budget planning with activities and resource requirements, while VBHC connects resource consumption and costs with patient outcomes and healthcare value.

The proposed framework illustrates how activity-based cost measurement can serve as a link between budgeting and value-based healthcare. By identifying activities, resource consumption, cost drivers, care processes, and patient outcomes, healthcare organizations may develop more accurate and relevant cost information.

The study also suggests that digital technologies can support this integration by facilitating the collection and connection of financial, operational, clinical, and outcome data. Overall, the proposed integration of ABB and VBHC provides a conceptual basis for shifting healthcare budgeting from a primarily expenditure-oriented approach toward an activity-, process-, and outcome-oriented approach.

Because the quantitative values presented in this study are hypothetical and illustrative, they should not be interpreted as empirical evidence of the actual effectiveness of the proposed framework. The practical effectiveness of the framework requires validation using real data from healthcare organizations.

6.2 Recommendations

Healthcare organizations should consider adopting activity-based budgeting to link planned expenditures with actual healthcare activities and resource requirements. They should also strengthen activity-based cost measurement to identify cost drivers and improve the accuracy of healthcare cost information.

The integration of cost information with patient outcomes should be encouraged to support value-oriented resource allocation. Healthcare managers should

focus not only on reducing costs but also on ensuring that resources are directed toward activities that contribute to better patient outcomes.

Organizations should also invest in appropriate digital systems that integrate financial, operational, clinical, and outcome data. Continuous monitoring of planned and actual activities, costs, and outcomes should be incorporated into the budgeting process to allow timely adjustments.

Finally, successful implementation requires cooperation among accounting, clinical, administrative, and information technology departments so that cost planning becomes an integrated organizational process.

6.3 Implications

The study has theoretical implications by connecting management accounting concepts with value-based healthcare and extending the role of ABB from traditional financial planning toward activity- and outcome-oriented planning.

The potential managerial implications relate to improving resource allocation, identifying cost drivers, controlling unnecessary resource consumption, and strengthening forward-looking cost planning. The proposed framework may provide managers with more comprehensive information for operational and strategic decisions. The study also has potential practical implications for healthcare organizations seeking to improve cost transparency and patient value. Integrating ABB, activity-based cost measurement, VBHC, and digital technologies may support a continuous management cycle in which resources are planned according to activities, costs are measured according to resource consumption, and outcomes are considered when evaluating healthcare value.

6.4 Final Conclusion

The study concludes that effective healthcare cost planning requires an integrated perspective that connects resources, activities, costs, care processes, and patient outcomes. The proposed integration of ABB and VBHC provides a conceptual

basis for such a perspective and may contribute to more accurate cost measurement, improved resource allocation, and more effective healthcare cost planning.

However, because the quantitative analysis presented in this study is hypothetical and illustrative, these potential effects should not be interpreted as empirically established. Future research should test the proposed relationships and evaluate the practical effectiveness of the integrated ABB–VBHC framework using actual data from healthcare organizations.

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