USING OF INVENTORY VALUATION METHODS (FIFO AND WEIGHTED AVERAGE) IN MANUFACTURING COMPANIES IN SAUDI ARABIA

Abdulrahman Atllah Alharbi, Department of Accounting, College of Business Administration, Taif University, Taif, Saudi Arabia

ABSTRACT

Inventory is an important asset in a manufacturing company. The means of recording inventory value could affect various financial parameters including profits and taxes, thereby impacting the financial statement. Thus, considering the significance of inventory valuation, this research aims to understand the range of factors that influence the selection of inventory valuation methods across the manufacturing sector in Saudi Arabia. This is a rapidly growing sector throughout the country, and the government is undertaking a variety of initiatives to support it. This research focuses on 35 manufacturing companies in Saudi Arabia that were analyzed over the observation period (2017–2021). Whilst there are several factors that may have an impact on the selection of inventory valuation method, this research focuses on inventory turnover, current ratio, financial leverage, and gross profit margin, and considered two inventory valuation methods (FIFO and weighted average). Employing the case question approach, it was found that the FIFO and weighted average inventory valuation methods have varying impacts on profit, tax, and ending inventory, with a weighted average generating higher profits across manufacturing firms in Saudi Arabia. Using the Logistic regression approach, it was found that whilst the four independent variables (inventory turnover, current ratio, financial leverage, and gross profit margin) can explain only minor variability in the selection of inventory valuation method, however, they have a significant influence on the dependent variable.

Keywords: Inventory Valuation, FIFO, Weighted Average.

INTRODUCTION

Inventory refers to an asset that is available for sale as part of the usual business operations. Inventory is an important current asset in a manufacturing company and is often the second largest item on the balance sheet, after the fixed assets (Akhtari et al., 2019). Therefore, as argued by Simeon & John (2018), the choice of inventory valuation method is very important in the sector. Simeon & John (2018) added that the inventory valuation method could affect various financial parameters including profits and taxes, thereby impacting the financial statement.

Weygandt et al. (2015) noted that in manufacturing firms, some inventory cannot be sold directly and as a result, inventories are typically classified into raw materials, work in progress, and finished goods. Raw materials refer to basic goods that are not yet processed, work in progress are goods that are being processed, and finished goods are those goods that are completed but not yet sold (Weygandt et al., 2015). Accordingly, considering the complex nature of inventory valuation, it is vital to understand the various factors that influence the selection of inventory valuation methods in the manufacturing sector, which this research will aim to address.

Significance of the Research

This research is focused on understanding the different factors that influence the selection of inventory valuation methods in the manufacturing sector in Saudi Arabia. The rationale behind focusing on Saudi Arabia is that with a 7.5% average growth, the manufacturing sector is one of the fastest-growing sectors in the country. As of 2021, the manufacturing sector contributes 10% of the country's GDP (Gross Domestic Product) (Mordor Intelligence, 2020). Furthermore, the Saudi Arabian government is supporting the manufacturing sector by implementing a range of incentives including the construction of new industrial cities, supporting infrastructure, and establishing infrastructure funds (Mordor Intelligence, 2020).

Research Question & Objectives

Based on the previously discussed background and significance of this research, the research question is set as:

'***Which factors have an impact on the selection of inventory valuation methods across manufacturing firms in Saudi Arabia?***'

The above research question is answered by setting the below objectives:

1. To understand the impact of the inventory valuation methods selection on tax, profit, and ending inventory.
2. To understand the impact of inventory turnover on inventory valuation method selection.
3. To understand the impact of the current ratio on inventory valuation method selection.
4. To understand the impact of financial leverage on inventory valuation method selection.
5. To understand the impact of gross profit margin on inventory valuation method selection.

LITERATURE REVIEW

Prior to conducting an empirical study, it is essential to review the existing literature in order to gain a comprehensive understanding of the topic, identify gaps in the existing literature, and develop a theoretical framework that can guide the study.

Significance of Inventory Valuation

Inventory is the current assets owned for manufacturing goods for sale or future sales (Boundless, 2016). Inventory cost includes the cost of procurement, processing, and other costs incurred to bring the inventory to its current location and condition (Azadi et al., 2019). On procurement or use of inventory, the valuation is made at the book value or input value. In the case of non-fungible inventory for those goods or services that are produced for distinct orders, their cost must be determined by the identification of specific individual costs. The individual specific cost can be identified by allocating the specific costs to inventory items that can be identified. This accounting treatment is required when the items are related in a distinct order. When inventory encompasses several elements that are typically fungible, specific identification cannot be used (Utami et al., 2018). Lee et al. (2019) added that the use of relevant valuation methods varies across industries: In the chemical industry, physiochemi00cal properties influence the treatment methods and hence the inventory valuation method. In the paint manufacturing industry, storage, mixing, and weighing determine the emission and hence the inventory valuation method. Thus, inventory valuation can be a complex undertaking in certain industries where it is difficult to track the flow of inventory based on the earliest or latest addition used (Utami et al., 2018).

Behunova et al. (2020) argued that inventory valuation is a sub-activity of identifying production costs that must be optimized, as this cost directly affects the price at which the product can be offered to the customer. Any product in the market must be priced competitively so that consumers are motivated to buy the product. This competitive pricing can be achieved by understanding the market dynamics and the production costs, which are usually the largest proportion of the cost. Therefore, it is increasingly important for the manufacturing company to closely monitor production costs and subsequently inventory costs (Cevallos-Torres & Botto-Tobar, 2019).

Moreover, as argued by Lonescu (2018), the inventory valuation method has an impact on both the financial position and financial performance of a business, as demonstrated below.

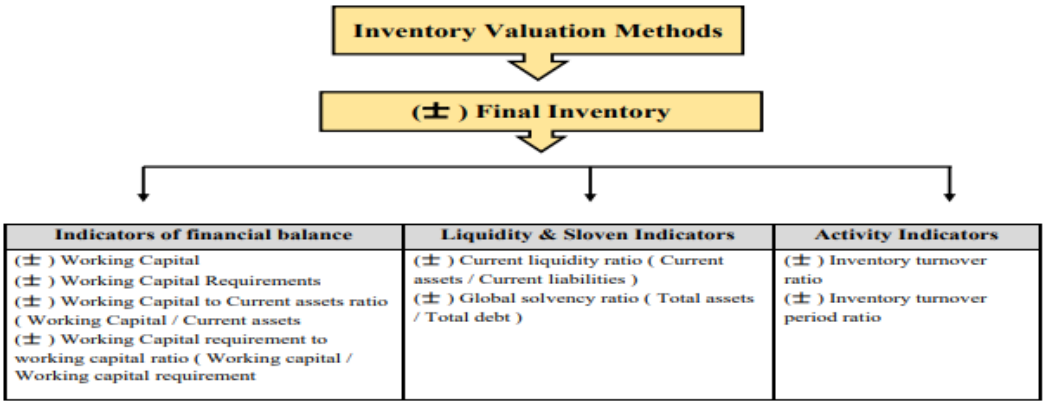

Figure 1a
IMPACT OF INVENTORY VALUATION METHODS ON FINANCIAL POSITION (SOURCE: LONESCU, 2018)

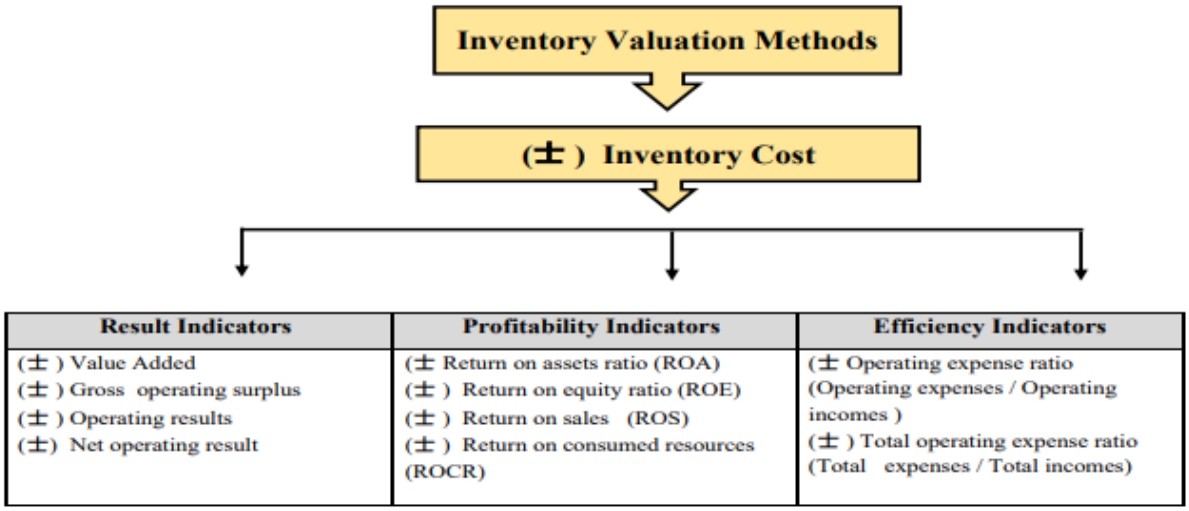

Figure 1b
IMPACT OF INVENTORY VALUATION METHODS ON FINANCIAL PERFORMANCE (SOURCE: LONESCU, 2018)

Based on figures 1a and 1b, it can be inferred that different valuation methods result in diverse inventory levels and costs, which subsequently causes changes in various financial metrics.

Thus, inventory valuation methods are important concepts of accounting and management and warrant particular focus as the price at which raw materials are procured has a direct impact on the cost of production. Therefore, it is essential that pricing is both realistic and consistent (Edori, 2018).

Inventory Valuation Methods

Ideally, there must be a standard costing method for valuing inventory. According to this standard costing method, activity should be used as the basis for valuing inventory. The standard costing should account for the normal levels of consumption associated with material, labour, production, and efficiency capacity. These levels must be reviewed periodically, and where necessary, adjusted according to the existing conditions at any moment. In a situation where there are price differences between procurement value and carrying value, there is a need to account for it separately by recognizing the cost of the asset (Lonescu, 2018).

However, since businesses do not procure their inventory at the same time, there are likely to be differences in the prices of inventory, meaning that the above-discussed standard costing method will be difficult to implement. Consequently, businesses must choose from various methods of inventory valuation to assess the value of inventory, with each approach having its own advantages and disadvantages (Rajendran & Ravindran, 2019).

According to Nisha (2015), there are three valuation methods for inventory: FIFO (First in First Out), LIFO (Last in First Out), and Weighted Average. As per the IFRS (International Financial Reporting Standards) and International Accounting Standard, the recommended output inventory valuation methods are the FIFO and the Weighted Average methods. Moreover, LIFO is prohibited under IFRS as it can potentially distort the financial position and performance of the company. For example, the use of LIFO can result in understated earnings, thereby reducing taxable income. It may also lead to management selling off inventory at a higher price in case of a liquidation event, leading to financial irregularities (Lonescu, 2018). Thus, this research will focus on the FIFO and Weighted Average methods only.

The first commonly employed method is FIFO. This method works under the assumption that items that were purchased earlier are used or sold first. It is one of the most widely used methods of inventory valuation as it is easy and practical. This method is widely recommended when manufactured products are perishable or may become obsolete (Nisha, 2019). This valuation method offers multiple advantages: The first advantage is that the oldest inventory items are used or sold first, so they do not become obsolete, as obsolete inventory may be written off. The second advantage is that the effect of inflation is alleviated as the business can sell the oldest item at the current inflated price, thereby reducing the impact of inflation. Third, it is an orderly approach which ensures that the current prices of inventory are reflected in the financial statement. However, there are also certain disadvantages associated with the FIFO method: For example, this approach may result in inconsistent pricing which may lead to a lack of clarity for clients who may have received products at different prices. This inconsistent pricing may also result in clerical errors as it is difficult to keep accurate records when the price of inventory is volatile (Lonescu, 2018).

The other widely used approach is the Weighted-Average method. This method involves the addition of net purchase to the opening inventory and then dividing the summation by the units of available inventory to arrive at a weighted average cost unit. The summation and division can be carried out at any time in the year to calculate a new weighted average cost which is then applied to the unit of total sales and the closing inventory to establish the cost of sales and the closing inventory value (Emmanuel & Abdullahi, 2015).

According to Nisha (2015), the weighted average method assigns an average production cost to a product. It is recommended for use when the inventory items are so intermingled that it is difficult to allocate specific costs to individual units. The valuation method offers a key advantage: During price volatility, since identical inventories are valued at the same price and inventory procured towards the end is used to arrive at the weighted average cost, the value obtained is close to the current market price. However, there are also several disadvantages associated with this Weighted Average method: First, different batches of inventory may lose their identity as the price may not have any relationship with the paid price. Second, there may be clerical errors due to rounding off, which could result in distortion of the actual financial performance (Simeon & John, 2018).

Factors influencing Inventory Valuation Methods

According to the positive accounting theory, a firms' management tends to engage in opportunistic behaviour during the decision-making process, and therefore choose accounting policies and practices that benefit them (Azahra & Siauwijaya, 2022). As per accounting standards, diverse types of inventories should be valued using different approaches; however, companies tend to follow the methods that suit them best or have been set out in the framework of the internal inventory valuation directive (Teplická & Seňová, 2020).

Li & Liu (2014) commented that a business must be able to analyse the actual situation and then select the most suitable method for valuing inventory. According to Teplická & Seňová, (2020), the decision for the selection of the method for valuing inventories should be based on economic efficiency, which is in turn linked to profitability. Optimal inventory size ensures the success of a business. The size of inventory is determined in order to achieve an efficient course for the business, and key factors include the size of the company, the availability of raw materials, the scope of activities, and technological processes (Teplická & Seňová, 2020).

There are several factors that influence the selection of inventory valuation method: First is the capacity for tax saving. According to Simeon & John (2018), inventory valuation methods have a significant influence on income tax: Since the FIFO method assumes the oldest inventory is sold first, taxes are minimized if the prices of the inventory items are decreasing. Due to the higher cost of the oldest inventory, the firms' COGS increases, which leads to reduced net income for an accounting period. Consequently, the tax liability of the company decreases. The second factor that determines the preference for the valuation method is inflation: Since the LIFO method assumes that the latest inventory is sold last, the recent cost is assigned to the inventory. Due to inflation, the revenue will be on a rise, and therefore the cost must also match the revenue. Due to the higher cost of the latest inventory, the firms' COGS increases, which leads to reduced net income for an accounting period. Accordingly, the tax liability of the company decreases. In addition, LIFO ensures that there are fewer inventory write-downs (Teplická & Seňová, 2020). The third factor that determines the inventory valuation method is price instability; in case of high volatility in pricing, organizations tend to prefer the weighted average method. The fourth factor is the nature of the inventory. In the case that the inventory has a limited shelf-life, the firm will opt to employ the FIFO method (Simeon & John, 2018). The fifth factor is the lack of adequate information. If firms do not maintain adequate records and are lacking information on the available inventory, they may not be able to use the FIFO method (Onyekwelu & Uche, 2014). Onyekwelu & Uche (2014) also listed several other factors that affect the choice of inventory valuation method including custom, convenience, ignorance, advice from auditors, and capacity to borrow money or sell the business at the highest possible price.

There are several factors that influence the selection of inventory valuation method, some of which have been discussed above. However, considering the scope of this study, it is critical to focus on factors that can be easily quantified. There are four factors that have been extensively focused on in prior studies, the majority of which have garnered opposing opinions from academics. First is inventory turnover, which Gaol (2015) and Azahra & Siauwijaya (2022) argued influences the inventory valuation selection methods; conversely, Indriyani & Riharjo (2018) maintained that it has no impact on the choice of approach. Second is the current ratio, which Mahardika et al. (2015) asserted does influence the inventory valuation selection, whereas Victoria (2016) and Azahra & Siauwijaya (2022) found that it does not. Third is financial leverage, which Ayem & Harjanta (2018) and Azahra & Siauwijaya (2022) argued does influence the inventory valuation selection methods, while Rahmayani & Utami (2019) found that it does not. Fourth is gross profit margin, which Kadim et al. (2019), Rahmayani & Utami (2019), and Azahra and Siauwijaya (2022) argued does affect the inventory valuation selection methods.

Clearly, there are mixed insights regarding these four factors that can have a potential impact on the inventory valuation method. Therefore, further exploration of these factors is required.

Theoretical Framework

Based on the above discussion, it can be inferred that the inventory valuation method has strong significance for a business and therefore businesses strive to make an efficient and effective decision. Of the three inventory valuation methods (FIFO, LIFO, and Weighted Average), LIFO is prohibited by the IFRS, thus the focus will be on the FIFO and Weighted Average inventory valuation methods.

There are several factors that impact inventory valuation, amongst which four factors are being focused on as discussed below:

Current Ratio*:* It is denoted by Current Assets/Current Liabilities. This ratio shows the short-term liquidity of the company; that is, if current assets can be converted to cash to meet current obligations. A high current ratio is desirable (Sharma, 2020).

Financial Leverage: It is denoted by debts/total assets. This ratio shows the long-term solvency of the company; that is, if the company can manage its debt obligations using its assets. Whilst low financial leverage is ideal, the ratio does differ across industries (Sharma, 2020).

Inventory Turnover: It is denoted by the cost of goods sold/average inventory level. This ratio shows the efficiency of inventory management. A high ratio is desirable (Sharma, 2020).

Gross Profit Margin: It is denoted by gross profit/sales. This ratio shows how profitable a business is after deducting direct expenses. A high ratio is desirable (Sharma, 2020).

Hypotheses

Based on the literature review, the following main hypothesis is set as:

Ho*: The current ratio, financial leverage, inventory turnover, and gross profit margin have no significant impact on the selection of inventory valuation method in manufacturing firms in Saudi Arabia.*

The sub-hypotheses are set as:

Ho_1*: The selection of inventory valuation method has no impact on tax, profit, and ending inventory.*

Ho$_2$: *The inventory turnover has no significant impact on the selection of inventory valuation method.*

Ho$_3$: *The current ratio has no significant impact on the selection of inventory valuation method.*

Ho$_4$: *The financial leverage has no significant impact on the selection of inventory valuation method.*

Ho$_5$: *The gross profit margin has no significant impact on the selection of inventory valuation method*.

METHODOLOGY

Based on the knowledge acquired from the literature review, a theoretical framework is developed. Next, based on insights from Saunders et al. (2015), a methodology framework must be developed for use during the conducting of this study

Research Design

This is a case study that is focused on understanding the factors that influence the selection of inventory valuation methods across manufacturing companies in Saudi Arabia. A total of 35 manufacturing companies were analyzed over the observation period (2016-2020).

The data utilized in this study is secondary data that was acquired from manufacturing firms' income statements and balance sheets in Saudi Arabia. The secondary data that was collected includes sales revenue, cost of goods sold, gross profit, inventory, current assets, total assets, current liabilities, and total liabilities. The data was obtained from the annual reports filed by the manufacturing firms with the Saudi Arabian Stock Exchange (TADAWUL, 2022).

Data Sampling

The samples in this study are manufacturing firms listed on the Saudi Arabian Stock Exchange, TADAWUL, for 2016-2020. In accordance with Saunders et al. (2015), the method employed for the sample selection is purposive sampling, which is a sampling technique to identify the part of the population that meets specified criteria. The criteria used for sampling data from the population are listed below.

1. The sample firm must be in the manufacturing sector.
2. The sample firm must publish audited financial statements that must contain sales revenue, cost of goods sold, gross profit, inventory items, current assets, total assets, current liabilities, and total liabilities.
3. The financial statements used are in the SAR (Saudi Arabia Riyal) currency.
4. The sample firm must employ either the FIFO or the weighted average inventory valuation method.

Operationalization of Variables

The factors that are being considered for this study have different scales. For analysis purposes, it is necessary to represent all variables on the same scale and accordingly, the operationalization of the variables is presented in Table 1.

Table 1
OPERATIONALIZATION OF VARIABLES

		COGS / Average Inventory	**=**	**Inventory Turnover**
		Current Asset / Current Liability	=	Current Ratio
		Non-Current Liability / Total Current Asset	=	Financial Leverage
		Gross Profit / Net Sales	=	Gross Profit Margin
1 (Nominal)	=	FIFO	=	Inventory Valuation Method

0 (Nominal)	=	Weighted Average		

Data Analysis

Based on insights from Azahra & Siauwijaya (2022), the analysis is conducted using two methods. The first method is a case question approach that is utilized to answer the first sub-hypothesis. The second method is a statistical analysis approach that is used to answer the remaining sub-hypotheses (2, 3, 4, and 5). The statistical analysis is conducted using the SPSS tool which will facilitate an understanding of the effect of independent variables (current ratio, gross profit margin, inventory turnover, and financial leverage) on the selection of inventory valuation method. The statistical analysis will be conducted in multiple stages: descriptive statistical analysis (to increase familiarity with the data), dependent variable coding (to assign a numerical value to valuation selection), multicollinearity test (to check for correlation between independent variables), overall model fit test (to check for fitness of model), determinant coefficient test (to check for regression between independent and dependent variables), and regression model feasibility test (to check for strength of regression).

Hypothesis Test

The hypothesis testing is performed by applying the statistical technique of multivariate tests. The multivariate test entails logistic regression based on the Backward Stepwise (WALD) method, which tests the effect of current ratio, financial leverage, inventory turnover, and gross profit margin on the selection of inventory valuation method. The dependent variable is the dummy variable, which is '*1*' for FIFO and '*0*' for Weighted-Average.

The model employed is as follows:

$$\ln\left(\frac{\mathrm{p}}{1-\mathrm{p}}\right) = \alpha + \beta 1\mathrm{CR} + \beta 2\mathrm{FL} + \beta 3\mathrm{IT} + \beta 4\mathrm{PM} + \mathrm{e}\ 1$$

Where:

P = Selection of inventory valuation method
α = Constant
β = Regression Constant
CR = Current Ratio
FL = Financial Leverage
IT = Inventory Turnover
PM = Gross Profit Margin
e = Error Term

Hypothesis testing using logistic regression is conducted at a confidence interval of 95% (significance level (α) of 5%). The p-value determines the criteria for accepting or rejecting this analysis. If the p-value is > 0.05, then the null hypothesis must be rejected, which means that the independent variables have a significant impact on the selection of the inventory valuation method. If the p-value is < 0.05, then the null hypothesis must be accepted, which means that the independent variables have no significant impact on the selection of the inventory valuation method.

RESULTS AND DISCUSSION

First Method with Case Question

Exemplary Inventory records of SABIC Agri-Nutrients Co manufacturing company engaged in trading during December 2020 are presented in Table 2.

Table 2
INVENTORY RECORDS SABIC AGRI-NUTRIENTS CO (SOURCE: PROCESSED)

				Figures in SR 000
Date	**Transaction**	**Unit**	**Unit Cost**	**Total**
01-12-2020	Beginning Inventory	1,000	403	403,000
08-12-2020	Purchase	50	650	32,500
13-12-2020	Sale	500	800	400,000
18-12-2020	Purchase	200	710	141,980
22-12-2020	Sale	300	900	270,000
28-12-2020	Purchase	250	525	131,250
30-12-2020	Sale	200	647	129,400

In addition, operating expenses for the year 2020 are reported as SR 693,754,000 and are estimated to be 57,812 (in 000) for December 2020, as shows in Table 3.

Similarly, the corporate income tax rate in Saudi Arabia is assumed to be 20% and zakat is charged at the rate of 2.5% of the total capital resources of the company.

Table 3
ADDITIONAL INFORMATION

					Figures in SR 000
Date	**Transaction**	**Unit**	**Unit Cost**	**Total Cost**	**Total Revenue**
01-12-2020	Beginning Inventory	1,000	403	403,000	
08-12-2020	Purchase	50	650	32,500	
18-12-2020	Purchase	200	710	141,980	
28-12-2020	Purchase	250	525	131,250	
13-12-2020	Sale	500	800		400,000
22-12-2020	Sale	300	900		270,000
30-12-2021	Sale	200	647		129,320
Total				**708,730**	**799,320**

Inventory Valuation Method Using FIFO

Under the FIFO method, the inventory that is procured first will be sold first. Table 4 shows the calculation for the Cost of Goods Sold (COGS) and ending inventory as per the FIFO Method.

Table 4
INVENTORY VALUATION METHOD FIFO

						Figures in SR 000
	Purchase		**COGS**		**Balance**	
Date	**Unit x Cost**	**Total**	**Unit x Cost**	**Total**	**Unit x Cost**	**Total**
01-12-2020					1,000 x 403	-
08-12-2020	50 x 650	32,500			50 x 650	32,500
						32,500
13-12-2020			500 x 403	201,500	500 x 403	201,500
					50 x 650	32,500
						234,000

18-12-2020	200 x 709.9	141,980			500 x 403	201,500
					50 x 650	32,500
					200 x 709.9	141,980
						375,980
22-12-2020			300 x 403	120,900	200 x 403	80,600
					50 x 650	32,500
					200 x 709.9	141,980
						255,080
28-12-2020	250 x 525	32,500			200 x 403	80,600
					50 x 650	32,500
					200 x 709.9	141,980
					250 x 525	32,500
						287,580
30-12-2020			200 x 403	80,600	50 x 650	32,500
					200 x 709.9	141,980
					250 x 525	32,500
Total				403,000		**206,980**

(**Source:** Calculated)

As per the calculations in the above table, the total cost of goods sold is 403,000 and the ending inventory is 305,730. Table 5 explains how to produce an income statement for the calculation of net profit.

Table 5
INCOME STATEMENT 1

	Figures in SR 000
Item	**Value**
Revenue	-
COGS	403,000
Gross Profit	(403,000)
Operational Cost	57,812
Profit	(460,812)
Tax and Zakat	(103,683)
Net Profit	(357,129)

(**Source:** Calculated)

Inventory Valuation Method Using Weighted Average

When employing this method, inventory items are sold using the average unit cost of all available units.

Weighted Average Cost = 708,730/1500 = 472.49 (in SR 000)

Table 6 shows the COGS and ending inventory using the weighted average method.

Table 6
INVENTORY VALUATION METHOD WEIGHTED AVERAGE

		Figures in SR 000
Units Sold	**Average Cost**	**Amount**
1,000	472	472,490
Remaining Units	**Average Cost**	**Amount**
500	472	236,245

(**Source:** Calculated)

Table 7 depicts how to produce an income statement for the calculation of net profit.

Table 7 INCOME STATEMENT 2	
	Figures in SR 000
Item	**Value**
Revenue	799,320
COGS	472,487
Gross Profit	326,833
Operational Cost	57,812
Profit	269,021
Tax and Zakat	60,530
Net Profit	208,492

(**Source:** Calculated)

Statistical Analysis

Descriptive statistics

The descriptive summary of the variables is presented in Table 8.

Table 8 DESCRIPTIVE STATISTICS							
	N	**Min**	**Max**	**Mean**	**Std. Dev**	**Skewness**	**Kurtosis**
Inventory Turnover	150	-2.00	14.00	2.63	2.30	2.11	6.94
Current Ratio	150	0.07	8.98	1.60	1.67	2.25	5.59
Financial Leverage	150	0.00	12.77	1.18	2.10	3.68	15.19
Gross Profit Margin	150	10.46	48.25	3.38	7.18	4.37	22.08
Inventory Valuation Method	150	0.00	1.00	0.28	0.45	0.99	-1.03
Valid N (listwise)	150						

Table 8 can be interpreted in the following manner: N shows the number of observations. Min and Max show the maximum and minimum values of ratios. Mean is the average observation value. Standard deviation (square root of variance) shows how the observations are spread around the mean, with a higher standard deviation indicating high volatility in the data. Skewness shows the distortion in a given distribution. '*0*' skewness indicates normal distribution, '+' skewness shows the outliers to be on the right, and '-' skewness means the outliers are on the left. All variables (as shown in the above table) exhibit positive skewness. Kurtosis demonstrates the comparative heaviness of the distribution tails to a normal distribution. A normal distribution has a kurtosis of 3, while leptokurtic have positive excess kurtosis and has fatter tails and platykurtic has negative excess kurtosis and has thin tails. All variables except the inventory valuation method (which is platykurtic) are leptokurtic.

Whilst the above table shows the disparities between the variables, it cannot be ascertained whether this difference is statistically significant. Therefore, a detailed analysis is required, which is carried out in the following section.

Dependent variable encoding

For logistic regression, it is necessary to encode the dependent variable, as depicted in Table 9.

Table 9 ENCODING	
Original Value	**Encoded Value**
Weighted Average	0
FIFO	1

Multicollinearity test

Table 10 MULTICOLLINEARITY TEST RESULTS		
Model	**Collinearity Statistics**	
	Tolerance	**VIF**
(Constant)		
Inventory Turnover	0.948	1.055
Current Ratio	0.894	1.119
Financial Leverage	0.876	1.142
Gross Profit Margin	0.974	1.027

Table 10 presents the multicollinearity test results for all the independent variables. It can be observed from the above table that every independent variable has a tolerance value of >0.1 and VIF of < 10, which signifies that no multicollinearity is observed in the model. Hence, there are no strong correlations amongst all of the independent variables.

Overall model fit test

The fit of the overall model is assessed by comparing the -2 Log-Likelihood model (block number = 0, without introducing the independent variable) with the -2 Log-Likelihood model (block number = 1, with introducing the independent variable).

A good regression in the model is indicated by -2 Log-Likelihood (block number = 0) > -2 Log- Likelihood (block number = 1).

Table 11a BLOCK 0 FOR OVERALL FIT			
Iteration History [a, b, c]			
Iteration		**-2 Log likelihood**	**Coefficients Constant**
Step 0	1	178.013	-0.880
	2	177.886	-0.944
	3	177.886	-0.944

a. Constant is included in the model.

b. Initial -2 Log-Likelihood: 177.886

Table 11b BLOCK 1 FOR OVERALL FIT							
Iteration History [a, b, c, d]							
Iteration		**-2 Log likelihood**	**Coefficients**				
			Constant	**IT**	**CR**	**FL**	**PM**
Step 1	1	172.902	-1.445	0.098	0.174	0.051	-0.009
	2	172.531	-1.634	0.117	0.202	0.063	-0.013
	3	172.530	-1.640	0.118	0.203	0.063	-0.014
	4	172.530	-1.640	0.118	0.203	0.063	-0.014
a. Method: Enter							
b. Constant is included in the model.							
c. Initial -2 Log-Likelihood: 177.886							
d. Estimation terminated at iteration number 4 because parameter estimates changed by less than 0.001.							

Based on the above Tables 11a and 11b, it can be observed that the -2 Log-Likelihood (block number = 0) is 177.886, which is greater than the -2 Log-Likelihood (block number = 1), which is 172.530. Consequently, it can be concluded that the block 1 model is a good fit as the value of -2 Log-Likelihood has decreased.

Table 12
CHI-SQUARE FOR OVERALL FIT

Omnibus Tests of Model Coefficients				
	Chi-square		df	Sig.
Step 1	Step	5.356	4	0.253
	Block	5.356	4	0.253
	Model	5.356	4	0.253

However, an important point of note here is that the value of -2 Log-Likelihood (172.53) > Chi-Square table (5.356), as shown in Table 12. Thus, there is a possibility that the model with the independent variable might not be considered a good fit.

Coefficient of determination test (Nagelkerke R Square)

Table 13 presents the results of the determination coefficient testing.

Table 13
TESTING FOR DETERMINATION COEFFICIENT

Step	-2 Log likelihood	Cox and Snell R Square	Nagelkerke R Square
1	172.530[a]	0.035	0.051

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

As observed in the above Table 13, the Nagelkerke R Square value is 0.051, which means that the dependent variable can be explained by the independent variables' variability of 5.1%, while the remaining 94.9% can be explained by other variables.

Regression Model Feasibility Test (Hosmer and Lemeshow's Goodness of Fit)

Table 14
HOSMER AND LEMESHOW'S TEST

Step	Chi-square	Df	Sig.
1	13.986	8	0.082

Based on the feasibility test results of the regression model, the chi-square value is determined as 13.986, the degree of freedom (df) value is observed to be 8, and the significance probability value is observed to be 0.082, as shown in Table 14. Furthermore, since the chi-square table for df (8) at a significance of 0.05 is 15.51, the calculated chi-square value < chi-square table and has a significance of 0.082 (>0.05). Thus, this logistic regression model can be accepted and is feasible for analysis.

Hypothesis Testing

Following testing for the feasibility of the logistic regression model and obtaining a fit model, the subsequent step involves testing for the hypothesis so that the objectives of this study can be answered.

Table 15 VARIABLES IN THE EQUATION									
		B	S. E.	Wald	Df	Sig.	Exp (B)	95% C. I. for EXP (B)	
								Lower	Upper
Step 1[a]	IT	0.118	0.079	2.228	1	0.136	1.125	0.964	1.313
	CR	0.203	0.110	3.370	1	0.066	1.225	0.986	1.521
	FL	0.063	0.092	0.468	1	0.494	1.065	0.889	1.276
	PM	-0.014	0.030	0.206	1	0.650	0.987	0.931	1.046
	Constant	-1.640	0.427	14.757	1	0.000	0.194		
a. Variable(s) entered on step 1: IT, CR, FL, PM.									

Table 15 presents the hypothesis testing results using binary logistic regression. The results of this test show whether the independent variables (inventory turnover, current ratio, financial leverage, and gross profit margin) affect the inventory valuation method selection with a significance level of <0.05. This requires a comparison of WALD values with a chi-square table, as carried out below.

Table 16 HYPOTHESIS TEST						
Variable	B	Exp(B)	Wald	Chi-square table	Sig.	Decision
IT	0.118	1.125	2.228	< 15.51	0.136	H2 rejected
CR	0.203	1.225	3.370	< 15.51	0.066	H3 rejected
FL	0.063	1.065	0.468	< 15.51	0.494	H4 rejected
PM	-0.014	0.987	0.206	< 15.51	0.650	H5 rejected

In Table 16, B indicates the direction of the regression and EXP (B) indicates the magnitude of the impact. For all variables, the Wald value is lower than the chi-square table value, which means sub-hypotheses 2, 3, 4 and 5 must be rejected.

The above results indicate the following

1. For every unit increase in inventory turnover ratio, the FIFO method is used 1.125 times more than the weighted average method.
2. For every unit increase in the current ratio, the FIFO method is used 1.225 times more than the weighted average method.
3. For every unit increase in financial leverage ratio, the FIFO method is used 1.065 times more than the weighted average method.
4. For every unit increase in gross profit margin ratio, the FIFO method is used 0.987 times more than the weighted average method.

DISCUSSION

The Effect of the Selection of Inventory Valuation Method on Tax, Profit, and Ending Inventory

Based on the calculation of the inventory valuation using FIFO and the weighted average methods, it can be inferred that the inventory valuation method using FIFO and weighted average does affect taxes, profits, and ending inventory as evidenced by their disparity across manufacturing companies in Saudi Arabia. This finding is in line with the research conducted by Edori (2018), which identified that the selection of inventory valuation methods affects taxes, profits, and ending inventory.

Furthermore, as evidenced by the higher profitability of inventory valuation using weighted average than inventory valuation using FIFO, it can be inferred that weighted average is a superior method to FIFO for manufacturing companies in Saudi Arabia. These findings are contradictory to Azahra & Siauwijaya (2022), who found FIFO to be the better approach. This difference could be explained by the fact that earlier studies focused on Indonesia whereas current studies focus on Saudi Arabia.

The Effect of Inventory Turnover on the Selection of Inventory Valuation Method

Based on the results obtained regarding the impact of the inventory turnover variable on the selection of the inventory valuation method, it can be reasoned that the inventory turnover variable has a significant effect on the inventory valuation method across manufacturing companies in Saudi Arabia. This finding is in line with Gaol (2015) and Azahra & Siauwijaya (2022), who identified that the inventory intensity variable affects the selection of inventory valuation methods.

The Effect of Current Ratio on the Selection of Inventory Valuation Method

As per the results of the testing of the impact of the current ratio variable on the selection of the inventory valuation method, it can be inferred that the current ratio variable has a significant effect on the inventory valuation method across manufacturing companies in Saudi Arabia. This finding concurs with Mahardika et al. (2015), who identified that the current ratio variable affects the selection of inventory valuation methods. However, this is contradictory to Azahra & Siauwijaya's (2022) research, which reported that the current ratio variable does not affect the selection of inventory valuation methods. A possible explanation behind this contradiction is that the earlier study focused on Indonesia, while the current study focuses on Saudi Arabia.

The Effect of Financial Leverage on the Selection of Inventory Valuation Method

Based on results obtained from testing the impact of the financial leverage variable on the selection of the inventory valuation method, it can be inferred that the financial leverage variable has a significant effect on the inventory valuation method across manufacturing companies in Saudi Arabia. This finding is in accordance with Rahmayani & Utami (2019), who established that the financial leverage variable affects the selection of inventory valuation methods. In contrast, the findings are not in line with Victoria (2016), Ayem & Harjanta (2018), and Azahra & Siauwijaya (2022), who reported that financial leverage does not affect the selection of inventory valuation methods. These contradictions may be due to diverse scopes of the studies, as the data in this study spans five years and focuses on Saudi Arabia, whilst Ayem & Harjanta (2018) used data spanning ten years and Azahra & Siauwijaya (2022) focused on Indonesia.

The Effect of Gross Profit Margin on the Selection of Inventory Valuation Method

As per the results of the testing for the impact of the gross profit margin variable on the selection of the inventory valuation method, it can be inferred that the gross profit margin variable has a significant effect on the inventory valuation method across manufacturing companies in Saudi Arabia. This finding is in line with Kadi et al. (2019), Rahmayani & Utami (2019), and Azahra & Siauwijaya (2022), who concluded that gross profit margin does affect the selection of inventory valuation methods.

Whilst the four independent variables account for 5.1% of the variance in the dependent variable, all four independent variables (inventory turnover, current ratio, financial leverage, and gross profit margin) do affect the selection of inventory valuation methods across manufacturing firms in Saudi Arabia.

Thus, the main hypothesis is rejected and it is found that the current ratio, financial leverage, inventory turnover, and gross profit margin all have a significant impact on the selection of inventory valuation method in manufacturing firms in Saudi Arabia.

CONCLUSION

Inventory is typically the second largest item on the balance sheet and is therefore an important asset in a manufacturing company. Thus, it is important to record the value of inventory as it could affect various financial parameters including profits and taxes, which subsequently impacts the financial statement. Accordingly, considering the importance of inventory valuation, it is essential to comprehend the various factors that influence the selection of inventory valuation methods in the manufacturing sector, which this research aimed to address. This research focused on understanding the various factors that influence the selection of inventory valuation methods in the manufacturing sector in Saudi Arabia specifically, as it is rapidly growing in the country and the government is also undertaking a series of initiatives to support the sector.

As part of this research, 35 manufacturing companies were analyzed over the five-year observation period (2016-2020). The focus was on four independent variables: inventory turnover, current ratio, financial leverage, and gross profit margin, with the dependent variables being inventory valuation methods (FIFO and weighted average) that were represented using dummy variables. Using the case question approach, it was found that the FIFO and weighted average inventory valuation methods have varying impacts on profit, tax, and ending inventory, with the weighted average approach generating higher profit across manufacturing firms in Saudi Arabia. The logistic regression approach was implemented using the SPSS tool and it was determined that whilst the four independent variables (inventory turnover, current ratio, financial leverage, and gross profit margin) can explain only 5% of the variability in the dependent variable, they significantly influence it. Thus, the research question can be answered as follows:

Whilst there are several factors that may have a potential effect on the decision regarding inventory valuation method, the inventory turnover, current ratio, financial leverage, and gross profit margin have a significant impact on the selection of the inventory valuation method across manufacturing firms in Saudi Arabia.

Limitations and Future Studies

As with all research, there are certain limitations associated with this study. The major limitation herein is the limited research available on the quantifiable factors that influence the selection of inventory valuation method. Similar studies had to refer to earlier studies which were not conducted in the English language, and this research too had to depend on these studies, where a translated script had to be referred to in order to gain insights.

Whilst this study is exploratory research on the topic in Saudi Arabia, it paves way for any future studies across other industries in Saudi Arabia or manufacturing industries in other countries. Additionally, whilst the current study focuses on four independent variables (inventory turnover, current ratio, financial leverage, and gross profit margin), there is a potential to include many other factors. This is a necessary endeavor as the current variables only explain approximately 5% of the variance in the selection of inventory valuation

method, so there will be variables that can account for the remainder of the variance. The current research contributes to the literature and can be used as a reference for future studies.

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