

Article

The Role of Resource Consumption Accounting in Achieving Competitive Prices and Sustainable Profitability

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Abstract: This study examines the roles of resource consumption accounting and competitive prices in attaining sustainable profitability. The objectives were (1) to determine whether the adoption of resource consumption accounting practices yields significant improvements in competitive strategies in a highly competitive situation where activity-based costing has proved to be insignificant, and (2) to ascertain if the positive relationship between competitive pricing and sustainable profitability is increased by the extent to which resource consumption accounting exerts pressure for sustainability profitability. A PLS-SEM procedure was applied in analysing 129 of the top 30 performing companies' structured questionnaire responses drawn from five industries in Kurdistan from 2021. The empirical results demonstrated that competitive pricing models involving resource consumption accounting systems provide superior price forecasting, error reduction and profit maximisation capabilities than existing energy models. The study's outcomes highlight that the extent to which resource consumption accounting exerts pressure on sustainability profitability significantly increases the positive relationship between competitive pricing and sustainable profitability. The results of this study advance construct and item development involving competitive pricing and resource consumption accounting while testing relationships to uncover the moderating role of resource consumption accounting in profit maximisation. Thus, energy and non-energy industrial companies must rely on resource consumption accounting to set competitive prices and enhance and sustain their profitability by considering the overlooked energy pricing stochastic parameters and errors amid rising energy shortages and costs.

Keywords: competitive prices; energy market; profit maximization; resource consumption accounting; stochastic parameters; sustainable profitability



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1. Introduction

Problems observed in contemporary business situations denote the limitations of merely setting competitive prices and how they hinder the attainment of competitive advantage and sustainable profitability. Such stems from incidences proving that setting competitive prices is a complex task surrounded by pricing irregularities [1] and failure by companies to sustain profitability in the long run [2]. Moreover, there is a clear distinction between attaining profitable levels and sustaining profitability, necessitating a huge cause for concern [1,2]. That is, situations proving to be currently profitable can potentially turn out to be unsustainable in the long run. It is in the midst of such circumstances that companies must seek ways of setting competitive prices and devising effective strategies capable of attaining sustainable profit levels. The importance of such aspects carries high relevance in contemporary business environments characterised by excessive market and industry competition [3], rising production costs [4], scarcity of resources and shocks like COVID-19 [5]. In addition, the business environment in which companies, especially industrial companies in the Kurdistan Region of Iraq (KRI), are operating is increasingly getting

complex and more dynamic. The study specifically draws insights from Kurdistan because of pricing rigidities, especially in its electrical energy market, hampering sustainable energy supply and pricing. These problems are due to a lack in the application of sound accounting methods due to the shortage of skilled accounting personnel. Consequently, these problems are observable through electrical power cuts, companies using expensive energy sources and undermined profit maximisation initiatives. Consequently, this imposes a significant burden and pressure on companies to optimise the use of resources, reduce their production costs, competitively price their products, continuously keep customers satisfied and enhance their competitive edge over their domestic and foreign competitors. It is little doubt that such situations require companies to have superior and dynamic cost management systems capable of aiding managers in making rational decisions. The benefits of such efforts are tied to numerous corporate, environmental, social and economic outcomes encompassing growth and development, increased employment levels, price stability and alike.

Nevertheless, some propositions cite that modern accounting methods like Resource Consumption Accounting (RCA) can be aligned with other organisational strategies to achieve specific corporate objectives [6–8]. It, however, remains questionable as to whether such propositions are capable of addressing sustainable profitability challenges encountered by industrial companies. This is because it remains to be tested as to whether RCA can be integrated with competitive pricing strategies to attain sustainable profitability in industrial companies. Since RCA represents a refinement of traditional accounting methods riddled with several drawbacks compromising industrial companies' capacity to devise proper competitive pricing, companies are continuously seeking refined, innovative, and superior ways of using RCA in maximising profitability [6–8]. However, that alone can potentially pose severe adverse effects on industrial companies' prospects and survival if other pertinent aspects like sustainable profitability are not taken into consideration.

While it is crucial to note that resource consumption accounting, competitive prices and sustainable profitability are theoretically and practically distinct, not much has been done to highlight the significance of the interaction existing between these variables; in other words, the integration of resource consumption accounting and competitive prices in the context of sustainable profitability is a new phenomenon, that this present study addresses. Foremost, several studies cite the benefits of charging competitive prices as aiding companies in regulating competition by preventing the loss of customers and market share to competitors [9–12]. As such, there is overwhelming evidence suggesting that this is one of the most significant advantages enabling companies to respond to every move of their competitors [13–15]. Nonetheless, it remains an exciting query to note that charging competitive prices alone is not adequate to warrant sustainable profit levels. For instance, Gupta, Ivanov and Choi opine that competing solely on price might grant companies a competitive edge for a while [11]. As such, companies must also compete on quality and work on adding value to customers if they want long-term success.

Additionally, Vidrova, Krizanova and Gajanova contend that there is huge potency for companies to risk selling at a loss if they base their prices solely on competitors [10]. Another study by Kumar, Basu and Avittathur avails that competitive pricing as a profit maximisation strategy on its own is an ineffective strategy requiring the integration of other strategies because of inherent risks and challenges, making it costly and difficult for newer businesses to achieve sustainable profitability [13]. Besides, there are substantial but empirically sidelined environmental, ecological and social factors influencing the interplay between the application of accounting methods, pricing strategies and profitability. Consequently, this present study argues that using RCA can serve as a medium that industrial companies can utilise in integrating vital environmental, ecological and social factors to set competitive prices necessary for sustaining profitability in the long run.

Meanwhile, it is to our knowledge that there exists no empirical model analysing structural connections concerning RCA's potential capability to moderate the relationship between competitive pricing and sustainable profitability. Hence, the application of struc-

tural equation modelling becomes instrumental in our study for establishing novel ideas regarding RCA's capacity to affect the strength and direction of the relationship between competitive pricing and sustainable profitability. Consequently, this aids in determining the best practices and approaches required for companies to effectively use RCA in setting prices and attaining sustainable profit. Nonetheless, current literature is yet to acknowledge the integrated association between RCA, competitive pricing, and sustainable profitability as the focus has been on the comparison of RCA and ABC [8] and relating RCA to organisational change and innovation [16]. Additionally, related studies do not test the impact of RCA on vital corporate indicators like competitive pricing and sustainable profitability [7]. It is in light of such attempts that our outcome aspect is a new competitive pricing concept in the context of sustainability.

It is in regard to the above-mentioned insights that the study aims to illustrate the role of resource consumption accounting in achieving competitive energy prices and sustaining profitability in the long run, considering that maximising and sustaining profitability is the source of business innovation and expansion of economic growth and social development. Having this background, the present study aims to address the above-identified empirical gaps to make both theoretical and practical contributions to existing literature via answering the following questions:

- (1) Given cases where applying activity-based costing methods has proved to insignificantly influence competitive pricing strategies, will the application of resource consumption accounting significantly impact companies' competitive pricing strategies?
- (2) Will the positive relationship between competitive pricing and sustainable profitability be increased by the extent to which resource consumption accounting exerts pressure for sustainability profitability?

The findings affirmed that adopting resource consumption accounting practices serves an essential purpose of providing vital information about all the pertinent stochastic parameters crucial in reducing forecasting errors and enhancing profitability. Of paramount importance are the established novel findings depicting competitive pricing models involving resource consumption accounting systems that provide superior price forecasting, error reduction and profit maximisation capabilities compared to existing energy models. Additionally, the study's outcomes highlight that the positive relationship between competitive pricing and sustainable profitability is significantly increased by the extent to which resource consumption accounting exerts pressure on sustainability profitability. The results of this study advance construct and item development involving competitive pricing and resource consumption accounting while testing relationships to uncover the moderating role of resource consumption accounting in profit maximisation. Additionally, empirical substance to the discussion on the use and implications of resource consumption accounting systems from pricing to profit maximising and sustenance initiatives are also offered. As a result, the results provide dynamic contemporary insights and contributions to profit maximisation and corporate stakeholder theory development. Therefore, we contend that both energy and non-energy industrial companies should rely on resource consumption accounting to set competitive prices and enhance and sustain their profitability levels, especially at a time when structural imbalances in commodity markets and poor economic problems are increasing worldwide.

2. Literature Review

The integration of RCA in the context of competitive pricing and company performance decisions is still lacking and commands significant empirical attention. This section reviews the related papers and identifies the research gaps.

2.1. The Role of Resource Consumption Accounting in Contemporary Business Situations

Having underscored that sustainable profitability challenges encountered by industrial companies can be addressed by using RCA to set competitive prices, this section explores the role of RCA in contemporary business situations. According to Al-Qady and

El-Helbawy, RCA was developed as a cost management approach that combines the ABC process and activities with the benefits of the focus of a resource [17]. Consequently, RCA aims to analyse the flow of resources from and among groups of resources to the final consumer of these resources. Clinton and Keys consider RCA as a comprehensive, integrated and dynamic system [18], while Webber and Clinton assert that RCA is a resource analysis method that aims to offer superior information essential for the accurate determination of costs [19]. Irrespective of the provided definition, it has come to our attention that the whole subject matter of RCA revolves around the use of resources to influence a company's pricing and costing activities and performance-related decisions. Such is congruent to Al-Qady and El-Helbawy's suggestion denoting that RCA is also another integral component of ERP (enterprise resource planning) fashioned to offer superior information across various reporting and planning systems in the company [17].

Though it is widely documented that applying an effective cost management system such as RCA would enable industrial companies to survive, compete and grow in consumer markets and achieve competitive prices [6–8,16], RCA is a broad concept that can be aligned with other corporate strategies like competitive pricing and sustainable profitability [10]. As a result, relevant attempts to apply RCA in competitive pricing and sustainable profitability are called for in contemporary business situations riddled with various complexities, volatile industry and market dynamics and structural rigidities. This can be reinforced by Yilmaz and Ceran's suggestions contending that RCA allows industrial companies to operate in changeable environments, gain their customers' satisfaction, and compete in the consumer market [20]. Another study by Abbas and Wagdi echoes similar sentiments and opines that RCA is instrumental in making operational and strategic decisions supporting the company's competitiveness initiatives [10].

Novel ideas are observable when RCA is not restricted to profit maximisation [6–8] but rather extended to sustainable profitability. Gibson's study acknowledges the growing concerns about the level of environmental degradation caused by companies [21]. In a similar fashion, Elkington raises concerns concerning the incapacity of industrial companies to address their employees' social challenges and enhance corporate social performance [22]. Such concerns tend to denote the absence of sustainable solutions whose implementation is crucial for providing enterprises financial benefits, improving the organisation's image and helping the environment, thereby contributing to the attainment of sustainable development goals (SDG) [23]. The prevalence of such problems in contemporary business situations is highly conceivable. For instance, Schipper and others regard these concerns and others as being caused by the unavailability of ready-to-use approaches required in assessing sustainability and operationalising and monitoring the implementation of the SDGs [24]. As a result, there is a call to look for and improve emerging sustainability areas of interest to practitioners and researchers. In addition, de Oliveira, Claro and Esteves underscored the importance of considering all possible economic, social and environmental factors impacting stakeholders and sustainable development when formulating vital corporate strategies such as sustainability-oriented strategies [25]. Hence, it is imperative for industrial companies to address such sustainability concerns by tapping into the benefits offered by RCA in conjunction with the application of competitive pricing strategies. In line with this assertion, Mareai, Senan and Alhebri highlighted that there is a profit maximisation opportunity embedded within RCA [23]. Hence, it is instrumental to note that though RCA cost modelling procedures are based on three essential aspects (costs, capacity and capability) influencing resource pools, they are also linked to other aspects like prices, profitability and sustainability. But such connections have been empirically sidelined. These insights significantly portray RCA's potential capacity to boost industrial companies' performance, and the attainment of other environmental, social and economic goals, and this attaches significant empirical contributions to this study. Thus, the next section of the study explores connections linking RCA with sustainability and how competitive pricing strategies can play an instrumental role in ensuring that industrial companies attain sustainable profit levels.

2.2. The Role of the Electricity Market and Competitive Pricing Strategies

The electricity market serves the essential purpose of ensuring that reliable electricity is provided to consumers at the least cost [26]. Nonetheless, the existence of pricing complexities has always proven to be a major stumbling block. The resultant effects of such drawbacks on profitability are unquestionably undesirable. Most importantly, observations made denote that wind speed, electricity prices, and load demand stochastic parameters essential in formulating profitable prices for virtual power plants are often overlooked in related situations [27]. Though their findings demonstrated that forecasting errors are minimised by 3.56% and virtual power plants' profits enhanced by 3.53% when wind speed, electricity prices and load demand parameters are integrated, the influence of resources and environmentally related stochastic parameters (sustainability indicators) was not integrated into the estimation process [27]. In this sense, the feasibility of further reducing forecasting errors and enhancing the profitability of both electricity companies and their customers is imminently significant when the resource consumption accounting method is deployed. Similarly, Sadeghi and others reaffirmed that increasing the penetration of distributed energy resources in power systems is essential in recognising several opportunities and challenges [28]. They evidently showed that diversifying virtual power plant resources using electric vehicles, energy storage and distributed generations yields \$33.58 profit [28]. Hence, it is in this regard that the application of resource consumption accounting inadvertently plays crucial forecasting and pricing roles in enhancing profitability.

Additionally, resource consumption accounting is instrumental in shifting towards the formulation of sustainable electricity prices as there exists a thick margin between devised profitable prices and desirable sustainable profitability [10,11]. It, therefore, remains an interesting inquiry that there are vast untapped profitable gains in electricity markets due to a lack of pricing integration methods like resource consumption accounting essential in setting competitive prices and achieving sustainable profit levels. Such is crucial amid rising electrical energy costs and shortage problems [29,30]. In this scenario, the importance of introducing resource consumption accounting and a competitive pricing model to achieve sustainable profitability grows.

Amid the prevalence of other problems undermining the effective functioning of electricity markets, Pourhaji and others highlighted that the commercialisation of electricity as a commercial commodity limits gains available to market participants [31]. Suggested measures denote those optimal offers by sellers or buyers are achievable when electricity price participants forecast the price in different horizons [31]. Furthermore, optimal power management systems in deregulated energy markets require accurate price forecasting [32] and the application of resource consumption accounting methods stands as one of the significant novel and effective approaches required in fostering the implementation of sustainable prices in electricity markets. The adoption of resource consumption accounting, as argued by empirical studies, is essential in minimising costs, maximising output and enhancing profitability in any market [6–8]. This mirrors established findings denoting that the joint optimization of both resources (energy storage units) and output (electric vehicles) minimises energy storage degradation costs and enhances accumulated profits [33].

Taleizadeh and Sadeghi pinpointed that such efforts to counter substantial competitive pressure and achieve sustainability require information to be collected from both direct and traditional channels [34]. Though such ideas are conceivable, the demand for cross-rewards and self-rewards suggested to customers by the competitors poses significant obstacles. Consequently, deploying cost accounting methods like ABC that do not incorporate cross-rewards and self-rewards and not RCA undermines competitive pricing initiatives. Besides, inevitable challenges are undermining competitive pricing existing in various markets and forms that are well documented in academic studies and demand a realistic competitive pricing system. For instance, Dimitriou argues that pricing strategies applied in highly competitive markets are unrealistic and lack methodological treatment that considers pricing differentiation among competitors [35]. Other studies consider power structures, decision-making systems, retail services and distribution channels as influencing pricing

strategies and hindering revenue and customer growth [36]. The resultant effects on profitability are imminent because pricing strategies decisively affect operational and economic performance. Consequently, applying appropriate pricing strategies with proper methodological treatment is a critically precedent in enhancing corporate performance through cost minimisation and increasing customers. Similarly, after discovering the ineffective incorporation of information patterns and profit coordination modes in pricing strategies, Li and others underscored the need for and importance of using proper pricing strategies to reduce costs and attract more environmental consumers [37].

Based on the empirical examinations provided in this section, it is apparent to note that achieving sustainable profitability requires the adoption of methods like resource consumption accounting capable of capturing resource and environmentally related stochastic parameters essential in devising competitive prices and achieving sustainable profitability. Nonetheless, not much has been done to explore the implications of such efforts on electricity buyers and sellers. Hence, this study offers a novel and original ideas essential in devising competitive pricing and sustainable models used in the electricity market. This is instrumental in allowing market participants to fully take advantage of existing opportunities and deal with challenges encountered in the electricity market.

2.3. The Resource-Based View's Theoretical Perspectives on RCA, Competitive Pricing and Sustainable Profitability Connections

While various theories can be deployed in the corporate sustainability debate, the relevance of the resource-based view (RBV) theory is worthy of consideration. Studies document that RBV theory serves to provide insights into the determinants of corporate profitability [38,39]. The RBV carries significant relevance in this context as it regards unique resources as a key element that influences organisational performance and distinguishes one entity from the other [40]. By the same principle, unique resources available for disposal to a specific energy company determine how it performs relative to its competitors. This is instrumental considering that the energy market is increasingly getting more competitive as more energy products and players are coming on board. Of paramount importance is the decisive aspect of capabilities playing a crucial role in boosting corporate profitability [39]. Such aspects are embedded in activities and attempts by companies to acquire adequate information and utilise it to forecast energy prices to gain a competitive edge in the market and maximise profits [27]. Furthermore, Ahmed et al.'s study opines that the effective use of resources coupled with acceptable resource utilisation capabilities is the key to enhancing profitability [40]. Hence, the application of information processing systems and competitive pricing models becomes of huge relevance and plays a crucial role in boosting productive and allocative efficiency leading to improved corporate performance. It is in this regard that the role of RCA and competitive pricing are attached amid rising huge concerns about the operational landscape becoming severely competitive [3], energy price forecasting errors undermining the effectiveness of energy pricing models [27], and resources becoming scarce [28], and declining profit margins [4].

Further deductions from the RBV exhibit that various forms of organisational resources, intellectual and technological resources, as well as management competencies, are key elements awarding organisations a competitive advantage through improved performance [39]. This overwhelmingly shows that there exist positive interactions linking RCA as a technological resource, competitive pricing strategies (unique capabilities) and corporate profitability (performance). However, the notion of sustainability is vital but lacks considerable theoretical considerations in as much as the RBV theory is concerned. Therefore, this study attempts to integrate the notion of sustainability and offer substantial concrete theoretical substance essential for discussing further the implications of RCA and competitive pricing practices on sustainable profitability related outcomes. The next section, therefore, explores further the notion of sustainability to unearth its connections with RCA and competitive pricing.

2.4. Sustainable Profitability

The concept of sustainability carries huge relevancy in contemporary academic and business situations. Consequently, sustainability has been applied in numerous fields such as human resources [26], finance [27] and development [28]. Nevertheless, there are nascent ideas regarding the application of the concept of sustainability in areas like competitive pricing and sustainable profitability. Hence, this present study addresses such concerns resulting in vast theoretical and practical contributions being embedded in this study.

Meanwhile, sustainability is defined as the ability to preserve well-being over an extended and possibly endless length of time [2]. Sustainability assumes various aspects, forms and functions capable of influencing various corporate activities and indicators. For instance, Reinhardt, Schwabe and Walsh contend that there are four pillars of sustainability, namely environmental, economic, social, and human sustainability [2]. By implication, companies can attain sustainable profitability by ensuring that RCA practices and competing pricing strategies are targeted at each pillar of sustainability. Hence, the effective ability of companies to deal with business complexities, volatile industry and market dynamics and structural rigidities undermining sustainable profitability extends beyond cost estimation and pricing decisions. This remarkable observation has been widely sidelined academically, and yet it carries tremendous relevance in contemporary business situations. For instance, studies consider implementing sustainable practices as instrumental for aligning with sustainable development goals [23–25].

Given that profitability is a prominent reflection of corporate performance, sustainable profitability can thus, be operationalized as profit levels capable of covering operational expenditure, enhancing retained earnings, increasing resource management efficiency and preserving the well-being over an extended and possibly endless length of time. This implies that sustainable corporate strategies should be devoted toward the attainment of long-term economic prosperity, ecological sustainability, and social stability for both the organization and its members. The benefits of achieving corporate sustainability go a long way in providing enterprises financial benefits, improving the organisation's image and helping the environment, thereby contributing to the attainment of sustainable development goals (SDG) [23]. It is through such efforts that the importance and need for resource cost accounting are reflected, but such is still yet to be empirically addressed.

With growing evidence of positive relationships between financial performance and social sustainability, it is critically necessary to understand how innovative organisations tie theory to practice and integrate sustainability. Sroufe and Gopalakrishna-Remani assert that sustainability represents a significant shift in focus from a mere business strategy to mitigating social and environmental harm whilst maintaining economic viability [41]. The empirical foundation of such ideas is engraved in arguments citing that neglecting sustainability violates managers' fiduciary duty to shareholders [41]. As a result, various methods are being sought to foster sustainable business practices in organisations. For instance, Sroufe and Gopalakrishna-Remani argued in support of managing sustainability practices citing that they lead to improved firm financial performance and social sustainability performance constructs [41]. In another instance, Jum et al. reckoned that the sustainability paradigm hinges on the nexus between lean green practices, sustainability-oriented innovation and the triple bottom line [42]. From a different perspective, Cui, Wang and Wang acknowledged integrating contemporary evolutionary analysis of green finance sustainability into the sustainability debate by employing a multi-agent game [43]. However, the feasibility of achieving sustainability has been questioned on several grounds, presumed to vary with the context under examination and imposes challenges in attaining Sustainable Development Goals. For instance, with specific reference to Zimon, Tyan and Sroufe, sustainable supply chain management drivers, practices and barriers are deemed as having a significant toll on United Nations Sustainable Development Goals [23]. Subsequently, this incites a monumental quest to expand the sustainability debate into various spheres of analysis. Of paramount importance is the energy industry currently riddled

with several resource discrepancies and pricing complexities. This study's contributions to the sustainability debate and scientific community are attached to such quests.

Vital non-financial indicators such as corporate social responsibility, brand image and reputation are necessary for attaining sustainable profitability and must be integrated. Mareai Senan and Alhebri echoed similar sentiments and contended that profits are sustained in the long term by improving product and service quality [44]. In another study by Strand, Freeman and Hockerts, CRS practices are deemed to be an instrumental key [45], while Bodhanwala and Bodhanwala reckon that participating in essential activities is targeted at improving a company's image and reputation is crucial for sustaining profitability [46]. Therefore, RCA can be used for collecting and harnessing information necessary for improving competition pricing and sustainable profitability. Such information must integrate resource capacity, capability and costs, pricing and environmental, economic, social, and human pillars of sustainability. Having illustrated the relatedness between resource consumption accounting, competitive pricing and sustainable profitability, the next sections of the study centre on establishing the distinct interactions between these variables through the formulation of related hypotheses.

2.5. The Impact of Competitive Prices on Sustainable Profitability

The importance of attaching sustainability has been linked to various aspects such as lean production [42], green finance [43] and supply chain management [23] and no modest attempt has been made to link sustainability with competitive pricing amid propositions citing competitive pricing's vital role in safeguarding economic sustainability [2,24,25]. The importance of such attempts carries huge practical and empirical relevance as they are linked to financial performance [41]. Given that the previous section has illustrated the role of resource consumption accounting in setting competitive prices, studies further exploring the role of competing pricing in attaining sustainable profitability are called for. Thus, the complexities and challenges regarding the attainment of sustainable profitability are not new phenomena. As such, prior studies expressed concerns about the difficulty in attaining sustainable profitability, as evidenced by De Figueiredo's study entitled finding sustainable profitability in electronic commerce [47]. De Figueiredo's study demonstrates that challenges undermining sustainable profitability have been long existent prior to the new millennium and have been posing significant challenges in electronic commerce [47]. Consequently, De Figueiredo opines that sustainable profitability is beyond the reach of several companies because of lacking strategy alignment [47].

By applying Porter's ideas, it can be noted that competitive pricing is a crucial strategy capable of enhancing companies' potential to attain stated profitability targets [48]. However, as it stands, no modest attempt has been made to extend De Figueiredo's suggestions and integrate them with Porter's potentially viable propositions concerning the role of competitive pricing in enhancing sustainable profitability [48]. Similarly, this study proposes that the relatedness connecting competitive pricing and sustainable profitability can be addressed using similar propositions. Hence, the study's novelty and originality are engraved in its capacity to demonstrate the empirically unexplored relatedness between competitive pricing and sustainable profitability. Such will be accomplished by drawing insights from several industrial companies as relatively similar studies focused on distinct individual industries [49–53]. Meanwhile, the importance of prices in influencing company profitability is widely documented in academic studies [49–53]. This direct positive effect of prices on company profitability has in the past been confirmed to hold valid [49,50]. Nevertheless, the available suggestions are partially exhibiting a possible direct positive interaction between competitive prices and sustainable profitability. This is because the key elements of sustainability like environmental, economic, social, and human sustainability are not engraved in these studies. It is in light of their observations that this study considers competitive prices and sustainable profitability to be positively and directly related.

3. Research Methodology

3.1. Methodology

Given that the study aimed to examine the significance of structural connections linking RCA, competitive prices and sustainable profitability, an integrated model in the form of a Structural Equation Model (SEM) was required to fulfil such a purpose (see Figure 1). Secondly, by applying SEM, we were able to answer the second research question aimed at determining whether the application of RCA can influence the way companies use their competitive pricing strategies to sustain profitability. Such attempts were further motivated by the need to ascertain whether RCA moderates the relationship between competitive pricing and sustainable profitability, which represented a key benefit of applying SEM in this study. Furthermore, we identified a novel methodological gap showing that there exists no empirical model analysing structural connections concerning RCA's potential capability to moderate the relationship between competitive pricing and sustainable profitability. Hence, the application of structural equation modelling became instrumental in our study for establishing novel ideas regarding RCA's capacity to affect the strength and direction of the relationship between competitive pricing and sustainable profitability. SEM provides superior analytical insights regarding both the structural connections and moderating effects of RCA on the relationship between competitive pricing and sustainable profitability when other related studies are confined to qualitative analysis [54], cloud computing [55] and the multisource-multimethod approach [56]. All data analysis computation methods presented in this study were conducted using Smart PLS. The formulated hypotheses were tested using the established path analysis results.

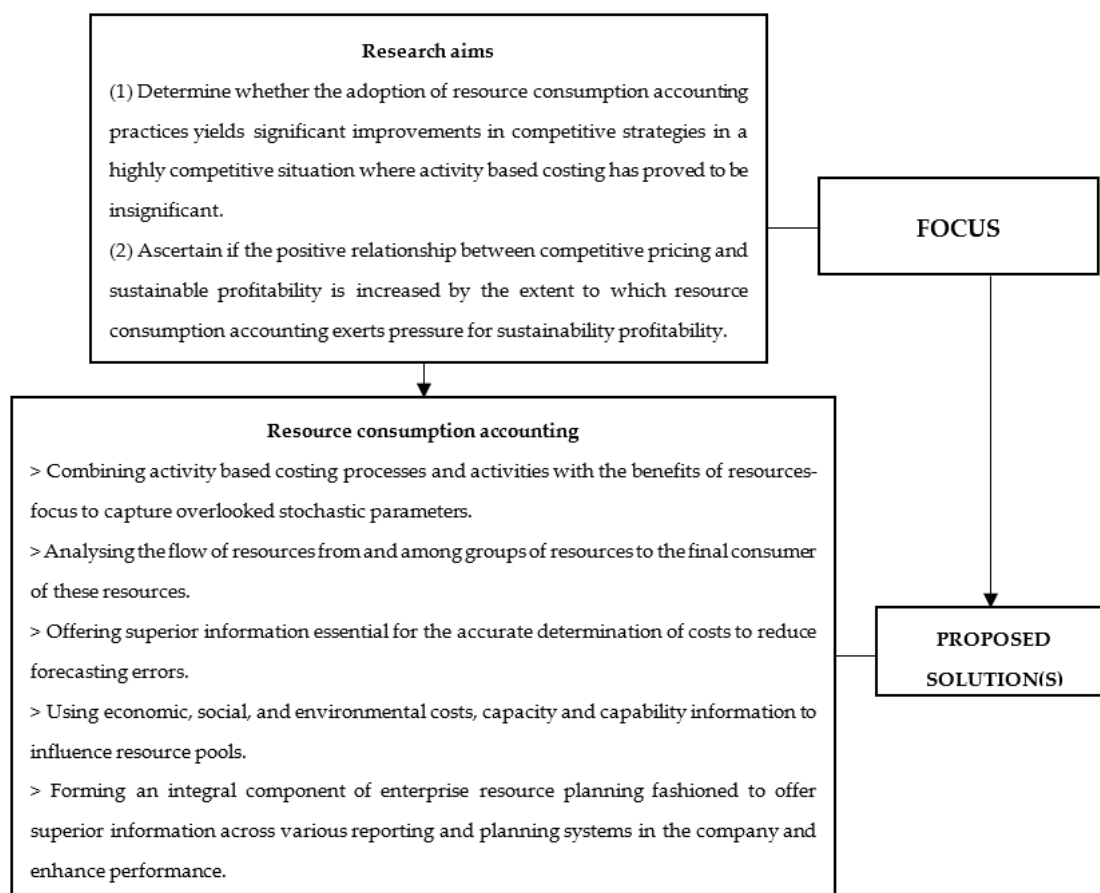


Figure 1. Conceptualization flow chart of the relationship between resource consumption accounting, competitive prices and sustainable profitability.

3.2. Description of Variables and Hypothesis Development

It is important to note that the previous sections have highlighted several distinct empirical gaps in the interaction between RCA, competitive prices and sustainable profitability that require further investigations. Thus, the main aim of this section is to identify connections linking these variables and test their validity in connection with industrial companies. Additionally, this is instrumental for devising robust and reliable methods of testing and analysing such connections. As a result, the following connections and hypotheses were examined.

3.2.1. The Influence of Resource Consumption Accounting on Competitive Prices

The extent to which RCA can be applied in competitive pricing decisions and contributes to setting competitive prices is conceivable. RCA can potentially represent a sustainable pricing tool companies can utilise to set competitive prices and achieve sustainable profitability. Literature suggests that companies are integrating RCA methods and practices into their business operations [17,18] and the deployment of such practices and methods enhances profitability through the value it adds to companies by controlling costs through the use of resources until they reach final consumers. Hence, RCA caters for non-financial aspects like customer satisfaction and service quality and can integrate them into determining competitive prices thereby allowing companies to gain a competitive edge over their counterparts.

Since ideas connecting RCA to competitive prices are still immature, available suggestions highlight the possibility of these two aspects being either directly or indirectly connected [10]. For instance, Tse and Gong consider the connection between RCA and prices as possibly being linked to the direct provision of understanding about resource capacity and capacity costs management [57]. In light of this connection, another group of studies attempted to illustrate the connection between RCA and competitive prices. Yijuan and Ting (2017) postulate that it is feasible to set prices using RCA as it assists managers in managing complicated cost models [58]. Al-Qady and El-Helbawy assert that there is a direct positive causative relation between operating resources enabling the cost management data to be integrated into the pricing of final products or services [17]. However, it is questionable whether the adoption of RCA practices will yield significant changes in competitive pricing strategies, especially in highly competitive environments. This follows arguments levelled against accounting methods like the ABC method citing that it does not capture key details of resource usage to the final point of consumption as well as vital attributes such as branding and customer satisfaction that are instrumental in devising competitive prices [6,7,10]. In addition, systematic empirical examinations consider the interaction between ABC and competitive pricing as insignificant [17]. Therefore, this calls for further examinations to ascertain whether applying RCA practices will yield significant results in similar circumstances. Accordingly, the following hypothesis is proposed:

Hypothesis 1 (H1). *If activity-based costing insignificantly influences competitive pricing strategies, then applying resource consumption accounting insignificantly affects competitive pricing strategies.*

3.2.2. Insights into the Moderating Effects of Resource Consumption Accounting

It remains an interesting inquiry to note that though competitive pricing, resource consumption accounting and sustainable profitability are distinct concepts, they are related. Our key argument is embedded in the notion that there exist moderating effects either as profit demotivators or motivators. This implies that applying any specific pricing strategy can shape a profit-maximizing firm's incentives to attain sustainable profit levels. Given the aforementioned ideas depicted in the previous sections, RCA influences not only resource usage and cost but also capacity, branding, customers and coworkers critical for boosting sustainable profitability, and the existence of its moderating effects is highly evident. Makadok acknowledges that mediating effects are inherently sequence-dependent,

with one mechanism serving as the antecedent and another as the mediator [1]. In general, these mediating effects have been studied more extensively than the moderating effects. Industrial companies' managers must acknowledge resource consumption accounting practices capable of enhancing the extent to which competitive pricing is used in attaining competitive advantage and enhancing social, environmental and ecological goals to achieve sustainable profitability. Hence, RCA serves as an instrumental platform for ensuring that all the sustainability components are integrated with devising competitive pricing strategies necessary for attaining sustainable profit levels.

The extent to which companies apply RCA practices provides superior details essential for accurately determining costs across various reporting and planning systems allowing industrial companies to operate in changeable environments, set competitive prices and safeguard long-run profitability [20]. Notably, Zimon, Tyan and Srufe assert that the degree to which managers are concerned with sustainability matters influences the sustainability-related competitive pricing strategies that companies may adopt [23]. Clinton suggested that RCA is a comprehensive, integrated and dynamic system that strives to strategically consider the interactive effects of various human, social, and environmental factors essential in aligning companies' competitive pricing strategies with sustainability initiatives [18]. Along similar lines, Al-Qady and El-Helbawy contend that RCA is capable of reducing overconsumption which increases air pollution and worsens climate breakdown and ensures that there are sufficient resources available for future use [17]. Such RCA's competitive pricing roles can impact how companies address sustainability issues. If companies fail to effectively meet stakeholders' sustainability needs, they are more likely to experience adverse developments. It has remained uncovered as to whether the positive relationship between competitive pricing and sustainable profitability will be increased by the extent to which resource consumption accounting exerts pressure on sustainability profitability. This study, therefore, hypothesises that resource consumption accounting's pressure for sustainability influences the integration of sustainability into core values and its impact on competitive pricing.

Hypothesis 2 (H2). *Resource consumption accounting positively moderates the relationship between competitive prices and sustainable profitability.*

3.2.3. Conceptual Framework

Interactions connecting resource consumption accounting, prices and sustainable profitability are shown in Figure 2. The influence of resource consumption accounting on competitive pricing, underpinned by the profit maximisation theory, is delineated by the arrow streaming from resource consumption accounting to competitive prices as assumed in H1. The influence of resource consumption accounting on the interactive connection linking competitive pricing with sustainable profitability represents the moderating effect of resource consumption accounting as hypothesised in H2.

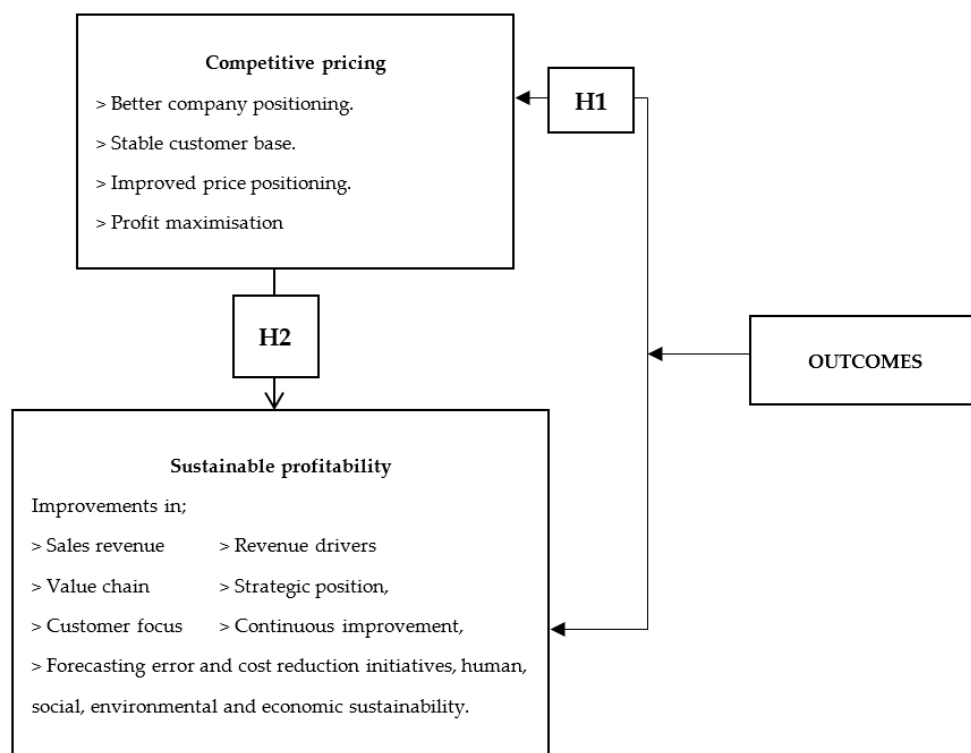


Figure 2. Conceptualization flow chart of the relationship between resource consumption accounting, competitive prices and sustainable profitability.

3.3. Data

As a data collection instrument, self-administered questionnaires were used, in which respondents assessed their level of agreement for each item using a five-point validated Likert scale ranging from “1 = strongly disagree to 5 = strongly agree” [2]. The questionnaire was divided into four sections: (i) resource consumption accounting; (ii) since the concept of competitive pricing is currently budding and displaying signs of future potential, the required measurement scales do not exist. Hence, we used a unique combination of our understanding of the reviewed studies and the experts’ perceptions to develop fifteen competitive price variable items. (iii) Though it is likely that subjective factors of the respondents can cause estimation bias, studies have conceivably deployed questionnaires in measuring sustainable corporate performance attributes. This presents major opportunities to address inherent issues related to the use of questionnaires in collecting data. Nonetheless, Chen, in an attempt to examine sustainability and company performance of manufacturing companies, used cost, market, growth, eco-system vitality, environmental health, environmental factors within production, governance, education, and individual and community attributes to measure sustainable corporate performance [2]. In another study, Wang and others interchangeably use environmental impact, social sustainability, economic gain, technical feasibility, and industrial compliance attributes to measure corporate sustainability performance in Indonesia’s cement industry [59]. In a similar fashion, we applied a questionnaire to measure and collect data on sustainable profitability. However, we asked neutrally worded questions and ensured that the answer options were not leading so as to avoid questionnaire bias. Therefore, sustainable profitability was modelled using fifteen variable items adapted from previous related studies [2,59–62]. The sustainable profitability perspectives encompassed variable items such as financial performance, resource usage, environmental pollution, human resources development and community and social interests, as shown in Table 1 [2] (Supplementary Material).

Table 1. Sustainable profitability perspectives.

Sustainable Profitability Perspectives	Aspect	No.	Criteria
Economic perspective	Financial performance	SP1	Sales volume
		SP2	Revenue inflows
		SP3	Costs drivers
		SP4	Investments
Environmental perspective	Resource usage	SP5	Decreasing harmful materials
		SP6	Reducing waste as inputs
		SP7	Efficiency of raw materials
		SP8	Renewable energy resources
	Environmental pollution	SP9	Total waste disposal
		SP10	Greenhouse gas emissions
		SP11	Noise pollution
Human perspective	Human resources development	SP12	Employee satisfaction
		SP13	Training and development
Social perspective	Community interests	SP14	Socio-oriented mission statement
		SP15	Charity contribution

3.3.1. Sampling Methods

For the population composition of this study, five major industries vital for the growth and development of Kurdistan's Region of Iraq's economy were considered based on the Ministry of Industry, Trade and Development's top-thirty performing companies in Kurdistan in 2021. The companies were selected based on their reported 2021 net profit margins. In this way, a subset of companies was drawn from the telecommunication industry, food and agriculture industry, construction industry, mining industry and manufacturing industry using resource consumption accounting. We further went on to consider companies using resource consumption accounting as eligible for participating in this study. Ultimately, the study recognised 178 industrial companies meeting the set criteria, and these companies were physically approached to request their participation in the study. However, the names and details of the reported figures could not be disclosed for confidentiality purposes. The obtained sample size was adequately considerable to carry out a statistical analysis using the PLS-SEM procedure [62–64], compared to the required minimum sample size of 30 sampling units used in estimating a related regression model [63,64].

We administered 178 questionnaires between December 2021 and January 2022, and 129 industrial companies' personnel finished the survey, yielding a response rate of 92.25%. Table 2 shows that 71.19% of the respondents were male, and 28.81% were female. As for the age of respondents, 11.02% of the respondents were between the ages of 18–30 years and were predominantly cost accountants, with a few employees in their early thirties assuming lower management positions, and the remaining age groups comprised 31–45 years (73.73%), and 46–60 years (15.25%). Respondents differed in their job positions which encompassed cost accountant (20.34%), finance manager (22.03%), general manager (15.25%), marketing manager (23.73%), and human resources manager (11.86%). These distinct job titles underline the multifaceted characteristics of resource consumption accounting methods and practices.

Table 2. Characteristics of Respondents in the Sample.

Variable	Description	Frequency	Percentage
Gender	Male	84	92.25
	Female	45	28.81
	Total	129	100
Age group	18–30 years	14	11.02
	31–45 years	95	73.73
	46–60 years	20	15.25
	Total	129	100
Job position	Cost accountant	24	20.34
	Finance manager	26	22.03
	General manager	24	15.25
	Marketing manager	30	23.73
	Human resources manager	14	11.86
	Total	129	100
Industry	Telecommunication	14	11.86
	Food and agriculture	36	30.51
	Construction	33	27.97
	Mining industry	13	11.02
	Manufacturing	22	18.64
	Total	129	100
	CP	RCA	SP
Mean	3.12	4.08	4.12
Standard deviation	0.78	0.64	0.78

RCA = Resource Consumption Accounting; **CP** = Competitive Prices; **SP** = Sustainable Profitability.

The extraction of judgments from respondents with varying job titles also flags expectations that respondents should be informed regarding RCA's methods and practices in their respective organisations. Nonetheless, ideas were drawn from various managers because RCA's application influences several organisational departments. Such implications stem from the fact that RCA is inherently designed to cater for an organisation's capacity and process aspects, and such ideas are well documented in academic studies [17–19,44]. Yijuan and Ting document that RCA relies on the causality principle used in optimising resources consumed by analysing the causality behind organisational outcomes and their related effects on decision alternatives, and this broadens RCA's scope and implications on organisational activities and departments [58]. For example, proportional and fixed product group costs encompass distribution, marketing and sales costs that are the epitome of the marketing department and require specialized attention from marketing managers. Furthermore, applying RCA practices in computing direct labour costs has a significant implication on how the human resources manager will effectively and optimally organise existing human resources to enhance employee productivity and operational efficiency, which are instrumental in attaining sustainable profitability. This shows that RCA is 'coined' with an overall organisational perspective through the integration of capacity and process analysis of all organisational activities and departments. Therefore, collecting ideas from various managers like marketing and HR managers is crucial for understanding how RCA affects their operational activities, strategies and effectiveness towards attaining sustainable profitability.

Table 2 shows that several industrial companies studied operate in the construction industry (27.97%); followed by telecommunication industry companies (11.86%) and food and agriculture industry firms (30.51%); the remaining companies were operating in the mining industry (11.02%); and manufacturing industry (18.64%). The computed mean and standard deviations revealed significant variations in profitability (Mean: 4.12; Standard Deviation: 0.92) compared to competitive prices (Mean: 3.12; Standard Deviation: 0.78) and RCA (Mean: 4.08; Standard Deviation: 0.64). This potentially denotes high responsiveness

in profitability followed by competitive prices and RCA. Hence, profitability is most likely to respond significantly to changes in competitive prices and RCA.

3.3.2. Validity and Reliability Tests

To ensure validity, the initial draft of the questionnaire was submitted for critiquing to three experts comprising one academic expert and two cost accounting practitioners. Feedback obtained was used to improve the questionnaire's ability to solicit reliable and valid responses from the study participants regarding the role of RCA in achieving competitive prices and sustainable profitability. Discriminant and convergent validity tests were further applied to ascertain the questionnaire variables' (RCA, competitive prices and sustainable profitability) construct validity. According to Cohen, Manion and Morrison, discriminant validity shows that two measures that are not supposed to be related are unrelated [65]. Conversely, convergent validity takes two measures conjectured to be measuring the identical construct and shows that they are related. Both types of validity tests were necessary for establishing superior RCA, competitive prices and sustainable profitability constructs' validity. RCA, competitive prices and sustainable profitability's internal consistency were determined using Cronbach's alpha test [65]. The incorporation of a model that cannot only determine the integrated connections but also test the validity and reliability of the established findings, as displayed in this study, is vital for corporate sustainability policy and decision making purposes.

4. Research Findings and Discussions

4.1. Factor Analysis

Preliminary examinations were made to ascertain the quality of the research model by analysing first-order and second-order constructs' factor loadings. Studies uphold that variable indicators almost perfectly reflect and are highly correlated with the latent variables when their related factor loadings exceed 0.70 [66,67].

Results presented in Table 3 show that all the factor loadings surpassed the prescribed 0.70 cut-off points, and this connotes that the RCA, competitive prices and sustainable profitability indicators are conceptually significant and less distant from the supposed latent variables [66].

Table 3. Factor analysis results.

Variable Elements	Factor Loadings	Variable Elements	Factor Loadings	Variable Elements	Factor Loadings
RCA3	0.784	CP1	0.770	SP2	0.740
RCA4	0.730	CP4	0.780	SP4	0.760
RCA6	0.780	CP5	0.740	SP5	0.740
RCA8	0.820	CP7	0.820	SP6	0.777
RCA9	0.810	CP8	0.760	SP7	0.754
RCA11	0.800	CP11	0.820	SP10	0.748
RCA13	0.840	CP12	0.800	SP12	0.777

RCA = Resource Consumption Accounting; CP = Competitive Prices; SP = Sustainable Profitability.

4.2. Discriminant Validity, Internal Consistency and Convergent Validity Tests

After having proved that the selected variable elements are conceptually significant and less distant from the supposed latent variables, we proceeded to determine if discriminant validity, internal consistency and convergent validity were established using the selected variable elements shown in Table 4. Fornell and Larcker criterion results presented in Table 3 showed that the diagonal correlation values exceed their respective underneath correlations coefficients values proving that discriminant validity existed [63].

Table 4. Fornell-Larcker Criterion.

	RCA	CP	SP
RCA	0.760		
CP	0.610	0.740	
SP	0.714	0.650	0.771

RCA = Resource Consumption Accounting; CP = Competitive Prices; SP = Sustainable Profitability.

With regard to reliability, we applied Cronbach's alpha test to determine the variables' internal consistency. As summarised in Table 4, all the Cronbach's alpha results were above 0.70 [68]. This signifies that the model variables were in a much better position to provide reliable details concerning the connections linking RCA, competitive prices with company profitability (see Table 4).

Table 5 shows that there are high levels of correlations of multiple indicators of the same construct that are in agreement as supported by the higher composite reliability values (resource consumption accounting: CR = 0.870; competitive prices: CR = 0.884; sustainable profitability: CR = 0.890) exceeding the prescribed limit of 0.70 [69]. Additionally, the Rho_A values were above 0.70 in all cases, thereby confirming the prevalence of composite reliability [70].

Table 5. Internal consistency and convergent validity tests.

	Cronbach's Alpha	rho_A	Composite Reliability	AVE
RCA	0.815	0.770	0.870	0.588
CP	0.836	0.820	0.884	0.570
SP	0.844	0.865	0.890	0.580

RCA = Resource Consumption Accounting; CP = Competitive Prices; SP = Sustainable Profitability; AVE = Average Variance Extracted.

Insights into the variables' convergent validity were provided using the computed Average Variance Extracted (AVE). The AVE values were above 0.50 in all cases, as displayed in Table 5 [71]. This implied that convergent validity existed among the three selected variables. It is in light of these aforementioned findings that we inferred that the estimated model was reliable and valid in explaining the use of RCA in achieving competitive prices and enhancing sustainable profitability.

4.3. Model Fit

The estimated SEM perfectly fitted as supported by the NFI values that exceeded 0.70, a significant Chi-square value of 210.814, D_G and D_ULS that were lower than the related confidence interval and an SRMR value exceeding 0.080 [70,71]. Inferences drawn from Table 6 results imply that there are no misspecifications that affect the model, and there is an exact fit (see Table 6). As a result, our estimated model was fit for exploring the influence of RCA on industrial companies' competitive pricing and sustainable profitability.

Table 6. Fit Summary.

	NFI	Chi-Square	d_G	d_ULS	SRMR
Saturated Model	0.750	210.814 *	0.415	1.045	0.084
Estimated Model	0.750	210.814 *	0.415	1.045	0.084

* Significant at 0.001.

4.4. Path Analysis

Finally, we conducted a path analysis to examine structural connections between RCA, competitive prices and sustainable profitability. Table 7 results confirm the existence of strong and positive interactive effects between RCA and competitive pricing. The SEM results depict that improvements in RCA by one unit significantly enhance companies' competitive pricing abilities by 0.728 units. This can be supported by related studies indicating

that RCA cost modelling procedures capture essential resource pool costs, capacity, and capability essential for determining optimal pricing decisions [17,18]. Additionally, apart from RCA practices serving an essential role in capturing vital non-financial information like customer satisfaction and services quality, Gougheri and others' suggestions about the overlooked speed, electricity prices, and load demand stochastic parameters can be integrated into RCA pricing strategies resulting in competitive prices in energy markets [27]. This supports novel constellations of ideas about RCA representing a sustainable pricing tool energy markets buyers and sellers can be utilised to set competitive prices and achieve their goals [31]. Thus, hypothesis one was accepted, asserting that resource consumption accounting has a significant positive and direct influence on competitive prices.

Table 7. Path analysis.

	Estimate	<i>p</i> Values	Impact	Hypothesis
RCA→CP	0.728	0.000	Significant	H1: Accepted
RCA→SP	0.610	0.038	Significant	
CP→SP	0.326	0.000	Significant	

RCA = Resource Consumption Accounting; CP = Competitive Prices; SP = Sustainable Profitability.

Fascinatedly, the adoption of RCA is observed in Table 7 as having a strong positive and direct influence on sustainable profitability by 0.610, and hence, hypothesis two was accepted. This aligns with some previous related findings [36,37,44,61]. This is possible because RCA provides essential information like the penetration of distributed energy resources in power systems [51] and other environmental stochastic details necessary for integrating the influence of environmental, social stability, and ecological dimensions of sustainability on energy markets. Consequently, integrating such aspects aids management in exhaustively assessing more vital elements such as cost, pricing and resource details required to minimise costs and maximise profit levels. Such conforms to the profit maximisation theorem and proposition proffered by the resource-based theory. Furthermore, RCA enhances the feasibility of enhancing corporate sustainability concepts like branding and customer and coworkers' satisfaction crucial for attaining sustainable profit levels in energy markets. Therefore, it can conclusively be inferred that applying RCA methods results in proactive resource utilisation (production), operational, pricing, competitive, and environmental, social stability, and the attainment of ecological sustainability necessary for safeguarding long-run sustainable profitability in energy markets. Such is vital amid rising electrical energy costs and shortage problems [48,49].

The other vital and interesting SEM outcomes are the positive influences of competitive pricing on sustainable profitability of 0.326. This is consistent with previous studies acknowledging the key role of pricing not only in amassing substantial company profits [49–53] but also in integrating key elements of sustainability, namely environmental, economic, social, and human sustainability. As a result, competitive pricing strategies target non-financial performance aspects linked to sustainable profitability, such as corporate social performance, brand image, goodwill, and reputation, enabling energy markets buyers and sellers to earn sustainable profit levels in the long run. This suggests that industrial companies must significantly use competitive pricing strategies to influence non-financial performance aspects linked to sustainable profitability to sustain their profitable long-term positions.

4.5. Moderating Effects

Table 7 exhibits the existence of low positive indirect effects linking RCA and CP with SP (coefficient = 0.443; *p*-value = 0.000). One of the prime reasons for applying SEM in this study was to test RCA's moderating effects on the connection linking competitive pricing and sustainable profitability. Consequently, the moderating effect of RCA on the connection linking competitive pricing with company profitability was not refuted.

Table 8 results reveal that there are highly positive and significant moderating effects of 0.674 spanning from competitive pricing to sustainable profitability via RCA, and hence, hypothesis three was accepted. Our results concur with related Daly's previous inferred suggestions highlighting that the adoption of RCA assists companies not only in setting competitive prices but also in aligning pricing strategies with other strategic activities such as market share, growth and development [49] to foster sustainability initiatives. Engaging this same logic suggests that RCA and competitive pricing mechanisms can be aligned to foster sustainability tenants like social sustainability [41], waste reduction [2] and environmental protection [59]. It is in light of such foundations that other vital strategies linked to environmental, social stability, and ecological dimensions of sustainability can also be aligned to enhance sustainable profitability in energy markets. Therefore, our novel suggestions about RCA moderating the connection between competitive prices and sustainable profitability have been proven to be valid.

Table 8. Indirect and moderating effects results.

	Estimate	<i>p</i> Values	Hypothesis
RCA → CP → SP	0.443	0.000	-
CP → RCA → SP	0.674	0.000	H2: Accepted

RCA = Resource Consumption Accounting; **CP** = Competitive Prices; **SP** = Sustainable Profitability.

While it is empirically established that applying ABC methods can insignificantly influence competitive pricing strategies [6,7,10], our findings demonstrated that RCA methods and systems significantly contribute toward improving the effectiveness of competitive pricing strategies by 0.728 per unit compared to an overall price forecasting error reduction of 3.56% obtained using energy price forecasting models [27]. Our findings are similar to a Clinton and Keys' study that found RCA methods and systems serve an essential purpose of capturing information about vital overlooked stochastic parameters and lend support to the argument made by Webber and Clinton and Yilmaz and Ceran that having all the pertinent information is essential for devising competitive prices [18–20]. The significance of incorporating RCA in pricing decisions becomes of paramount importance, especially in energy markets, when studies consider that existing price forecasting strategies are incapacitated to reduce forecasting errors and costs, undermining profitability [26–29].

Hence, our study has remarkably uncovered that encountered energy price forecasting errors undermining profitability in energy markets can be minimised by integrating resource consumption accounting practices. RCA cost modelling procedures can capture essential resource pool costs, capacity, capability, customer details and other overlooked electricity stochastic parameters essential for determining optimal pricing decisions. This supports novel constellations of ideas about RCA representing a sustainable pricing tool energy markets buyers and sellers can utilise to set competitive prices and achieve their goals. Such findings conform to the profit maximisation theorem and proposition proffered by the resource-based theory concerning the effective use of resources to attain a competitive advantage and hence, show this study's theoretical contributions.

Recognising that the adoption of resource consumption accounting had strong positive moderating effects of 0.674 on the relationship between competitive prices and sustainable profitability, the study advocates for innovative improvements in resource consumption accounting to improve the realization of profitable gains embedded in implementing a contemporary resource consumption accounting system in energy markets. Though Zimon, Tyan and Srufe's study insights do not uncover and validate any specific moderating effects, our findings mirror and extend their study insights regarding possible factors moderating any sustainability linked relationship [23]. In a similar fashion, our findings align with Daly's propositions about the conceivable benefits of pricing for profitability [49] but have been broadened to include social and environmental sustainability activities like socio-oriented mission statement and decreasing greenhouse gas emissions, and noise pollution. Consequently, substantially higher improvements in competitive prices and

sustainable profitability of \$0.610 per unit and \$0.326 per unit are achievable when both RCA and competitive pricing strategies are respectively applied compared to overall increases in profitability of 3.53% [27] and \$33.58 [28] registered by previous studies. This suggests that competitive pricing plays a vital role in improving financial performance and resource usage (e.g., decreasing harmful materials and waste as inputs and boosting the efficiency of raw materials and renewable energy resources), reducing environmental pollution, enhancing human resources development and safeguarding community interests. Therefore, we can contend that both energy and non-energy industrial companies should rely on resource consumption accounting to set competitive prices and enhance and sustain their profitability levels, especially at a time when structural imbalances in energy markets and rising energy shortages and cost problems are increasing worldwide.

5. Conclusions

Our standpoint for rationalising and demonstrating the role and effectiveness of using RCA in enhancing companies' competitive pricing capabilities and sustainable profitability is based on the observation that there is an unending quest by companies to attain sustainable profit levels in the long run. As a result, this paper builds on previous research and originally formulates a structural equation model to explicitly discuss and demonstrate that the effective combination of cost accounting methods and pricing strategies is instrumental in enhancing long term sustainable profitability in energy markets.

The findings affirmed that adopting resource consumption accounting practices serves an essential purpose of providing vital information about all the pertinent stochastic parameters crucial in reducing forecasting errors and enhancing profitability. Of paramount importance are the established novel findings depicting competitive pricing models involving resource consumption accounting systems, providing superior price forecasting, error reduction and profit maximisation capabilities compared to existing energy models. Hence, applying resource consumption accounting practices enhances competitive pricing. Therefore, it is in this regard that this study contributes toward improving the competitive pricing of electrical energy and eliminating energy demand and supply bottlenecks amid a rise in energy cost shortage problems. Furthermore, the study's contributions are visible through positive ripple effects on social and environmental sustainability initiatives via a reduction in environmental degradation and waste disposal and resource consumption levels.

The study's outcomes highlight that the positive relationship between competitive pricing and sustainable profitability is significantly increased by the extent to which resource consumption accounting exerts pressure on sustainability profitability. Without understanding such an interaction, industrial companies' ability to harness symbiotic relationships between their operations, society and the environment and achieve long sustainability is undermined. The resultant effects often manifest in various undesirable forms like expensive energy and non-energy product prices, low industrial and economic viability, and a lack of investment in social and environmental management initiatives.

This study's contributions include operationalizing and empirical validating hard to measure competitive pricing constructs and extending prior research on the value relevance of resource consumption accounting at a time when related studies [18–20] had not broadened their scope to uncover the moderating role of resource consumption accounting in profit maximisation. The study also provides some empirical substance to the discussion on the use and implications of resource consumption accounting systems, from pricing to profit maximising and sustenance initiatives. As a result, the results provide dynamic contemporary insights and contributions to profit maximisation and corporate stakeholder theory development.

In terms of practice, our results imply that resource consumption accounting is a comprehensive, integrated and dynamic system which managers should utilise in providing superior details essential for accurately determining costs across various reporting and planning systems. Additionally, this is instrumental in allowing industrial companies to operate in changeable environments, set competitive prices and safeguard long-run

sustainable profitability amid rising energy costs and shortage problems [20]. Such is significantly applicable in modern business environments and energy markets highly characterised by the failure of some energy and non-energy companies to sustain profitability in the long run [26–28]. Therefore, it is advisable for energy and non-energy companies to integrate key elements of resource consumption accounting, competitive pricing strategies and sustainability to sustain their profitable long-term positions.

5.1. Research Limitations

The study is not void of limitations, calling for caution in interpreting findings. Foremost, the number of firms sampled was limited because of restricted access to companies and a limited number of companies using resource consumption accounting. Additionally, the study was industry-specific and country-specific (based on Kurdistan). Thus, the results cannot be easily interpreted to cover all non-industrial companies and extended to more general scenarios.

5.2. Future Research Directions

Given that the number of firms sampled was limited, future studies may consider enlarging the sample size by including insights from other industry participants. Of critical importance will be to investigate how to evaluate other industries since their sustainable profitability indicators can differ from those used in telecommunications, food and agriculture, construction, mining and manufacturing industries in this study. Such limitations should provoke future research on this subject to dispel the preoccupation that cost and management accounting are exclusively applicable to industry and country concerns.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/en15114155/s1>, Research Questionnaire.

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