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THE IMPACT OF LEAN ACCOUNTING ON ACHIEVING COMPETITIVE ADVANTAGE FOR COMPANIES: AN ANALYTICAL STUDY OF A SAMPLE OF INDUSTRIAL COMPANIES IN IRAQ

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ABSTRACT

This paper investigates the effect of lean accounting techniques (value stream costing, target costing and kaizen costing) on competitive advantage of Iraqi industrial companies in terms of cost reduction, quality improvement, time efficiency, operational reliability and innovation. Quantitative cross-sectional design was used with data collected between April and July 2025 by electronically distributed questionnaire using five-point Likert scale. The sample consisted of accountants, financial staff and auditors from Iraqi industrial companies selected purposively (n = 136). Data were analyzed using SPSS through reliability analysis, descriptive statistics, Pearson correlation and simple and multiple linear regression. Both lean accounting and competitive advantage are perceived at high level while target costing is the most applied tool. Quality improvement, operational reliability and cost reduction were strongest dimensions of competitive advantage whereas time efficiency and innovation were moderate. Lean accounting was positively and significantly correlated with competitive advantage and had significant positive effect on it (explained almost half of variance). Value stream costing, target costing and kaizen costing each had a significant positive effect; target costing and kaizen costing were nearly as strong and stronger than value stream costing. Iraqi industrial companies can increase competitiveness by expanding the use of lean accounting tools (target costing and kaizen costing) more generally and paying more attention to time efficiency and innovation. Empirical evidence from the Iraqi industrial context on how each lean accounting tool affects competitive advantage is lacking (where it does exist).

Keywords: lean accounting; value stream costing; target costing; kaizen costing; competitive advantage

INTRODUCTION

Value stream costing (VSC), target costing (TC) and kaizen costing (KCO) are examples of lean accounting techniques that have become widely accepted and used in a variety of business processes all over the world. Organizations also need to set standards for effective resource management because there is an increasing demand for cost savings and operational effectiveness. Lean accounting framework applicability to operational effectiveness improvement and sustainable business practices has therefore increased significantly. These practices can be used by organizations to mitigate the negative effects of industry problems on their operations. More businesses are using LAT as a strategy to

gain competitive advantage as awareness of operational efficiency increases worldwide (Ahakchi et al., 2012; Altal, 2024).

Internationalization has increased the importance of sustainable development concerns for businesses worldwide in response to social, economic and operational problems (Alqudah et al., 2023). Organizations must be innovative to compete and improve their procedures as operational innovation and improvement have also increased. Stakeholder expectations of lean accounting methods (among others) have risen as operational efficiency has become a major driver of corporate performance (Kennedy & Widener, 2008); stakeholders continue to expect businesses to use lean accounting so businesses have had to investigate and apply lean accounting principles in order to compete (Stronczek, 2023). Alves et al. (2022) and Okorie et al. (2023) argue that firms need to adopt efficient lean accounting strategies that reduce waste and inefficiency so as to improve operational performance, gain a competitive advantage, achieve long-term sustainability profitability and overall corporate success in the face of recent changes in operating environments and market conditions. Companies have had to use lean as a survival strategy in a competitive environment because operations have changed dramatically over the last few decades (Yu et al., 2023). Businesses are under pressure to solve operational problems and use effective technology to increase productivity and gain a competitive edge (Nguyen & Ngo, 2023). Processes need to be streamlined, and technology applied to eliminate waste and redundancy to gain competitive advantage (Monroy et al., 2014). The industrial revolution has brought greater concern about operational efficiency which forces companies to change their practices. So, every organization needs to focus on embedding efficiency and sustainability into basic operating strategies (Sharabati, 2021).

Lean accounting's main goals are process efficiency (safe ways to reduce waste while increasing value added activities) and more information and visibility for stakeholders (Al Karabsheh et al., 2024). Harris and Cassidy (2014) state that lean accounting combines successful management concepts into social, economic and operational efficiency in all corporate activities and processes. Lean management principles can give companies a competitive edge in the long run if they are incorporated into strategic planning (Farida & Setiawan, 2022). Businesses are under pressure to

adopt strategies that guaranty competitiveness since efficiency measurements are essential for driving success in a global market where competition is intense (Fabrizio et al., 2022). By reducing waste and inefficiencies and enhancing service quality, productivity, and profitability, lean accounting boosts competitiveness (Rosa & Machado, 2013).

To be competitive logistics service providers need to focus on operational efficiency (Rehman et al., 2022). Lean accounting reduces waste in distribution as well as sourcing and production (Delery & Roumpi, 2017). Whether or not an organization can create and build an effective operational network determines its long-term survival. Lean accounting encompasses a broad range of procedures for improving procurement, manufacturing, sales, transportation and recycling processes. Every step of these procedures needs efficient methods applied (Liu et al., 2023). Businesses may dramatically reduce material and operational costs by using lean accounting technologies such as Value Stream Costing (VSCs), Time Costing (TCs) and Key Cost Objectives (KCOs) (better overall organizational performance). These initiatives improve financial performance and operational efficiency which increases competitiveness of the company (Elsukova, 2015). Lean accounting will make businesses more efficient and competitive (DeBusk, 2015). Performance must be improved to maintain competitive advantage and operational innovation and lean methods are needed (Wang & Yuan, 2009). Lean accounting uses strategies like waste reduction, quality improvement, timely delivery and cost control to increase production efficiency (Alotaibi et al., 2021). Fresh and creative lean initiatives can further enhance an organization's performance and competitiveness (Momani et al., 2023).

The main objective of this study is to fill some gaps in the literature on Lean Accounting and study its actual use in Iraqi industrial sector. It investigates practical effects of Lean Accounting tools (VSC, TC and KPM) on competitiveness of manufacturing firms in Iraq through that investigation it increases knowledge about how Lean Accounting practices influence key aspects of continuous improvement (CR, QI, TE, OR and INN), cost reduction (CR), quality enhancement (QI), time efficiency (TE), operational reliability (OR) and innovation capacity (INN). Strategies for Lean Accounting implementation in Iraqi industrial sector are explored so as to improve performance

and create sustainable competitive advantage. Thus, by exploring these elements the study aims to provide practical knowledge for industry practitioners to formulate strategies for improving their operational efficacy and strategic performance. The main research questions addressed in this paper are: (1) To what extent are Lean Accounting methods applied in the daily work of Iraqi industrial enterprises? (2) What effects do Value Stream Costing (VSC), Target Costing (TC) and Key Performance Measurements (KPM) — the three fundamental Lean Accounting tools have on dimensions of continuous improvement in these organizations?

We will go into study methods, data analysis, literature evaluation, and hypotheses derived from these topics in the parts that follow. The conclusions, suggestions, implications, and practical and societal effects that may be deduced from the results are all covered and interpreted in the last part.

Theoretical Framework

This section provides a historical review of previous research that studied the relationship between Lean Accounting Techniques (LAT) and Competitive Advantage (CA). Ahakchi et al. (2012) stated time efficiency, cost reduction and quality improvement are the pillars for sustainable growth in Iraq. To achieve these objectives lean accounting techniques such as VSC (Value Stream Costing), TC (Total Cost), "Kaizen" culture improvement has been used. These technologies reduce costs and streamline organizational procedures so much that they greatly improve competitive advantage and corporate performance (Ahakchi et al., 2012; Al Karabsheh et al., 2024). Lean practices (Total Cost, Value Stream and Kaizen culture) enhance cost effectiveness and product quality which increases competitiveness overall (Al Mubarak & Hamdan, 2023; Alotaibi et al., 2021). Lean accounting techniques also improve operational efficiency by reducing waste and controlling expenses. Strict cost management and operational efficiency increase competitive advantage further (Alqudah et al., 2023; ALShanti et al., 2024). Internal agile accounting techniques and external alliances can be implemented to improve operations as well (Altal, 2024; Alves et al., 2022). Agile accounting has also been shown to save manufacturing costs, increase operational quality and efficiency as well as more flexibility and dependability (Al-Zwaylif & Taher 2020; Arora & Soral 2017). A meta-analysis shows that agile accounting practices enhance sustained

competitiveness because they focus on value-added cost management and continuous development (Azeem et al. 2021; DeBusk 2015). Internal procedures have been streamlined and external alliances strengthened by “Lean Accounting” when used with technology, quality improvement and corporate social responsibility (CSR). Lean accounting concepts made it easier to eliminate waste and lower overall costs in the manufacturing and distribution sectors which improved economic performance and gave businesses a competitive edge (Fabrizio et al., 2022; Farida & Setiawan, 2022). In Iraq, companies that implemented tools such as "Value Stream Mapping" (VSM) and "Key Cost Objectives" (KCO) reported improvements in quality, reliability, and performance, thereby bolstering their competitive standing (Fullerton et al., 2013; 2014). There is a strong correlation between Lean Accounting methods, operational performance, and competitive advantage; Lean Accounting practices influence cost management and operational efficiency, both of which serve as fundamental drivers of competitive advantage (Hair et al., 2014; Hallam et al., 2018)

Even though only limited Lean Accounting methods (Value Stream Mapping and Key Cost Objectives) have been applied to operational processes these improvement attempts have led to significant improvements. Alliances and partnerships with suppliers have also been important in helping businesses implement lean accounting while improving competitiveness and capabilities (Maskell & Kennedy, 2007; Momani et al., 2023). Strong collaborations among lean accounting stakeholders have made it easier to share best practices which has improved operational effectiveness; this type of cooperation has also allowed resources and skills to be obtained that were vital for competitive advantage. (Monroy et al., 2014; Nguyen & Ngo, 2023). Waste elimination and process efficiency have reduced manufacturing costs while increasing competitive advantage through lean accounting. Lean accounting improved operational performance and cost control at the manufacturing and distribution stages (Nielsen et al., 2023; Okorie et al., 2023). Research has shown how performance and competitive advantage relate to lean accounting techniques (VSC, TC and KCO). VSC and TC directly increase competitiveness of an organization because they reduce costs and quality whereas KCO results in more

reliable and efficient processes (Stronczek, 2023; Wang & Yuan, 2009).

Lean accounting techniques (VSC, TC and KCO) have been used by organizations to improve performance through cost management (i.e., reduction), operational reductions (i.e., waste elimination) and innovation (i.e., competitive advantage) (Zhang et al., 2023). Lean accounting techniques are strongly related to competitiveness of organizations. VSC and KCO strongly influence cost reduction and reliability of operations (VSC reduces material and manufacturing costs; KCO increases process efficiency and quality). Use of lean accounting practices has improved organizational performance and given them a competitive edge over rivals (Fullerton et al., 2013; Hallam et al., 2018).

Industrial businesses have used lean accounting technologies (VSC, TC and KCO) to improve cost control, quality and operational efficiency (Kuncoro & Suriani 2018; Liu et al., 2023). To strategically implement lean accounting practices for competitiveness businesses, need to work with suppliers and stakeholders (Magboul et al., 2024; Maskell & Baggaley, 2006). Long-term relationships between lean accounting practices and competitiveness were found in studies of industrial enterprises by Nguyen and Ngo (2023) and Nielsen et al. (2023). However, managerial commitment, small scale operations and resource and logistics constraints still exist.

Performance and competitiveness have been improved by lean accounting (Okorie et al., 2023; Ong and Puteh, 2017). Lean accounting is closely related to competitive strategy (Wang & Yuan, 2009; Wongsansukcharoen & Thaweepaiboonwong, 2023); organizations use lean accounting techniques to differentiate their offerings and manage risks associated with lean management practices (Yu et al., 2023; Zhang et al., 2023); how they are used determines how they interact with external stakeholders and ultimately affects performance (Rehman et al., 2022; Stronczek, 2023). Leading Jordanian companies link competitive strategy with lean accounting techniques. Alves et al. (2022) and Al-Zwaylif & Taher (2020) state that lean accounting methods typically improve operational performance but not financial performance.

Indeed, operational competitive performance measures (CR, QI, TE and dependability) and lean accounting approaches (VSC and TC procedures) are closely related (Arora & Soral 2017;

DeBusk 2015). Effective internal accounting practices have been shown to improve operations, quality and cost management only occasionally (Al-Zwaylif & Taher 2020; Liu et al. 2023); VSC and TC techniques can reduce costs but not necessarily increase TE or flexibility (Farida & Setiawan 2022; Harris & Cassidy 2014); KCO aims at improving process efficiency and operational reliability although it does not necessarily lead to lower costs (Kennedy & Widener 2008; Liu et al. 2023). To meet customer needs a system's operational performance has to be high quality, complete efficiency and dependability. KCO also aims at improving quality, process efficiency and operational performance (cutting waste) (Nguyen & Ngo 2023; Rehman et al., 2022). The aim of lean accounting is to improve performance and competitiveness while controlling costs effectively and efficiently (Sharabati, 2021; Stronczek, 2023). Organizations need to coordinate internally and externally to compete. Value stream costing increases operational dependability as well as cost reduction significantly (Ahakchi et al., 2012; Zhang et al., 2023). Although results on external coordination and continuous improvement were mixed the organizational performance in terms of cost management and process efficiency improved when lean internal techniques were implemented. (Al Mubarak & Hamdan, 2023; Alotaibi et al., 2021)

KCO, VSC and TC directly affect the competitive aspects of a business (Al-Zwaylif & Taher, 2020; Arora & Soral, 2017). DeBusk (2015) and Farida & Setiawan (2022) state that competitiveness then affects operational performance, quality and innovation. Research (Fullerton et al., 2014; Liu et al., 2023) shows that lean accounting techniques have a significant impact on competitiveness and performance. Jordanian SMEs may thus implement internal and external lean solutions to improve their processes due to competitive challenges (Momani et al., 2023; Nguyen & Ngo, 2023). Organizations must implement internal lean processes and build external relationships in order to increase performance (Ong & Puteh, 2017; Rehman et al., 2022).

Internal management, the commitment of senior leadership, cost management strategies, process enhancements, and supplier partnerships are interconnected aspects of lean accounting (Sharabati, 2021; Wongsansukcharoen & Thaweepaiboonwong, 2023). There exists

a robust correlation between lean accounting techniques (LAT) and organizational success (Yu et al., 2023). The variables of Value Stream Costing (VSC), Total Cost (TC), and Key Cost Objectives (KCO) have significantly influenced operational and financial performance indicators. Implementing VSC and KCO is expected to enhance cost management and process improvement, respectively (Ahakchi et al., 2012; Al Mubarak & Hamdan, 2023), while the effects of TC can vary, either improving or detracting from outcomes (Al-Zwaylif & Taher, 2020; Liu et al., 2023). Furthermore, lean accounting has induced notable transformations in various performance metrics, including quality, cost, overall efficiency, and reliability (Al-Zwaylif & Taher, 2020; Liu et al., 2023). Each aspect of LAT influences performance and competitiveness in distinct ways (Sharabati, 2021). The overall conclusions indicate that critical elements of LAT affect an organization's competitive edge. The discussion regarding which LAT component is most contributory remains ongoing between Al-Zwaylif and Taher (2020) and Liu et al. (2023).

Research Model and Hypothesis Formulation

Lean accounting methods (LAT) are becoming increasingly popular because of their impact on business performance and competitive advantage (CA). Despite the widespread use of LAT, little empirical data exist on how these tools (value stream costing (VSC), target costing (TC) and kaizen costing (KCO)) affect CA (Ahakchi et al., 2012; Nguyen & Ngo, 2023); few studies have looked at how each tool affects CA (Alotaibi et al., 2021; Monroy et al., 2014); very little research has been done on how lean accounting affects competitiveness of organizations (Hallam et al., 2018; Stronczek, 2023); few reviews exist on how lean accounting affects operational performance and CA. Some studies have shown how LAT can improve cost management and operational performance: VSC and TC can reduce operating expenses and speed up organizational processes (Nguyen & Ngo, 2023); other research has looked at the effect of LAT on quality and innovation (Al Karabsheh et al., 2024). There is still conflicting data about lean accounting methods influence on CA (Azeem et al., 2021; DeBusk, 2015). Another strategy to increase CA in enterprises is Lean Agile Thinking method (Kuncoro & Suriani, 2018; Rehman et al., 2022). Each of these

points shows gaps in research that guide this study.

There is contradictory evidence on the effect of each lean accounting tool on competitive advantage; some research found that LAT improves operational performance and cost efficiency (Fullerton et al., 2014). Some research (Azeem et al., 2021; Fabrizio et al., 2022) finds that lean accounting practices improve some aspects of competitive advantage but not others. This study fills this gap by investigating whether LAT (and each of its instruments) affects competitive advantage of Iraqi industrial enterprises (Al Mubarak & Hamdan, 2023; Stronczek, 2023). Therefore, we propose the following hypotheses:

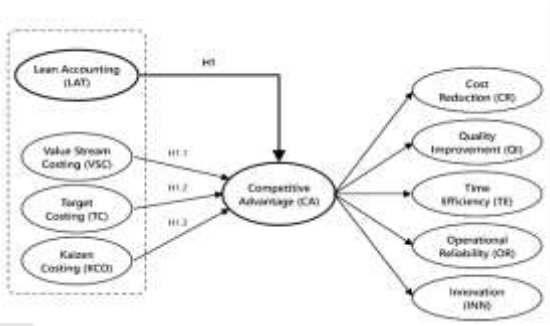
Main Hypothesis (H1): There is a statistically significant effect of lean accounting techniques (LAT) on the competitive advantage (CA) of Iraqi industrial companies The following sub-hypotheses emerge from it:

H1.1: There is a statistically significant effect of value stream costing (VSC) on the competitive advantage (CA) of Iraqi industrial companies.

H1.2: There is a statistically significant effect of target costing (TC) on the competitive advantage (CA) of Iraqi industrial companies.

H1.3: There is a statistically significant effect of kaizen costing (KCO) on the competitive advantage (CA) of Iraqi industrial companies.

Based on these hypotheses, the research model is presented in Figure 1. It illustrates the influence of lean accounting tools (LAT), comprising VSC, TC, and KCO, on competitive advantage (CA).



METHODOLOGY

Research Design

This study uses quantitative cross-sectional design to investigate the effect of lean accounting techniques (LAT) such as value stream costing (VSC), target costing (TC) and kaizen costing (KCO) on competitive advantage (CA) of Iraqi industrial companies in accordance with hypotheses and research model above.

Population and Sample.

The population of the study consists of 210 accountants, financial staff and auditors working in 12 Iraqi industrial companies. Purposive sampling was used to select respondents from these groups as they are the most familiar with applying lean accounting techniques. Sample size was calculated based on table of (Krejcie and Morgan, 1970) which recommends a

sample size of 136 respondents for every 210 respondents in the population; therefore, the final sample comprised of 136 respondents.

Data Collection

Field research was conducted between April 1, 2025, and July 1, 2025. Primary data were collected by questionnaire distributed electronically to the respondents; secondary data were taken from books, academic sources and online sources.

Questionnaire design and measurement.

The three dimensions of the independent variable LAT (VSC, TC and KCO) were taken from (Stronczek ,2025) and each dimension was measured with four items. The dimensions of dependent variable CA (cost reduction, quality improvement, time efficiency, operational reliability and innovation) were taken from (Sharabati ,2021) and CR1–CR5, QI1–QI4, TE1–TE6, OR1–OR4 and INN1–INN5 were measured by items. Responses were measured on a five-point Likert scale from "strongly agree" to "strongly disagree", scored from 5 to 1 respectively.

Data Analysis

Data were analyzed using (SPSS). The reliability of the questionnaire was assessed using Cronbach's alpha, and the results are presented in the results section. The main hypothesis (H1) was tested using simple linear regression, while the sub-hypotheses (H1.1–H1.3) were tested using multiple linear regression, at the $\alpha \leq 0.05$ level of significance.

RESULTS

Reliability Analysis of the Research Instrument

Before testing the study hypothesis's reliability of questionnaire was checked to ensure internal consistency of its items. Cronbach's alpha coefficient was calculated for each dimension of the two variables (lean accounting and competitive advantage) as well as for each variable as a whole based on responses of study sample (N = 136). A value of 0.70 or higher is considered acceptable evidence of reliability (Nunnally, 1978). Results are shown in Table (1).

Table 1. Cronbach's Alpha Reliability Coefficients

Variable/ dimensions	No. of items	Cronbach's Alpha	Reliability level
value stream costing	4	0.716	Acceptable
target costing	4	0.749	Acceptable

kaizen costing	4	0.733	Acceptable
lean accounting	***12***	0.870	*Good*
cost reduction,	**5**	0.826	*Good*
quality improvement,	**5**	0.804	*Good*
time efficiency,	**5**	0.824	*Good*
operational reliability	**5**	0.749	Acceptable
innovation	**5**	0.789	Acceptable
Competitive advantage	**25**	**0.873**	***Good***

Source: Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30*(3), 607–610.

In Table (1) Cronbach's alpha for the dimensions of lean accounting ranged from 0.716 (value stream costing) to 0.749 (target costing) with an overall value of 0.870 for the variable; for competitive advantage dimensions values were 0.749 (operational reliability) to 0.826 (cost reduction) with an overall value of 0.873. All coefficients were greater than 0.70.

Descriptive Statistics of the Independent Variable: Lean Accounting

To describe respondents' perceptions of lean accounting, the means and standard deviations of its three dimensions (value stream costing, target costing, and kaizen costing) were calculated, along with skewness and kurtosis values to assess the distribution of the data. Table (2) presents the results.

Table 2. Descriptive Statistics For Lean Accounting Dimensions

Items	Mean statistic	Std. Deviation statistic	Skewness	Kurtosis
Value Stream Costing	3.65	.653	-.098	-.271
Target Costing	3.74	.713	-.164	-.712
Kaizen Costing	3.61	.687	-.078	-.778
Lean Accounting	3.67	.589	-.055	-.523

Table (2) shows that the overall mean of lean accounting was 3.67 (SD = 0.589). Target costing had the highest mean (3.74, SD = 0.713), followed by value stream costing (3.65, SD = 0.653) and kaizen costing (3.61, SD = 0.687). Skewness values ranged from -0.164 to -0.055 and kurtosis values from -0.778 to -0.271 and all were within ±1.

Descriptive Statistics of the Dependent Variable: Competitive Advantage

To describe respondents' perceptions of competitive advantage, the means and standard deviations of its five dimensions (cost reduction, quality improvement, time efficiency, operational reliability, and innovation) were calculated, along with skewness and kurtosis values to

assess the distribution of the data. Table (3) presents the results.

Table 3. Descriptive Statistics For Competitive Advantage Dimensions

Items	Mean statistic	Std. Deviation statistic	Skewness	Kurtosis
cost reductio,	3.6724	.70249	-.091	-.605
quality improvement,	3.7933	.68123	-.184	-.698
time efficiency,	3.3895	.72156	-.092	-.471
operational reliability	3.7562	.62391	-.191	-.392
innovation	3.3181	.68794	-.010	-.495-
Competitive advantage	3.5859	.45604	.098	-.394

Table (3) shows that the overall mean of competitive advantage was 3.586 (SD = 0.456). Quality improvement had the highest mean (3.793, SD = 0.681), followed by operational reliability (3.756, SD = 0.624) and cost reduction (3.672, SD = 0.702); innovation had the lowest mean (3.318, SD = 0.688), followed by time efficiency (3.390, SD = 0.722). Skewness values ranged from -0.191 to 0.098 and kurtosis values from -0.698 to -0.392 (all within ±1.).

Correlation Analysis of the Study Variables

To test the relationships between study variables Pearson's correlation coefficient was calculated between dimensions of lean accounting (value stream costing, target costing and kaizen costing) and dimensions of competitive advantage (cost reduction, quality improvement, time efficiency, operational reliability and innovation) as well as between dimensions and overall variables. This test was used because data were approximately normally distributed (skewness and kurtosis values are positive). Table (4) shows result

Table 4. Pearson Correlation Coefficients Between Lean Accounting and Competitive Advantage Dimensions

Items	Cost Reduction	Quality Improvement	Time Efficiency	Operational Reliability	Innovation	Competitive Advantage
Value Stream Costing	0.374	0.449	0.408	0.254	0.372	0.560
Target Costing	0.411	0.411	0.530	0.331	0.320	0.604
Kaizen Costing	0.391	0.426	0.448	0.347	0.409	0.608
Lean Accounting	0.457	0.498	0.539	0.362	0.426	0.688

Table (4) shows positive and statistically significant correlations between all dimensions of lean accounting with competitive advantage at the 0.01 level. The overall correlation between lean accounting and competitive advantage was 0.688. Among the dimensions of lean accounting kaizen costing had the highest correlation with overall competitive advantage (0.608), followed by target costing (0.604) and value stream costing (0.560). Overall lean accounting variable was most strongly correlated with time efficiency (0.539) and quality improvement (0.498) and least strongly with operational reliability (0.362). Strongest correlation between a pair of dimensions was between target costing and time efficiency (0.530) and weakest was between value stream costing and operational reliability (0.254).

Testing the Effect of Lean Accounting on Competitive Advantage

To test the main hypothesis of the study, simple linear regression analysis was conducted to determine the effect of lean accounting (independent variable) on competitive advantage (dependent variable). Table (5) presents the results of the analysis.

Table 5. Simple Linear Regression Results For The Effect of Lean Accounting On Competitive Advantage

Coefficients[a]					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.631	.145		11.257	.000
Lean accounting	.532	.039	.688	13.665	.000

a. Dependent Variable: Competitive advantage, f=186.72 R2 =0.473

Table (5) shows that the regression model was statistically significant ($F = 186.72$, $p < 0.001$). Lean accounting had a positive and statistically significant effect on competitive advantage ($B = 0.532$, Beta = 0.688, $t = 13.665$, $p < 0.001$). The coefficient of determination ($R^2 = 0.473$) means that lean accounting explains 47.3 % of the variance in competitive advantage so the main hypothesis is accepted

Testing the Effect of Lean Accounting Dimensions on Competitive Advantage

To test the sub-hypotheses of the study, multiple linear regression analysis was conducted to determine the effect of the dimensions of lean accounting (value stream costing, target costing, and kaizen costing) on competitive advantage. Table (6) presents the results of the analysis.

Table 6. Multiple Regression Results For The Effect of Lean Accounting Dimensions On Competitive Advantage

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.640	.146		11.201	.000
	value stream costing	.152	.047	.217	3.257	.001
	target costing	.189	.044	.295	4.257	.000
	kaizen costing	.189	.047	.286	3.999	.000

a. Dependent Variable: Competitive advantage, f=61.827 R^2 .472

Table (6) shows that the regression model was statistically significant (F (3, 132) = 61.827, p <0.001), and that the three dimensions of lean accounting jointly explained 47.2% of the variance in competitive advantage (R^2=0.472). Value stream costing had a positive and significant effect (B = 0.152, Beta = 0.217, t = 3.257, p = 0.001); target costing also (B = 0.189, Beta = 0.295, t = 4.257, p <0.001); kaizen costing (B = 0.189, Beta = 0.286, t = 3.999, p <0.001). Target costing had the largest standardized effect, kaizen costing then value stream costing. So sub-hypotheses are accepted.

Discussion of the Results

The descriptive results show that respondents perceive lean accounting at a high level (M = 3.67), target costing is ranked first (M = 3.74) followed by value stream costing (M = 3.65) and kaizen costing (M = 3.61). This means that the Iraqi industrial companies surveyed apply lean accounting tools to a great extent which is in line with the view that lean accounting has been widely accepted across corporate operations (Ahakchi et al., 2012; Altal, 2024). The relatively higher position of target costing may indicate that these firms put emphasis on cost control in a competitive environment as studies link target costing with cost and quality improvement (Stronczek, 2023; Wang & Yuan, 2009). Competitive advantage was also perceived at high level overall (M = 3.586). Quality improvement (M = 3.793), operational reliability (M = 3.756) and cost reduction (M = 3.672) were rated high while time efficiency (M

= 3.390) and innovation (M = 3.318) were moderate. Firms have probably focused on cost, quality and reliability but innovation and speed require resources, technology and managerial commitment that may be constrained (Nguyen & Ngo, 2023; Nielsen et al., 2023).

Lean accounting was positively and statistically significant correlated with competitive advantage (r = 0.688) so firms with more lean accounting practices report stronger competitive advantage which is consistent with literature showing that lean accounting methods are strongly associated with competitiveness (Hair et al., 2014; Hallam et al., 2018). At the dimension level lean accounting was most strongly correlated with time efficiency (r = 0.539) and quality improvement (r = 0.498) and least strongly operational reliability (r = 0.362). The strong link to time efficiency supports the idea that lean tools reduce waste and speed up processes (Alotaibi et al., 2021). Value stream costing's modest correlation with operational reliability (r = 0.254) differs from studies where value stream costing strongly affects operational reliability (Ahakchi et al., 2012; Zhang et al., 2023). This difference could be due to differences in sample, sector or extent of implementation and it suggests that the relationship between specific tools and specific competitive dimensions is not uniform (Sharabati 2021).

For the main hypothesis, simple regression results show that lean accounting has positive and significant effect on competitive advantage (B = 0.532; Beta = 0.688, $p < 0.001$) explaining 47.3% of its variance so the main hypothesis (H1) is accepted. This result is in line with studies showing that lean accounting techniques improve performance and competitiveness (Okorie et al., 2023; Ong & Puteh, 2017; Fullerton et al., 2014), and with the argument that elimination of waste and control of costs increase the competitive position of firms (Rosa & Machado, 2013; Elsukova, 2015). It also gives empirical evidence from the Iraqi industrial context to a literature which as mentioned earlier did not have evidence on this relationship (Ahakchi et al., 2012; Nguyen & Ngo, 2023). At the same time 52.7% of variance is unexplained so other factors such as managerial commitment, technology and supplier relationships also contribute to competitive advantage (Sharabati, 2021; Wongsansuk charoen & Thaweepaibo onwong, 2023).

As for the sub-hypotheses, multiple regression results indicate that value stream costing (Beta = 0.217; $p = 0.001$), target costing (Beta = 0.295; $p < 0.001$)

and kaizen costing (Beta = 0.286; $p < 0.001$) all have a positive and significant effect on competitive advantage so H1.1, H1.2 and H1.3 are accepted (together they explain 47.2% of its variance). Target costing had the strongest effect followed by kaizen costing and weakest was value stream costing studies have found that target costing directly contributes to competitiveness through cost and quality (Stronczek, 2023; Wang & Yuan, 2009) and kaizen costing supports process efficiency and reliability (Kennedy & Widener, 2008; Liu et al., 2023). The significant effect of target costing is in contrast with studies reporting variable or even negative effects of this tool (Al-Zwaylif & Taher, 2020; Liu et al., 2023) so its effect depends on how it is applied. With regard to the debate about which tool contributes most (Al-Zwaylif & Taher, 2020; Liu et al., 2023), the present results show that target costing and kaizen costing have nearly equal weight in Iraqi industrial context while value stream costing contributes less but still significantly.

CONCLUSION

The present study explored the effect of lean accounting techniques (value stream costing, target costing and kaizen costing) on competitive advantage of Iraqi industrial companies from the views of accountants, financial staff and auditors working in them. Reliability tests showed that research instrument is internally consistent and suitable for analysis.

Lean accounting is used to a high degree in the companies surveyed (target costing is the most widely used tool). Overall competitive advantage was also perceived as high (quality improvement, operational reliability and cost reduction were the strongest dimensions), time efficiency and innovation received the lowest assessments and remained moderate (i.e., two dimensions are less developed than others).

The correlation analysis showed that lean accounting and competitive advantage were positively and meaningfully related. All dimensions of lean accounting were positively and significantly associated with all dimensions of competitive advantage (the closest association was time efficiency; weakest operational reliability).

Lean accounting was found to be positively and significantly related to competitive advantage (and explains a large part of its variation), which supports the main hypothesis. Each of value stream costing, target costing and kaizen costing was also found to have positive and significant effects (which support all three

sub-hypotheses). Target costing and kaizen costing had nearly equal and stronger effects than value stream costing.

Overall, the results indicate that adopting lean accounting techniques is associated with a stronger competitive position for Iraqi industrial companies, although a considerable part of competitive advantage is shaped by other factors not covered in this study.

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