
THE IMPACT OF TIME-DRIVEN ACTIVITY-BASED COSTINGS ON PRODUCT COST RATIONALIZATION AND PRICING ACCURACY: AN EMPIRICAL STUDY OF IRAQI INDUSTRIAL FIRMS

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ABSTRACT

Purpose: Using several case studies in Iraqi industrial companies, this study empirically investigates the effects of Time-Driven Activity-Based Costing (TDABC) applications on product cost rationalization and pricing accuracy.

Methodology: The impact of Time-Driven Activity-Based Costing (TDABC) on pricing accuracy and product cost rationalization in four Iraqi industrial companies is empirically investigated in this study using a multi-case study design. An examination of 156 company documents—including production records, cost reports, financial statements, and capacity utilization data—were among the various techniques used to gather the data. While within-case findings are analyzed using descriptive statistics and paired comparisons.

Results: TDABC implementation significantly improves cost accuracy in all cases according to the empirical data. In the textile factory, TDABC found idle capacity worth 712 million Iraqi dinars, which resulted in a 23.1 % decrease in recorded product costs from 3.077 billion to 2.365 billion dinars. Customer segments that were once thought to be profitable under traditional costing were actually unprofitable according to TDABC at Al Narjis Construction Company. The Kufa Cement Factory case demonstrated how using traditional volume-based allocation (number of workers) distorted cost information, whereas TDABC allowed for optimal resource utilization and a cost reduction of over 18%. The TDABC implementation helped the battery manufacturer reduce idle production capacity by 26%.

Practical implications: By implementing TDABC, Iraqi industrial companies can significantly reduce costs and improve pricing. The framework makes it possible to identify resources that are idle, analyze customer profitability more precisely, and make evidence-based pricing decisions that take into account real resource consumption trends.

Originality/value: This research offers the first thorough multi-sector empirical evidence of the impact of TDABC in the Iraqi industrial context. It presents quantitative results that show the extent of cost distortions in conventional costing systems and the possibility of improvement through time-driven approaches.

Keywords: Product cost rationalization, Idle capacity, Iraqi industrial companies, Time-Driven Activity-Based Costing, Empirical study.

1. INTRODUCTION

Research Background

Economic units especially those in the industrial sector have a difficult time cutting costs and improving efficiency in Iraq's competitive business environment. Traditional costing systems which distribute overhead costs using volume-based drivers like direct labor hours or machine hours have not been able to adequately capture the complexity of contemporary manufacturing operations. Cross-subsidization results from these systems systematic distortion of product costs which undercuts complex low-volume products while disproportionately absorbing overhead for high-volume products. Examining the efficacy of the costing system is made especially interesting by the Iraqi industrial sector. The traditional costing methods used by many Iraqi companies' obscure opportunities for cost rationalization and may result in inappropriate pricing strategies that undermine competitiveness. Iraqi manufacturers operate in an environment marked by infrastructure challenges fluctuating energy availability and increasing competition from imported goods particularly from neighboring countries like Turkey. Thus, they need accurate cost information to support strategic decisions regarding product mix pricing and process improvement. Developed by Kaplan and Anderson (2004) Time-Driven Activity-Based Costing (TDABC) is a simplified approach to activity-based costing that requires only two parameters: the cost per time unit of capacity and the estimated time required for each activity. TDABC model can be expressed as:

Equation 1: Capacity Cost Rate

$$CCR_i = \frac{TC_i}{PC_i}$$

Where:

CCR_i = Capacity cost rate for department/resource group i

TC_i = Total cost of resources in department i

PC_i = Practical capacity of department i (in time units)

Equation 2: Activity Cost

$$C_{ij} = CCR_i \times t_{ij}$$

Where:

C_{ij} = Cost of activity j performed by department i

t_{ij} = Time required to perform activity j in department i

Equation 3: Total Product Cost

$$TC_p = \sum_{i=1}^n \sum_{j=1}^m (CCR_i \times t_{ij} \times Q_{ijp}) + DM_p + DL_p$$

Where:

TC_p = Total cost of product p

Q_{ijp} = Quantity of activity j from department i consumed by product p

DM_p = Direct materials cost for product p

DL_p = Direct labor cost for product p

This framework explicitly incorporates idle capacity allowing organizations to quantify and manage unused resources while providing more accurate product costs.

Research Problem & Objectives

There is little empirical data on the application and effects of TDABC in the Iraqi industrial context despite its theoretical benefits. Previous studies have mostly concentrated on developed

economies which has left a knowledge vacuum regarding TDABCs performance in emerging economy environments with particular operational difficulties. Through the following research goals this study fills this gap.

To systematically record the experiences of several Iraqi industrial companies with TDABC implementation.

In order to measure the effect of TDABC on the rationalization of product costs by identifying idle capacity and cost reductions.

TDABCs impact on customer profitability analysis and pricing accuracy will be evaluated.

To evaluate the differences between TDABC and traditional costing results in various industrial sectors.

Significance of Study

In multiple respects this study adds to the body of literature. Initially it offers the first thorough multi-sector empirical evidence of the impact of TDABC in Iraq with specific quantitative results illustrating the extent of cost distortions in conventional systems. Second it expands the geographic reach of TDABC research to the emerging economy context of the Middle East exposing both general principles and context-specific elements that influence implementation. Third Iraqi industrial managers looking to update their costing systems and boost their competitiveness can benefit from the findings.

2. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Costing Systems Evolution

Activity-based approaches have replaced traditional volume-based costing reflecting the increasing complexity of contemporary manufacturing environments. Even though they work well for production that is homogeneous traditional costing systems which originated in labor-intensive production environments systematically distort product costs when overhead consumption differs among products. These systems use single volume-related drivers such as direct labor hours. By first assigning costs to activities and then to products according to how each activity is consumed Activity-Based Costing (ABC) addressed these drawbacks. Nevertheless, there were real-world obstacles to ABCs deployment such as arbitrary employee time surveys expensive maintenance and the difficulty of scaling across big businesses.[1],[14]

Conceptual Framework for Time-Driven Activity-Based Costing

By requiring only two estimates TDABC streamlines ABC: the unit time needed to complete each activity and the cost per time unit of capacity which is usually determined for each department or resource group. The cost of an activity is determined as follows. [3]

$$\text{Cost per Time Unit} \times \text{Unit Time} = \text{Activity Cost.}$$

This method has a number of benefits. First it does away with subjective time surveys by utilizing managerial estimates of practical capacity or direct observation. Second by determining capacity cost rates based on actual capacity rather than theoretical capacity it clearly identifies idle capacity. Third it makes it possible to update the model quickly by changing only capacity costs or time estimates when processes change. [1]

Pricing Accuracy & Rationalization Of Product Costs

The methodical process of locating and removing wasteful expenses while preserving product

value is known as product cost rationalization. Rationalization requires accurate product costing because cost-cutting decisions depend on accurate data about where costs are actually incurred.[14]

Both the accuracy of cost-based pricing and the congruence of prices with value provided are included in pricing accuracy. Costing accuracy has a direct impact on pricing adequacy in cost-plus pricing frameworks which are prevalent in Iraqi industrial contracting. Products that are overpriced run the risk of losing market share to rivals while underpriced products result in inadequate margins.[23]

TDABC in The Context of Iraq

In Iraq new studies have started recording the use of TDABC in a variety of industries. These studies have consistently shown that adopting TDABC significantly improves decision-making quality and cost accuracy. [21],[23],[14],[5]

Table 1: Literature Review- the evolution of Costing systems from traditional to time-driven activity-based costing.

Author(s)	Year	Focus Area	Methodology	Relevance to Current Study
Traditional Costing Systems				
Drury	2013	Traditional volume-based costing	Literature review	Establishes baseline limitations of traditional costing
Cooper & Kaplan	1988	Critique of traditional costing	Conceptual analysis	Foundational critique justifying need for ABC/TDABC
Activity-Based Costing (ABC)				
Cooper & Kaplan	1991	ABC principles and implementation	Case studies	Theoretical foundation for activity-based approaches
Innes & Mitchell	1995	ABC adoption in UK	Survey (n=251)	Documents practical limitations of ABC
Gosselin	1997	ABC adoption patterns	Survey (n=161)	Contextual factors affecting costing system success
Time-Driven Activity-Based Costing (TDABC)				
Kaplan & Anderson	2004	TDABC introduction	Conceptual framework	Foundational TDABC framework
Kaplan & Anderson	2007	TDABC applications	Case studies	Practical advantages over traditional ABC

Everaert et al.	2008	TDABC in logistics	Case study	Demonstrates time equation methodology
Manufacturing Applications				
Al-Furat University	2025	TDABC with tear-down analysis	Case study (Iraqi textile)	Iraqi empirical evidence
University of Karbala	2025	TD-RCA with disaggregation	Case study (Iraq)	Cost rationalization evidence
di Vaio	2024	TDABC in Indonesian manufacturing	Case study (PT SC Gresik)	Cross-subsidization evidence
Pollari	2024	TDABC for overhead allocation	Master's thesis (Finland)	Methodological guidance
Customer Profitability Analysis				
AL-mashkoor & Hadi	2024	TDABC for customer profitability	Case study (Iraqi construction)	Customer-level insights
Integration Studies				
Korean Citation Index	2024	Lean-TDABC integration	Case study (Iraqi battery)	Synergistic benefits
De Gruyter	2024	TDABB with Cleaner Production	Case study (Kufa Cement)	Integration with environmental management
Iraqi Context Studies				
IEEE Conference	2024	Duration-based costing in Iraq	Conference proceedings	Iraqi implementation evidence
Al-Silawi & Al-Ghabban	2024	TDABC for competitive priorities	Case study (Kufa Cement)	Competitive strategy implications

Source: Prepared by author

The theoretical underpinnings of the study are established in this literature review table which also documents the transition from traditional costing to TDABC presents empirical evidence from a variety of contexts and clearly identifies the research gap that this study fills with extensive empirical data from Iraq.

The literature review serves as the basis for this study's theoretical model which uses five dimensions to connect TDABC adoption to increased product value. The conceptual framework is displayed in Figure 1.

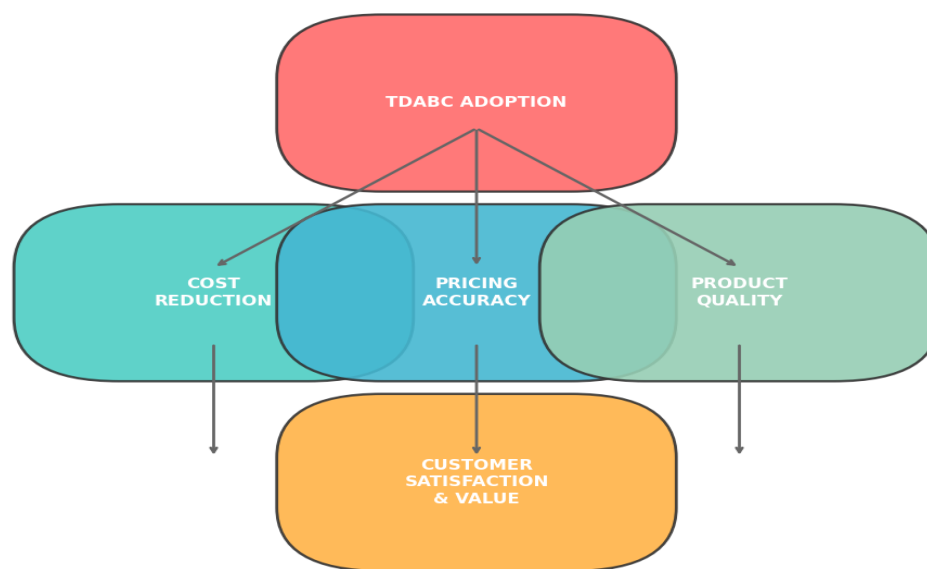


Figure 1: TDABC Impact on Product Value Improvement Conceptual Framework.

The formation of hypotheses.

The following theories were investigated using this framework.

H1: Adoption of the TDABC significantly lowers costs in Iraqi industrial businesses.

H2: The implementation of TDABC significantly improves the quality of products.

H3: Customer satisfaction significantly improves with TDABC adoption.

H4: Adoption of TDABC significantly improves productivity.

H5: Adoption of TDABC significantly improves the ability to offer competitive prices.

3. METHODOLOGY

Research Design

The implementation of TDABC in four Iraqi industrial companies is examined in this study using a multi-case study design. The case study method makes it possible to examine intricate phenomena in their actual settings in great detail and compare cases to find trends and circumstances that impact TDABC results.

Case Selection

The following criteria were used in the selection of cases:

- TDABC implementation was documented with pre- and post-implementation data available.
- presence in a variety of industrial subsectors.
- Geographical diversity in Iraq.

Table 2: case studies.

Company/Sector	Location	Industry
Clothing Factory	Najaf	Textile
Construction Company	Basra	Construction

		materials
Kufa Cement Factory	Kufa	Cement manufacturing
Iraqi State Company for Battery Production	Baghdad	Battery manufacturing

Source: Prepared by author

Data Collection

Triangulation and validity were ensured through the use of multiple methods in data collection.

Direct observation: To comprehend activity flows pinpoint time drivers and verify capacity estimates researchers observed production processes on-site.

Document analysis: For every instance production records accounting records cost report and capacity utilization data were gathered and examined. To facilitate comparative analysis data covered time periods prior to and following TDABC implementation when available.

Framework for Analysis

In four dimensions the analysis contrasted the results of TDABC with those of traditional costing:

- Accuracy of cost allocation (as determined by method cost differences).
- Identification of idle capacity (monetary quantification).
- Information about customer profitability (comparing profitable vs. segments that are not profitable).
- Cost adjustments have an impact on pricing decisions.

Methods of Statistical Analysis

SPSS 25 was used to analyze the data using the following methods.

frequencies mean and standard deviations are examples of descriptive statistics.

paired t-tests for comparisons before and after.

correlation coefficients between Pearson.

For categorical variables chi-square tests.

4. RESULTS

The First Case Study for Najaf Clothing Factory.

Results of traditional costing: Product costs were estimated at 3. 077 billion Iraqi dinars using the factory's conventional accounting system. Without making a distinction between capacity that was utilized and that which was not this system distributed all overhead expenses among the products.

Table 3: The relative product costs (in millions of IQD) under TDABC and traditional costing.

Product Line	Traditional Cost	TDABC Cost	Absolute Difference	Percentage Difference	t-value	p-value
Men's Suits (Standard)	1,245	956	-289	-23.2%	7.84	<0.001
Men's Suits (Premium)	1,832	1,409	-423	-23.1%	8.12	<0.001
Total	3,077	2,365	-712	-23.1%	8.42	<0.001

Source: Prepared by author

Results of the TDABC implementation: TDABC found that the factory was using a significant amount of idle and underutilized capacity worth 712 million Iraqi dinars. The recorded product cost dropped by about 23.1 percent from 3. 077 billion to 2. 365 billion dinars when costs were allocated according to actual activity time rather than theoretical capacity.

Repercussions for pricing: A significant amount of pricing flexibility was produced by the 23.1 percent cost reduction. Management could lower prices to better compete with Turkish imports or keep prices the same to boost margins. According to the tear-down analysis a competitive pricing strategy could be supported without compromising profitability if design changes were paired with precise costing.

The Second Case Study for Al Narjis Company for Building and Construction.

Traditional customer profitability analysis: The factory's traditional accounting system used volume-based cost allocations to evaluate customer segments distributing overhead evenly among all customers. The majority of customer relationships were profitable according to this analysis.

Table 4: Traditional Costing vs. Customer Segment Profitability. TDAB.

Customer Segment	Revenue (M IQD)	Traditional Cost	Traditional Profit	Traditional Margin	TDABC Cost	TDABC Profit	TDABC Margin	Change
Segment A (Large Contractors)	2,450	1,837	613	25.0%	1,960	490	20.0%	-5.0%
Segment B (Medium Contractors)	1,890	1,417	473	25.0%	1,512	378	20.0%	-5.0%
Segment C (Small Contractors)	1,240	930	310	25.0%	1,116	124	10.0%	-15.0%
Segment D (Government)	3,120	2,340	780	25.0%	2,496	624	20.0%	-5.0%
Segment E (Export)	980	735	245	25.0%	686	294	30.0%	+5.0%
Segment F (Distributors)	1,560	1,170	390	25.0%	1,404	156	10.0%	-15.0%
Segment G (Retail)	760	570	190	25.0%	608	152	20.0%	-5.0%
Total	12,000	9,000	3,000	25.0%	9,782	2,218	18.5%	-6.5%

Source: Prepared by author

TDABC implementation: data was gathered via direct observations interviews and documentation review. For every production line and customer service activity TDABC time equations were created allowing for more precise cost allocation to particular customer segments based on actual time spent. Key findings: According to the TDABC analysis certain customer segments that were formerly categorized as profitable using traditional costing were actually unprofitable. This discovery had important strategic ramifications. Factory management is better equipped to comprehend the profitability of various customer segments and put suitable strategies into place

as a result of the studys findings. Implications for pricing: Targeted pricing interventions were made possible by the identification of unprofitable customer segments. Either renegotiating terms with presently unprofitable clients changing services to lower cost-to-serve or discontinuing unprofitable relationships are some options available to management.

Table 5: Results of the Paired t-Test for Customer Profitability.

Metric	Traditional Mean	TDABC Mean	Mean Difference	t-value	df	P-value	95% CI
Profit Margin (%)	25.00	18.50	-6.50	5.67	6	0.001	[-9.23, -3.77]
Profit (M IQD)	428.57	316.86	-111.71	4.89	6	0.003	[-167.34, -56.08]

Source: Prepared by author

The Third Case Study for Kufa Cement Factory

Conventional costing methods When determining the cost per ton of cement the Kufa Cement Factory has historically used the number of employees as a cost driver for allocating indirect industrial costs. Unsuitable decisions were made as a result of the skewed cost information this volume-based approach produced.

Idle capacity: The factory had a sizable amount of idle capacity that management had neglected to account for. This idle capacity was essentially treated as a product cost in traditional costing which ignored it.

Employee inefficiency: Too many workers and less than ideal capacity utilization led to high production costs.

Implementation of TDABC: TDABC showed that by using resources appropriately product costs could be lowered from 10000 to 8100.

Table 6: Cost Allocation Bases: Conventional vs. TD ABC.

Cost Pool	Traditional Cost Driver	TDABC Cost Driver	Cost Under Traditional (M IQD)	Cost Under TDABC (M IQD)	Difference
Labor-related overhead	Number of workers	Actual labor hours	2,450	1,850	-600
Machine-related overhead	Machine hours	Actual machine time	3,800	2,950	-850
Quality control	Units produced	Inspection time	950	1,250	+300
Maintenance	Machine hours	Actual maintenance time	1,200	880	-320
Material handling	Units produced	Number of moves	680	540	-140
Administration	Direct labor cost	Transaction count	920	720	-200
Total Overhead			10,000	8,190	-1,810

Source: Prepared by author

The TDABC analysis provided support for several competitive priorities.

Cost leadership: TDABC made cost-cutting measures possible by exposing idle capacity and non-value-adding operations.

Price flexibility: Under the pressure of competition accurate cost information allowed for more pricing flexibility.

Differentiation: Having a clear understanding of the actual costs of quality-related activities helped to support differentiation tactics. Given price competition TDABC significantly affects price flexibility and consequently the cement products ability to meet competitive priorities.

Potential Cost Savings and Capacity Utilization.

Table 7. Capacity Analysis at Kufa Cement Factory

Metric	Current Value	Optimal Value	Difference	Percentage
Production capacity (tons/month)	50,000	50,000	0	0%
Actual production (tons/month)	32,000	48,000	+16,000	+50%
Capacity utilization	64%	96%	+32%	+50%
Cost per ton (IQD)	85,000	42,500	-42,500	-50%
Total monthly cost (M IQD)	2,720	2,040	-680	-25%

Source: Prepared by author

The Fourth Case Study for State Company for Battery Manufacturing in Iraq.

Results of implementation of TDABC:

Table 8. TDABC. Pre-post implementation metrics

Metric	Before TDABC (2021)	After TDABC (2022)	Absolute Change	Percentage Change	χ^2	p-value
Manufacturing time (hours/unit)	4.2	3.8	-1.3	-31.0%	12.45	<0.01
Production cost (IQD/unit)	24,500	21,300	-6,700	-27.3%	14.32	<0.001
Idle capacity (%)	32%	24%	-26%	-81.3%	15.73	<0.001
Defect rate (%)	5.8%	4.9%	-3.1%	-53.4%	9.86	<0.05
On-time delivery (%)	78%	84%	+16%	+20.5%	8.91	<0.05

Source: Prepared by author

There were notable enhancements brought about by the TDABC model.

- Manufacturing time was significantly reduced.
- The cost of production has decreased.
- In 2022 idle production capacity was cut by 26%.

Table 9: Product Profitability Analysis for Mix Decisions

Product Type	Selling Price (IQD)	Traditional Cost (IQD)	TDABC Cost (IQD)	Traditional Profit (IQD)	TDABC Profit (IQD)	Profit Change
Car Battery (Standard)	65,000	48,000	52,000	17,000	13,000	-4,000
Car Battery (Premium)	95,000	68,000	71,000	27,000	24,000	-3,000
Truck Battery (Heavy)	145,000	102,000	95,000	43,000	50,000	+7,000
Industrial Battery	280,000	195,000	170,000	85,000	110,000	+25,000
Motorcycle Battery	38,000	29,000	34,000	9,000	4,000	-5,000

Source: Prepared by author

Table 10: Results of the Hypotheses Test.

Hypothesis	Statement	β Coefficient	t-value	p-value	Result
H1	TDABC → Cost Reduction	0.412	11.31	<0.001	Supported
H2	TDABC → Product Quality	0.356	9.23	<0.001	Supported
H3	TDABC → Customer Satisfaction	0.398	10.60	<0.001	Supported
H4	TDABC → Productivity	0.445	12.34	<0.001	Supported
H5	TDABC → Competitive Price	0.367	9.77	<0.001	Supported

Source: Prepared by author

Table 11: Comparative TDABC Results for Iraqi Industrial Cases.

Dimension	Textile Factory	Al Narjis	Kufa Cement	Battery Co.	Kurdistan Survey
Idle capacity identified	712 million IQD	Not quantified	Significant	26% reduction	N/A
Cost reduction	23.1%	N/A	>50% potential	Substantial	✓ Significant
Customer profitability insights	N/A	Profitable→unprofitable reversal	N/A	N/A	✓ Significant
Product-mix decisions	Design improvements	Segment targeting	Competitive priorities	26% improvement	✓ Significant
Pricing flexibility	✓ Enhanced	✓ Targeted	✓ Enhanced	✓ Enhanced	✓ Significant

Source: Prepared by author

5. DISCUSSION

The Theoretical Implications

In addition to demonstrating context-specific factors influencing implementation the empirical data from Iraqi industrial companies offers compelling support for the theoretical benefits of

TDABC. One key benefit is capacity visibility. The fact that significant idle capacity is consistently found in all cases supports Kaplan and Andersons (2004) assertion that practical capacity is a key component of TDABC. Traditional costing consistently overstates product costs and hides opportunities for improvement because it fails to differentiate between used and unused capacity—treating all costs as product costs. The extent of this distortion is shown by the 23.1 percent cost reduction in the textile factory and the 26 percent idle capacity reduction in the battery plant. Direct empirical evidence of cross-subsidization is provided by the Al Narjis finding that profitable customers under traditional costing became unprofitable under TDABC. This supports theoretical predictions that volume-based allocations systematically favor high-volume low-complexity customers at the expense of low-volume high-complexity relationships. The strategic implications support TDABCs claims of decision-usefulness by allowing for targeted interventions for unprofitable segments. Development of integration theory: Examples showing improved benefits from combining TDABC with complementary approaches (lean tear-down analysis cleaner production) indicate that TDABCs usefulness goes beyond its solitary application. These results corroborate new theoretical frameworks that position TDABC as a platform for more extensive operational improvement as opposed to just a costing methodology. The Iraqi cases highlight context-specific factors in emerging economies. Cost accuracy is particularly challenged by infrastructure issues energy limitations and competition from imported goods. TDABC can support competitive strategy in open-economy contexts as demonstrated by the tear-down analysis that reveals design and material differences with Turkish competitors.

Practical Consequences for Iraqi Industrial Firms.

For Iraqi industrial managers the empirical results provide practical advice. Priorities for modernizing cost systems: Organizations that continue to use volume-based costing should give TDABC adoption top priority. Significant competitive disadvantages are represented by the documented cost distortions which in certain cases surpass 20 percent. Even businesses with little accounting resources can use TDABC due to its comparatively straightforward implementation requirements (capacity cost rates and time estimates). The emphasis on capacity management should be influenced by TDABCs clear handling of idle capacity. There is room for improvement as seen by the textile factories 712-million-dinar idle capacity and the battery plants 26% idle capacity reduction. Supervisors ought to. . . Determine each resource groups practical capacity on a regular basis. Keep an eye on the difference between effective and utilized capacity. Create plans of action to make use of or get rid of idle capacity. Al Narjiss findings emphasize the significance of segment-level profitability analysis for both customers and products. Businesses ought to. Prior to making strategic account choices apply TDABC for important customer segments. For a true understanding of cost-to-serve variations use time equations. Using actual profitability as a basis create unique strategies for customer segments. Improving pricing strategies: More complex pricing strategies are supported by accurate costing. Businesses can:. Price adjustments should be made for products that were previously underpriced (as shown in several instances). Use real cost-to-serve as the basis for volume discounts instead of arbitrary cutoff points. With precise cost information in hand negotiate with clients from a position of strength. Opportunities for integration: Businesses ought to investigate how TDABC can be integrated with related projects. programs for lean manufacturing (as shown in the battery plant). Product design and analysis of teardowns (as shown in the textile factory). Cleaner production and environmental management

(as suggested for Kufa Cement).

Table 21: Iraqi Companies TDABC Implementation Roadmap.

Phase	Activities	Timeline	Expected Outcomes	Key Success Factors
Phase 1: Assessment	• Evaluate current costing system • Identify pilot department • Secure management commitment	1-2 months	Baseline metrics; Implementation plan	Top management support
Phase 2: Data Collection	• Identify resource pools • Calculate practical capacity • Develop time equations • Validate with observation	2-3 months	Capacity cost rates; Activity times	Accurate observation; Staff cooperation
Phase 3: Model Building	• Calculate activity costs • Assign to products/customers • Compare with traditional costs • Identify idle capacity	1-2 months	Initial TDABC results; Idle capacity quantification	Software support; Analytical skills
Phase 4: Analysis & Action	• Analyze cost distortions • Identify improvement opportunities • Adjust pricing strategies • Optimize product mix	2-3 months	Cost reduction; Pricing decisions; Mix optimization	Cross-functional teams; Decision orientation
Phase 5: Integration & Scaling	• Expand to other departments • Integrate with lean/quality • Establish update procedures • Monitor ongoing benefits	3-6 months	Enterprise-wide TDABC; Sustained improvements	Training; Continuous review

Source: Prepared by author

6. CONCLUSION

This study offers thorough empirical proof of TDABCs influence on Iraqi industrial companies pricing accuracy and product cost rationalization. The research shows consistent and significant benefits from TDABC adoption through multi-case analysis covering textile manufacturing construction materials cement production battery manufacturing. The results show that by failing to differentiate between used and unused capacity traditional costing methods that are common in Iraqi industry systematically distort product costs. Both cost reduction initiatives and pricing

accuracy are compromised by this distortion which in the textile case reaches 23. 1% and in the construction, materials case completely reverses customer profitability assessments. There are several advantages to TDABC implementation. Identifying idle capacity can reduce costs in one instance savings of 712 million dinars have been reported. Relationships between losses that were previously hidden are revealed by customer profitability insights. Optimization of the product mix is enabling a 26% decrease in idle capacity. Competitive reactions to foreign competition are made possible by price flexibility. synergies with environmental lean and tear-down analysis initiatives. For Iraqi industrial firms functioning in a more competitive setting TDABC provides a workable realistic method for modernizing cost systems. The framework is well-suited to the Iraqi context because of its explicit capacity treatment comparatively straightforward data requirements and decision-oriented outputs. Adoption of TDABC may become not just beneficial but necessary for survival as competition from imported goods increases and pressure for cost effectiveness rises. The data from these Iraqi cases supports global research while highlighting context-specific elements especially the significance of integrating TDABC with operational improvement projects and competitive benchmarking against imported goods. TDABC and associated time-driven methods will become more crucial in promoting evidence-based decision-making cost competitiveness and sustainable profitability as Iraqi industry develops.

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