

## Design and implementation of the GABC model to calculate the cost of outsourcing services with an emphasis on sustainability concepts

**Ali Khosravi**

Ph.D. student, Department of Accounting, Yasooj Branch, Islamic Azad University, Yasooj, Iran  
(khosravi.ali65@gmail.com)

**Zabihollah Khani Masoomabadi**

Assistant Professor, Department of Accounting, Fasa Branch, Islamic Azad University, Fasa, Iran  
(Corresponding author)  
khanifinance@gmail.com

**Naser Eghbali far**

Assistant Professor, Department of Accounting, Yasooj Branch, Islamic Azad University, Yasooj, Iran  
eghbalinaser@gmail.com

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### Abstract

**Objectives:** This research investigates the correlation between two approaches, aiming to propose a model for calculating the total cost of outsourced services using green activity-based costing with a sustainability perspective. Activity-based costing is a well-established accounting method that can easily trace direct and indirect costs of products based on activities and accurately track product costs resulting from different product combinations while also reducing environmental issues. The goal of this research is to propose a model for green activity-based costing in the gas industry to assist managers in addressing cost challenges and managing environmental issues in production decisions.

**Design/methodology/approach:** This research is descriptive in nature. Descriptive statistics and histograms using SPSS 24 software will be utilized for statistical descriptions and frequencies of demographic and research variables. The research was conducted using a descriptive review method, with data gathered from reputable domestic and international sources such as books, articles, and websites. The research involves analyzing multiple criteria of activity-based costing, identifying environmental activities, and outlining the outsourcing of these activities using various tools.

**Results:** The research results indicate that the identification of activities, environmental activities, and outsourcing significantly impact financial and operational performance.

**Innovation:** To present the operating model and verify the research model, the structural equation method was used. The factor analysis method with PLS2 software was employed to assess the questionnaire's validity, followed by checking and analyzing the path coefficients and their significance.

**Keywords:** Activity-Based Costing, Cost Accounting, Strategy Management Accounting, Outsourcing

## 1. Introduction

Today, many companies specialize in specific expertise or skills and operate solely to provide services to external entities. Research shows that the benefits of outsourcing are significant for many companies, with the most important ones being time savings, cost efficiency, quality enhancement, and freeing up internal resources for optimal use. However, in our country, outsourcing in its broad sense has not received much attention and consideration from managers and officials due to various reasons. Therefore, researchers and industry managers must study and research the adoption of outsourcing and its dos and don'ts so that we know scientifically what to outsource, when, how, and to whom.

Within organizations, there is a growing motivation to understand costs and the factors that contribute to these costs. Although there is still confusion between understanding costs and cost measurement methods (such as activity-based costing, standard costing, project accounting, and goal-based costing), this has left managers and employees confused about identifying costs.

Upon closer examination, different costing methods are not necessarily competitive. While organizations strive for competitiveness in the business environment, they are searching for accurate and relevant information to improve their cost accounting needs. In the past, companies controlled operations with accounting information that inaccurately reflected production and service costs. The cost allocation system of many companies, through the widespread allocation of indirect costs on an average basis, provided misleading information to decision-makers, ultimately leading to wrong decisions by managers. In recent social and economic situations, efficiency and performance have become imperative, while management needs to create products and services with the same quality while reducing resource usage in projects and activities.

Activity-Based Costing (ABC) is the most famous innovation in management accounting in the last

twenty years. This method originated in the production sector as a response to dissatisfaction with traditional management accounting techniques based on production volume for allocating overhead costs to productions.

Traditional methods have many errors in modern production conditions. Today, the majority of costs related to producing a product are not directly related to production volume. For example, engineering costs, order processing, planning, quality control with advanced technologies, custom production, or timely delivery all increase activity levels, and costs associated with these activities are considered and then allocated to the products or services produced through them.

The ABC system is a logical approach for organizational managers to describe and evaluate organizational performance processes and determine total costs. The idea behind activity-based costing is simple and logical; total costs and expenses do not automatically arise; expenses and costs arise in the midst of organizational activities. There are no total costs within the organization, only activities intended to serve customers exist, and against these, service fees are charged.

To address the limitations of traditional cost accounting systems, which often involve simplistic cost allocation and a lack of transparency for indirect costs, organizations have turned to activity-based costing (ABC) systems. These systems track both direct and indirect costs of organizations and attribute them to products, services, and customers responsible for those costs. It is important to note that economic enterprises, as vital components of economies and progress in countries, play a significant role in sustainability principles. The significance of this issue varies depending on the scope of activities and resources available. Governments also play a crucial role in supporting society to better implement these principles by establishing appropriate frameworks, developing rules and regulations, and providing incentives.

During the lean manufacturing movements of the early 1990s, optimization programs were implemented, focusing on intra-firm processes (Jones et al., 1997). One key reason for this was to reduce a company's contribution to a product's value by outsourcing up to 70% of it to external suppliers (McCarthy and Anagnostou, 2004). The increased outsourcing of functions has placed significant demands on coordinating activities within the supply chain. It is essential to align intercompany material and information flows to meet market demands, such as adapting to product functions, demand fluctuations, or new delivery service requirements. Coordination is defined as a method to effectively and efficiently combine various firm-specific competencies related to different aspects (information, actions, decisions, goals, etc.) (Simatupang et al., 2002). This has led to a discussion on supply chain integration (see, e.g., the review by Van der Vaart and van Donk, 2008). Low total costs are often a primary operational goal for supply chain management, necessitating the use of cost management tools as key components (Mouritsen et al., 2001; Israelsen and Jorgensen, 2011). These tools are seen as objective criteria for evaluating the profitability of strategic or operational actions. Such information is typically available at an intercompany level and can be generated by intra-firm cost accounting tools (Askarany and Yazdifar, 2011). Effective and efficient coordination of the value chain in a supply chain requires an inter-firm accounting tool (LaLonde and Pohlen, 1996), whether for introducing a new supply chain strategy or optimizing specific processes (Seuring, 2009).

According to the theory of resource optimization, companies must reduce costs and optimize resource utilization to thrive in a competitive market (Plenert 1993; Wernerfelt 1984). Research indicates that the main reasons for enterprise failure include lack of planning, knowledge, skills, management expertise, and key competencies (Dyer and Ross 2008). This raises the question: how can companies overcome these shortcomings? One approach is through outsourcing, where companies engage external service

providers to acquire the knowledge and skills they lack. This is particularly crucial for micro, small, and medium enterprises as it allows them to enhance their capabilities, enabling them to compete and succeed in the modern market (Anderson and McKenzie, 2022).

The outsourcing process begins with companies deciding to outsource to obtain the knowledge, skills, and competencies they lack in the market at a lower cost than developing those services in-house (Espino-Rodríguez et al. 2006). The theory of transaction cost economics (TCE) is founded on this principle.

## **Problem Statement**

Stakeholders are urging organizations to be more ecologically conscientious regarding their products and operations for various reasons, including compliance with regulations, sustainable consumption, public perception, and potential competitive benefits (Hsieh et al., 2020). Many facility owners and managers are exploring the use of aqueous degreasers and powder coatings as alternatives to traditional cleaning solvents and paints to reduce harmful air emissions and manage the costs associated with treating contaminated effluent (Nikkeh et al., 2022). Initiatives are being taken to eliminate pollution during production by transitioning to greener processes (Ali et al., 2023). However, a barrier to Green Manufacturing System (GMS) adoption is the lack of compelling reasoning for green manufacturing practices (Al-houry et al., 2022). Recent studies have examined the tangible and intangible benefits enabled by activity-based costing (ABC) methods. Based on the findings of these analyses, it is evident that identifying intangible benefits is a crucial aspect of the Sustainable Development of cutting-edge manufacturing technology (Al-Mawali, 2021).

The adoption and implementation of green management strategies and environmental management in corporate policies have increased in recent years (Flayyih & Khiari, 2023). As businesses expand globally, the economy has shifted from a conventional financial and economic system to a modern capacity-based economic system with ties to

green management and green economics (Raqeeb Omar, 2020).

As industries grow, the focus on environmental issues also grows. Companies are increasingly seeking better cost management through activity-based costing in response to competitive pressures and legal requirements. Aligning activity-based costing with environmental accounting provides more accurate information to companies for more effective decision-making. This research aims to propose an effective approach for activity-based costing systems and environmental accounting to calculate the fully allocated cost of outsourced services by the Fars Gas Company.

This analysis not only helps managers better understand financial information related to fully allocated costs, activities, and environmental costs allocated to services but also assists in making more concrete and precise decisions. Today, large and modern companies in both production and service sectors face outsourcing issues. Accurately determining fully allocated costs has become a strategic goal. Recent developments in activity-based costing have helped companies accurately determine fully allocated costs, as green competition is a fundamental factor for the sustainable development of companies.

Given the current conditions where stakeholders pay significant attention to companies' environmental activities, environmental accounting becomes a valuable tool for management. Most companies emphasize environmental fully allocated cost systems because the impact of fully allocated costs on environmental laws has increased.

Environmental fully allocated costs play a crucial role in international competition. In response to this pressure, most companies have taken steps to improve efficiency and reduce environmental impact, making activity-based costing and environmental accounting integral to unified goals for sustainable competitive advantage development. This research investigates how these two methods correlate, aiming to propose a model for calculating the fully allocated cost of

outsourced services using green activity-based costing with a sustainable approach.

Outsourcing, like other scientific subjects, has different definitions from various perspectives. Outsourcing, in its initial concept, means delegating some of a company's activities outside and essentially withdrawing from the process, which is carried out by employees of the service-providing activities. This concept of outsourcing is known as traditional outsourcing, while in new outsourcing, employees do not move, and a new service is used by a company within the business processes of the same company. However, to provide a more comprehensive definition, all aspects of outsourcing and various classifications must be included.

Gas, like other essential commodities, is an economic commodity, and its supply, like other activities, is an economic activity. Therefore, one of the most important effective issues in the oil and gas economy is determining the correct fully allocated cost and its constituent elements. Thus, with the vital importance of gas to public life, health, and the environment, provincial gas companies have been established with new management as financially independent entities by the government.

Since gas production and gas supply services, in general, have social value, and governments govern social matters, the pricing of goods and services in the oil and gas industry is determined by the government based on supportive policies for various segments of society. This policy results in these companies deviating from their primary and ultimate goal, which is maximizing profit.

The independence of provincial gas companies is essential due to the financial independence of each of these companies. This allows the activities of the company to be outsourced, as predetermined prices cause provincial gas companies to focus on internal activities and processes, hoping to be profitable by reducing and controlling costs or at least minimizing losses. Therefore, examining how outsourcing affects the fully allocated cost of services is essential. This means that large commercial companies, government

agencies, hospitals, and major universities no longer need to transform into organizations that employ numerous people.

This issue is even more important due to recent policies aimed at rationalizing subsidies, especially in the energy sector, and receiving fully allocated costs from subscribers.

Corporate sustainability is a different approach to business that, based on this approach, organizations create "long-term value" for all stakeholders. In this approach, not only green and environmentally friendly strategies are considered, but all functional dimensions of the business, including social, cultural, economic, and environmental dimensions, are taken into account.

In this research, given the existing challenges and the importance of sustainable development discussions, we investigate the potential side effects of sustainable development on the value of accounting information, which is one of the most important concerns of companies and other stakeholders. Specifically, we explore whether companies that disclose their EGSEE development performance have any impact on the value of accounting information.

### **Main Objectives of the Research**

The primary objective of this research is to analyze the distribution of constituent elements in the fully loaded cost of services before and after outsourcing the activities of Fars Gas Company to the private sector. The aim is to reduce costs and provide managers with valuable insights to determine the feasibility of outsourcing. By achieving this objective, we can enhance cost recovery and ensure accurate cost calculations for Fars Gas Company. The ultimate goal of this research is to precisely determine the fully loaded cost of services for Fars Gas Company through the implementation of Activity-Based Costing (ABC) with an environmentally friendly approach. This will aid Fars Gas Company in making informed decisions regarding the implementation of outsourcing.

#### **The specific goal of this research is:**

- To determine whether outsourcing should be carried out or not

- To calculate the fully loaded cost of services based on Activity-Based Costing
- To control and monitor sustainability indicators in the outsourcing process

#### **The practical goal of this research is:**

To calculate the fully loaded cost of outsourced services of Fars Gas Company and provide the results to the company's managers to use in decision-making processes related to outsourcing.

### **Importance and Necessity of the Research**

Due to changes and developments in outsourcing, the literature utilizes various scientific theories to explain the phenomenon. However, research notes that as outsourcing evolves, the expectations of businesses and the factors driving outsourcing also change. Initially, outsourcing was seen as a way to reduce costs (a tactical objective). Over time, organizations, both in manufacturing and service sectors, have expanded their outsourced activities, making outsourcing a strategic and transformative practice. Consequently, the theoretical foundations also change accordingly. Marshall et al. (2007) point out a paradox in the outsourcing literature due to differences in the underlying theories used in various studies.

Decisions regarding outsourcing and make-or-buy choices are strategic considerations for organizations when introducing new products/services or outsourcing existing ones. In outsourcing decisions, the goal is to determine which activities should be done internally or externally, which resources should be owned internally, and which should be leased externally.

Research shows that many senior managers, financial managers, and accounting department heads lack sufficient information about Activity-Based Costing (ABC) because it is a relatively new cost accounting system that has not been widely adopted and has few tangible aspects. Consequently, companies may rely on inaccurate information from an unsuitable cost accounting system for financial proposals, operational leadership, policy alignment, and product pricing.

The evolution of sustainable development processes requires collaboration among governments, legislative bodies, and public and private organizations to preserve and coordinate the three main elements of sustainable development: society, economy, and the environment.

### Research Hypotheses and Their Theoretical Basis

- Testing the first hypothesis: there is a significant relationship between identifying activities and activities without added value.
- Testing the second hypothesis: there is a significant relationship between the identification of activities and the calculation of the cost price.
- Testing the third hypothesis: there is a relationship between the identification of environmental activities and the cost price.
- Testing the fourth hypothesis: there is a significant relationship between the identification of environmental activities and activities without added value.
- Testing the fifth hypothesis: there is a significant relationship between identifying activities without added value and financial performance.
- Testing the sixth hypothesis: there is a significant relationship between the identification of activities without added value and organizational performance.
- Seventh hypothesis test: There is a relationship between cost calculation and financial performance.
- Eighth hypothesis test: There is a relationship between cost calculation and organizational performance.
- Testing the ninth hypothesis: there is a relationship between outsourcing activities and identifying activities without added value.
- Testing the 10th hypothesis: there is a relationship between the outsourcing of activities and the calculation of the cost price.

**Table 1. Costing Model**

Description	Costing model
Traditional Costing	Traditional
Activity-based Costing	ABC
Time-Driven Activity-Based Costing	TDABC
Performance-Focused Activity-Based Costing	PFABC
Green Activity-Based Costing	GABC

### Main Question:

- 1) Is the fully loaded cost of services based on Green Activity-Based Costing (GABC) lower after outsourcing than before outsourcing activities?

### Subsidiary Questions:

- 1) Does the proportion of activity in meter reading and billing to the total fully loaded cost of services change after outsourcing?
- 2) Does the proportion of activity in the distribution network and connections to the total fully loaded cost of services change after outsourcing?
- 3) Does the proportion of activity in sampling and testing to the total fully loaded cost of services change after outsourcing?
- 4) Does the proportion of activity in gas supply facilities and pipeline networks to the total fully loaded cost of services change after outsourcing?
- 5) Does the proportion of activity in security and maintenance to the total fully loaded cost of services change after outsourcing?

### Research Methodology

This study utilizes the Wilcoxon signed-rank test, which compares the means of a group of data before and after an intervention. The Wilcoxon test is a non-parametric test used to evaluate the similarity of two dependent samples. Similar to the Mann-Whitney test, it is suitable for designs involving pre- and post-implementation or two samples from the same population. This test not only indicates which part of a

pair is larger than the other but also ranks the absolute differences. Therefore, the Wilcoxon test assesses not only the direction but also the magnitude of differences between groups. (Azar and Momeni, 1998)

In this research, given the hypotheses, the Wilcoxon signed-rank test for comparing means with two dependent samples has been employed because it compares the means of a group of data before and after an intervention. The Wilcoxon test is a non-parametric test used to evaluate the similarity of two dependent samples. Under the assumptions of equal distributions between the two populations, it is expected that about half of the positive pairwise differences and half of the negative differences are present. Moreover, the sizes of positive and negative differences are expected to be equal. Therefore, if we rank the differences from small to large and ignore zero differences, it is expected that the sum of positive and negative ranks will be approximately equal. This test not only assesses direction but also evaluates the magnitude of differences between groups. Therefore, the Wilcoxon test answers which part of a pair is larger than the other and also ranks the absolute differences (Azar and Momeni, 1998).

For computations, the Wilcoxon test should have about 95% of the power of the t-test. Therefore, its mathematical form is similar to the t-test, with only different parameters used in the calculation. The general form of the test is as follows, which is used by SPSS<sup>1</sup> software.

**a) Data Collection**

The data for this study has been collected from various sources, including books, theses, Persian and English articles, and the necessary information from the financial statements of Fars Gas Company. Both library research and field data processing have been used to gather the required information.

**b) Data Collection Tools**

Since the financial statements of Fars Gas Company are prepared annually and approved by the shareholders' general assembly each year, the data for

this study is based on the published financial statements of the company for the fiscal year 1399.

**c) Sustainability Development Reporting**

Sustainability, as a descriptive aspect of development, is a state in which desirability and available resources do not diminish over time. Sustainable development means meeting the current needs of societies without compromising the ability of future generations to meet their needs and seizing opportunities to illuminate a new era of transformative change towards global transformation. Business entities, like citizens, are obliged to comply with many social regulations, such as respecting human rights, prohibiting child labor, ensuring gender equality, adhering to greenhouse gas and environmental regulations, and controlling environmental pollution. Therefore, sustainability development reporting aims to demonstrate the extent of each of these impacts to its users through specific reports.

**d) Indicators of Sustainable Development Reporting**

Indicators aligned with the 4G framework are part of the Global Reporting Initiative (GRI)<sup>2</sup> guidelines, introduce indicators for reporting sustainable development in various sectors (EGSEE).

**e) Value Relevance of Accounting Information**

One of the important areas of accounting research is examining the content of accounting information data. The purpose of this type of research is to investigate whether specific types of accounting data, such as accounting profits and non-financial reports, add informational value to the available data for investors and guide them toward better decision-making.

**f) Company Value**

The company's value is derived from the ratio of the market value of shareholders' equity to the book value of shareholders' equity at the end of the fiscal year. The market value of shareholders' equity is calculated by multiplying the number of outstanding shares by the share price at the end of the fiscal year, and the book value of shareholders' equity is determined. Due

<sup>1</sup> Statistical Package for the Social Sciences

<sup>2</sup> Global Reporting Initiative

to the non-linearity and skewness of this variable, its natural logarithm is often used in models.

#### **a. Novelty and Innovation Aspects in Research**

The current research investigates the design and implementation of the Green Activity-Based Costing (GABC) model and the status of sustainability development reporting based on the latest indicators specified by the Global Reporting Initiative (GRI) within the scope of the Fars Gas Company. By studying the costs associated with activities and existing reports, we calculate the total cost based on the activity-based costing model and analyze the level of disclosure of specified sustainability indicators. Additionally, we examine the impact of sustainability development reporting on the total costs of outsourced services and subject them to testing.

#### **b. Statistical Population, Sampling Method, and Sample Size**

In conducting any research, specifying the statistical population is essential, as it allows the researcher to understand their domain so they can gather the necessary information and data for analysis.

In this research, the statistical population is the Fars Gas Company, which includes 88 subsidiary cities. The research was conducted during the fiscal year 1399, which marked a turning point in outsourcing. This choice was made after interviewing and consulting with senior and executive managers.

#### **c. Research Hypotheses and Their Theoretical Basis**

In general, this research is summarized in three main sections:

##### ➤ **Activity-Based Costing and Activity Identification Phase**

- Identification of all different activities at various levels within the Fars Gas Company.
- Feasibility assessment of implementing these activities in an activity-based costing system.

##### ➤ **Identification of Environmentally Related Activities as Green Activity-Based Costing towards Sustainable Development**

- Identification of environmentally related activities towards sustainable development.
- Calculating the costs of these activities (green activity-based costing) to assess their impact on sustainability.

##### ➤ **Outsourcing**

- Examining, identifying, and comparing the costs of outsourcing activities with a special focus on green activities.

To achieve this, in the **first step**, all activities at various levels within the National Gas Company were identified. This was based on data available in accounting software and discussions with senior and middle managers of the National Gas Company.

In the **second step**, all activities related to the environment and sustainable development were identified again based on the opinions of managers and employees. The contribution of these activities to the overall activities was determined based on cost calculations.

In the **third step**, after discussions and opinions from various employees and managers, and by the available data, the costs were calculated before and after outsourcing. The impacts on the environment in line with cost accounting based on green activities were examined.

Finally, the following hypotheses were examined to evaluate all the above stages:

- 1) There is a significant relationship between activity identification and non-value-added activities.
- 2) There is a significant relationship between activity identification and total cost calculation.
- 3) There is a significant relationship between environmentally related activities identification and total cost calculation.
- 4) There is a significant relationship between environmentally related activities identification and non-value-added activities.



- 5) There is a significant relationship between non-value-added activities identification and financial performance.
- 6) There is a significant relationship between non-value-added activities identification and organizational performance.
- 7) There is a significant relationship between total cost calculation and financial performance.
- 8) There is a significant relationship between total cost calculation and organizational performance. Total costs have a higher performance value, leading to organizational growth.
- 9) There is a significant relationship between outsourcing activities and non-value-added activities.
- 10) There is a significant relationship between outsourcing activities and total cost calculations.

## **Research Method**

### **a. Research Method Based on Objective, Data Type, and Execution Method**

This test compares the average of a group of data before and after an intervention. The Wilcoxon signed-rank test is a non-parametric test used to evaluate the similarity of two dependent samples. Similar to the McNemar test, it is suitable for pre-post designs or comparing two samples from the same population. This test not only determines significance but also measures the size of the differences between groups. Therefore, the Wilcoxon signed-rank test indicates which part of a pair is greater than the other and ranks the absolute differences.

### **b. Variables Under Investigation**

#### **Phase 1: Traditional Volume-Based Costing**

In traditional volume-based costing systems, the total cost of a product is determined by adding direct material costs, direct labor costs, and allocated overhead costs, typically using a specific cost driver like direct labor. However, this method often results in

inaccuracies in the allocation of overhead costs to specific products. Overhead costs encompass a wide range of expenses that may not correlate directly with the chosen basis for calculating the absorption rate of overhead. Consequently, each product's share of overhead costs is calculated uniformly based on this specific basis, leading to inaccurate cost allocation for each product.

In many industries, particularly service companies, the use of traditional cost accounting principles no longer provides an accurate reflection of actual product costs. The discrepancies between actual costs and calculated costs are growing over time.

If this inconsistency is not addressed, the risk of making inappropriate decisions will naturally increase.

In recent decades, there has been a significant rise in technology, engineering, support costs, and other expenses classified as overhead costs in traditional cost accounting methods. As a result, cost structures must evolve to accommodate these changes and aid organization managers in making informed decisions. Ultimately, the goal is to minimize costs as much as possible to remain competitive in the global market.

#### **Phase 2: Activity-Based Costing (ABC)**

Activity-Based Costing involves a two-stage process for allocating overhead costs to products or services produced. In the first stage, major activities are identified, and overhead costs are allocated to these activities based on the resources consumed in each activity. The overhead cost allocated to each activity is termed an activity cost pool. Subsequently, in the second stage, appropriate cost drivers related to each activity are identified. Then, the allocated overhead costs for each activity are assigned to production lines based on the usage of cost drivers in these lines.

#### **Phase 3: Green Activity-Based Costing (Emphasizing Sustainability Concepts)**

Green Activity-Based Costing not only considers greenhouse gas emissions but also factors in costs and time. This approach provides a comprehensive view of management-related dimensions for decision-making,

focusing on reducing time-related costs in activity scheduling and other business goals.

One activity driver is defined as "measuring the frequency and intensity of contracted demand activities," which can be used to allocate costs to the activities used (according to Raffish et al.). Another resource driver is defined as "measuring the amount or quantity consumed by an activity." Thus, the costing system is multi-stage, as cost tracing is done in three ways:

- Direct allocation: Resources are directly linked to activities and related cost components.
- Allocation: Costs are apportioned somewhat arbitrarily, such as production planning costs based on the number of units produced.
- Cause-and-effect allocation using resource and activity drivers: A feature of a cost driver is a measure of consumption amount.

ABC provides a systematic method for cost recovery accounting. First, it identifies activities within an organization. Then, based on resource consumption, it allocates resource costs for each activity to products or services. For instance, in manufacturing, costs are analyzed and transformed into three main categories: direct materials, direct labor, and factory overhead. Each activity has different levels of resource consumption, so activities are categorized based on their resource usage levels, such as unit-level activities, batch-level activities, production line activities, and facility/customer support activities (Walther, 2010).

#### **Phase 4: Cost-Effectiveness Calculation of Outsourcing Activities Based on Phases 1, 2, and 3**

In many organizations, aside from the challenge of understanding the concepts and foundations of outsourcing, the execution of outsourcing has often been carried out through trial and error without adopting a scientific and systematic approach. However, an organization intending to effectively benefit from outsourcing requires the necessary strategies, infrastructure, and a scientific approach for outsourcing implementation. Below are the major

infrastructure factors and implementation stages mentioned:

**Production Network Structuring:** The basis of outsourcing is the networking or process structuring of production. Before outsourcing, the company must understand the activities it performs to decide which activities to outsource and which ones to keep in-house. In this phase, activity descriptions and profiles are clearly defined and standardized. Technical standards are translated into legal and contractual language, and delivery indicators are specified.

**Selection of Outsourcing Activities (Outsourcing Methodology):** The challenge senior managers face is not the use of outsourcing but determining which activities should be outsourced. It is crucial to understand how outsourcing each activity contributes to the organization's goals in this phase. What are the opportunities and threats, and what are the impacts (outsourcing) on human resources, processes, costs, etc.? Developing a logical framework, conceptual model, and systematic system where influential variables in outsourcing decision-making are defined is better. This results in the selection of activities suitable for outsourcing. Management consultants play a key role in executing outsourcing projects correctly based on a scientific approach. With a scientific approach, an organization can outsource its core activity while still maintaining control mechanisms over it. Identifying business risks such as cultural differences between organizations, risks of delayed or subpar service delivery, and restrictions in choosing alternative contractors are crucial factors in evaluating activities for outsourcing.

**Outsourcing Accounting:** The most significant motivation at negotiation tables is pricing. If the full cost price is ambiguous, both parties suffer losses. The negotiated price should be a win-win situation for both parties. In a competitive situation, supplier selection is based on price. Determining such a price requires a cost accounting system for each activity. Evaluating the efficiency of outsourced activities in achieving financial goals such as cost reduction or capital return

speed can also be possible with this accounting system.

**Service Provider Selection:** Holding a tender and identifying and selecting the activity provider is the next step. In this phase, preparing suitable bid conditions and requests for information from contractors, accessing professional and experienced (qualified) service providers, and their initial evaluation are critical for appropriate outsourcing. It is suggested to form an evaluation team for proposed projects with activity profiles and service descriptions.

**Monitoring Performance and Unified Control Systems - IT Approach:** The initiation of outsourcing activities creates an interaction network among them. This network and production chain ultimately lead to achieving goals such as cost reduction, product quality improvement, skill enhancement, or production time reduction. After the contract, monitoring and controlling organizational operations play a vital role, necessitating a comprehensive and cohesive communication, monitoring, and evaluation program based on delivery indicators, agreements made, and the mentioned goals.

### **Data Collection Method**

Data collection tools are instruments that researchers use to gather, record, and quantify necessary information (Talei, 2010: 102). In any study, collected data are analyzed against hypotheses. There are various tools and methods available for data collection. The tool utilized in this study is a questionnaire, and

the method of data collection is field-based. The questionnaire comprises purposeful questions designed to assess the opinions and viewpoints of respondents using various scales.

For this study, a standardized questionnaire based on Tiago's 2013 research is employed to gather information for hypothesis testing. This questionnaire includes 23 questions, with questions 1 to 4 focusing on structural capital, questions 5 to 8 on relational capital, questions 9 to 11 on cognitive capital, questions 12 to 14 on knowledge sharing, questions 15 to 17 on knowledge transfer, and questions 18 to 23 on organizational performance.

In this research, a questionnaire has been prepared and formatted for hypothesis testing. A Likert 5-point scale (strongly agree, agree, neutral, disagree, strongly disagree) is used to provide respondents with more options than just yes or no in case they cannot express their opinions. Since measurements on this scale are qualitative, scores ranging from 0 to 4 are assigned to each option in order of importance. The importance coefficient is included in the frequency distribution coefficients to use the results for statistical analysis purposes.

One of the most fundamental parts of research is the method of data collection and processing, which depends on the nature of the research, the type of required information, and the research facilities and limitations.

**Table 2. Distribution of Question Numbers in the Questionnaire**

Number of questions	Questionnaire questions	Dimensions under consideration
Activity Identification	1-4	4
Environmental Activities Identification	5-8	4
Outsourcing Activities	9-11	3
Comparison of Outsourced and Non-Outsourced Costs	12-14	3
Valueless Activities	15-17	3
Organizational Performance	18-20	3
Financial Performance	21-23	3

The present study will also be conducted using some of these data collection methods, as outlined below:

Additionally, necessary information has been collected from two sources for implementing the activity-based costing system in Zanzan Gas Company:

- 1) Accounting documents and records available in this sphere, such as balance sheets, income statements, expenses, etc.
- 2) Acquiring information about activities through observation and examination of service delivery methods and individuals involved, or those who have sufficient information about performing tasks and related organizational resources, cost drivers, and performance evaluation criteria. Some of this information can be seen in process maps, company operations descriptions, and job descriptions.

Data collection is one of the fundamental stages of research and must be defined and specified accurately due to its importance. The data collection stage initiates a process during which the researcher gathers field and library findings, then proceeds to summarize the findings through classification and subsequently analyzes them, evaluates formulated hypotheses, and finally draws conclusions and finds solutions to the research problem based on them. In other words, relying on collected data, the researcher discovers the truth as it is. Therefore, the credibility of collected data is crucial because unreliable data hinder the discovery of truth, and the research problem or unknown remains unclear or presents a distorted and incorrect image of it. To maintain the credibility of collected data, the researcher must carefully collect accurate data.

In this study, a library method has been used for data and information collection. In the library section, theoretical foundations of research are gathered from Persian and Latin specialized books and journals. Based on the definitions of research variables and how to measure them, the required data for this research includes some accounting items extracted from audited financial statements of companies. Accordingly, the required research data has been collected through gathering information resources, data, documents, and

materials of sample companies and referring to their annual reports, financial statements, explanatory notes, weekly reports, monthly stock exchange reports, library, Tehran Stock Exchange company website, and also using Rahavard comprehensive statistics software.

### **Reliability of the Questionnaire:**

An essential aspect of evaluating the quality of a research instrument, such as a questionnaire, is its reliability and validity. The main focus here is on reliability and validity as crucial characteristics of the questionnaire. The essence of reliability lies in how accurately and consistently the instrument measures the variables under study. There are three types of validity: 1) Content Validity (part of content reliability), 2) Criterion-related Validity, and 3) Structural Validity (convergent and divergent validity). In this study, content and face validity were assessed by experts. Thirty questionnaires were distributed among experts to confirm that the research questions were appropriately measured.

To evaluate convergent validity, the Average Variance Extracted (AVE) was utilized, with a criterion value greater than 0.50 for each variable. Furthermore, construct validity and discriminant validity were assessed using the Fornell-Larcker matrix.

Reliability is measured through various methods, including 1- Test-Retest method, 2- Parallel Forms method, 3- Split-Half method, 4- Internal Consistency method, and 5- Cronbach's Alpha method. In this research, both Cronbach's Alpha and Composite Reliability methods were used, with values exceeding 0.70, indicating good reliability of the questionnaire.

Data were analyzed using SPSS 23 software, with a calculated Cronbach's Alpha value of 0.70 for the entire questionnaire, indicating good reliability. Table 3 presents the computed Cronbach's Alpha values for each research variable.

**Table 3. Computation of Reliability for Questionnaire Items**

Variables	AVE	Composite Reliability	Cronbach's Alpha value
Activity Identification	0.534	0.824	0.792
Environmental Activities Identification	0.615	0.879	0.794
Outsourcing Activities	0.723	0.888	0.739
Comparison of Outsourced and Non-Outsourced Costs	0.543	0.835	0.741
Valueless Activities	0.679	0.859	0.765
Organizational Performance	0.676	0.864	0.777
Financial Performance	0.742	0.903	0.811

For assessing convergent validity, the Average Variance Extracted (AVE) criterion was used, and all variables had AVE values above 0.50, indicating acceptable convergent validity. Discriminant validity was assessed using the Fornell-Larcker method, and having the matrix's diagonal larger than the off-diagonal elements is considered acceptable. Furthermore, reliability was assessed using the Composite Reliability (CR) and Cronbach's Alpha methods, and all variables demonstrated the required reliability.

Statistical analysis is a crucial step in research, as the results heavily depend on it. Once the theoretical framework is outlined, the sample size is determined, data is collected, and data analysis methods are chosen, the focus shifts to data analysis and hypothesis testing. During this phase, the collected data is analyzed to evaluate the validity of the hypotheses.

In this chapter, the collected data is described using descriptive statistics, such as tables and charts, to provide an overall view of the characteristics of the sampled population. Hypothesis testing is carried out using statistical analysis techniques, with data input into SPSS 23 software for hypothesis testing. Finally, the research's conceptual model is addressed using modeling methods and the PLS model.

## 6. Research Results and Analysis

### 6.1. Descriptive Statistics

This section focuses on examining the distribution of the sample concerning demographic variables such as

gender, age, education level, academic degree, employment type, and work experience. Both independent and dependent variable dimensions are analyzed.

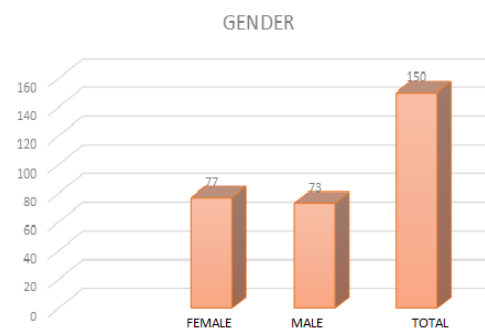
### 6.2. Demographic Variables

#### • Gender

Based on the provided figures and charts, it's observed that out of the 150 selected samples, 77 individuals (51.3%) were female, and 73 individuals (48.7%) were male. Therefore, the frequency indicates an equal representation of males and females in this study, with the percentage of each gender specified in the table below :

**Table 4.**

Gender	Frequency	Frequency Percentage
Male	77	51.3
Female	73	48.7
<b>Total</b>	<b>150</b>	<b>100</b>



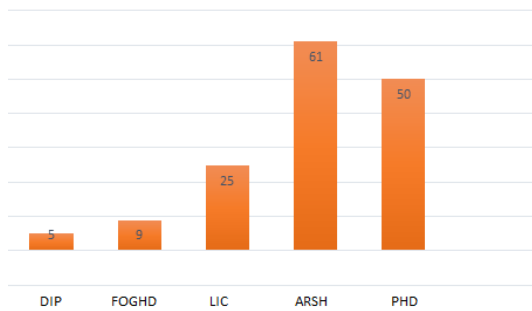
**Chart 1. Gender Frequency Chart**

**• Educational Background**

Based on the presented figures and charts, out of the 150 selected samples, 25 individuals had a bachelor's degree, 61 had a master's degree, and 50 had a doctorate. The percentage of each category is specified in the table below :

**Table 5.**

Educational Background	Frequency	Frequency Percentage
Diploma	5	3.3
Associate Degree	9	6.0
Bachelor's degree	25	16.7
Master's degree	561	40.7
P.H.D	5	33.3



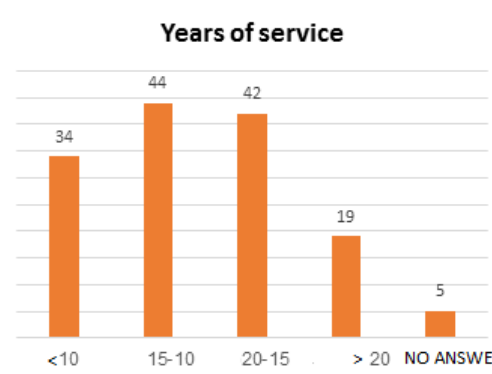
**Chart 2. Frequency Chart of Education**

**• Work Experience**

Based on the provided figures and charts, out of the 150 selected samples, 34 individuals had less than 10 years of experience, 44 individuals had 10–15 years of experience, 42 individuals had 15–20 years of experience, and 19 individuals had more than 20 years of experience. The percentage of each category is specified in the table below :

**Table 6.**

Work Experience	Frequency	Frequency Percentage
Under 10 years	34	22.7
10–15 years	44	29.3
15–20 years	42	28
Over 20 years	19	12.7
<b>Total</b>	<b>150</b>	<b>100</b>



**Chart 3. Frequency Chart Based on Service Record**

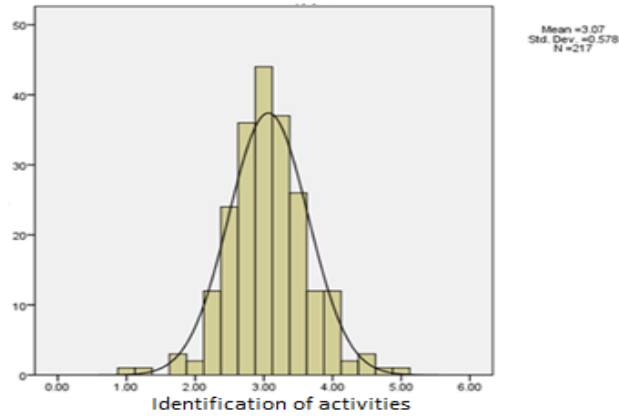
**6.3. Inferential Statistics**

**➤ Activities Identification Variable Description**

For the activity's identification variable, the minimum score was 1.00, the maximum score was 5.00, the mean score was 3.0668, the standard deviation was 0.57848, and the variance was 0.335. The mean score indicates that respondents are at a good level. The histogram and statistical description of the structural capital variable are also presented in the table below.

**Table 7. Activities Identification Variable Description**

Variable	Number	Min	Max	Mean	Standard Deviation	Variance
Activities Identification	150	1.00	5.00	3.0668	0.57848	0.335



**Chart 4. Variable Chart of Activity Identification**

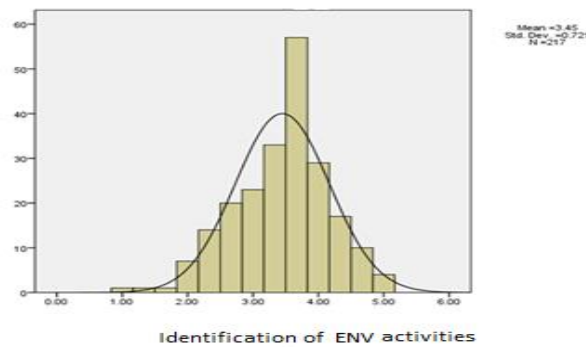
➤ **Environmental Activities Identification Variable Description**

For the environmental activities identification variable, the minimum score was 1.25, the maximum score was 5.00, the mean score was 3.726, the standard deviation

was 0.54025, and the variance was 0.292. The mean score indicates that respondents are at a good level. The histogram and statistical description of the relational capital variable are also presented in the table below.

**Table 8. Environmental Activities Identification Variable Description**

Variable	Number	Min	Max	Mean	Standard Deviation	Variance
Environmental Activities Identification	150	1.25	5.00	3.5726	0.54025	0.292



**Chart 5. Variable Chart of Environmental Activities Identification**

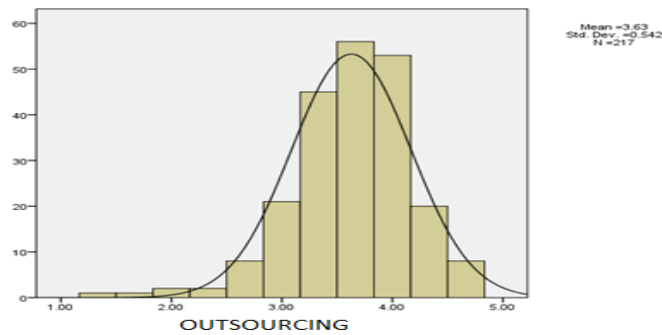
➤ **Outsourcing Activities Variable Description**

For the outsourcing variable, the minimum score was 1.00, the maximum score was 5.00, the mean score was 3.4485, the standard deviation was 0.72118, and

the variance was 0.520. The mean score indicates that respondents are at a good level. The histogram and statistical description of the outsourcing variable are also presented in the table below.

**Table 9. Outsourcing Activities Variable Description**

Variable	Number	Min	Max	Mean	Standard Deviation	Variance
Outsourcing Activities	150	1.00	5.00	3.4485	0.72118	0.520



**Chart 6. Variable Chart of Outsourcing Activities**

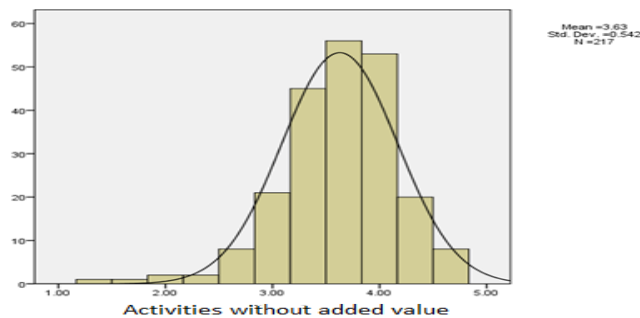
➤ **Valueless Activities Variable Description**

For the valueless activities variable, the minimum score was 1.33, the maximum score was 4.67, the mean score was 3.6283, the standard deviation was 0.54155, and the variance was 0.293. The mean score

indicates that respondents are at a good level. The histogram and statistical description of the valueless activities variable are also presented in the table below.

**Table 10. Valueless Activities Variable Description**

Variable	Number	Min	Max	Mean	Standard Deviation	Variance
Valueless Activities	150	1.33	4.67	3.6283	0.54155	0.293



**Chart 7. Variable Chart of Activities without Added Value**

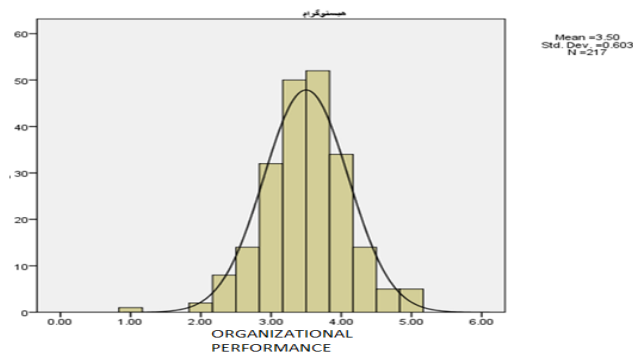


➤ **Organizational Performance Variable Description**  
 For the organizational performance variable, the minimum score was 1.00, the maximum score was 5.00, the mean score was 3.4992, the standard deviation was 0.60274, and the variance was 0.363.

The mean score indicates that respondents are at a good level. The histogram and statistical description of the organizational performance variable are also presented in the table below.

**Table 11. Organizational Performance Variable Description**

Variable	Number	Min	Max	Mean	Standard Deviation	Variance
Organizational Performance	150	1.00	5.00	3.4992	0.60274	0.363



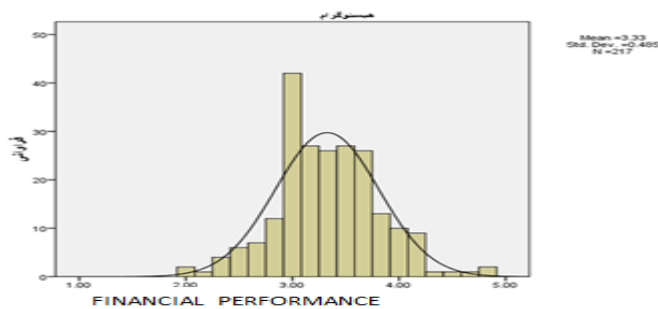
**Chart 8. Variable Chart of Organizational Performance**

➤ **Financial Performance Variable Description**  
 For the financial performance variable, the minimum score was 2.00, the maximum score was 4.83, the mean score was 3.3257, the standard deviation was 0.48506, and the variance was 0.235. The mean score

indicates that respondents are at a good level. The histogram and statistical description of the financial performance variable are also presented in the table below.

**Table 12. Financial Performance Variable Description**

Variable	Number	Min	Max	Mean	Standard Deviation	Variance
Financial Performance	150	2.00	4.83	3.3257	0.48506	0.235



**Chart 8. Variable Chart of Financial Performance**

➤ **Selection of Suitable SEM Approach for Data Analysis**

A researcher intending to use Structural Equation Modeling (SEM) for data analysis in their study must understand which generation of SEM they should use. In the first generation, introduced with software such as AMOS, Lisrel, and EQS, there was a need for a large sample size (over 200), normal distribution of data, and at least three indicators for each question. However, in the second-generation approach, known for the Partial Least Squares (PLS) method and popularized with software like Smart PLS, there is no need for a large sample size or normal distribution. Considering that this study has a sample size of 150 and the data fail the normality assumption based on the Kolmogorov-Smirnov test, and considering the complexity of the research model, the data analysis approach based on Partial Least Squares (PLS) has been chosen, and data analysis is performed using Smart PLS2 software.

• **Main Model**

In the PLS method, two models are tested: the outer model equivalent to the measurement model and the

inner model similar to the structural model in SEM. The outer model indicates the factor loadings of observed variables. PLS simultaneously investigates two models: the outer model (measurement model) that examines the relationships between manifest variables and latent variables, and the inner model (structural model) that measures the relationships between latent variables. (ون وو، ۲۰۱۰)

• **Outer Model Fit (Measurement Model)**

**Factor Loadings**

In the methodology of structural equation modeling, it is necessary to validate the constructs under study to ensure that the selected items for measuring the variables of interest are sufficiently accurate. Confirmatory Factor Analysis (CFA) is used for this purpose, where the factor loading of each item with its variable should have a t-value higher than 1.96. If this condition is met, the item is considered to have the necessary accuracy for measuring that construct or latent variable. The factor loading values for the questions of each latent variable are provided in Table (13).

**Table 13. Confirmatory Factor Analysis (CFA) of Research Variables**

Variables	Item	Factor Loading	t-value
Activities Identification	Q1	0.705	10.781
	Q2	0.779	15.405
	Q3	0.707	9.567
	Q4	0.751	12.486
Environmental Activities Identification	Q5	0.885	38.281
	Q6	0.843	26.871
	Q7	0.838	19.237
Outsourcing Activities	Q8	0.775	14.821
	Q9	0.787	19.930
	Q10	0.828	32.382
	Q11	0.865	32.382
Comparison of Outsourced and Non-Outsourced Costs	Q12	0.809	16.320
	Q13	0.801	12.892
	Q14	0.776	24.149
Valueless Activities	Q15	0.728	26.710
	Q16	0.863	20.547
	Q17	0.874	45.141
Organizational Performance	Q18	0.843	47.433

Variables	Item	Factor Loading	t-value
Financial Performance	Q19	0.815	48.246
	Q20	0.777	38.885
	Q21	0.893	38.885
	Q22	0.861	38.885
	Q23	0.851	38.885

The results of the conceptual model test in terms of significance and path coefficients (main and sub-model of the research) are shown in charts (9) and (10).

As depicted in Chart (10), the factor loading values of the manifest variables for all variables were above 0.4, and no items were deleted. Therefore, all items had factor loadings above 0.4 and t-values greater than 1.96, and the analysis continued with these items, proceeding to examine the model.

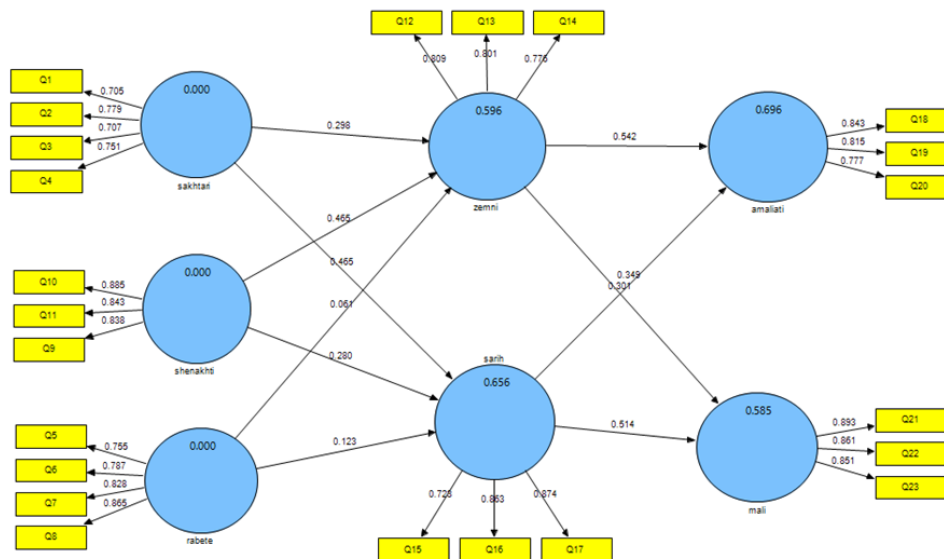


Chart 9. Path Coefficients of the Research Conceptual Main Model

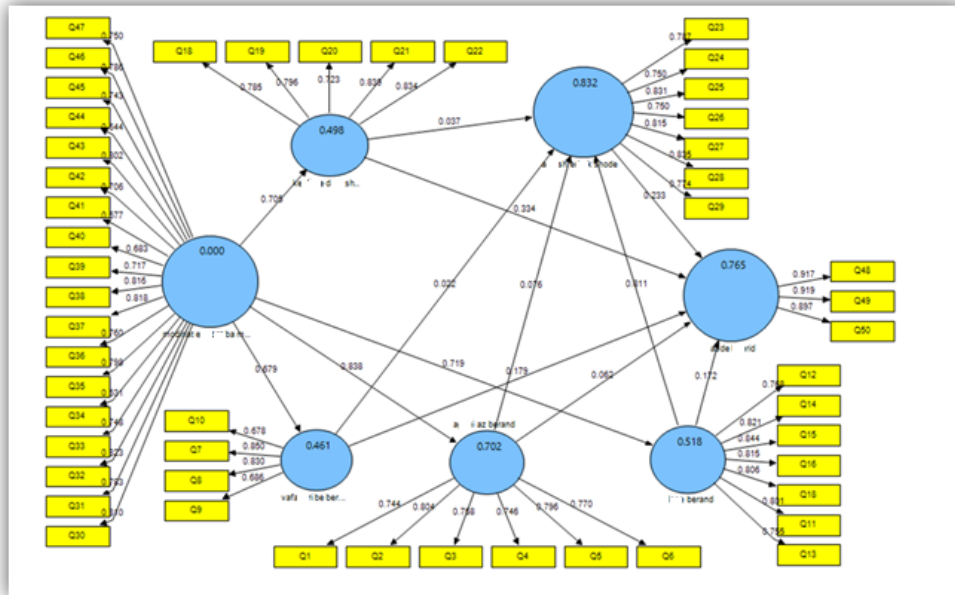


Chart 10. Path Coefficients of the Research Conceptual Sub-Model

**Reliability**

**Convergent Validity**

In structural equation modeling, besides construct validity being used to assess the importance of selected items for measuring variables, discriminant validity is also crucial. Discriminant validity ensures that the items of each variable provide adequate discrimination from other variables in the model. In simpler terms, each item should measure only its respective variable, and their combination should effectively distinguish all variables from each other. This process is evaluated using the extracted Average Variance Extracted (AVE) indicator. AVE coefficients reveal the percentage of variance in the structural or model variables explained by an individual item. For the model variables, AVE has been manually calculated. The structures or model variables with Average Variance Extracted (AVE) coefficients higher than the threshold of 0.5, as introduced by Fornell and Larcker (1981), are considered acceptable. This indicates that the items

can adequately explain the variance of the research model variables.

In the measurement model, internal consistency, or the degree of reliability, is assessed by calculating composite reliability. The reliability coefficients are displayed in Table 14. In all model structures, the composite reliability is high and exceeds the threshold of 0.7, as introduced by Nunnally (1978) (Wen and Wu, 2010). Composite reliability signifies high internal consistency of the research data. Additionally, a Cronbach's alpha value above 0.7 indicates acceptable reliability, with the results presented in Table 14.

Based on the results in the above table, the comparison of Cronbach's alpha values and composite reliability as well as convergent validity (AVE values) obtained from this study with their standard values indicates that all measurement models in this study are confirmed.

**Table 14. Computation of Composite Reliability for Questionnaire Items**

Variables	AVE	Composite Reliability	Cronbach's Alpha value
Activities Identification	0.541	0.825	0.892
Environmental Activities Identification	0.655	0.883	0.894
Outsourcing Activities	0.731	0.891	0.869
Comparison of Outsourced and Non-Outsourced Costs	0.632	0.837	0.841
Valueless Activities	0.659	0.853	0.865
Organizational Performance	0.676	0.861	0.877
Financial Performance	0.754	0.902	0.911

**Divergent Validity**

Divergent validity is assessed through two methods. One is the cross-loading method, which compares the correlation between indicators of one construct with their correlations with other constructs. The other method is the Fornell and Larcker criterion, which has been used in this study, and its results are presented in Table (15).

As shown in the above table, the square root of AVE for the latent variables in the current study,

placed in the main diagonal cells of the matrix, is higher than the correlation values between them, arranged in the lower left-hand side cells of the main diagonal. Therefore, it can be stated that in this study, the research variables in the model have a higher interaction with each other, meaning that the convergent validity of the model is at an appropriate level.

**Table 15. Divergent validity according to Fornell and Larcker**

Variables	Activity Identification	Environmental Activities Identification	Outsourcing Activities	Comparison of Outsourced and Non-Outsourced Costs	Valueless Activities	Organizational Performance	Financial Performance
Activities Identification							0.76
Environmental Activities Identification						0.77	0.73
Outsourcing Activities					0.83	0.19	0.72
Comparison of Outsourced and Non-Outsourced Costs				0.75	0.52	0.48	0.13
Valueless Activities			0.87	0.62	0.21	0.39	0.24
Organizational Performance		0.84	0.63	0.38	0.45	0.71	0.55
Financial Performance	0.81	0.28	0.16	0.47	0.48	0.21	0.41

**Hypothesis Testing Results**

Each hypothesis is tested by examining the sign, size, and statistical significance of the path coefficient (beta) between each independent variable and the dependent variable. The higher the magnitude of this path coefficient, the greater the predictive effect of the independent variable on the dependent variable. By

considering the results of examining the relationships between independent and dependent variables using the relevant coefficients, we can investigate the meaningfulness of the effects among the research variables. To test the significance of the path coefficient or beta, the significance of the t-value for each path coefficient must be considered. For this

reason, bootstrapping is employed, and the results are reliable.(Azar and Momeni ,1998)

**Hypothesis 1**

There is a significant relationship between activity identification and valueless activities.

The path coefficient between activity identification and valueless activities is 29%, with a t-value higher

than 1.96, indicating a positive and significant influence of activity identification on identifying valueless activities. This suggests that employees who have higher performance in terms of activity identification are likely to identify more valueless activities.

**Table 16. Relationship between Activities Identification and Valueless Activities**

Variables	Path coefficient	t-value	Result
Activities Identification and Valueless Activities	0.298	2.401	accept

**Hypothesis 2**

There is a significant relationship between activity identification and full costing.

The path coefficient between activity identification and full costing is 46%, with a t-value higher than

3.624, indicating a positive and significant influence of activity identification on full costing. This indicates that employees with higher cognitive performance will also take full costing more seriously.

**Table 17. Relationship between Activities Identification and Full Costing**

Variables	Path coefficient	t-value	Result
Activities Identification and Full Costing	0.465	3.624	accept

**Hypothesis 3**

There is a relationship between environmental activity identification and full costing.

The path coefficient between environmental activity identification and full costing is 0.6%, with a

t-value lower than 1.96, indicating no positive and significant influence of environmental activity identification on full costing.

**Table 18. Relationship between Environmental Activities Identification and Full Costing**

Variables	Path coefficient	t-value	Result
Environmental Activities Identification and Full Costing	0.061	0.383	reject

**Hypothesis 4**

There is a significant relationship between environmental activity identification and valueless activities.

The path coefficient between environmental activity identification and valueless activities is 12%, with a t-value lower than 1.96, indicating no positive and significant influence of environmental activity identification on valueless activities.

**Table 19. Relationship between Environmental Activities Identification and Valueless Activities**

Variables	Path coefficient	t-value	Result
Environmental Activities Identification and Valueless Activities	0.123	0.866	reject

**Hypothesis 5**

There is a significant relationship between identifying valueless activities and financial performance.

The path coefficient between identifying valueless activities and financial performance is 29%, with a t-

value higher than 1.96, indicating a positive and significant influence of identifying valueless activities on financial performance. This suggests that employees with higher performance in identifying activities will achieve higher financial performance.

**Table 20. Relationship between Valueless Activities and Financial Performance**

Variables	Path coefficient	t-value	Result
Valueless Activities and Financial Performance	0.298	2.401	accept

**Hypothesis 6**

There is a significant relationship between identifying valueless activities and organizational performance.

The path coefficient between identifying valueless activities and organizational performance is 45%, with

a t-value higher than 1.96, indicating a positive and significant influence of identifying valueless activities on organizational performance.

**Table 21. Relationship between Valueless Activities and Organizational Performance**

Variables	Path coefficient	t-value	Result
Valueless Activities and Organizational Performance	0.465	3.624	accept

**Hypothesis 7**

There is a significant relationship between full costing and financial performance.

The path coefficient between full costing and financial performance is 54%, with a t-value higher than 1.96, indicating a positive and significant influence of full costing on financial performance.

**Table 22. Relationship between Full Costing and Financial Performance**

Variables	Path coefficient	t-value	Result
Full Costing and Financial Performance	0.542	6.977	accept

**Hypothesis 8**

There is a significant relationship between full costing and organizational performance.

The path coefficient between full costing and organizational performance is 30%, with a t-value

higher than 1.96, indicating a positive and significant influence of full costing on organizational performance.

**Table 23. Relationship between Full Costing and Organizational Performance**

Variables	Path coefficient	t-value	Result
Full Costing and Organizational Performance	0.301	3.630	accept

**Hypothesis 9**

There is a significant relationship between outsourcing activities and identifying valueless activities.

The path coefficient between outsourcing activities and identifying valueless activities is 34%, with a t-

value higher than 1.96, indicating a positive and significant influence of outsourcing activities on identifying valueless activities.

**Table 24. Relationship between Outsourcing Activities and Valueless Activities**

Variables	Path coefficient	t-value	Result
Outsourcing Activities and Valueless Activities	0.349	4.172	accept

**Hypothesis 10**

There is a significant relationship between outsourcing activities and full costing.

The path coefficient between outsourcing activities and full costing is 51%, with a t-value higher than 1.96, indicating a positive and significant influence of outsourcing activities on full costing.

The t-values indicate the significance levels of the relationships tested. Based on the results in Table (26), the t-values for two paths related to environmental activity identification and both valueless activities and full costing are insignificant, but all other paths are significant.

**Table 25. Relationship between Outsourcing Activities and Full Costing**

Variables	Path coefficient	t-value	Result
Outsourcing Activities and Full Costing	0.514	7.299	accept

**Table 26. Direct Linear Effect of the Role of Research Variables in the Model**

Direction	Beta	t-value	Result
<b>ID Activity I see</b>			
Identification of activities → Activities without added value	0.465	4.365	the reception
Identification of activities → Accurate calculation of the total price	0.280	2.323	the reception
<b>Identification of E nvironmental Activities</b>			
Environmental Activities → Activities without Added Value	0.061	0.383	Rejection
Environmental Activities → Accurate Calculation of the Total Price	0.123	0.855	Rejection
<b>then leave Sapar Y Activity I see</b>			
Outsourcing of Activities → Activities without Added Value	0.298	2.401	the reception
Outsourcing of Activities → Accurate Calculation of the Total Price	0.465	3.624	the reception
<b>The active dimension of T Yes Lacking Value added</b>			
Activity Yes Lacking Value Added → Financial Performance	0.542	6.977	the reception
Activities without added value → Organizational Performance	0.301	3.630	the reception
<b>Calculation dimension: The exact time, The price of the entire thing done</b>			
Computing the exact time the price of the entire done → Financial Performance	0.349	4.172	the reception
Computing the exact time the price of the entire done → Organizational Performance	0.514	7.299	the reception

**Conclusion**

The case and calculation model presented above offer several insights into the applicability of ABC costing for evaluating outsourcing decisions. Firstly, ABC costing must be based on a clear definition of the

scope of analysis, followed by process identification. It is indisputable that no two organizations are alike, except for industries. Certain patterns and terminology, while useful, should only serve as frameworks to initiate discussions. A set of activities, known as VAS,



may be categorized as belonging to manufacturing, marketing, sales, etc., depending on the approach and goal of the analysis. However, in the discussed case, it was evident that they had to be treated as part of the logistic operation.

The second issue pertains to cost drivers. They serve a dual role. Primarily, they act as pivots through which costs are allocated to different objects (activities, customers, etc.). Secondly, they are often seen as reflecting cost determinants. Some authors differentiate between cost drivers and activity drivers, but such differentiation is rare. Scientists emphasize the importance of carefully identifying cost drivers, with a focus on balancing information value and measurement cost. However, practical experience, as demonstrated in the case under discussion, shows that interpreting their meaning correctly and using them appropriately for decision-making is far more crucial.

This brings us to the issue of idle capacity and orphan costs. One could envision allocating storage capacity on a daily basis, but it would require an ideally elastic warehouse with all costs being equally elastic (or the presence of another user with precisely matching needs). In cases of underutilization, orphaned costs must be distributed among active targets.

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