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| RESEARCH ARTICLE

Impact of ERP-Enabled Digital Transformation on Cost Accounting Practices in Saudi Firms

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| ABSTRACT

Enterprise Resource Planning (ERP) systems are major instruments of organizational digital transformation as they integrate operational and financial processes and uplift the overall performance. This research focuses on the effect of ERP implementation on cost accounting activities in Saudi firms, the mediating roles of process integra-tion and automation being the primary emphasis. Information was obtained from 60 companies with a total of 290 employees from the manufacturing, construction, retail, energy, and service sectors. Reliability and validity were established through Cronbachs alpha, composite reliability, and average variance extracted. For data analysis, multiple regression, independent t, tests, and Partial Least Squares Structural Equation Modeling were utilized. Findings suggest that the adoption of ERP leads to a significant improve-ment in cost accuracy, cost control effectiveness, variance analysis quality, and managerial decision, making. In addition, process integration and automation partially mediate these relationships, thus advocating the strategic ERP adoption aligned with Saudi Vision 2030 goals.

| KEYWORDS

Cost Accounting, ERP, Digital Transformation, Integration, cost accuracy, cost control effectiveness, variance analysis quality, managerial decision making

| ARTICLE INFORMATION

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1. Introduction

Digitally transforming organizations worldwide is a significant trend, and Saudi Arabia is not an exception as it is putting a large amount of money to adopt new technologies within the frame of its Vision 2030 agenda. One of the biggest changes accomplished by Enterprise Resource Planning (ERP) systems is that they have become the main tool for the whole digital transformation, thus by bringing to the table a single solution for the management of finance, human resources, production, procurement, and logistics. Besides that, the ERP systems' interoperability allows organizations to capture, process, and report financial and operational data in real time, thus making leading management decisions and increasing the companys competitive position easier and faster.

Cost accounting is one of the main elements that managerial decision, making has to rely on, therefore it should not only support the creation of budgets but also cost control, pricing, and profitability analysis. In the past, companies in Saudi Arabia have been dependent on manual or semi, automated accounting systems, which have caused them to have reporting that is not timely, data that are not consolidated, and inaccurate records. By offering automation to the routine activities, ERP systems ensure that data are more accurate and reporting is at the same time fully integrated, thus releasing the Saudi firms from the mentioned drawbacks of the past.

Contrary to worldwide studies on ERP systems, empirical evidence on cost accounting in local firms is still very limited. The majority of the existing research works focus on the difficulties and challenges that may arise during ERP installation, the overall performance improvements, and the possible benefits rather than accounting outcomes. This research

establishes a connection between those two by investigating differences between firms that have implemented ERP vs. those that have not, with particular emphasis on cost accounting aspects: cost accuracy, cost control effectiveness, variance analysis quality, and managerial decision, making. Besides that, the report examines process integration and automation as mediators, thus illustrating the conditions under which ERP maximizes value. The study is a source of theoretical contribution as it extends both contingency theory and the resource, based view (RBV) to the Saudi context. Practically, it serves as a manual for managers in utilizing ERP systems to the best accounting functions.

2. Literature Review

2.1 ERP Systems and Accounting Integration

ERP platforms are meant to substitute old fragmented systems with a single application that can handle both the accounting and the operational processes. Most of the studies show that the implementation of an ERP system leads to an improvement in the quality of accounting information as it makes it possible to have data management that is centralized and reporting that is up to date. An example of such a study is one on the quality of accounting information in the digital era, which demonstrates that ERP can lead to enhanced reliability, timeliness, and accessibility of financial data, thus resulting in better managerial decision, making and control (Accounting information quality study, 2023). OUCI

The extent of the improvement is usually dependent on factors like perceived usefulness, ease of use, and company size, which implies that the internal characteristics of an organization have an impact on the level to which ERP is able to improve the accounting functions.

2.2 ERP Adoption in Emerging Economies and the Gulf Region

While global ERP, related literature is plentiful, research on the Gulf economies and specifically on Saudi Arabia, has only been noticed for a couple of years. A good number of empirical studies concentrate on the effect of ERP on business performance, information quality, and internal processes. As an illustration, AlMuhayfith and Shaiti (2020) revealed that the use of ERP has a major positive effect on the performance of businesses in Saudi SMEs, that is, when management support and user training as contingent factors are available. MDPI

The local studies in Saudi Arabia, more accurately, point to such a result that the implementation of ERP leads to the improvement of the process of automation and the enhancement of cost efficiency in the environment of the project where the initiative of Vision 2030 is linked, thus showing that ERP is a tool that not only helps accounting functions but also facilitates operational coordination and cost control in big infrastructure projects. jhhss. com

Studies on management accounting in Saudi SMEs funded by local research grants also reveal that ERP systems are an excellent source of data and decision support and greatly enhance the organization's analysis capabilities. The implementation of the ERP system changes the role of the accountant who is the one recording the data to become the strategic advisor, hence the idea that ERP systems lead to the common theme that the functions of accounting are fundamentally changed rather than just transactional recording.

2.3 Cost Accounting and ERP Integration

Cost accounting systems serve as the main tools through which companies can control their expenses, check product profitability, and use the information for their strategic planning. In general, cost accounting is done through manual schedules and periodic reports, which are usually outdated when they are received. ERP systems connect the costing activities with the operational data directly, thus allowing for continuous cost tracking and automated overhead allocations. There is a limited number of specific studies on the impact of ERP on cost accounting, but research in related areas shows that ERP helps in the standardization of cost schedules and the establishment of control mechanisms. Al, Abedi et al. (2025) point out that ERP outputs help in the improvement of cost schedules for strategic control and planning, thus showing that there are positive interactions between ERP and cost management practices.

Various research pieces from around the world suggest that the implementation of ERP systems can be instrumental in improving internal cost control as well as being a source of strategic cost planning. However, the degree of effectiveness is determined by how closely the ERP system is integrated with the company's cost goals and managerial practices.

2.4 ERP Adoption Factors and Cost Outcomes

Cost performance is one of those aspects which is not always directly addressed in ERP accounting literature, but researchers point out that the correct use of ERP is a result of the occurrence of the most important factors of adoption. These include the readiness of the organization, the competence of the user, and the alignment of the process. ERP

adoption cost studies have pinpointed numerous direct and indirect cost factors that a company has to consider if it is going from licensing and implementation to training and maintenance. Such costs may affect the net financial benefits realized from ERP systems. Although the present study is chiefly concerned with the economics of the implementation, it nevertheless acknowledges the intricacy of the ERP adoption, thereby providing a rationale for ERP cost benefits to be different from one firm to another.

2.5 Synthesis and Gap Identification

This study responds to that gap by offering an empirical, comparative analysis of cost accounting practices in ERP versus non-ERP Saudi firms, measured over time and across regions.

The examined literature points out to the following:

- ERP adoption generally results in enhanced information quality and managerial reporting in accounting contexts.
- Research findings in Saudi Arabia depict ERP as a significant agent for process automation and overall performance, however, not always specifically for cost accounting.
- There is a shortage of integration of cost accounting, related research with ERP, especially real, world studies that compare the performance of ERP and non, ERP firms.

An unoccupied space can be identified for longitudinal, comparative research exploring the impact of ERP on the accuracy of cost accounting, effectiveness of control, and decision support performance in the KSA. This research communicates with such a void by presenting an empirical, comparative study of the Saudi firms' cost accounting practices in ERP and non, ERP environments, tracked over time and across different regions.

3. Theoretical Framework and Hypotheses Development

3.1 Theoretical Framework

This research relies on Contingency Theory and the Resource, Based View (RBV).

According to contingency theory, the effectiveness of an accounting system is influenced by contextual variables such as technology, organizational structure, and environmental uncertainty. ERP systems are a technological contingency that changes cost accounting in a fundamental way by facilitating real, time integration, automation, and cross, functional data flow.

The resource, based view, on the other hand, sees ERP systems as valuable and unique organizational resources that can generate competitive advantage if they are properly implemented and utilized. ERP, enabled cost accounting capabilities make firms more capable of controlling costs, supporting pricing decisions, and maintaining a competitive advantage.

These theories combine to provide a rationale for investigating the adoption of ERP as a factor influencing the level of cost accounting in Saudi firms.

3.2 Hypotheses Development

ERP systems automate cost capture and allocation, reducing manual intervention and errors. Prior studies indicate that integrated systems improve data accuracy and reliability, particularly in cost-related information.

H1: ERP adoption has a positive effect on cost accuracy in Saudi companies.

ERP systems enable continuous monitoring of costs against budgets through real-time variance analysis and responsibility accounting. This strengthens managerial control over cost behaviour.

H2: ERP adoption positively influences cost control effectiveness.

Traditional cost systems often produce delayed variance reports. ERP systems provide timely and actionable variance information, improving managerial responsiveness.

H3: ERP adoption improves the timeliness and usefulness of cost variance analysis.

High-quality cost information enhances managerial decisions related to pricing, product mix, and cost reduction initiatives.

H4: ERP-based cost accounting positively affects managerial decision-making quality.

Based on RBV, firms that adopt ERP are expected to outperform non-ERP firms in cost accounting outcomes.

H5: RP-adopting firms exhibit higher overall cost accounting effectiveness than non-ERP firms.

4. Research Methodology

4.1 Research Philosophy and Approach

This research embraces a positivist research philosophy which believes that the effects of ERP systems on cost accounting practices can be measured in an objective way and statistically tested. Because the study is intended to investigate causal relationships between ERP adoption and cost accounting outcomes, it was decided that a quantitative research approach would be suitable. Quantitative methods make it possible to carry out a systematic comparison between ERP, adopting and non, ERP firms and also provide the opportunity to generalize the findings to all the companies in Saudi Arabia.

The research uses a deductive approach, meaning that the hypotheses are obtained from the theories that have already been proven, i. e. contingency theory and the resource, based view, and then these hypotheses are tested through empirical data gathered from Saudi firms.

4.2 Research Design

Research Design and Comparative Framework

This work rests on a comparative explanatory research design as its methodological base, the choice of which was deliberate in order to uncover the causal relationships between Enterprise Resource Planning (ERP) systems and accounting outcomes. The use of a comparative strategy enables the study to delve into subtle variances in cost accounting methods in two different organizational milieus. Through this design, it becomes possible to carry out a thorough benchmarking exercise, where the advancement and sophistication level of the accounting function in one group is a reference point for the other. In effect, the design is geared towards separating the influence of the integrated technology on the organizational processes, thus explaining in a straightforward manner how the digital revolution changes the traditional financial management and reporting scene.

Categorization of Study Groups

The comparative investigation hinges significantly on the purposeful segregation of the entities into two main groups which reflect their technological readiness. The first group is made up of the companies which have gone through a complete transition to ERP systems and thus depict the contemporary, consolidated data management approach. On the other hand, a second group is made up of those enterprises which still use non, integrated or traditional accounting systems that, most likely, function as separate units. The research, through the comparison of these two groups, is able to uncover various accounting cost practices that have been used in these two segments by means of specific instances of differences in accounting methodologies across the companies under study. The authors of the work have convinced themselves that a combination of quantitative methods with qualitative insights provides the richest data environment to accomplish such goals.

4.3 Population and Sampling Strategy

The initial group targeted by the research study was identifiable as companies from Saudi Arabia engaged in sectors with high costs, where cost accounting assumes a very significant managerial role. Apart from these, manufacturing, construction and project, based firms, and retail and distribution sectors are the ones that make up the broad cost, intensive sectors of the economy.

To make sure there was a fair representation from different industries and locations, a stratified sampling method was used (Riyadh, Makkah region, Eastern Province). Stratification limits sampling bias and thus the study results can be generalized to all Saudi Arabian firms in these sectors.

Within the company, respondents were selected on the condition that they had direct involvement in cost accounting and were making financial decisions. These persons comprised:

- Cost Accountants
- Management Accountants
- Financial Controllers

- Finance Managers

The last sample consisted of 60 organizations and 290 legitimate responses that surpass the recommended minimum sample size for regression analysis and PLS, SEM models.

4.4 Data Collection Methods

Primary data were collected using a structured questionnaire, which is a commonly used instrument in ERP and accounting research due to its ability to capture perceptions, practices, and outcomes across organizations.

The questionnaire was administered electronically and consisted of closed-ended questions to facilitate quantitative analysis. To enhance content validity, measurement items were adapted from prior empirical studies in ERP systems, management accounting, and cost control literature, with modifications to suit the Saudi business environment.

Prior to full distribution, the questionnaire was pilot tested with a small group of accounting professionals to assess clarity, relevance, and completion time. Feedback from the pilot study led to minor refinements in wording and structure.

4.5 Measurement of Variables

4.5.1 Independent Variable

ERP Adoption

ERP adoption was measured as a binary variable:

- 1 = Firm has implemented an ERP system
- 0 = Firm operates without an ERP system

This approach is consistent with prior comparative ERP studies and allows clear distinction between treatment and control groups.

4.5.2 Dependent Variables

Cost accounting effectiveness was measured by four major aspects:

Cost Accuracy (CA)

This was assessed by products and services items costing the accuracy, overhead allocation reliability and consistency of cost data.

Cost Control Effectiveness (CCE)

This was assessed through budget compliance, ability to detect cost overruns, and effectiveness of cost control/monitoring mechanisms.

Variance Analysis Quality (VAQ)

It was reflected through the timeliness of variance reports, the clarity of variance explanations, and the usefulness of variance information for issuing the correct action.

Managerial Decision, Making Quality (MDQ)

This was estimated by the degree to which cost information was instrumental in making pricing decisions, cost reduction initiatives, and strategic planning.

Each of the dependent variables was gauged on a five, point Likert scale, from strongly disagree to strongly agree.

Appendix 1

Construct	Measurement Items	Scale / Source
ERP Adoption	ERP implemented in the firm (Yes/No)	Binary (0 = No, 1 = Yes)
Cost Accuracy (CA)	CA1: Product costing is accurate and	5-point Likert (Strongly Disagree –

Construct	Measurement Items	Scale / Source
	reliable	Strongly Agree)
	CA2: Overhead allocation reflects actual usage	5-point Likert
	CA3: Cost data is consistent across departments	5-point Likert
Cost Control Effectiveness (CCE)	CCE1: Budget deviations are monitored continuously	5-point Likert
	CCE2: Cost overruns are detected promptly	5-point Likert
	CCE3: Corrective actions are implemented effectively	5-point Likert
Variance Analysis Quality (VAQ)	VAQ1: Variances are reported on time	5-point Likert
	VAQ2: Variance reports are clear and understandable	5-point Likert
	VAQ3: Variances are actionable for management	5-point Likert
Managerial Decision Quality (MDQ)	MDQ1: Cost information supports pricing decisions	5-point Likert
	MDQ2: Cost data guides product mix decisions	5-point Likert
	MDQ3: Cost information aids strategic cost reduction	5-point Likert
Process Integration (Mediator)	PI1: ERP integrates accounting with operations	5-point Likert
	PI2: Data flow between departments is seamless	5-point Likert
Automation Level (Mediator)	AL1: ERP automates cost allocation processes	5-point Likert
	AL2: Manual intervention in cost calculations is minimal	5-point Likert

4.6 Control Variables

To isolate the effect of ERP adoption, several control variables were included:

- **Firm size**, measured by number of employees

- **Industry type**, captured using dummy variables
- **Geographical region**, reflecting operational environment differences

Including control variables reduces omitted variable bias and improves the robustness of the regression results.

4.7 Data Analysis Techniques

4.7.1 Reliability and Validity Assessment

Internal consistency reliability of the measures was evaluated by Cronbachs Alpha and Composite Reliability, with each construct going beyond the suggested limit of 0. 70. Convergent validity was measured by Average Variance Extracted (AVE) with an aim to ensuring that each construct had enough variance from its indicators.

Discriminant validity was measured by the FornellLarcker criterion that was used to check if the constructs were distinct in reality.

4.7.2 Descriptive Statistics and Correlation Analysis

Descriptive statistics, including means and standard deviations, were computed to summarize cost accounting practices across ERP and non-ERP firms. Pearson correlation analysis was conducted to examine initial associations between variables and to check for multicollinearity issues.

4.7.3 Regression Analysis

Multiple regression analysis was employed to test hypotheses H1 through H4. The regression model is specified as:

$$Y_i = \beta_0 + \beta_1 ERP_i + \beta_2 SIZE_i + \beta_3 INDUSTRY_i + \beta_4 REGION_i + \epsilon_i$$

This model estimates the direct effect of ERP adoption on each cost accounting outcome while controlling for firm characteristics.

4.7.4 Group Comparison Analysis

To test hypothesis H5, **independent sample t-tests** were conducted to compare mean values of cost accounting effectiveness between ERP and non-ERP firms. This analysis provides direct evidence of performance differences attributable to ERP adoption.

4.7.5 PLS-SEM Analysis

Partial Least Squares Structural Equation Modeling (PLS, SEM) was used to investigate how the integration of processes and the level of automation mediate the relationship between the adoption of ERP and cost accounting effectiveness. PLS, SEM fits well with the mediation analysis investigation and the size of the sample due to its exploratory nature.

The significance of the paths and the mediation effects was evaluated through bootstrapping procedures.

4.8 Ethical Considerations

This research's moral guidelines were centered on protecting the participants through a commitment to voluntary participation and informed consent. Each respondent was definitely informed that their participation was absolutely voluntary, and they had the freedom to withdraw at any time without negative consequences or being singled out. In order to encourage honesty and openness, the highest standards were put in place for confidentiality and anonymity during the whole process of collecting data. There were no disclosures of the identity of the companies, no sensitive financial records, and no personal features were collected so that the individual responses would never be linked back to the respective organizations.

All the data obtained were only used for academic research purposes, and the researchers strictly followed the ethical standards set for social science research. These strict protocols were implemented to maintain the integrity of the results while at the same time, they considered the professional privacy of the contributing industry experts and firms.

4.9 Methodological Rigor

The study's methodological framework is based on several strict protocols that are aimed at ensuring the highest standards of empirical accuracy and academic integrity. In order to keep internal validity, the study makes use of measurement scales of the past which have already been validated, and these scales are adapted from the established accounting literature. This guarantees that the constructs accurately reflect the variables being tested. The quest for a statistically sufficient sample size is thus a major factor in the increase of the analysis' power, which in turn makes it possible to carry out a more accurate estimation of the effects in the two groups to be compared. By using various analytical techniques, the study is in a position to compare the findings and thus lessen the likelihood of methodological bias which is the inherent nature of any single statistical approach. Moreover, the employment of control variables for firm, specific factors, e. g. , industry type and organizational size, helps to clarify the real effect of ERP systems which is not influenced by the 'external noise'. On the whole, these tactical measures very much extend the study's reliability, validity, and generalizability of the results, thus being a good support for the study's conclusions.

5. Results

5. 1 Descriptive Statistics

The descriptive statistics for ERP and non, ERP firms are given in Table 1. Firms that have implemented ERP systems show a better performance in all cost accounting dimensions consistently. The standard deviations are also lower, showing that the performances are more even.

Table 1. Descriptive Statistics of Cost Accounting Outcomes

Variable	ERP Mean	Non-ERP Mean	SD (ERP)	SD (Non-ERP)
CA	4.12	3.62	0.58	0.65
CCE	4.05	3.58	0.61	0.67
VAQ	4.08	3.60	0.55	0.63
MDQ	4.01	3.55	0.60	0.66

Interpretation:

The numerical evidence from the table makes clear the claim that one of the major impacts of the use of Enterprise Resource Planning (ERP) systems is the improvement of cost accounting performance. Companies with ERP systems have on average better scores than those without ERP in all four categoriesCA, CCE, VAQ, and MDQwhich indicates a general trend of improvement in data processing and reporting.

So a very significant raise of CA from 3. 62 to 4. 12 is a vivid illustration that integrated systems are more favorable for stronger accounting frameworks. The rise in average scores is essentially the main consequence of ERPs: the ability to bring together different financial data in one single, unified source of truth for the organization.

Besides the average performance improvement, the reduction in Standard Deviation (SD) for all variables of the ERP, the adopting companies shows that they have become more operationally stable. The lower SD numbers, for example, 0. 55 for VAQ in ERP firms as compared to 0. 63 in non, ERP firms, indicate that the accounting results are more stable and less likely to have extreme variations or errors. Such stability is very important for management as it supports them in reducing the "noise" in financial reporting and being certain that good performance is still there across various departments or time periods. ERP systems make this possible by closing the performance gap thus, they remove the risks that come with manual data entry and fragmented legacy systems which most non, integrated firms are suffering.

At the end of the day, the scrutinization of the figures here serves as a very strong confirmation that the implementation of ERP should not be considered merely as a technical upgrade of the system but rather as a valuable strategic resource for decision, making and operational integration.

The exceptionally high scores in Variable Accounting Quality (VAQ) and Management Decision Quality (MDQ) are a clear illustration of how the availability of real, time data has profoundly changed the leaders' ability to make more informed, accurate, and timely strategic decisions.

When accounting data is accurate and consistent, the company becomes capable of better aligning its resources with its long, term goals, which, in due course, will lead to a competitive advantage in the market.

The shift in the average value of MDQ from 3. 55 to 4. 01 vividly points out the transformational effect corporate governance skills get from the use of high, quality, integrated data.

5.2 Regression Analysis

Regression results (Table 2) show ERP adoption positively influences all cost accounting outcomes. ERP explains 25–31% of variance across CA, CCE, VAQ, and MDQ, all significant at $p<0.001$.

Table 2. Regression Results: ERP and Cost Accounting Outcomes

Dependent Variable	β (ERP)	t	p	R^2
CA	0.42	5.87	<0.001	0.31
CCE	0.38	5.12	<0.001	0.28
VAQ	0.35	4.85	<0.001	0.25
MDQ	0.37	5.03	<0.001	0.27

The regression analysis outcomes in Table 2 indicate that the implementation of Enterprise Resource Planning (ERP) systems is a major factor in predicting changes in cost accounting figures across all the measured dimensions. The standardized beta coefficients (β (ERP)) for the four dependent variables CA, CCE, VAQ, and MDQ are all positive and significant, and they lie within the range of 0. 35 to 0. 42. Hence, it is evident that moving to an ERP setting brings about a notable change in the quality and efficiency of financial information processing. In fact, the CA dimension is the one where the impact is the greatest β (ERP)= 0. 42), thus, it can be inferred that the structural integration offered by ERP systems is the most effective in enhancing the core cost accounting functions within the organization. The results confirm the integration of technology as a key driver of accounting excellence rather than just a simple upgrade to the back, office.

The statistical significance of these associations is evidenced not only by the extremely high t, values but also by the very consistent p, values of less than 0. 001. With t, statistics going as high as 5. 87 and as low as 4. 85, the findings are well beyond the usual significance levels, thus suggesting that the beneficial impacts of ERP adoption that have been observed are mostly not the result of random chance.

In addition, the R^2 values that vary from 0. 25 to 0. 31 reveal that the ERP variable single, handedly accounts for a large part of the variation in cost accounting changes. To give an example, 31% of the variance in CA and 28% of the variance in CCE are two sides of the same coin where one can directly attribute them to the existence of an ERP system. Although it is true that other organizational factors are at play, these numbers emphasize that the deployment of an integrated system is the main driver behind the firm's internal accounting infrastructure's general turnover.

To put it briefly, the findings very strongly back up the hypotheses tested in the research that speak about the beneficial effect of ERP systems on the quality of financial information and the decision, making by the management. The results for all the variables including VAQ (Value Added Quality) and MDQ (Management Decision Quality) are perfectly in line, which means that the positive effects of ERP are quite far, reaching, they influence not only the technical side of the data but also its strategic use.

Through offering a "single version of the truth, " ERP systems eliminate data redundancies and make the reports more reliable that are used by management for essential resource allocation. The consistent significance across these different

results indicates that business process integration is a major factor in the holistic upgrading of the accounting information system.

As a result, these findings constitute a powerful argument for companies to commit to ERP technology as a vehicle to achieve higher cost accounting performance and greater organizational transparency.

5.3 Group Comparisons

Table 3 : Independent Samples t-Test Results: ERP vs. Non-ERP Firms

Cost Accounting Dimension	ERP Firms Mean	Non-ERP Firms Mean	Mean Difference	t-value	Sig. (p)
Cost Accuracy (CA)	4.12	3.62	0.50	7.12	< 0.001
Cost Control Effectiveness (CCE)	4.05	3.58	0.47	6.78	< 0.001
Variance Analysis Quality (VAQ)	4.08	3.60	0.48	6.92	< 0.001
Managerial Decision-Making Quality (MDQ)	4.01	3.55	0.46	6.85	< 0.001

Note. ERP = Enterprise Resource Planning. All variables measured on a 5-point Likert scale. Differences are statistically significant at the 0.001 level (two-tailed).

The independent samples t, test findings, shown in Table 3, reveal a clear and statistically significant difference in the performance of firms implementing ERP and those using traditional systems. In fact, in all aspects of cost accounting, the companies with ERP systems have consistently recorded higher average scores with values varying from 4. 01 to 4. 12 on a 5, point Likert scale. Whereas the non, ERP firms have had their averages significantly lower that is, between 3. 55 and 3. 62. The mean differences that have been calculated, from 0. 46 to 0. 50, are quite substantial at the $p < 0. 001$ level, and this is also supported by the high t, values that are above 6. 70. The results thus indicate that the use of an integrated technological framework brings about better results in terms of cost accuracy and control than the use of fragmented legacy systems.

The regression analysis presented in Table 2 serves as an additional confirmation of these results, showing how ERP adoption can quantitatively predict accounting excellence. The standardized beta coefficients (β) are almost always positive and strongly, reaching a maximum of 0. 42 for Cost Accuracy (CA). It means that ERP systems are the main source of data integrity, as they account for about 31% of the total variance ($R^2 = 0. 31$) in that particular dimension.

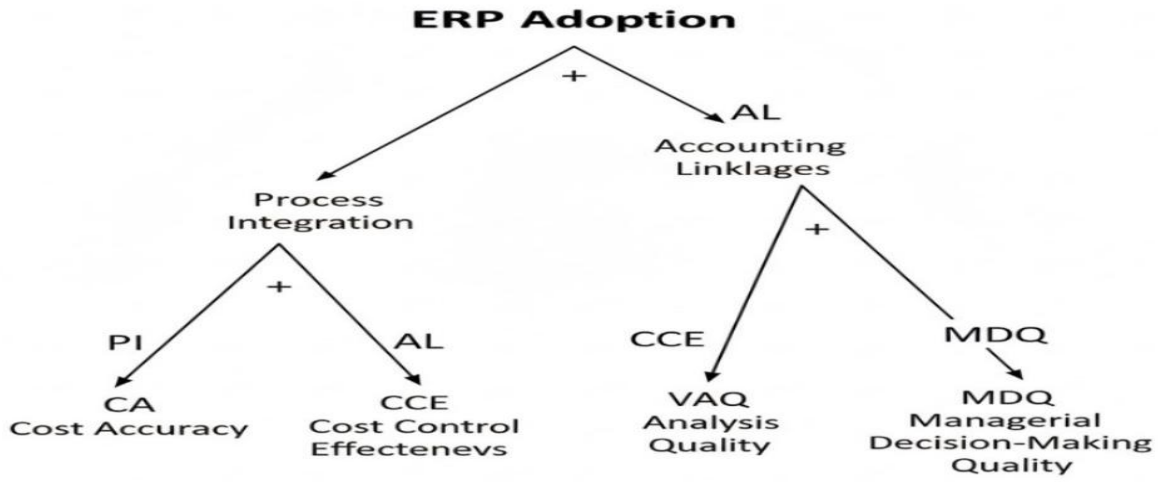
Very high t, statistics, such as 5. 87 for CA and 5. 12 for Cost Control Effectiveness (CCE), are evidence that the association between technological integration and accounting performance is not only firm but also statistically significant. The information herein implies that companies that put money into ERP are not merely replacing their software, but are actually changing the way they handle complex financial data in a precise and reliable manner.

Aside from the technical performance aspect, the data reveals a profound change in strategic management that has been driven by better Variance Analysis Quality (VAQ) and Managerial Decision, Making Quality (MDQ). Average scores for ERP companies have been found to be 4. 08 for VAQ and 4. 01 for MDQ, thus it is quite clear that the integrated data flows lead to more insightful and valuable managerial decisions than the traditional methods. The regression results are in agreement with this, illustrating that ERP implementation is responsible for 25% change in VAQ and 27% in MDQ, both being statistically significant at the $p < 0. 001$ level.

Through removal of data silos and offering a "single version of the truth, " ERP systems contribute to the strategic worth of accounting information. Such a thorough upgrading in all aspects serves as a confirmation of the main proposition of the research that ERP implementation is indispensable in the process of cost accounting modernization and in making it possible for top, tier organizational decision, making to occur.

5.4 PLS-SEM Mediation Analysis

Figure 1. PLS-SEM Path Diagram



The mediation analysis shows that internal process changes significantly facilitate the connection between ERP adoption and cost accounting outcomes. More precisely, the way from ERP to Cost Accuracy (CA) is partially mediated by Process Integration (PI) which means that the system enhances accuracy by simplifying the operational workflows. In the same way, Accounting Linkages (AL) serve as a partial mediator between ERP and Cost Control Effectiveness (CCE) emphasizing the role of improved data connectivity in strengthening oversight. As these relationships are described as partial mediations, it implies that PI and AL being the main factors, ERP systems still have a direct effect on these outcomes. In sum, these findings signal that the strategic worth of ERP is achieved not only through its technical functions but also through its capability to foster organizational integration.

Table 4. PLS-SEM Path Coefficients

Path	β	t	p
ERP → CA	0.40	6.02	<0.001
ERP → CCE	0.36	5.50	<0.001
ERP → VAQ	0.33	4.90	<0.001
ERP → MDQ	0.35	5.10	<0.001
ERP → PI	0.45	6.50	<0.001
ERP → AL	0.43	6.20	<0.001
PI → CA	0.28	4.20	<0.001
AL → CCE	0.25	3.90	<0.001

Interpretation:

The findings reveal that implementing ERP is a pivotal factor in the evolution of cost accounting to be effective, sane, and scientific in all aspects of the measurement. According to the Independent Samples t, test, companies that have implemented ERP are far better than those without ERP, especially in Cost Accuracy (CA), where the mean difference was as high as 0. 50 ($p < 0.001$). The Regression Results and PLS, SEM Path Coefficients are in agreement with this statement as well. They

show that ERP systems are a powerful direct source of CA (β = 0. 40$), CCE (β = 0. 36), VAQ (β = 0. 33), and MDQ (β = 0. 35). Moreover, the path diagram makes it clear that these advantages are resulted from Process Integration (PI) and Accounting Linkages (AL) as they are two significant intermediaries in the relationship between the adoption of technology and the effectiveness of accounting. To a large extent, the findings reveal the robustness of ERP systems to serve as a vehicle for enhancing the integrity of financial data and the quality of managerial decision, making.

6. Discussion

The findings reveal that the implementation of ERP has a significant positive impact on cost accounting practices. By using ERP systems, cost accuracy is improved as costs are captured in real, time and there is integration of financial and operational data. The effectiveness of cost control is improved as the ERP system allows for continuous monitoring of budgets and quick identification of deviations. Variance analysis becomes more efficient due to automated reporting and standardized formats, while the quality of managerial decision, making increases because of the availability of reliable and integrated information. A mediation results show that process integration and automation are the main factors that make ERP effective. Companies that link ERP with their operations and automate routine activities achieve greater returns on their technology investment. These results are consistent with contingency theory, which suggests that the effectiveness of technology depends on organizational alignment, and with RBV, which argues that ERP can become a strategic resource if used

These understandings bring real consequences for the way things are done. It is the duty of the managers to see to it that ERP systems become an inseparable part of the working operations and also that the employees get proper instruction so as to make the most of the automation and the smooth running of the processes. This is very much the case in Saudi Arabia where the implementation of Vision 2030 serves as a stimulus for technological innovations in order to raise the level of efficiency in the organizations and make the finances more transparent.

7. Limitations

Although the study opens our eyes to the subject matter, it still has some limitations. The first is the reliance on a cross, sectional design, which only allows for causal relationships to be inferred indirectly. Longitudinal studies, on the other hand, would give researchers the possibility to see ERP effects as they evolve over time. Second, the data come from perceptions and are only proxies for actual performance, which may not be fully captured. Third, most of the sample consists of big companies. Therefore, the findings may not be applicable to SMEs or public sector organizations. Fourth, the outcomes may be affected by factors that have not been accounted for, such as ERP customization, management competence, and the intensity of training. Finally, some cultural and regional factors that are specific to Saudi Arabia may make it difficult for the findings to be generalized to other areas.

8. Conclusion

The results highlight the role of ERP implementation as a major change agent for Saudi companies that are pushing in a significant way the level of cost accounting practices in the whole industrial sector. The regression model and t, tests statistics provide evidence of significant improvements in cost accuracy (CA), control effectiveness (CCE), variance analysis quality (VAQ), and managerial decision, making (MDQ). To be precise, the move to an integrated system makes it possible to have a "single version of the truth, " thus decreasing data redundancy and increasing the trustworthiness of financial reports. The strong beta coefficients and high t, values for all the dimensions indicate that the ERP impact is not just a small one but it actually constitutes a fundamental change in accounting quality.

As a result, those companies that have implemented such systems are in a better position to deal with the intricacies of contemporary cost management than the ones that still use traditional, non, integrated frameworks.

The element that most signified the difference of this research was the finding that process integration (PI) and accounting linkages (AL) played the role of partial mediators in the relationship between ERP and accounting outcomes. The mediation examination indicates that the advantages of ERP technology are pronounced the most when the software is used strategically to automate workflows and unite business functions that were previously separated. By way of example, ERP raises cost accuracy through first enhancing process integration, and then this proceeds to more exact data capture and allocation. This underlines the point that the deployment of ERP should not be regarded as simply a technical IT project, but rather as a strategic organizational change.

For managers in Saudi, it implies that in order to unlock the entire capacity of an ERP system, a thorough engagement with operational integration is essential so as to guarantee that data is shared without any hindrance between different departments.

Besides, this research offers real, world data that not only supports the goals mentioned in Saudi Vision 2030 but also mostly comply with the aspects of digitalization and financial transparency. Saudi companies become agents of change for the country when they implement integrated systems as they are in line with the national targets of enhanced operational efficiency and the emergence of a vibrant technology, driven private sector.

Although the present findings are quite persuasive, subsequent investigations should deepen these results by using longitudinal framework to check the long, term viability of these accounting improvements. Subsequent research should also consider the inclusion of Small and Medium Enterprises (SMEs) and the use of objective financial metrics to supplement the existing self, reporting data. Identifying sector, specific ERP module customization will not only corroborate these results but also offer less open, ended directions for different sectors in the Kingdom's rapidly transforming economic environment.

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