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The Impact of Digital Technologies in Cost Accounting on Improving Services in the Government Public Sector: A Case Study of Public Hospitals

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ABSTRACT

This research aims to study the impact of digital technologies on cost accounting in improving services in public hospitals. We seek to provide a comprehensive understanding of how modern technologies are adopted and used in cost accounting such as implementing artificial intelligence systems or enterprise resource planning (ERP)systems are adopted and used in cost accounting, and how these tools can contribute to improving the quality and efficiency of services provided in public hospitals. it will also help manage cost structures and minimize cost variables. Therefore, this research is of great importance in achieving sustainable development goals and improving the quality of life. Research design is a mixed-method approach, and both questionnaires and case studies are done to increase the validity and reliability of research results. Primary research data was gathered from patients visiting the Government General Hospital of Medical City and Al Yarmouk Hospital in Baghdad. The value of R Square is 0.559, and this shows that there is a 55.9% variation in service quality if digital technologies are adopted along with maintaining cost accounting records in a positive manner. Research also recommends that for future studies, it is required that the interviews should also be conducted with the individuals working in the finance and accounting departments of the hospitals as they will be able to provide better insights regarding the impact of digital technologies on cost accounting.

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KEYWORDS: Cost accounting, government hospitals, Digital technologies, Artificial intelligence, Tele medicine, Mayo Clinic, Cleveland Clinic, efficiency of public services provided.

IDENTIFY THE UNIQUE CONTRIBUTION

With the rapid development of digital technologies, it has become essential to explore their impact on various aspects of life, including the public sector. Digital transformation means the adoption of modernized technology to manage operations. In terms of digital transformation, one of the most important and significant factors is the presence of technological infrastructure through which innovative business practices can be implemented and used to accomplish business targets. The research is significant because it focuses on the digital transformation that will take place in the healthcare sector. The importance and significance of the healthcare sector within economic development and progression cannot be denied because it will make both economic and social impacts on society. Within the healthcare sector, public hospitals are more significant to be assessed, which is the prime focus of this research because they are based on governmental funding from the general budget, and the maximization of outcomes in terms of treating patients is the target. Achieving economies of scale is not going to be convenient if the individuals working in healthcare do not have access to modern technology that can be used to fulfill the goals of the operation in a limited time. This research focuses on a significant aspect related to the major challenges faced by public hospitals in improving the quality and efficiency of their services amidst the rapid development of digital technologies. Despite the potential benefits of adopting digital technologies in cost accounting, there is a lack of studies exploring the impact of these technologies on improving services in the public sector. This research aims to fill this gap by studying the case of public hospitals in Baghdad and analyzing how digital technologies in cost accounting affect the quality and efficiency of the services provided. The last and foremost essential aspect discussed in this research is the quality of services provided, and it is expected that innovative practices and digital transformation are directly proportional to this component, which is also discussed in this research.

1. INTRODUCTION

The healthcare sector is important not only for society but also for the economy because the services provided are essential and required. Hospitals are required to provide services to individuals in society so that they can have a better quality of life [1]. Healthcare is considered a basic human right, so it is necessary to have practices that can be used to make a positive impact on the lives of people. The economic importance of the healthcare sector cannot be denied as well, considering it to be a basic physiological need and eligible for massive governmental funding. However, in the healthcare sector, specifically within public hospitals, it is vital to focus on ways through which costs are managed and maintained [2]. Cost management and cost accounting represent the methods or techniques that are used for evaluating the cost structure in businesses, thus making it necessary to adopt practices that can increase the efficiency of policies adopted. The costing is considered as an issue within the healthcare sector considering its need for managing costs and allocating then to achieve maximized results. Cost efficiency management and calculation is only possible in the healthcare sector if the cost drivers are properly assessed and it is possible through the adoption and implementation of digital technologies. Modern systems are also used for saving time of the cost accountant which they can allocate in analyzing and interpreting the business variances so that the operations in healthcare will not get negatively affected [3].

2. LITERATURE REVIEW

2.1 Digital technologies applicable in healthcare

Implementation of digital technologies means that the hospitals are bound to have a well-developed infrastructure so that they can easily cater to the issues in technology on an immediate basis, along with the adoption of innovation [4]. Artificial intelligence, referred to as AI, is commonly used in the healthcare sector and is widely used for having predictive analysis regarding the adoption of modern technology in the diagnosis of diseases at early stages. The use of telemedicine or virtual hospitals is also becoming common as it focuses on providing flexibility to patients so that they do not have to make a physical visit to the doctor unless there is an emergency [5]. Another important aspect that is related to the implementation of digital technologies in the healthcare sector is electronic health records (EHRs), which are widely used by cost accounting teams [6]. These are systems that consist of automated solutions and can easily generate cost reports along with variances so that real-time information regarding the fulfillment of business objectives is available [7].

2.2 Benefits of using digital techniques in cost accounting

When the working efficiency within the healthcare sector is discussed, it is necessary to evaluate the importance and implications of digital technologies. Digital technologies will represent technological advancements such as the implementation of artificial intelligence (AI) or the installation of enterprise resource programs (ERPs), which are capable of positively impacting the ability of institutions to work in a better way [8]. With reference to the adoption of digital technologies in the healthcare sector, its benefit is extended to the simplification of accounting processes and procedures. It is also expected that when modernized accounting policies and principles are implemented in the healthcare sector, then the chances for error in budgeting and cost accounting are also mitigated, resulting in enhanced efficiency of systems [9]. The implementation of digital technologies in the healthcare sector is also expected to reduce the time required to prepare financial reports in the government sector. The limited time also means that the business will have cost savings with reference to labor costs as well [10]. Manual labor will be limited in the governmental hospitals, which means that the institutions will have excessive cash flows available, which they can further invest in the betterment of people or achieve performance targets [11]. This will also make a problem statement for this research regarding the fewer employment opportunities due to the adoption of digital technologies, but its positive implications will be immense for people and economies [12]. One of the benefits that is relatable with the government hospitals with respect to the implementation of digital technologies is the convenience within management and tracking of assets, which can also help in minimizing resource utilization, which can lower the impact on costs within hospitals [14].

For the healthcare sector specifically, one of the most crucial aspects is to focus on the information provided by the systems, and it is possible through having digital technologies that can provide real-time information [15]. This information will not only help in the allocation of budget but can also be used for analyzing the cost variances, which are crucial to minimizing, especially in the governmental sector, due to the limited availability of sources [16]. Financial data interpretation is thus crucial because it helps assess the performance of institutes, and this performance evaluation is necessary in all possible cases [17]. The improvements in current working practices within the healthcare sector need improvement, and thus, the implications of digital transformation or innovation in this regard are vital to understand [18].

2.3 Limitations

Limitations are the limited access to the view of individuals working in the finance and accounting departments of hospital as it would help in analyzing the cost accounting factor in more in-depth manner [19].

2.4 Define Research Objectives and Questions:

The research objectives based on the topic are as follows:

1. Analyze the impact of digital technologies in cost accounting: Study how digital technologies can be used to improve the accuracy and efficiency of cost accounting in public hospitals.
2. Evaluate the improvement of services in the public sector: Measure the extent to which the use of digital technologies improves the quality and efficiency of services provided in public hospitals.
3. Case study of public hospitals: Provide a detailed case study of public hospitals to illustrate the benefits and challenges associated with the application of digital technologies in cost accounting.
4. Provide recommendations for performance improvement: Based on the findings, offer practical recommendations to enhance the use of digital technologies in cost accounting and improve services in public hospitals.

Research questions based on the outlined objectives are as follows:

1- How do digital technologies affect the accuracy and efficiency of cost accounting in public hospitals?
2- What is the impact of using digital technologies on the quality and efficiency of services provided in public hospitals?
3- What are the benefits and challenges associated with the application of digital technologies in cost accounting in public hospitals?
4- How can the use of digital technologies in cost accounting be improved to enhance services in public hospitals?

3. RESEARCH METHODOLOGY

Research methodology refers to the adoption of techniques for gathering and evaluating data. If there is an expected issue in evaluating the research methodology, then there is a risk of having a negative impact on the validity or reliability of the data gathered [20]. For this research, the use of mixed methods is appropriate because it will help focus on both the qualitative and quantitative aspects of the research. Using a mixed method design means that both the qualitative and quantitative aspects of the implementation of digital technologies in healthcare, with reference to service quality, will be assessed. The qualitative aspect will focus primarily on the implementation and need of digital technologies in the healthcare sector. Making this evaluation is crucial before analyzing its impact on the service quality standards. If a thorough analysis is made regarding digital technologies and related success cases, then it would become convenient to understand the concept and the need to implement them in the healthcare sector. Then, a quantitative analysis is conducted, which can be used to further analyze ways digital technologies are helping the healthcare sector in Baghdad manage its service quality standards [21]. Along with the mixed-method design, inductive reasoning will also be implemented in this research, considering its relevance in gathering all possible data regarding the use of digital technologies in the healthcare sector. Through using inductive reasoning, it would also be helpful to include all the research and journal articles, which can make it convenient to form an opinion regarding the basic principles and principles of cost accounting along with the ways through which implementing digital technologies can help in managing them [22].

3.1 Data Collection and Analysis:

Within research, data collection is an integral aspect because it is the factor on which research findings and conclusions are based. For this research, the data is collected through primary and secondary data sources to increase the efficiency of research findings. The primary data is collected by distributing questionnaires among the patients who are visiting the Government General Hospital of Medical City and Al Yarmouk Hospital in Baghdad to gather their opinions regarding the need to implement digital technologies and their relative impact on service quality standards. For the secondary data collection methods, it is assumed that the data has been gathered through reliable journal articles for the past 10 years, and case studies related to healthcare will also be mentioned for analyzing the success of digital technologies in the sector. The data analysis is done using SPSS tools, and the tests are performed to analyze the impact of digital technologies on the service quality standards of the Government General Hospital of Medical City and Al Yarmouk Hospital in Baghdad [23].

4. RESULTS

4.1 Reliability

Reliability is crucial for ensuring the accuracy and credibility of research findings.

Table 1: Reliability

	Items	Cronbach Alpha
Digital Technologies in Cost Accounting	5	.796
Services Quality	10	.877

All the Cronbach's Alpha values mentioned above show the reliability of the constructs that have been used for measuring. Cronbach alpha of 0.796 obtained for the construct Digital Technologies in Cost Accounting represents acceptable to good reliability for a scale that has only 5 items. This value indicates the reliability of items in this scale, and hence, the use of these four items can validly assess the concept of digital technologies in cost accounting. Likewise, the construct services quality has 3 items that yield a Cronbach's Alpha of 0.877 which suggests internal consistency reliability. This high value ensures that items are reliable and valid when estimating the construct of the popular content. The findings of this research suggest that both constructs possess adequate levels of internal consistency to be used in the subsequent analysis of the study.

4.2 Descriptive Statistics

Descriptive statistics are used to summarize and describe the main features of a dataset. They provide simple summaries about the sample and the measures.

Table 2: Descriptive Statistics

	Minimum	Maximum	Mean	Std. Deviation
Digital Technologies in Cost Accounting	**6.40**	**21.00**	**17.5860**	**2.65172**
Services Quality	**10.10**	**45.50**	**38.8635**	**5.08372**

In the case of "Digital Technologies in Cost Accounting," the lowest score recorded is 6.40, and the highest score is 21.00, with a mean of 17.59. This shows that, on average, the respondents have a fairly high level of perceived adoption or efficiencies of digital technologies in cost accounting, with differentials of about 2.65, implying moderate variability in the data. Life "Quality" has a lower standard deviation than the score for "Service Quality"; for "Service Quality," the minimum score possible is 10.10, and the maximum of 45.50 has a mean score of 38.86. This shows that respondents have a relatively high perception of the service quality. However, the mean presents a 5.08 standard deviation. There was relatively low and higher variability observed in the students' responses towards these technologies than that observed in the earlier survey on digital technologies in cost accounting. However, these results reflect that both visions are positively rated in general, but the variations of service quality perceived by the respondents are comparatively higher than the perceived digital technologies in cost accounting.

4.3 Correlation

Correlation refers to a statistical measure that describes the extent to which two variables are related to each other.

Table 3: Correlation

Correlations

		DTCA	SQ
DTCA	Pearson Correlation	1	.748**
	Sig. (2-tailed)		.000
	N	299	299
SQ	Pearson Correlation	.748**	1
	Sig. (2-tailed)	.000	
	N	299	299

**. Correlation is significant at the 0.01 level (2-tailed).

The results of the correlation analysis show a positive and significant relationship between Digital Technologies in Cost Accounting (DTCA) and Service Quality (SQ), with a Pearson coefficient of 0.748. This means that as the adoption level of digital technologies in cost accounting rises, the service quality will also rise.

The calculated significance value p = 0.000, which is less than 0.01; hence, we can conclude that the correlations between the variables are statistically significant at the 1 % level. Using 299 participants in the study, the results are credible and can be generalized. In conclusion, based on the findings, there is a significant and practical difference between effective connection and effective use of digital technologies in improving the quality of services.

4.4 Regression

Regression is a statistical method used to examine the relationship between a dependent variable and one or more

independent variables. It helps in understanding how the dependent variable changes when any one of the independent variables is varied while the other independent variables are held fixed.

Table 4: Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.748[a]	.559	.558	3.38081

a. Predictors: (Constant), DTCA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4308.166	1	4308.166	377.062	.000[b]
	Residual	3393.406	297	11.426		
	Total	7701.573	298			

a. Dependent Variable: SQ

b. Predictors: (Constant), DTCA

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	13.648	1.313		10.392	.000
	DTCA	1.434	.074	.748	19.418	.000

a. Dependent Variable: SQ

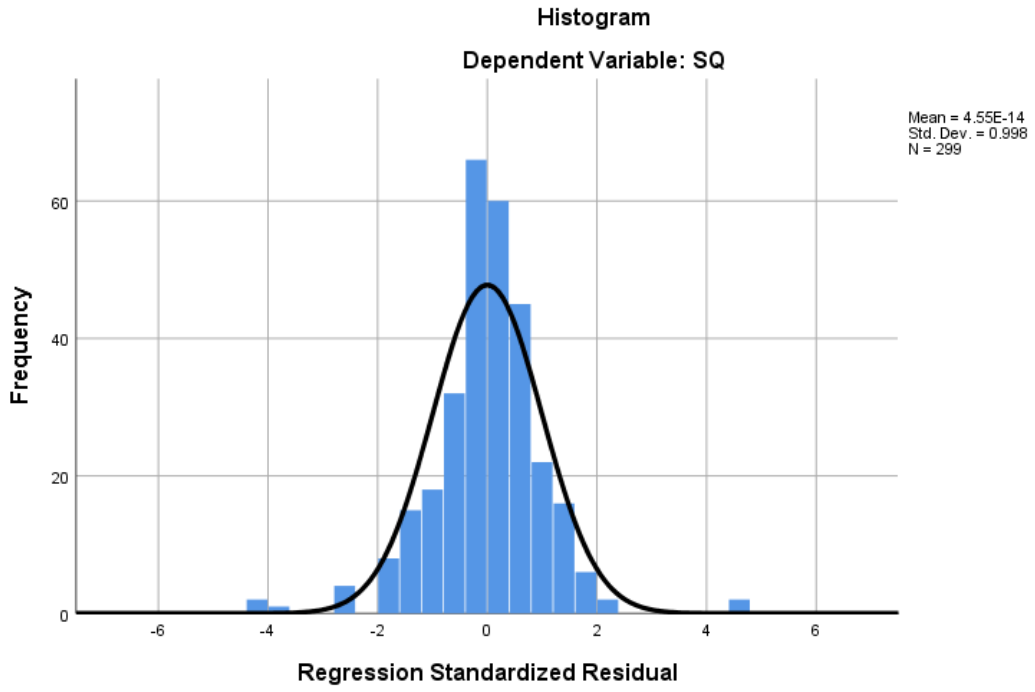

Figure 1: Histogram for the variables

From the model summary, it is evident there is a correlation between DTCA and SQ. This is seen from the positive linear relationship, whose value is close to 1 (R = 0.748). It is clear that the use of digital technologies in cost accounting has a

significant effect; the coefficient of determination (R Square = 0.559) shows that there is a 55.9% variation in service quality. Finally, the Adjusted R Square value of 0.558 is used to support the fact that the model will be good for the total sample size and the number of predictor variables that have been taken in the study. As another internal validity check, we obtained the standard error of the estimate, 3.38081, which measures how much the obs errors deviated from the predicted errors, which also looks pretty acceptable. Thus, the regression result displayed that completely the model is highly significant (F = 377.062, p = 0.000), which means that the DTCA has a significant prediction of SQ. The model has accounted for a good deal of extent of variability in SQ (Regression SS 4308.166) than the unexplained variability (Residual SS 3393.406), indicating a significant influence of DTCA over the SQ. The coefficients table shows that DTCA strongly influences SQ (β=0.748, p=0.000). This indicates that as DTCA increases by one unit, SQ also increases by 1.434 units, as shown by the unstandardized coefficient (B). The constant is the predicted value of SQ when DTCA is estimated to be zero (B = 13.648, p = 0.000). The t-values of 10.392 for constant term and 19.418 for DTCA confirmed the significance and measure of the predictor.

5. DISCUSSION

The regression has mentioned that there is value of high significance related to the implementation of modern technology in the healthcare sector and thus there are case studies which are also proving that the presence of digital technologies is beneficial.

Case Study 1 – Mayo Clinic

The use of AI technology is visible in the case study of Mayo Clinic as it is an advanced tool which is used for early detection of the diseases through analyzing patient's records and symptoms. The implication of this AI technology is positive of the healthcare sector as the diagnostic time has been reduced by 50% and detection of issues such as heart conditions and cancer is done at an early prevention stage [24].

Case Study 2 – Cleveland Clinic

The adoption of modernized technology is evident within the case study of Cleveland as they are successful in launching telehealth platforms, which can be used to help patients reach healthcare professionals when needed. The significant use of Cleveland Clinic was observed during the pandemic, and the report published by the clinic mentioned that 1 million virtual visits were conducted during the year 2020. This also helped the hospitals manage their workload as the number of visiting patients has declined by 65%, and thus, more people will have access to healthcare services on an immediate basis. The cost accounting and principles adoption will also become convenient as costs are reduced by 65% [25].

6. CONCLUSION AND RECOMMENDATIONS

From analyzing the impact of digital technologies on the healthcare sector and cost accounting, it is observed that hospitals such as Government General Hospital of Medical City and Al Yarmouk Hospital in Baghdad are impacted significantly. These hospitals have implemented the technology, which has also helped them manage their cost accounting principles by analyzing the cost variances. It is also observed that the minimization of costs due to the implementation of digital technology has helped hospitals increase their service quality standards. Based on the findings, the following recommendations can be made:

1. To ensure effective adoption of digital technologies, it is essential to improve and develop the technological infrastructure in public hospitals.
2. Provide training programs for employees on the use of digital technologies in cost accounting to ensure maximum benefit.
3. Update and develop cost accounting systems to be compatible with modern digital technologies.
4. Use data analysis tools to improve the accuracy and efficiency of cost accounting and provide accurate reports that aid in decision-making.
5. Establish a system for monitoring and evaluating the performance of digital technologies in cost accounting to ensure the achievement of desired goals and improve the quality and efficiency of services provided.

Implementing these recommendations will contribute to improving the quality and efficiency of services in public hospitals, positively reflecting on the public sector as a whole.

For future research, it is recommended that the impact of digital technologies on patient outcomes be evaluated for a better understanding of service quality standards. It is also recommended that in the future, interviews with the individuals working in the financial and accounting domain of hospitals should also be conducted as they would provide a more realistic overview regarding the use of digital technology in healthcare and its benefit in managing operations.

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