工學博士 學位 請求論文

Measuring Logistics Performance

- A Study on Retail Sector -

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It is my pleasure to remember my parents and family members for their support and love during my studies.

Abstract

This thesis concentrates on shareholder value analysis in retail companies as the final link between consumers and manufacturers; therefore, retailers are a vital part of the business world. The research reviews methods for measuring shareholder value and applies SPM method to the US Discount, Variety Stores as a sample of the retail industry. Such an analysis would enable firms in this industry to know their competitive advantages and disadvantages, and provide focus on the key area of improvement of shareholder value.

Six sample companies were chosen among 14 companies in U.S. retail industry. These six companies were analyzed using the Strategic Profit Model (SPM) and then recommendations were given to improve the shareholder value focusing on logistics functions and strategies.

The result most common to all companies examined in this research is the direct or indirect impact of inventory and cost of sales on net profit, asset turnover, return on assets, financial leverage, and return on net worth. The results reinforce the importance of logistics and Supply Chain Management can have on firm's financial performance.

The role of logistics on inventory decision-making has been a major factor in the operational performance of the firms examined.

The results of the research indicate that the financial and operational performances of firms in retail sector are heavily affected by inventory and cost of sales (COS) related issues.

This investigation illustrates the direct or indirect impact of inventory on ROA, financial leverage, and RONW. Logistics decisions can influence the financing decisions through impacting the financial leverage which can affect positively or negatively the desired level of RONW (shareholder value).

Finally, this thesis aims to study inventory performance. There is a large variation in inventory turnover performance of retailers across firms as well over time. This thesis aims to analyze this variation and factors affecting this variation. This thesis finds that inventory turnover increase as cost of sales and capital intensity increase. The results are useful in helping managers make inventory decisions, employing inventory turnover in performance analysis, and identifying the causes of performance differences among firms and over time.

Key Words: Logistics, Logistics and Supply Chain Performance Measurement, Return on Assets, Return on Net Worth , Shareholder Value Measurement, Strategic Profit Model, Supply Chain Management.

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List of Abbreviations

CAGR	Capital Average Growth Rate
COGS	Cost of Goods Sold
COS	Cost of Sales
EDI	Electronic Data Interchange
EVA	Economic Value Added
MVA	Market Value Added
NOPAT	Net Operating Profit after Tax
RFID	Radio Frequency Identification
ROA	Return on Assets
ROE	Return on Equity
RONA	Return on Net Worth
SCM	Supply Chain Management
SPM	Strategic Profit Model

Chapter 1

Introduction

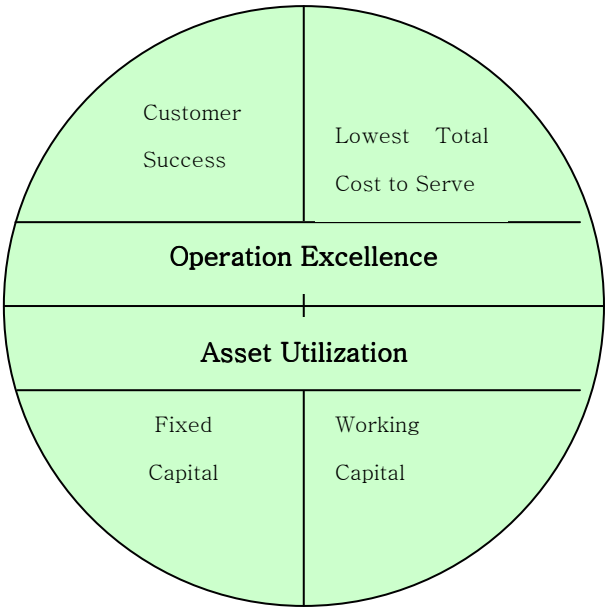
1.1 Background and Motivation

Business enterprise is meant to maximize shareholder value. An overriding objective of superior logistics and supply chain performance is to improve shareholder value. Therefore, management must view the supply chain management and logistics as strategic tools to achieve the corporate goal of shareholder value maximization.

Figure 1.1 provides a framework that considers both operational excellence and asset utilization in logistical performance. On the operational excellence dimension, key metrics focus on improved accommodation of customers through increasing customer success, and on lowest total cost of service. Asset utilization reflects the effectiveness in managing the firms fixed assets and working capital. Fixed capital assets include manufacturing and warehouse facilities, transportation and material handling equipment, and information technology hardware. Working capital represents cash, inventory investment, accounts receivable, and other current assets. In particular, by more efficiently managing the assets related to logistics operations, the firm will be able to liberate assets from existing base. This freed capital is known as cash spin, which can be used for reinvestment in

other aspects of the organization. Overall asset utilization is particularly important to shareholders and to how the firm is viewed by financial investors.

Figure 1.1 Shareholder Value Model



Source: Donald J. et.al, (2007)

Different alternatives of logistics are available for shareholder value maximization. Some alternatives minimize costs, but reducing sales and profits, therefore, reducing shareholder value. Conversely, some alternatives increase sales while increasing costs, and reducing profits, therefore, reducing shareholder value. The major asset involved in supply chain is inventory throughout the chain (Hausman, 2002).

This thesis examines and analyzes the retail industry, specifically, the main players in the Discount, Variety Stores in U.S., because of the

importance of the retailer and its positions as the final link to the consumer in the supply chain.

Financial decisions are integral component in every aspect of retailer's strategy. Different retailers, however, pursue different strategies, resulting in different types of financial performance. Retailers use financial tools to measure and evaluate their performance. Financial information taken from standard accounting documents such as *income statement* and *balance sheet* can be used to evaluate strategies and performance.

There are several methods to evaluate and analyze the performance of companies focusing on shareholder value. This thesis uses the strategic profit model to illustrate how retailers, using very different strategies and financial performance characteristics, can be financially successful.

The purposes of this investigation are as follows.

First, to analyze the financial performance of the Discount, Variety Stores in the U.S. retail industry, particularly with respect to the measures that are affected by supply chain management and logistics practices related to asset utilization and product availability, namely, sales growth, inventory turns, gross margins, and return on assets.

Second, previous researches and studies (Stapleton et al, (2003); Nviswandham and Luther, (2005), which measured shareholder value using SPM (Strategic Profit Model) have focused on improving ROA (Return on Assets) to improve and measure shareholder value. This

thesis considers RONW (Return on Net Worth) as a final measure of shareholder value, and suggests strategies to improve RONW instead of ROA. Therefore, an additional variable (financial leverage) is included in the model, which influences the RONW either negatively or positively, and this thesis aims to analyze the relationship between variables and final shareholder metrics (RONW).

The main purpose of this research is to analyze management alternatives to influence shareholder value by manipulating variables that are at least partially under its control. Finally, analyzing the factors may affect the inventory performance by estimating a model for inventory turnover in the Discount, Variety Stores.

1.2 Outline and Summary of Contributions

This thesis consists of 6 chapters with the contents as follows:

Chapter 1 *Introduction*

Review the importance and motivation of this research thesis, purposes of this thesis, and then giving the outline of contents and summary of contributions.

Chapter 2 *Retailer's Significance and Importance*

Introduction about the significance and importance of retailers is viewed in this chapter. First section is retailers' role in the supply chain, and then retailers' significance in the national economy.

Chapter 3 *Logistics and Supply Chain Management Performance Measurement*

This chapter is concerned about the shareholder value methods; it reviews 3 main methods, the Strategic Profit Model, Economic Value Added, and Market Value Added. Then how logistics and SCM affect shareholder value is reviewed in the next section. The last section reviews the Information Technology and its role in affecting logistics and SCM and then Shareholder Value.

Chapter 4 *Data and Methodology*

Chapter three has two sections. The first one is the data and collection of data, in this section the cases selection process is viewed. The second section reviews the methodology and approach used to analyze the target sample cases. What-If analysis applied to Strategic Profit Model to analyze each case.

Chapter 5 *Modeling and Application*

This chapter analyzes each case individually, strategies are developed for each case to improve the return on net worth (RONW) as a measurement of shareholder value, and then recommendations are given to each case company in order to get the target level of RONW.

Chapter 6 *Inventory Performace*

This chapter aims to analyze the factors affecting inventory turnover ration. Firstly, the importance and significance of inventory and its share of total assets is viewed, then a model was tested in order to estimate the factors affecting inventory turnover.

Chapter 7 *Conclusion and Directions for Future Research*

Finally, the conclusion and future research are presented in this chapter.

Chapter 2

Retailer's Significance and Importance

Retailing is the set of business activities that adds value to the products and services sold to consumers for their personal or family use. Often people think of retailing only as the sale of products in stores. But retailing also involves the sale of services, and not all retailing is done in stores (Levy et al, 2000).

2.1 Retailer's Role in the Supply Chain

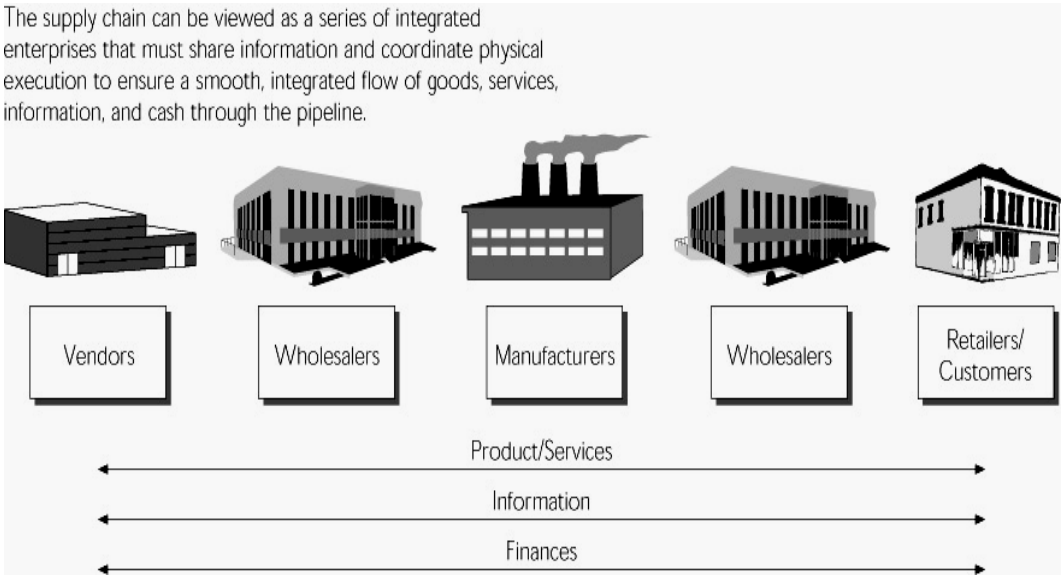
The members of a supply chain include all organizations with whom the focal company interacts directly or indirectly through its suppliers or customers, from point of origin to the point of consumption. These members can be divided into two groups. The first group is primary members, and the second one is the supporting members. Primary members of a supply chain are: all those autonomous companies or strategic business unites who carry out value-adding activities (operational and/or managerial) in the business process designed to produce a specific output for a particular customer or market.

In contrast, supporting members are companies that simply provide resources, knowledge, utilities, or assets for the primary members of the supply chain. For example, supporting companies include those that lease trucks to the manufacturer, banks that lend money to a

retailer, the owner of the building that provides warehouse space, or companies that supply production equipment, print marketing brochures (Lambert, 2001).

Retailers are the final businesses in distribution channels and supply chain that link manufacturers with consumers. Figure 2.1 shows the retailer's position within the supply chain.

Figure 2.1 Supply Chain Members and Retailer Position



Source: Coyle et al, (2003).

Retailers undertake business activities and perform functions that increase the value of the products and services they sell to consumers. These functions are presented in Table 2.1 below.

Table 2.1 Retailers' Functions	
Function	Definition
Assortment of product and services	Offering and assortment enables their customers to choose from a wide selection of brands, designs, sizes, colors, and prices in one location.
Breaking bulks	To reduce transportation costs, manufacturers and wholesalers typically ship products in large quantities to retailers. Retailers then offer the products in smaller quantities tailored to individual consumers' and households' consumption patterns.
Holding inventory	A major function of retailers is to keep inventory. By maintaining an inventory, retailers provide a benefit to consumers which is reducing the consumer's cost of storing products.
Providing services	Retailers provide services that make it easier for customers to buy and use products. They offer credits. They display products so customers can see and test them before buying. Some retailers have salespeople on hand answer questions and provide additional information about products.
Giving feedback to producer, wholesaler, and others	A retailer tells the producer, what to produce. In other words, the retailer determines what he or she thinks customers will buy and buys from the producer accordingly (Bolen, 1988).
Retailing assumes risk	Retailers buy merchandise before they sell it, thereby giving the manufacturer a more stable business operation. Retailers in turn, assume risk by offering credit to customers. This action tends to level out business operations since customers no longer need to wait for payday to purchase items (Bolen, 1988).

2.2 Retailers' Significance in the Economy

Retailing is a significant aspect of the U.S. and world economies. Retail sales and employment are both major contributors to the national economy, and retail trends often reflect the trends of the overall national economy.

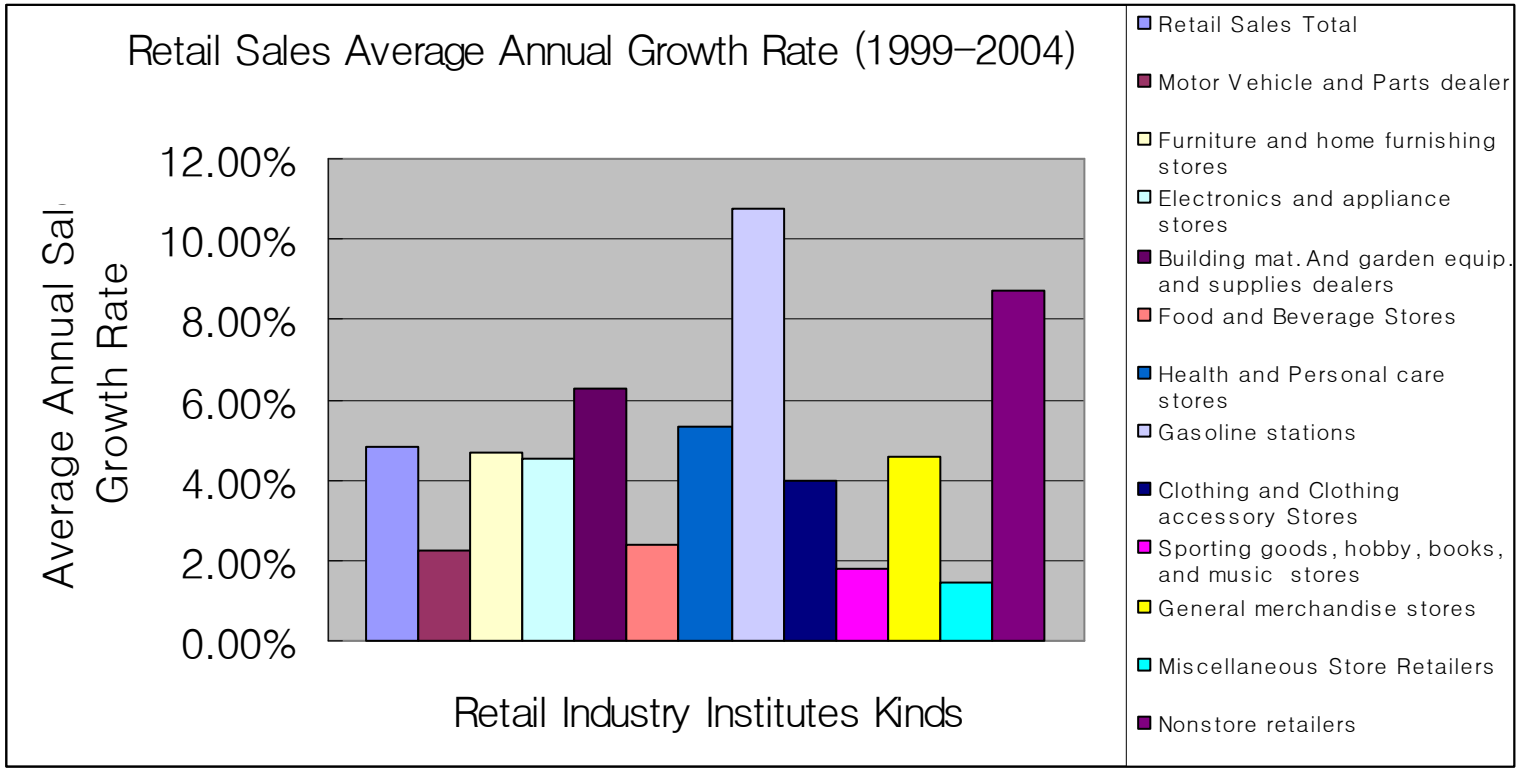
According to U.S. department of commerce, annual U.S. retail store sales are well over US$ 3.7 trillion in 2005. U.S. retail store sales from 1999 to 2005 are presented in table 1 below. Overall sales rose by 33% between 1999 and 2005. Sales growth rate for each year for each category in the retail industry is shown in the Appendix 1.

Figure 2.2 shows the sales average annual growth rate from 1999-2004 for the US retail industry. The figure shows also the sales growth rate for each category. The highest sales growth rate is in Gasoline Stations with more than 10%, and the lowest is in Miscellaneous Stores. The General Merchandise Stores which includes Discount, Variety Stores has an annual average growth rate more than 4%, this category is the interest of this research.

Table 2.2 Annual retail Sales from 1999 till 2005 (millions of dollars)							
Retail Kind	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Retail Sales Total	2,808,556	2,988,756	3,067,725	3,134,322	3,265,477	3,477,308	3,719,178
Motor Vehicle and Parts dealer	765,549	797,568	816,941	820,269	841,215	864,848	895,250
Furniture and home furnishing stores	84,451	91,328	91,644	94,610	97,528	105,477	111,293
Electronics and appliance stores	79,138	82,363	80,395	83,897	86,957	94,989	100,440
Building mat. And garden equip. and supplies dealers	218,229	229,320	239,707	248,888	265,052	298,935	326,993
Food and Beverage Stores	434,599	445,666	463,330	465,794	477,130	495,717	519,292
Health and Personal care stores	142,829	155,372	166,678	180,143	192,224	198,588	208,376
Gasoline stations	212,682	249,975	251,537	250,770	273,566	320,793	388,261
Clothing and Clothing accessory Stores	160,043	167,968	167,583	172,617	178,778	190,204	201,682
Sporting goods, hobby, books, and music stores	72,764	76,112	77,138	76,988	77,335	80,211	81,853
General merchandise stores	380,291	404,344	427,586	446,648	468,734	497,231	525,726
Miscellaneous Store Retailers	105,577	108,052	104,381	104,163	103,056	105,616	111,001
Nonstore retailers	152,022	180,688	180,805	189,535	203,902	224,,699	249,011

Source: U.S. Department of Commerce.

Figure 2.2 Retail Sales Average Annual Growth Rate (1999-2004)



Source: Depicted by the researcher from Table 2.2

Retailing is a major source of jobs. In the United States, Bureau of Labor Statistics' data show that about 15 million people are employed by traditional retailers, and the employment has grown over 10.4% from 1992-2005 as shown in table 2.3.

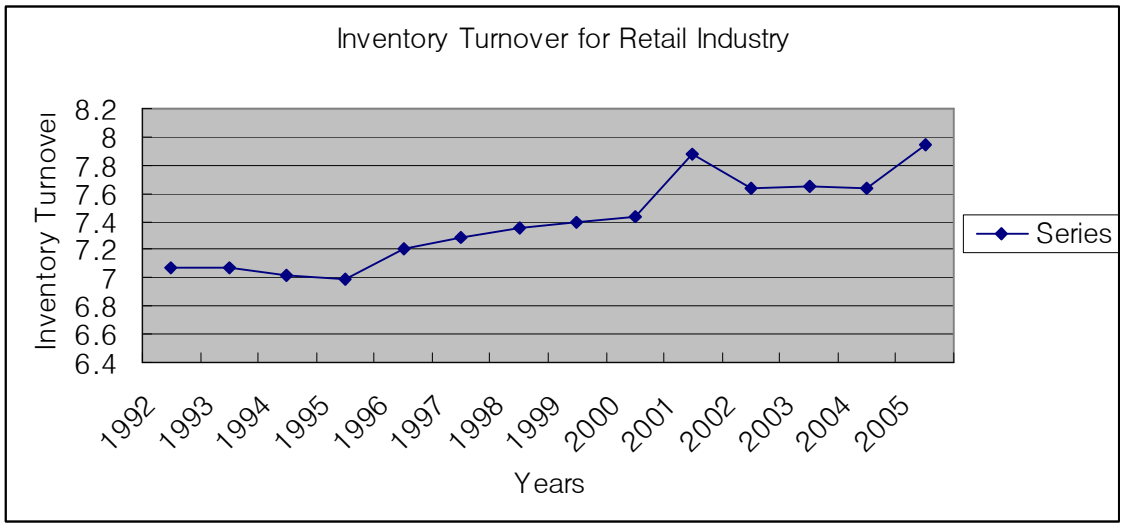
Table 2.3
Employment in Retail Industry from 1996-2005 (thousand)

1992	12,827.9
1993	13,020.5
1994	13,490.8
1995	13,896.7
1996	14,142.5
1997	14,388.9
1998	14,609.3
1999	14,970.1
2000	15,279.8
2001	15,238.6
2002	15,025.1
2003	14,917.3
2004	15,028.2
2005	15,254.9
Total Growth (1992-2005)	10.4%

Source: U.S. Department of Labor, Bureau of Labor Statistics

The inventory turnover for the overall retail industry increased slightly by over years from 1992 until 2005. Inventory turnover ratio increased from 7.1% in 1992 to 8% in 2005. Figure 2.3 below shows that overall logistics and supply chain performance was improved.

Figure 2.3 Retail Industry Inventory Turnover



Source: Depicted by the researcher, data were taken from US department of Commerce

Chapter 3
Logistics and Supply Chain Management Performance Measurement

Logistics is playing an increasingly important role in value creation, revenue enhancement, capital consumption, and expense control. As a result, logistics financial performance is playing a bigger role in corporate financial performance. Measuring and improving logistics financial performance is increasingly important in measuring and improving corporate financial performance.

Logistics is the process of planning, implementing, and controlling, the efficient, cost effective flow and storage of raw materials, in-process inventory, finished goods, and related information from point-of-origin to point-of-consumption for the purpose of conforming to customer requirements.[1]

Logistics does not just generate cost; it also generates revenue through the provision of availability, therefore, it is important to analyze the profit and performance impact of logistics and supply chain decisions. There are financial issues to be considered when logistics and supply chain strategies are adopted.

1 The Council of Logistics Management (CLM) is now the Council of Supply Chain Management Professionals (CSCMP), website address: http://www.cscmp.org/

3.1 Shareholder Value Measurement Methods

(Kleijnen and Smits, 2003) distinguished four different types of performance metrics: customer metrics, internal process metrics, innovation metrics, and finance metrics. Financial metrics include revenue, cost, profit, market share, and so on, and finally the most comprehensive one is shareholder value.

One component of success is to increase shareholder value. One of the key measures of corporate performance today is shareholder value. Increasingly senior management within the business is being driven by the goal of enhancing shareholder value.

Existing researches on shareholder value is focused on determining the methods of measuring this value, and apply these methods to study the creation of shareholder value for various industries. Lambert & Burduroglu (2000) provide methods for measuring this value, and they discussed the Strategic Profit Model (SPM). Stapleton et al (2002) have applied the SPM to players of the athletic footwear industry. In this paper the (SPM) is used.

A particular category of performance measures are financial performance measures. Financial measures indicate to top-management whether their strategy execution is leading to better-line results (Niven, 2003). The financial metrics are based on information obtained from balance sheets, income statements and cash flow statements. By adopting a performance measurement system based on financial measures, companies can identify the key performance metrics that would result in improved financial outcomes.

The most common methods for measuring shareholder value are (Lambert and Burduroglu, 2000):

- *Customer Satisfaction and Customer value-added (CVA)*
- *Total cost analysis*
- *Profitability analysis*
- *Strategic Profit Model (SPM)*
- *Economic Value-added (EVA)*

The most relevant methods concerning measuring shareholder value are, Strategic Profit Model (SPM), Economic Value Added (EVA), and Market Value Added (MVA). Therefore, in this thesis, the Strategic Profit Model, Economic Value Added, and Market Value Added are reviewed and then the Strategic Profit Model is applied to the sample companies.

3.1.1 Strategic Profit Model

A specific way to measure the increase (or decrease) is to calculate the Return on Net Worth (Return on Equity).[2] Managers at DuPont Corporation created the DuPont Model to help them understand how changes in operations impact shareholder value.

The importance of ROE as an indicator of performance make it desirable to divide the ratio into several components that provide insights into the causes of a firm's ROE or any changes in it. This breakdown of ROE into component ratios is generally referred to as the DuPont System. To illustrate this system, ROE ratio can be broken down into two ratios: net profit margin and equity turnover.

[2] ROE is used in Finance which is Return on Equity, RONW (Return on Net Worth) is used in other fields of Business, but they have the same meaning.

$$ROE = \frac{\text{Net Income}}{\text{Equity}} = \frac{\text{Net Income}}{\text{Net Sales}} \times \frac{\text{Net Sales}}{\text{Equity}}$$

Where:

ROE — Return on Equity

Equity in this equation means Common Equity

This breakdown is an identity because we have both multiplied and divided by net sales. To maintain the identity, the common equity value used is the year-end figure rather than the average of the beginning and ending value. This identity reveals that ROE equals the net profit margin times the equity turnover. This implies that a firm can improve its return on equity by either using its equity more efficiently (increasing its equity turnover) or by becoming more profitable (increasing its net profit margin).

As noted previously, a firm's equity turnover is affected by its capital structure. Specifically, a firm can increase its equity turnover by employing a higher proportion of debt capital. We can see this effect by considering the following relationship:

$$\frac{\text{Net Sales}}{\text{Equity}} = \frac{\text{Net Sales}}{\text{Total Assets}} \times \frac{\text{Total Assets}}{\text{Equity}}$$

Similar to the prior breakdown, this is an identity because we have both multiplied and divided the equity turnover ratio by total assets. This equation indicates that the equity turnover ratio equals the firm's total assets turnover (a measure of efficiency) times the ratio of total assets to equity, which is a measure of financial leverage. Specifically, this latter ratio of total assets to equity indicates the proportion of total assets financed

with debt. All assets have to be financed by either equity or some form of debt (either current liabilities or long term debt).

Therefore, the higher the ratio of assets to equity, the higher the proportion of debt to equity.

This breakdown of the equity turnover ratio implies that a firm can increase its equity turnover either by increasing its total asset turnover (becoming more efficient) or by increasing its financial leverage ratio (financing assets with a higher proportion of debt capital).

Combining those two breakdowns, we see that a firm's ROE is composed of three ratios as follows:

$$\frac{\text{Net Income}}{\text{Equity}} = \frac{\text{Net Income}}{\text{Net Sales}} \times \frac{\text{Net Sales}}{\text{Total Assets}} \times \frac{\text{Total Assets}}{\text{Equity}}$$

We can rewrite this equation as follows:

$$\text{ROE} = \text{Profit Margin} \times \text{Total Asset Turnover} \times \text{Financial Leverage}$$

Beyond the original DuPont system, some analyst have suggested using extended DuPont system, which provides additional insights into the effect of financial leverage on the firm and also pinpoints the effect of income tax on the firm's ROE.3 Subsequent research formalized the DuPont Model and introduced the Strategic Profit Model (Stapleton et al, 2002).

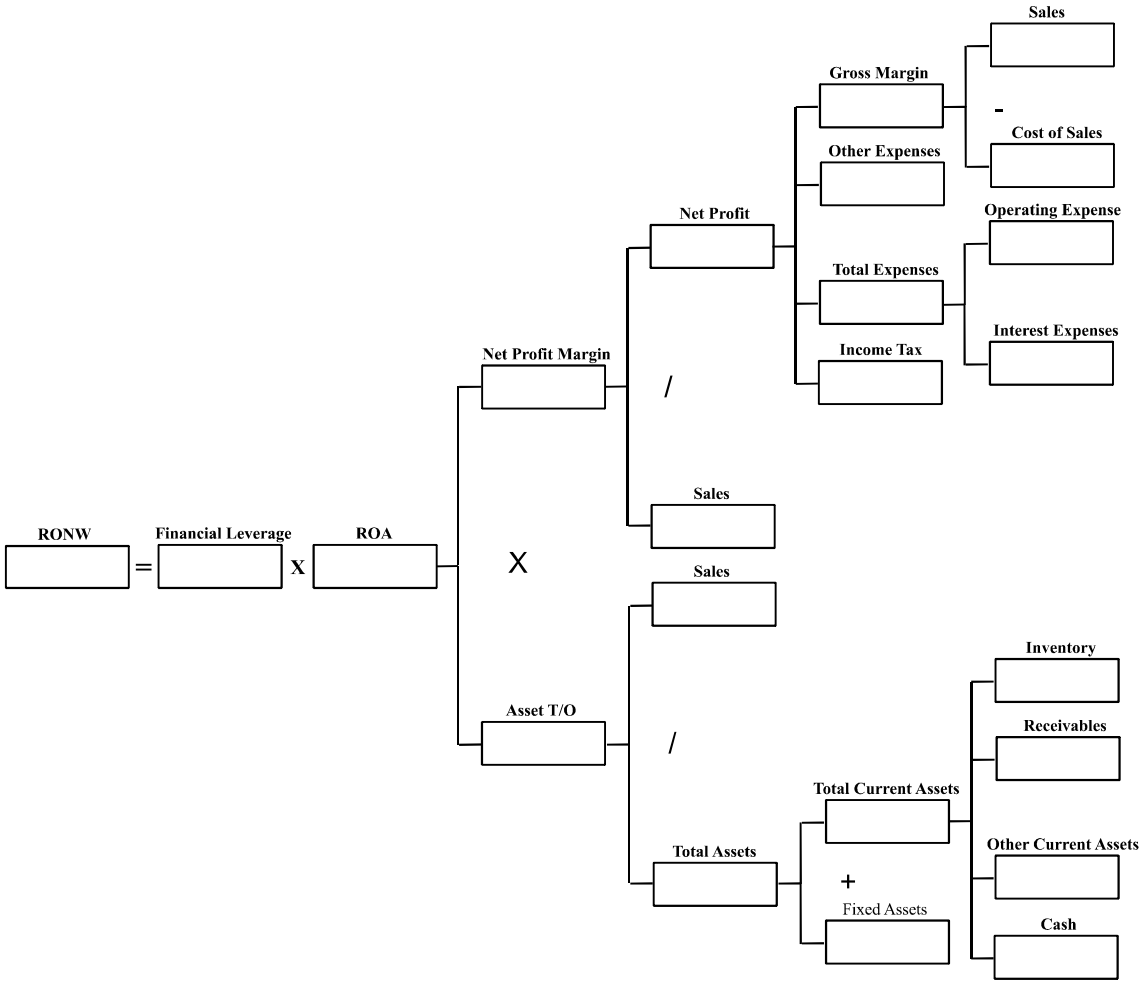
The strategic profit model measures the return on net worth (RONW) of a company. RONW is a tool that used to measure

the increase or decrease in the shareholder value of an organization. RONW is made up of three basic components namely net profit margin, asset turnover, and financial leverage. These components can be controlled by the managers of a company.

Net profit is defined as the difference between sales and expenses. Related to net profit is the net profit margin of a company which is the net profit as a percentage of sales. This measures how efficiently a company manufactures and sells its products. Asset turnover which is the sales divided by total assets of a company shows how efficiently the company employs its assets in order to achieve a certain level of sales. The return on assets (ROA) of a company is calculated by multiplying the net profit margin with asset turnover. This measure relates the profitability of a company to the value of assets employed. The ROA of a company can be improved by increasing the net profit and/or reducing the assets employed. The financial leverage of a company provides a relationship between the total equity (liabilities and shareholders' equity) of the firm and the amount invested by the shareholders. Since total equity is equal to total assets, financial leverage is the total assets under the control of management divided by the net worth or amount of shareholder's investment in the company.

From these financial figures, the RONW is obtained by multiplying the return on assets by the financial leverage. This provides an indication of how well a company is utilizing the investment made by their shareholders (see figure 3.1 below)

Figure 3.1 SPM



Source: Lambert and Burduroglu (2000).

This information required in the calculation of RONW is obtained from a company's income statement and balance sheet. The data on sales and total operating expenses (comprising of cost of goods sold (COGS), variable expenses and fixed expenses) are obtained from the income statement, while the data for current and fixed assets are obtained from the balance sheet.

A company can increase its RONW by implementing one of the following:

- *Increase sales*
- *Reduce operating expenses*
- *Reduce total assets*

3.1.2 Economic value-added (EVA)

Stern Stewart & Co created the EVA to aid managers in their decision-making by incorporating two basic concepts of finance. The first is that the objective of any business is to maximize the value created for the company's shareholders. Second, the value of a company is dependent on the extent to which shareholders expect earnings to be greater than or less than the cost of capital. A continuous increase in EVA will result in an increase in the market value of the company.

EVA has been adopted by many companies including Coca Cola Inc, DuPont, AT&A, Quaker Oats and General Motors (Nviswandham and Poornima Luther, 2005).

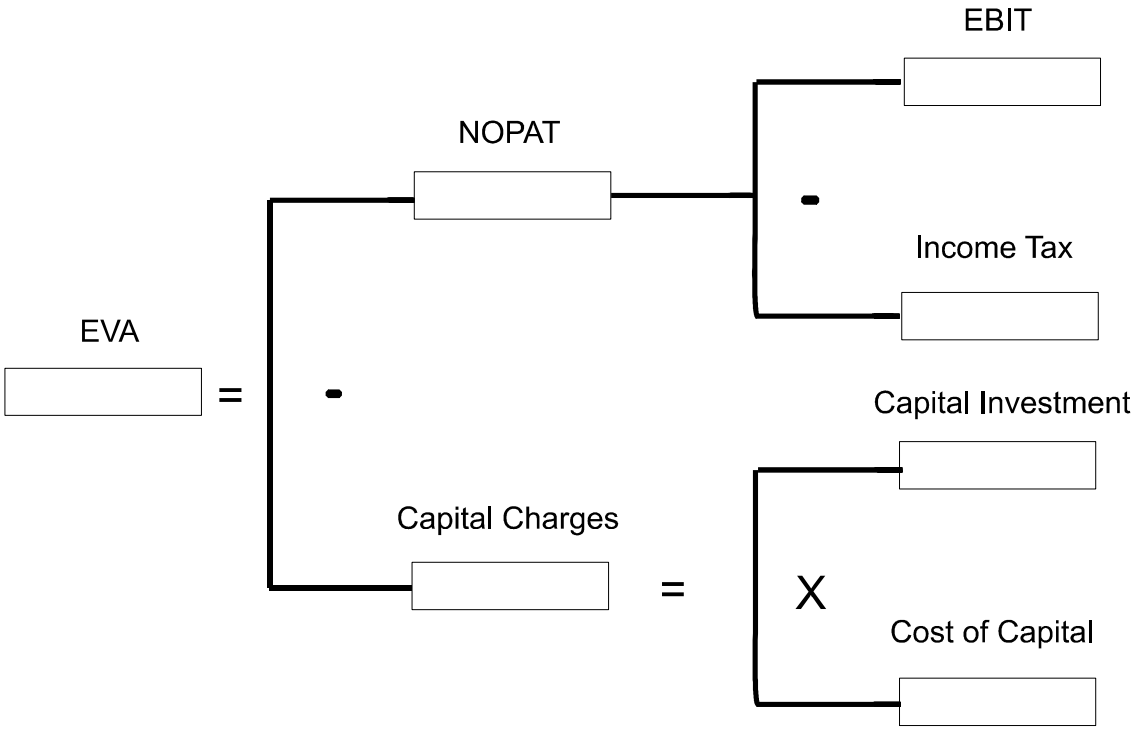
The reasons that so many companies have adopted the EVA and have realized financial benefits are due to the advantages of its use. EVA highlights the areas of the company that create value. This enables managers to take decisions on increasing the efficiency of their capital and operations by focusing work on areas with higher productivity. EVA-based financial management gives managers superior information, motivation, empowerment and accountability to ensure that their decisions create the greatest amount of shareholder value. EVA aligns the decisions managers take with the creation of

shareholder wealth.

EVA is the net operating profit after tax (NOPAT) minus the capital charge of a company. The NOPAT of a company is defined as the operating profit after taxes have been deducted. It is the return on the company's total capital invested. The capital charge is an appropriate charge for the opportunity cost of all capital invested in a company. EVA shows the dollar amount of wealth a company has created or destroyed.

Figure 3.2 below shows the above steps lead to the calculation of the EVA of a company.

Figure 3.2 Calculation of EVA

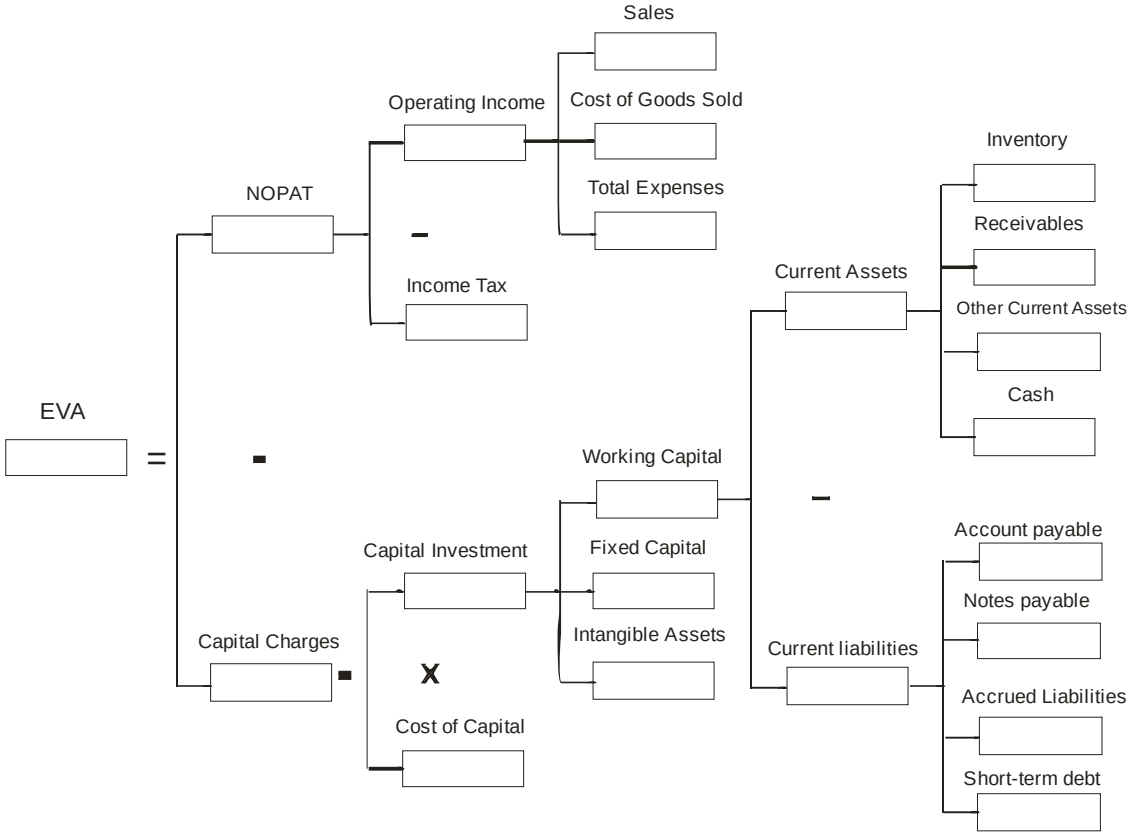


EVA = Economic Value Added
NOPAT = Net Operating Profit After Tax
EBIT = Earnings Before Interest and Tax

Source: Lambert and Burduroglu (2000)

The significant components of a company's capital (C) are the working capital, the fixed assets and the intangible assets (e.g. goodwill and patents). The company's working capital is the difference of the total current assets and the current liabilities. The current assets include the company's account receivables, inventory, prepaid expenses, cash and other current assets. The current liabilities are the sum of account payable, notes payable and accrued liabilities, less short-term debt. This is shown in figure 3.3 below:

Figure 3.3 The Components of Capital and its Impact on EVA



EVA = Economic Value Added
NOPAT = Net Operating Profit After Tax

Source: Lambert and Burduroglu (2000)

A company can increase its EVA in the following ways:

- Increase NOPAT by increasing operating income.
- Reducing the capital charge by reducing the company's capital and cost of capital.

3.1.3 Market Value Added (MVA)

Market Value Added (MVA) is defined as the differences between the market value of a company and the sums invested in it over the years.

Stewart (1991) defines MVA as the excess of market value of capital (both debt and equity) over the book value of capital. If the MVA is positive, the company has created wealth for its shareholders. To determine the market value, equity is taken at the market price on the date the calculation is made, and debt at book value. The total investment in the company since day one is then calculated as interest-bearing debt and equity, including retained earnings. Present market value is then compared with total investment. If the former amount is greater than the former, the company has created wealth (Raman, 2005).

If the market price of a company's stock is based on expectations about the company's performance in the future, which is best measured by increases in EVA, then MVA is properly described as the present value of future expected EVA.

MVA is calculated as (Friedlob et al, 2002, p.194-195):

$$MVA = MV_c + MV_p + MV_d - TC$$

Where:

MVA — Market Value Added

MV_c — Market Value of Common Stock

MV_p — Market Value of Preferred Stock

MV_d — Market Value of Debt

TC — Total Capital

3.2 How Logistics and Supply Chain Management Affect Shareholder Value.

A study by D'avanzo et al, (2003) aims to understand how companies derive competitive advantage from their supply chains, and tries to establish a relationship between supply chain performance and business success. By analyzing corporate disclosure data from 636 Global 3000 companies in 24 industries and measuring three supply chain performance variables (inventory turns, cost of goods sold as a percent of revenue, and return on assets) in the period of 1995-1997 and 1998-2000, the study categorizes companies into four groups: Leaders, Transformers, Decliners, and Laggards -- based on the correlation between their supply chain performance and financial performance. The result strongly suggests a direct relationship between supply chain and financial performance, especially manifested by the linkage between inventory turns and compound average growth rate (CAGR) as a metrics

of shareholder value.

Hendricks and Singhal (2005), studied the relationship between supply chain disruptions and shareholder value, profitability, and share price volatility. The evidence of their study indicates that firms that suffer supply chain disruptions experience 33 to 40% lower stock returns relative to their benchmarks, 13.5% increase in share price volatility, 107% drop in operating income, 7% lower sales growth, and 11% increase in costs. By any yardstick, these are very significant economic loses.

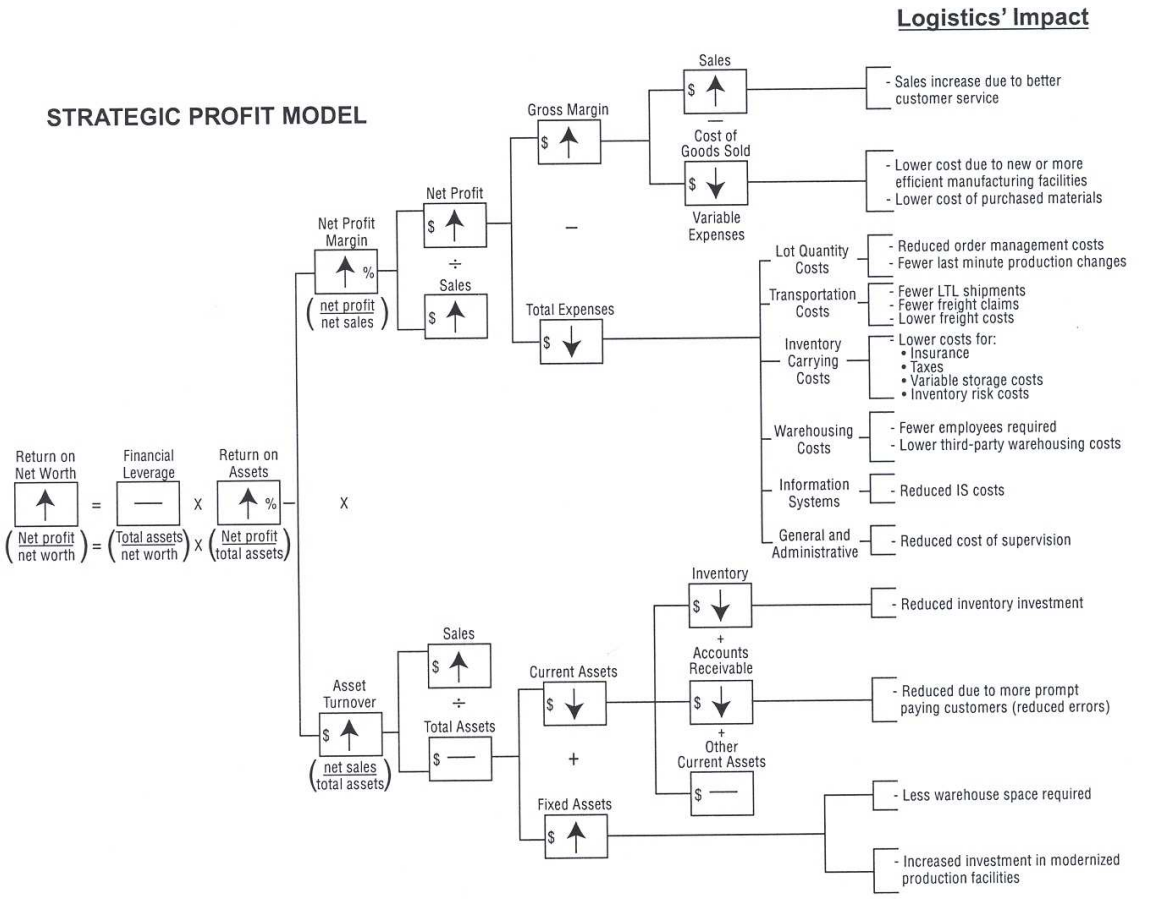
3.2.1 How Logistics Affects RONW

Figure 3.4 below illustrates the many ways that logistics contributes to RONW (Return on Net Worth). First, better management of logistics (as measured by length of lead-time, in-stock availability and fill rates, for example) can result in higher sales as a result of higher prices, higher volume or more rapid time-to-market for new products introductions. Cost of Sales (for Retailers) or Cost of Goods Sold (for manufacturers) can be reduced as a result of taking cash from an inventory reduction and/or accounts receivable and investing it in new manufacturing or production equipment that will enable quick production changeover and be more efficient (lower labor costs, less material waste, and more energy efficient). Cost of sales (or Cost of Goods Sold) can be reduced through purchasing cost reductions as a result of logistics. Total expenses can be reduced by improved logistics in a number of expenses categories (see Figure 3.4). These actions will result in much higher profitability.

In terms of the balance sheet, excellence in logistics can

result in a reduction in both current and fixed assets, which leads to increased asset turnover. The higher profitability and higher asset turnover provide two upward pressures on return on assets. This combined with a reduction in financial leverage as a result of debt repayment leads to higher return on net worth.

Figure 3.4 Logistics Impact on RONW



Source: Lambert and Burduroglu (2000)

3.2.2 How Logistics affects EVA

Logistics can affect EVA in four areas (Lambert et al, 2000): revenue growth, operating cost reduction, working capital efficiency, and fixed asset efficiency (figure 3.5).

Revenue Growth

The customer service provided by logistics can have a major impact on sales volume and customer retention. While it is not generally possible to calculate the exact correlation between service and sales, there have been many studies that have indicated a positive relationship. Certainly, the effect of an out-of-stock situation can be dramatic.

Operating Cost Reduction

The potential for operating cost reductions through logistics is considerable. A large proportion of costs in a typical business is driven by logistics practices. Transportation cost, warehousing costs, lot quantity costs, information systems costs, and the non-cost-of money components of inventory carrying costs must be considered. Often the upstream logistics costs can represent a significant proportion of total supply chain costs embedded in the final product.

Working Capital Efficiency

Logistics management is fundamentally linked to the working capital requirement within the business. Long supply chains, by definition, generate more inventories. Order-fill rates and invoice accuracy directly affect accounts receivable, and procurement policies affect cash flow. Working capital

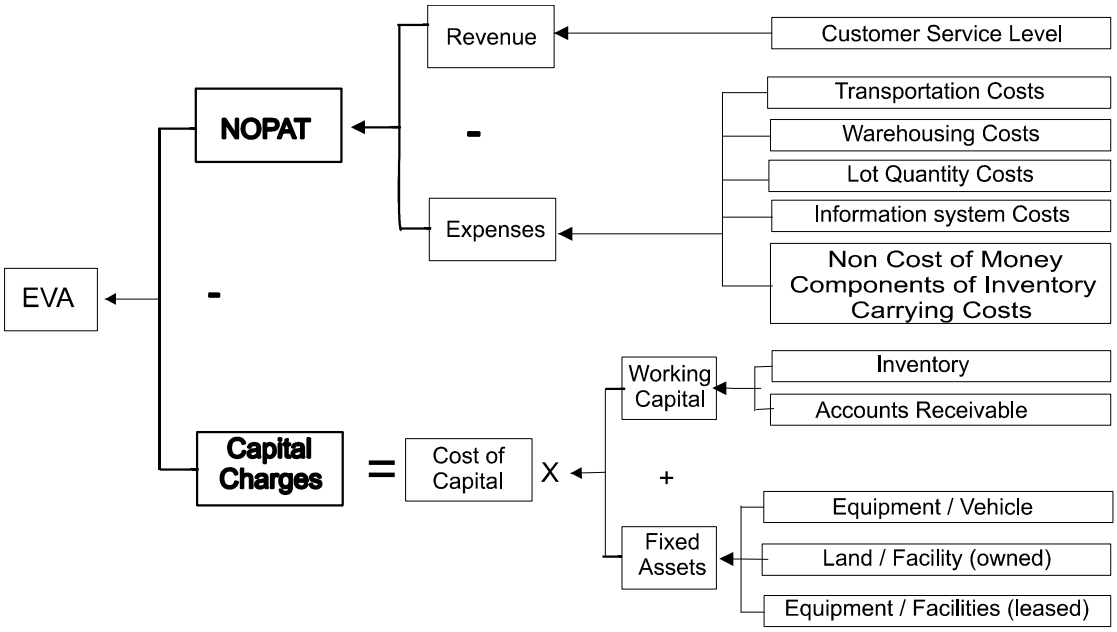
requirements can be reduced through time compression in the supply chain and subsequently reducing cash-to-cash cycle times. The cash -to-cash cycle time can be six months or longer in many manufacturing industries. By focusing on eliminating time in the supply chain that does not add value, reductions in working capital can be achieved.

Fixed Capital efficiency

Logistics by its nature tends to be "fixed-asset intensive." Trucks, distribution centers, and automated handling systems involve considerable investment and consequently will often depress return on investment.

One of the main drivers behind the growth of the third-party logistics service sector has been the desire to reduce fixed-asset investment. Decisions to rationalize distribution networks and production facilities are increasingly being driven by realization that the true cost of financing that capital investment is sometimes greater than return that it generates.

Figure 3.5 How Logistics Affect EVA



EVA = Economic Value Added
NOPAT = Net Operating Profit After Tax

Source: Source: Lambert and Burduroglu (2000)

3.3 Information Technology

There are no doubt that the availability of cheap computing power has led to dramatic developments in the fields of logistics and supply chain management. The ability to handle vast amount of data quickly and accurately has in the last 30 years literally transformed the way business is conducted. The ability to pass information between supply chain partners via electronic data interchange is being exploited by more and more companies daily. The advent of mass access to the internet has sparked off a boom in home-/office-based shopping to say nothing of the use of e-mail as a means of communication with friends and business colleagues around the globe.

Information system and associated hardware used in supply chain management fulfill different roles. They may aid the decision-making, process, help to monitor, and control operations, create simulated systems, store and process data, and aid communication between individuals, companies and machines.

A great deal has already been written about this vast area; therefore it is not the purpose here to go into any great detail. What is intended is to highlight the most common features with respect to logistics and supply chain management, and to explain briefly what they are and how they work.

Electronic data interchange (EDI)

EDI has been defined as: computer-to-computer exchange of structured data for automatic processing. EDI is used by supply chain partners to exchange essential information necessary for the effective running of their business. Supply partners can freely share information allows for timely & appropriate actions.

These structural links are usually set up between organizations that have a long-term trading relationship. For example, some multiple retailers will supply electronic point of sale (EPOS) data directly to suppliers, which in turn triggers replenishment of the item sold.

As a sequence of this type of strong link, suppliers will be able to build a historical sales pattern that will aid their own demand forecasting activities. In this context, EDI has many benefits. It is providing timely information about its customers' sales, it is highly accurate and it is very efficient because it does not require staff to collate the information manually. EDI is used to send invoices, bills of lading, confirmation of dispatch, shipping details and any information that the linked

organizations choose to exchange.

The main advantages of using EDI are:

- Information only needs to be entered on to the computer system once.
- Speed of transactions
- Reduced cost and error rates

Bar codes

A bar code is the representation of a number or code in a form suitable for reading by machines. Bar codes are widely used throughout the supply chain to identify and track goods at all stages in the process. Bar cods are a series of different width lines that may be presented in a horizontal order, called ladder orientation, or a vertical order, called picket fence orientation.

The use of bar codes can speed up operations significantly. Problems can occur if bar codes are defaced or the labels fall off in transit.

Radio Frequency Identification (RFID)

Today, the retail industry is facing a serious challenge due to rapidly changing market conditions, fueled by increasing global competition, higher performance expectations by customers and the market, and ever evolving technologies. During the past three decades, the industry has grown significantly due to technological innovations, and by adopting supply-chain management techniques, such as QR, which combines technologies, modular layouts, process reengineering, total quality management, and employee involvement (Koh et al. 2006). While QR has been a successful initiative for the retail industry, there is a

growing need for a new technology to sustain and revive its vitality in order to deal with the increasing market pressure and customer demand. The industry welcomes RFID as a possible solution to this challenge, although it is not clear what the limits of the technology and how to harness it to maximize its benefits while controlling its risks. Accordingly, there is demand for a comprehensive framework of RFID that can be used as a roadmap for researchers as well as practitioners.

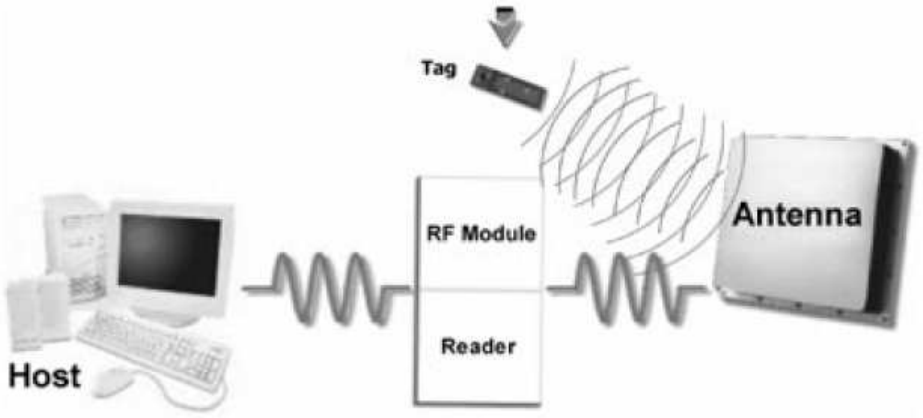
RFID is a new challenging technology that is coming into sight, replacing traditional Barcodes.

In general terms, RFID (Radio Frequency Identification) is a means of identifying a person or object using a radio frequency transmission. The technology can be used to identify, track, sort or detect a wide variety of objects. Communication takes place between a reader (interrogator) and a transponder (Silicon Chip connected to an antenna) often called a tag. Tags can either be active (powered by battery) or passive (powered by the reader field), and come in various forms including Smart cards, Tags, Labels, watches and even embedded in mobile phones. The communication frequencies used depends to a large extent on the application, and range from 125KHz to 2.45 GHz.

Typical RFID system Components are shown in figure 3.6. In a typical system tags are attached to objects. Each tag has a certain amount of internal memory (EEPROM) in which it stores information about the object, such as its unique ID (serial) number, or in some cases more details including manufacture date and product composition. When these tags pass through a field generated by a reader, they transmit this information back to the reader, thereby identifying the object. Until recently the focus of RFID technology was mainly on tags and readers which were being used in systems where relatively low volumes of data

are involved. This is now changing as RFID in the supply chain is expected to generate huge volumes of data, which will have to be filtered and routed to the backend IT systems. To solve this problem companies have developed special software packages called savants, which act as buffers between the RFID front end and the IT backend. Savants are the equivalent to middleware in the IT industry (Lewis, 2004).

Figure 3.6 Typical RFID system Components



Source: Bhuptani Manish and Moradpour Shahram (2005).

RFID can help retailers through (Gerasmon et al, 2006):

- **Sequence of Purchase**: It is possible to know in which order people buy things. In fact, we know the exact time of putting an item in the basket. Extracting such patterns, retailers may decide, for instance, to change the position of some items in the store in order to facilitate (or not) people in the store.

- **Positive/ negative preferences**: It is possible to have answers on questions such as: Are there customers that, after taking an item, change their mind and put it back

on the shelf? Is there a specific pattern behind this behavior? How much time do customers need to decide about the selection or not of a product?

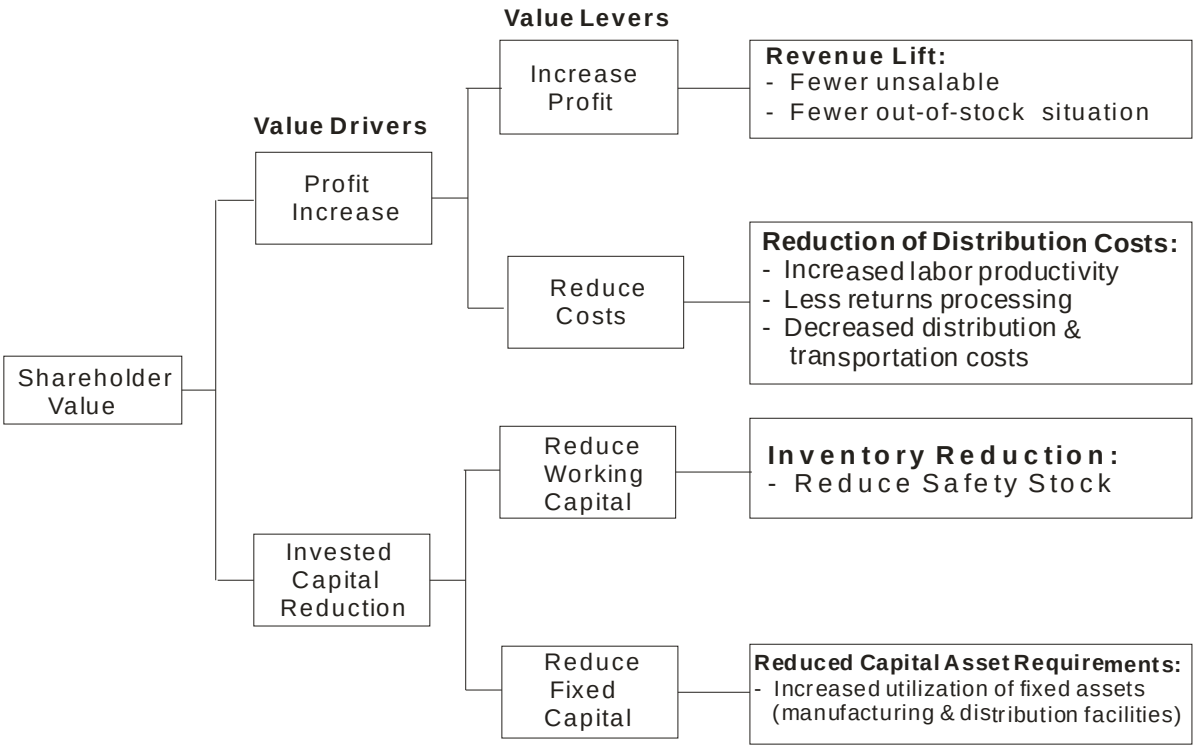
- **Routes of customers**: By placing RFID labels on the baskets, it is possible to track the movement of customers inside the store. Thus, by placing an Indoor Positioning System (IPS), customers could be informed based on their interests and their location.

For retailing, RFID technology has numerous advantages over the prevailing bar code technology, for suppliers, retailers, and consumers. Some of these benefits include:

A) improved accuracy in managing inventory;
B) improved visibility of orders and inventory;
C) reduced costs for logistical operation;
D) improved efficiency of store operation;
E) shorter retail cycle of designing, manufacturing and stocking the latest products;
F) improved sales floor planning for desired styles, sizes, and colors;
G) improved customer service; and
H) Improved security, among others.

RFID implementation can affect shareholder value in several ways as shown in figure 3.7 below.

Figure 3.7 The Impact of RFID Implementation on Shareholder Value



Source: ACCENTURE, (2003).

Chapter 4
Data and Methodology

4.1 Data Source and Collection

The source of data is an important issue. The most readily available data, especially for broad international comparisons, are often based on financial accounting data. For reporting purposes, organizations are required to maintain financial records according to accepted accounting practices. These accounting practices called Generally Accepted Accounting Principles (GAAP), which are the accounting guidelines, formulated by the Financial Accounting Standard Board (FASB), that govern how accounting measure, process, report, and communicate financial information (Harrison and Horngren, 2001). This has the advantage of promoting consistency within accounting jurisdictions, but it does not provide consistency across jurisdictions of different countries (Heaver, 2001).

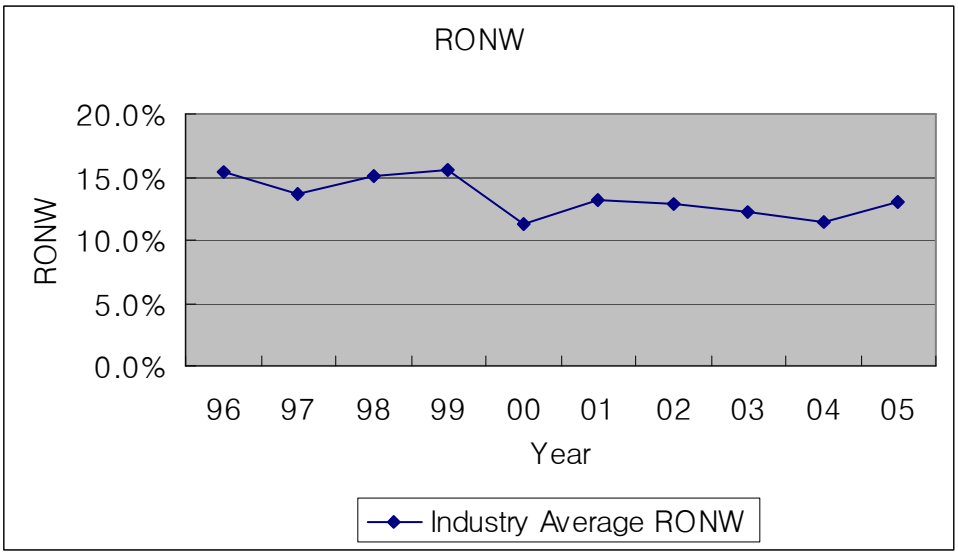
In this section, the performance of 14 Retail Company (Discount, Variety Stores) is analyzed. Table 4.1 compares these companies in terms of revenues and number of employees.

Table 4.1 Comparison of Discount, Variety Stores 2004.		
Company name	**Revenue (million)**	**No. of employee**
99 Cents Only Stores	972.17	8,636
BJ's wholesale club Inc	7,375.30	20,300
Cost Plus, Inc.	908.56	2,390
Cost-U-Less, Inc.	209.39	600
Costco Wholesale Corp.	48,106.99	60,500
Dollar General Corp.	7,660.93	64,500
Dollar Tree Stores, Inc.	3,126.01	11,400
Duckwall-ALCO Stores, Inc	409.35	4,800
Family Dollar Stores, Inc	5,281.89	24,000
Fred's, Inc.	1,441.78	10,370
PriceSmart, Inc.	544.19	2,960
Target Corporation	46,839.00	338,000
The TJX Companies, Inc.	14,913.48	119,000
Wal-Mart Stores, Inc.	288,132.00	1,800,000

Source: published public financial statement.

The first step in my analysis is selecting the weak companies (sample of my analysis) in terms of RONW. Table 4.2 shows RONW for 14 retail companies from 1996-2005. This table shows also the Industry Average RONW for each year of the 14 companies. Figure 4.1 shows the trend of industry average over year from 1996 to 2005, the figure shows that the trend is slightly slowing down, which is influenced by many factors including macroeconomic factors and microeconomic factors. This analysis is addressing the company level factors influencing the RONW which in turn will influence the industry average.

Figure 4.1 Industry Average RONW trend from 1996-2005



The RONW ratios which are less than industry average are shaded as shown in table 4.3. The result was clear that 6 companies have less than industry average for almost all years, and 8 companies have above industry average RONW for almost all years. Hereafter, we call the 6 companies which have less than industry average RONW the target companies on which SPM is applied.

Table 4.2 RONW for 14 companies from 1996-2005										
Company	96	97	98	99	2000	2001	2002	2003	2004	2005
99 Cent Only Store	17.9%	19.7%	16.1%	17.5%	15.6%	15.4%	15.3%	11.8%	5.7%	N/A
BJ's Wholesale Club, Inc	19.5%	15.3%	16.9%	19.2%	19.9%	12.2%	19.7%	12.3%	12.4%	12.7%
Cost Plus, Inc.	10.1%	10.5%	12.1%	14.2%	12.8%	10.2%	12.4%	12.4%	10.4%	6.4%
Cost-U-Less, Inc.	4.0%	3.8%	6.1%	5.6%	-37.3%	3.6%	1.8%	8.1%	13.5%	12.5%
Costco Wholesale Corporation	NA	12.6%	15.5%	14.6%	14.9%	12.3%	12.3%	11.0%	11.6%	12.0%
Dollar General Corp.	23.7%	24.8%	20.8%	22.1%	8.2%	19.9%	20.4%	19.2%	20.4%	20.3%
Dollar Tree, Inc.	32.3%	30.8%	30.2%	23.5%	18.9%	18.1%	-0.6%	17.5%	15.5%	14.8%
Duckwall-Alco Stores, Inc.	8.3%	9.3%	8.3%	7.3%	5.1%	4.6%	4.9%	5.2%	4.4%	4.5%
Family Dollar Stores, Inc.	14.9%	17.9%	20.3%	21.6%	19.8%	18.4%	18.8%	19.3%	15.2%	16.6%
Fred's, Inc.	4.9%	7.6%	6.4%	7.3%	9.3%	9.0%	11.0%	11.5%	8.9%	7.7%
PriceSmart, Inc.	NA	-23.2%	2.9%	-4.1%	-4.1%	2.6%	6.6%	- 13.3%	- 16.3%	- 11.5%
Target Corporation	12.3%	17.9%	18.0%	20.2%	19.4%	17.4%	14.6%	14.5%	14.5%	17.0%
The TJX Companies	19.0%	26.3%	35.5%	47.1%	44.3%	40.3%	41.0%	39.3%	34.9%	36.5%
Wal-Mart, Inc.	17.8%	19.1%	21.0%	21.6%	20.1%	18.4%	19.8%	20.3%	20.8%	21.1%
Industry Average	**15.4%**	**13.7%**	**15.1%**	**15.6%**	**11.3%**	**13.1%**	**12.8%**	**12.3%**	**11.5%**	**13.0%**

Source: Prepared by the researcher from various financial statements.

Table 4.3 Selection of Less Than Industry Average RONW										
Company	96	97	98	99	2000	2001	2002	2003	2004	2005
99 Cent Only Store	17.9%	19.7%	16.1%	17.5%	15.6%	15.4%	15.3%	11.8%	5.7%	N/A
BJ's Wholesale Club, Inc	19.5%	15.3%	16.9%	19.2%	19.9%	12.2%	19.7%	12.3%	12.4%	12.7%
Cost Plus, Inc.	10.1%	10.5%	12.1%	14.2%	12.8%	10.2%	12.4%	12.4%	10.4%	6.4%
Cost-U-Less, Inc.	4.0%	3.8%	6.1%	5.6%	-37.3%	3.6%	1.8%	8.1%	13.5%	12.5%
Costco Wholesale Corporation	NA	12.6%	15.5%	14.6%	14.9%	12.3%	12.3%	11.0%	11.6%	12.0%
Dollar General Corp.	23.7%	24.8%	20.8%	22.1%	8.2%	19.9%	20.4%	19.2%	20.4%	20.3%
Dollar Tree, Inc.	32.3%	30.8%	30.2%	23.5%	18.9%	18.1%	-0.6%	17.5%	15.5%	14.8%
Duckwall-Alco Stores, Inc.	8.3%	9.3%	8.3%	7.3%	5.1%	4.6%	4.9%	5.2%	4.4%	4.5%
Family Dollar Stores, Inc.	14.9%	17.9%	20.3%	21.6%	19.8%	18.4%	18.8%	19.3%	15.2%	16.6%
Fred's, Inc.	4.9%	7.6%	6.4%	7.3%	9.3%	9.0%	11.0%	11.5%	8.9%	7.7%
PriceSmart, Inc.	NA	-23.2%	2.9%	-4.1%	-4.1%	2.6%	6.6%	-13.3%	-16.3%	-11.5%
Target Corporation	12.3%	17.9%	18.0%	20.2%	19.4%	17.4%	14.6%	14.5%	14.5%	17.0%
The TJX Companies	19.0%	26.3%	35.5%	47.1%	44.3%	40.3%	41.0%	39.3%	34.9%	36.5%
Wal-Mart, Inc.	17.8%	19.1%	21.0%	21.6%	20.1%	18.4%	19.8%	20.3%	20.8%	21.1%
Industry Average	**15.4%**	**13.7%**	**15.1%**	**15.6%**	**11.3%**	**13.1%**	**12.8%**	**12.3%**	**11.5%**	**13.0%**

Source: Prepared by the researcher from various financial statements.

4.2 Research Methodology and Approach

Descriptive Approach or often called mapping investigation is used in this analysis. The goal is top offer a profile or to describe relevant aspects of the phenomena of interest to the researcher from an individual, organizational, industry-oriented or other perspective By describing how the present situation looks without explaining why.

The goal of this investigation is to find ways to improve the RONW of the 6 target companies to the industry average level. Next strategies are proposed to investigate the changes in the different variables (sales, expenses, and assets) of the model to achieve a desired goal. These strategies are considered in isolation, one variable at a time, and then recommendations are presented for each company, which may involve varying one or more variables to achieve the desired result.

The data are entered into the SPM method to observe how the decisions that managers make affect the RONW and hence shareholder value. This method is ratio methodology applied to SPM. By entering the model into a spreadsheet using Microsoft Excel, what-if analysis can be used to improve shareholder value and can be carried out easily (Stapleton at al 2002).

RONW was chosen rater than ROA to be improved, because RONW is the final metrics for shareholder value in SPM model. Table 4.4 shows summary of financial ratios for all industry companies (14 companies),

Table 4.4 Ratio Comparison (2005)

Company	sales	Net Profit Margin	Asset Turnover	ROA	Financial Leverage	RONW
99 Cent Only Store	N/A	N/A	N/A	N/A	N/A	N/A
BJ's Wholesale Club, Inc	7,949.93	1.6%	4.00	6.5%	1.96	12.7%
Cost Plus, Inc.	970.44	2.1%	1.82	3.8%	1.68	6.4%
Cost-U-Less, Inc.	219.41	1.4%	4.42	6.0%	2.06	12.5%
Costco Wholesale Corporation	52,935.23	2.0%	3.21	6.4%	1.86	12.0%
Dollar General Corp.	8,582.24	4.1%	2.87	11.7%	1.74	20.4%
Dollar Tree, Inc.	3,393.92	5.1%	1.89	9.7%	1.53	14.8%
Duckwall-Alco Stores, Inc.	435.02	1.1%	2.43	2.6%	1.75	4.5%
Family Dollar Stores, Inc.	5,824.81	3.7%	2.42	9.0%	1.69	15.3%
Fred's, Inc.	1,589.34	1.6%	3.19	5.2%	1.47	7.7%
PriceSmart, Inc.	618.83	-3.7%	1.93	-7.2%	1.61	-11.5%
Target Corporation	52,620.00	4.6%	1.50	6.9%	2.46	16.9%
The TJX Companies	16,057.94	4.3%	2.92	12.6%	2.90	36.4%
Wal-Mart, Inc.	315,654.00	3.6%	2.28	8.1%	2.60	21.1%
Average	**35,911.62**	**2.4%**	**2.68**	**6.3%**	**1.95**	**13.0%**

Source: Prepared by the researcher from various financial statements.

Table 4.5 below shows the variables for the target companies (6 companies) which have less than industry average RONW. These variables are the selected variables that influence the RONW and financial overall performance which are under the control of logistics and supply chain management.

Table 4.5 Performance Variables (as a percentage of Sales) (2005)

Company	C.O.S.*	Operating Expense	Inventory	Receivables	Cash	Other Cur. Assets
99 Cent Only Store	N/A	N/A	N/A	N/A	N/A	N/A
BJ's Wholesale Club, Inc	89.61%	7.83%	10.23%	1.28%	2.04%	0.54%
Cost Plus, Inc.	66.26%	29.87%	26.05%	0.00%	4.16%	1.58%
Cost-U-Less, Inc.	81.40%	16.33%	10.50%	0.38%	2.42%	0.52%
Costco Wholesale Corporation	87.55%	9.66%	7.58%	0.76%	6.54%	0.40%
Dollar General Corp.	71.28%	22.17%	17.18%	0.00%	2.44%	0.92%
Dollar Tree, Inc.	65.46%	26.20%	16.99%	0.00%	10.01%	0.81%
Duckwall-Alco Stores, Inc.	68.16%	30.10%	31.05%	0.41%	0.36%	0.74%
Family Dollar Stores, Inc.	67.10%	27.01%	18.73%	0.00%	2.38%	2.15%
Fred's, Inc.	71.80%	25.68%	19.11%	2.00%	0.20%	0.68%
PriceSmart, Inc.	83.55%	17.31%	10.62%	0.44%	4.87%	2.56%
Target Corporation	67.85%	24.81%	11.09%	11.83%	3.13%	1.32%
The TJX Companies	76.57%	17.15%	14.73%	0.88%	2.90%	1.05%
Wal-Mart Stores, Inc.	76.16%	17.97%	10.20%	0.84%	2.03%	0.81%
Industry Average	74.83%	20.93%	15.70%	1.45%	3.34%	1.08%

* Cost of Sales

Source: Prepared by the researcher from various financial statements.

Chapter 5
Modeling and Application

5.1 Case I: "*Cost Plus, Inc.*"

Cost Plus, Inc. has 2.1% Net Profit Margin which is slightly lower than the industry average 2.4%, and Asset Turnover 1.82 which is less than the industry average. As a result, *Cost Plus, Inc.* has less than industry average ROA because both Net Profit Margin and Asset Turnover are less than industry average (ROA = Net Profit Margin *X* Asset Turnover). *Cost Plus, Inc.'s* management is efficient in controlling Cost of Sales which is less than industry average, but has above industry average Operating Expenses which is mainly General, Administrative and Selling Expenses.

Cost Plus, Inc.'s management is poor at asset management, inventory, and cash, and other current assets as a percentage of sales are above industry average. Account Receivable as a percentage of sales is less than industry average.

5.1.1 Strategies to Improve RONW for "*Cost Plus, Inc.*"

The three basic strategies that *Cost Plus, Inc.'s* logistics managers can use to improve RONW are to increase sales, reduce expenses, and reduce assets. Assuming they desire to increase RONW to 13%, these various changes are evaluated independently with the strategic profit model (SPM).

To get RONW to the target level 13%, *Cost Plus, Inc.'s* management would have to increase sales by 116%. This means

that sales account US$ 2,100 million instead of US$ 970.44 million. To achieve this level of sales, the firm would have a corresponding increase in COS, Operating Expenses, Inventory, and Account Receivables. Net Profit for the firm would remain roughly the same but the asset turnover increases, helping to improve ROA and hence RONW.

Reducing expenses can be achieved by lowering COS (cost of sales) and/or by lowering operating expenses. If all else is held constant, COS would have to decrease by approximately 3.3% or US$ 21.02 million (from 643.02 to 622.0 million) to achieve the desired level of RONW (13%). Likewise, if we just decreased the Operating Expenses by 7.2% or US $ 20.91 million (from 289.91 to 269.0 million), the same result would be achieved. A more realistic scenario is to reduce both expenses simultaneously. Achieving a total reduction of US$ 21.02 million between the two expense categories will result in the desired RONW.

The final way for *Cost Plus, Inc.'s* management to increase RONW is by reducing total assets. The easiest assets for logistics managers to change are inventory and accounts receivable. Again, all else hold constant while changing both independently. To achieve the desired level of RONW, the firm would have to reduce inventory, but in this case if inventory was set to be 0.0 which is unrealistic case, then the RONW is 12.2%. Then the company's logistics management knows the best level of inventory to achieve the highest possible RONW.

Account receivable is 0, so there is no need to change it because it is very efficient. The inventory reduction strategy is substantial and could result in lost sales from stock-outs.

5.1.2 Recommendation for *"Cost Plus, Inc."*

The firm has less than average Cost of Sales, but above average Operating Expenses and Inventory Level. The firm can achieve its desired RONW by a combination of increasing sales, reducing operating expenses, and reducing inventory level. For example, the model shows that a decrease about 6.9% in operating expenses coupled with a 10.2% decrease in inventory level will result with an increase in RONW from 6.4% to 13% which is the average industry RONW, as shown in Figure A3.1 in Appendix 3.

5.2 Case II*: "Cost-U-Less, Inc."*

Cost-U-Less, Inc. operates mid-sized warehouse club-style stores in the United States Territories, foreign island countries in the Pacific and the Caribbean, the Hawaiian Islands and Sonora, California. At January 1, 2006, the Company operated eleven retail stores.[4]

Cost-U-Less, Inc. has 12.5% RONW, but the financial leverage is slightly above the average and slightly less than average ROA (6%). The components of ROA are Asset Turnover and Net Profit Margin. Net Profit Margin is 1.4% less than the average, and it reflects the less than average ROA. Asset Turnover is 4.42% above the average (2.68%). Operating expenses, Inventory, Accounts Receivable, cash, and other current assets as a percentage of sales are below the industry average. Cost of Sales as a percentage of sales is above the average, which needs more attention.

[4] Cost-U-Less, Inc. Annual Report 2005.

5.2.1 Strategies to Improve RONW for "*Cost-U-Less, Inc*."

By using the SPM to assess the same three basic strategies applied to company B, we attempt to increase the RONW of company B by 4% from 12.5% to the industry average 13%.

Cost-U-Less, Inc. could increase sales by 4.8% to achieve the desired result. Alternatively, *Cost-U-Less, Inc*. management could attempt to control costs by lowering Cost of Sales by 0.073% or US$ 0.13 million to achieve the desired increase in RONW. The final approach the asset reduction is not needed in this company because all current asset items are less than the industry average.

5.2.2 Recommendation for *Cost-U-Less, Inc*.

Cost-U-Less, Inc. should concentrate on those areas that are under-performing relative to the industry average, namely, reducing Cost of Sales. Combining this reduction of cost of sales with slight increase in sales will result in the targeted RONW.

The model predicts that using a strategy targeting a combination of several factors represents the best solution. But in this case, reducing the Cost of Sales by 0.08% or US$ 0.14 million is enough, as shown in Figure A3.2, in Appendix 3.

5.3 Case III: *"Costco Wholesale Corporation"*

Costco Wholesale Corporation operates an international chain of membership warehouses, mainly under the "Costco Wholesale" name, that carry quality, brand name merchandise at substantially lower prices than are typically found at conventional wholesale or retail sources. The warehouses are designed to help small-to-medium-sized businesses reduce costs in purchasing for resale and for everyday business use. Individuals may also purchase for their personal needs. [5]

"*Costco Wholesale Corporation*" has 12% RONW which is less than the industry average. ROA is 6.4% and it is slightly above the industry average. The reason why RONW is less than the industry average is because of company C has less than industry average financial leverage. The two components of ROA are Net Profit Margin and Asset Turnover. Net Profit Margin is 2.0% and less than the industry average, on the other hand, Asset Turnover is above average and it is 3.21 times. By examining the components of Net profit Margin, we can see that the management is not efficient at controlling Cost of Sales and it is above the average, and efficient at controlling Operating expenses and it is less than the industry average.

5.3.1 Strategies to improve RONW for *"Costco Wholesale Corporation"*

By using the SPM to assess the same three basic strategies applied to *Costco Wholesale Corporation* attempting to increase the RONW of *Costco Wholesale Corporation* from 12% to the industry average 13%.

[5] www.costco.com , Annual Report 2005.

This company can increase its RONW to 13% by ways. First, increasing Sales by 7.7% or US $ 4064.77 million. Second, reducing Cost of sales by 1.9% from 46,346.96 to 46,260.

5.3.2 Recommendations for “Costco Wholesale Corporation”

Finally, a combination of the previous 2 ways, increasing sales and reducing Cost of Sales can be applied. “*Costco Wholesale Corporation*” can increase its sales by 2% and at the same time reduce its cost of sales by 0.15% in order to get the targeted RONW, as shown in Figure A3.3 in Appendix 3.

5.4 Case IV: “*Duckwall-Alco Stores, Inc.*”

The Company is a regional retailer operating 266 stores in 21 states in the central United States. The Company's strategy is to target smaller markets not served by other regional or national full-line retail discount chains and to provide the most convenient access to retail shopping within each market. The Company's ALCO discount stores offer a full line of merchandise consisting of approximately 35,000 items, including automotive, candy, crafts, domestics, electronics, fabrics, furniture, hardware, health and beauty aids, housewares, jewelry, ladies', men's and children's apparel and shoes, pre-recorded music and video, sporting goods, seasonal items, stationery and toys. The Company's smaller Duckwall variety stores offer a more limited selection of similar merchandise.

From an examination of the recent financial statements, it appears that the firm has 4.5% RONW which is lower than the industry average (13%).

The financial leverage is slightly less than the industry average, and the ROA is 2.43% less than industry average (6.3%). The reason why ROA is less than industry average is because Net Profit Margin is greatly less than the industry average for this firm. Net Profit Margin is 1.1% but the industry average is 2.4%. The other component of ROA is Asset turnover. This Company has slightly less than average Asset Turnover which is 2.43 and the industry average is 2.68. As a result, ***Duckwall-Alco Stores, Inc.*** should focus on Net Profit Margin to improve it RONW and ROA because it is less than the industry average.

5.4.1 Strategies to Improve RONW for *"Duckwall-Alco Stores, Inc."*

Here suggestions are made to get this company up to the industry level using the SPM. Therefore this firm's RONW should be increased from 4.5% to 13%.

Duckwall-Alco Stores, Inc.'s Cost of Sales is less than the industry average, which shows performance higher than the industry average. Operating expenses are higher than the industry average. The data shows that the operating expenses of this firm as a percentage of sales are 30.10% but the industry average is 20.93%. Inventory as a percentage of Sales is also higher than the industry average. It accounts for 30.05% comparing with the Industry average 15.7%.

Logistics management can improve RONW to the target level by increasing sales and/or controlling the Operating expenses and/or Inventory level.

First strategy the firm's management can implement is to increase sales revenue, but this company needs a large percentage of sales increase in order to improve ROA and RONW

to the target level. Therefore this strategy is not realistic.

The second strategy is to reduce operating expenses in order to get RONW to the target level. Operating expenses can be reduced by 6.7% or by US$ 8.72 million (from 130.92 to 122.2 million).

The third strategy to get RONW to the target level is reducing inventory level. Logistics managers can reduce inventory by 86.7% or by US $ 117.1 million (from 135.08 to 18 million). This strategy is hard to implement also.

5.4.2 Recommendation for "*Duckwall-Alco Stores, Inc.*"

The SPM indicates that the best way to improve RONW is to reduce the operating expenses because as shown earlier that the two components of ROA can have great influence on RONW, it is shown also that the Asset Turnover is slightly less than the industry average and the Net Profit Margin is less than the industry average. Therefore, *Duckwall-Alco Stores, Inc.* can focus on Profit side to get the targeted RONW. This can be achieved by reducing the operating expenses.

A combined strategy can be implemented as well, increasing sales, reducing operating expenses, and reducing inventory level as the same time to get the targeted level of RONW. Sales revenue can be increased by 26.4%, operating expenses can be reduced by 4.7%, and inventory level can be reduced by 3.4%, as shown in Figure A3.4 in Appendix 3.

5.5 Case V: "*Fred's, Inc.*"

Founded in 1947, *Fred's* operates 645 discount general merchandise stores, including 24 franchised Fred's stores, mainly in the southeastern states. Fred's stores stock more than 12,000 frequently purchased items that address the everyday needs of its customers, including nationally recognized brand name products, proprietary Fred's label products, and lower-priced, off-brand products.[6]

Fred's, Inc. has 7.7% RONW which is less than RONW industry average. The financial leverage is also less than industry average, *Fred's, Inc.* has 1.47 financial leverage, and the industry average is 1.95.

ROA is 5.2% which is also less than the industry average. The first component of ROA is Net Profit Margin is 1.6% and it shows that it is less than the industry average. The second component of ROA is Asset Turnover is 3.19, it shows higher performance than the industry average. In terms of controlling costs, management at firm E is behind the industry average in operating expenses, but performing higher than the industry average in Cost of Sales.

In terms of assets, inventory level needs to be controlled; accounts receivable also is behind the industry average.

5.5.1 Strategies to Improve RONW for *"Fred's, Inc."*

Using SPM to analyze *Fred's, Inc.'s* financial data helped to determine potential areas for improvement. Since RONW is below the industry average of 13%, the goal here is to increase RONW from 7.7% to 13%. In order to achieve such an improvement, management would have to increase sales by 133% to be US$

[6] Fred's, Inc Annual Report (2005), www.fredsinc.com

37100 million, not likely in a short term frame. Nevertheless, expansion into new market segments should be explored as a possible solution to increasing sales.

Fred's, Inc.'s low RONW and ROA are due to a low profit margin, which can be increased by addressing sales prices or costs. Since firm E's operating costs rank higher than their industry average, management may wish to focus on controlling operating costs to increase ROA and then RONW.

The SPM indicates that a 4.4% reduction in operating expenses would result in an increase in RONW to the target level 13%.

Instead of increasing the profit margin, firm E can concentrate on reducing assets which are higher than the industry average using variables available to the logistics managers, such as Accounts Receivable, Inventories in order to improve Assets Turnover, then ROA, and finally, RONW. Firm E would have to reduce inventory level by 67% from 303.8 to US$ 100 million in order to get the targeted RONW 13%. Accounts Receivable can also be reduced in order to improve RONW, but cannot get the desired level since Accounts Receivable as a percentage of sales are higher than the industry average.

5.5.2 Recommendations for "*Fred's, Inc.*"

Fred's, Inc.'s management needs to focus on controlling operating costs, increasing sales, and reducing current assets. The Net Profit margin is relatively low and current assets are negatively affecting ROA and then RONW. A combination of events must be undertaken by management in order to bring RONW up to

the industry average.

An increase in sales by 5%, decrease in Operating expenses by 2.8%, decrease in inventory by 17%, and decrease in Accounts Receivable by 6.3% will result in an improvement in RONW from 7.7% to 13% which is the industry average RONW, as shown in Figure A3.5 in Appendix 3.

5.6 Case VI: *"PriceSmart, Inc."*

PriceSmart, Inc., through its subsidiaries, engages in the ownership and operation of membership shopping warehouse clubs under the trade name 'PriceSmart' in Central America and the Caribbean. Its warehouse clubs sell perishable foods and basic consumer goods to individuals and businesses. The clubs' ancillary services include food services, bakery, tire centers, photo centers, and pharmacy and optical departments. The company also licenses one warehouse club in Saipan, Micronesia. As of November 23, 2005, it operated 23 consolidated warehouse clubs. PriceSmart was founded in 1994.[7]

PriceSmart, Inc. is the worst performer of the industry sample group. This firm's RONW is -11.5%. Stockholder's equity is actually in deficit, indicating financial trouble. Financial Leverage is 1.61 less than the industry average 1.95 indicating that the financing decision of this firm is concerning about the financial risk associated with debt. ROA is negative -7.2%. The main reason for low ROA is Net Profit Margin. Net Profit Margin is -3.7%. The other component of ROA which is the Asset Turnover 1.93, it is less than the industry average but it is acceptable.
The examination here shows that the cost of sales as a percentage of

[7] Pricesmart, Inc. Annual Report (2005), www.pricesmart.com

sales is higher than the industry average, indicating more attention to be paid on this part. Cash and other current assets are greater than the industry average.

5.6.1 Strategies to Improve RONW for "*PriceSmart, Inc.*"

In order to increase RONW from -11.5% to 13%, a simple increase in sales will not allow the company to achieve a positive profit margin. This is due to excessively high Cost of Sales. We suggest that *PriceSmart, Inc.'s* management aims to achieve the industry average of Cost of Sales as 75.67% of sales (versus 83.55%) which is slightly higher than the industry average in order to get the RNOW to the target level 13%. This will require management at this firm to decrease Cost of Sales by 9.4% holding all other variables constant.

Operating expenses, Inventory level, and Accounts Receivable as a percentage of sales are performing better than the industry average. Therefore, logistics management needs to focus on controlling Cost of Sales.

5.6.2 Recommendations for firm "*PriceSmart, Inc.*"

PriceSmart, Inc. appears to be a firm facing considerable financial challenges. The firm needs to focus on Cost of Sales in order to achieve positive net profit margin. Achieving a Cost of Sales ratio close to the industry average will get the RONW to the target level. Therefore, there is no need to adjust other variables because all other variables which are controlled by logistics managers are below the industry average, as shown in Figure A3.6 in Appendix 3.

Chapter 6
Inventory Performance

6.1 Significance of Inventory for Retail Firms

Inventory constitutes a significant fraction of the total assets of the retailers. It is the largest and probably the most important asset of many retailers. More money is tied up in inventory than in buildings or equipments. And inventory is usually less liquid than accounts receivable. Therefore, effective management of inventory is critical to profitability performance and shareholder value. The inventory proportion of total assets for the 14 retailers is shown in the table 6.1 below.

Table 6.1 Inventory as a percentage of Total Assets

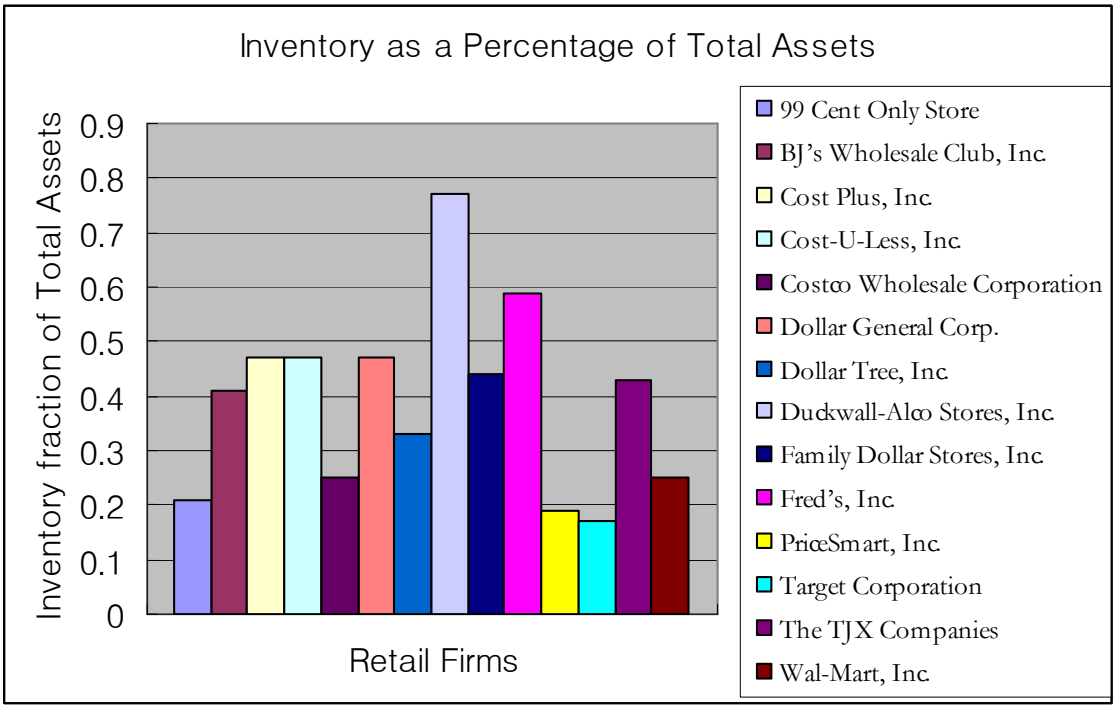
Company	2005 %	2004 %	2003 %	2002 %	2001 %	Avg. %
99 Cent Only Store	N /A	26.0	19.1	18.8	18.9	20.7
BJ's Wholesale Club, Inc.	40.9	40.2	41.2	42.6	39.4	40.9
Cost Plus, Inc.	47.5	51.1	48.8	46.0	41.3	46.9
Cost-U-Less, Inc.	46.4	50.1	47.7	46.4	46.5	47.4
Costco Wholesale Corporation	24.3	24.1	25.3	26.9	27.1	25.5
Dollar General Corp.	49.3	48.5	44.2	48.1	44.3	46.9
Dollar Tree, Inc.	32.1	34.3	35.0	32.0	32.9	33.3
Duckwall-Alco Stores, Inc.	75.5	79.4	78.6	76.3	75.7	77.1
Family Dollar Stores, Inc.	45.3	44.1	41.4	43.7	N /A	43.6
Fred's, Inc.	61.0	59.2	58.7	56.0	57.6	58.5
PriceSmart, Inc.	21.6	15.0	18.8	20.4	22.0	19.6
Target Corporation	16.7	16.7	14.4	16.6	18.4	16.6
The TJX Companies	43.1	46.3	44.2	39.7	40.5	42.8
Wal-Mart, Inc.	23.3	24.8	25.3	25.7	27.1	25.2
Average	40.5	40.0	38.8	38.5	37.8	

Source: Calculated by the researcher, data obtained from balance sheets.

The inventory fraction of total assets varies greatly from one company to another but vary slightly from one year to another. Figure 6.1 below shows the variation of inventory fraction of total assets for 14 retail firms. Note that this figure shows the average inventory fraction of 5 years from 2001-2005. Duckwall-Alco Stores, Inc. has 0.77 which is the greatest fraction, but Target Corporation has the lowest fraction 0.17.

Figure 6.1 Inventory / Total Assets Ratio

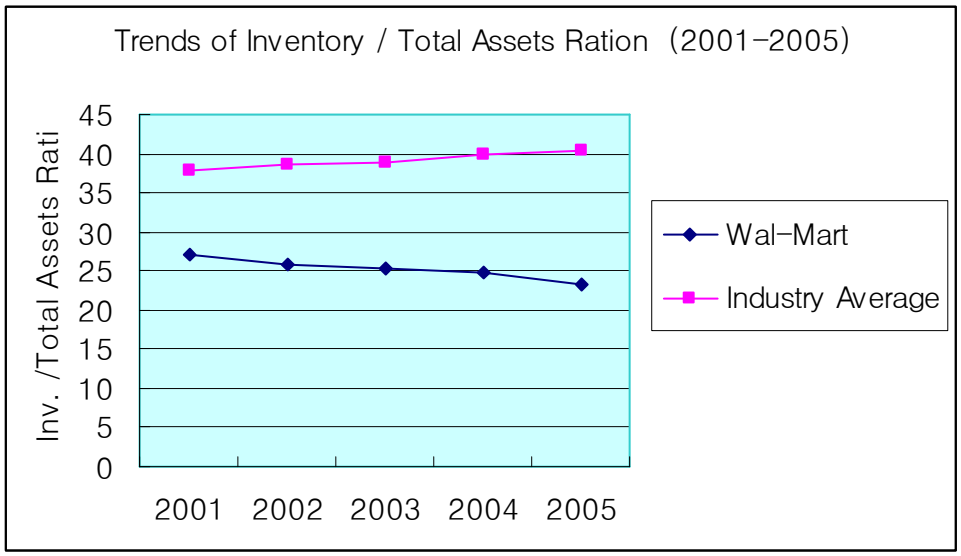
(Average 2001-2005)



Source: Depicted by the Researcher from the previous table ....

Figure 6.2 below illustrates the trend of inventory as a percentage of total assets from 2001 to 2005. This figure shows that the industry average (14 Discount, Variety Stores) of this ratio is slightly increasing over year; on the other hand, Wal-Mart, Inc. is slowing down, which means that Wal-Mart is performing and managing its inventory well.

Figure 6.2 Trend of Inventory as a percentage of Total Assets 2001 - 2005



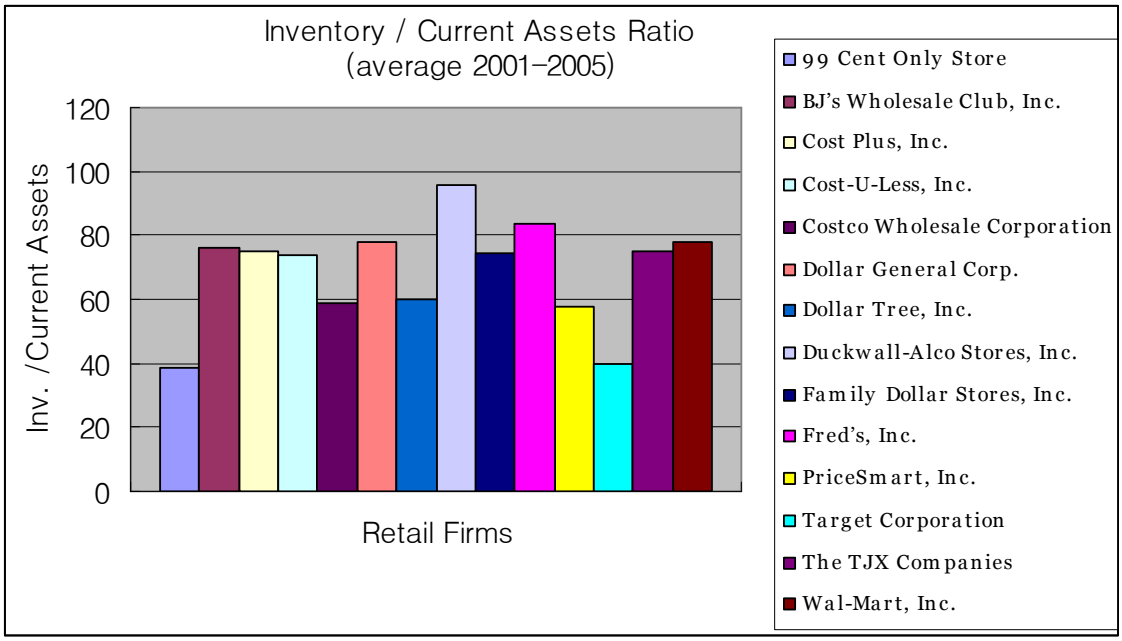
Source: Depicted by the researcher, data obtained from balance sheets (2001-2005).

Table 6.2 below illustrate inventory as a percentage of current assets for the period 2001-2005 for the 14 firms. This percentage varies greatly among firms as can be seen in figure 6.3. This figure, represents the average of inventory as a percentage of current assets (2001-2005), 99 Cent Only Store has less than 40% inventory as percentage of current assets, on the other hand, the highest ratio is for Duckwall-Alco Stores, Inc. which is 95.7% which means that current assets consists almost only inventory.

Table 6.2 Inventory as a percentage of Current Assets						
Company	**2005 %**	**2004 %**	**2003 %**	**2002 %**	**2001 %**	**Avg. %**
99 Cent Only Store	N/A	54.2	39.1	32.4	29.8	38.9
BJ's Wholesale Club, Inc.	72.5	72.8	78.0	82.3	74.3	76.0
Cost Plus, Inc.	81.9	80.1	73.3	71.6	67.9	75.0
Cost-U-Less, Inc.	76.0	74.5	71.6	71.9	76.7	74.1
Costco Wholesale Corporation	48.7	50.1	58.5	67.5	70.5	59.1
Dollar General Corp.	83.6	79.5	70.0	84.8	72.7	78.1
Dollar Tree, Inc.	61.1	63.5	72.8	50.0	52.9	60.1
Duckwall-Alco Stores, Inc.	95.4	96.2	96.5	95.7	95.5	95.7
Family Dollar Stores, Inc.	80.5	76.0	68.9	72.6	N/A	74.5
Fred's, Inc.	86.9	85.6	88.0	84.9	82.0	83.5
PriceSmart, Inc.	57.4	36.0	68.6	61.5	64.4	57.6
Target Corporation	40.5	38.7	35.0	39.9	46.1	40.0
The TJX Companies	75.3	81.0	79.2	69.8	68.9	74.8
Wal-Mart, Inc.	73.5	76.6	77.3	79.4	81.1	77.6
Average	71.8	68.9	69.8	68.9	67.9	

Source: Calculated by the researcher, data obtained from balance sheets.

Figure 6.3 Inventory / Current Assets Ratio (2001-2005)

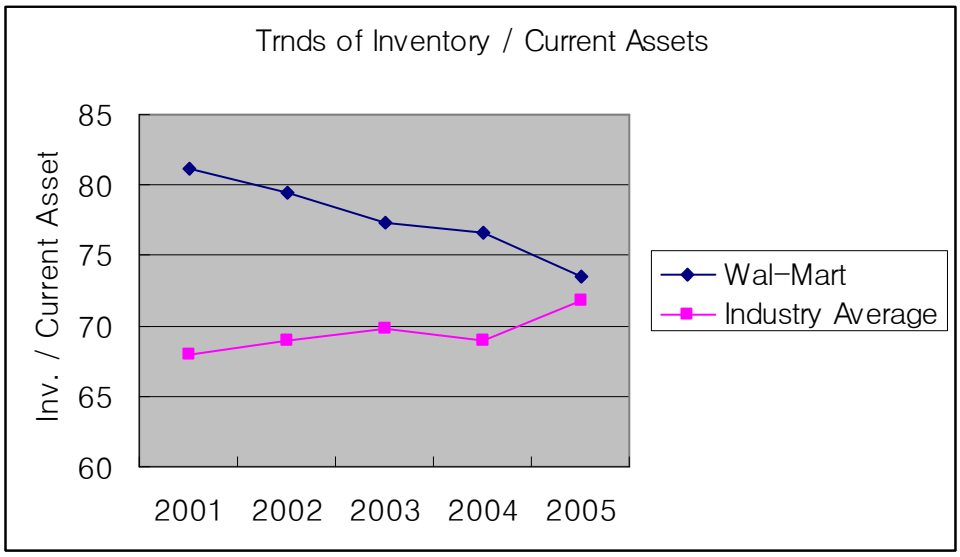


Source: Depicted by the researcher, data obtained from various balance sheets (2001-2005).

These figures show the importance and significance of inventory for retail firms.

The trend of the inventory/current assets ratio is also important indicator to measure the efficiency of inventory management and benchmark. Figure 6.4 below illustrates the industry average trend for the inventory/current assets ratio; it shows that industry average is increasing over year, on the other hand, Wal-Mart's ratio shows declining over year. This figure presents that Wal-Mart has the advantage over its competitors to manage inventory over years.

Figure 6.4 Inventory/Current Assets Ratio Trend for the Industry Average



Source: Depicted by the researcher, data obtained from various balance sheets (2001-2005).

6.2 Inventory Turnover Performance

Fisher et al, (2002) studied the correlation of inventory turnover with gross margin for public-listed U.S. retailers. They did not imply causality in that relationship. That is the model does not imply that if a firm increases its gross margin through better management its inventory turns will decline commensurately. Instead, they proposed that the variance between gross margin and inventory turns is a function of their mutual dependence on the characteristics of a retailer business.

In this thesis we would expect that inventory turns is positively affected by the cost of sales, because management will decide to increase the inventory turnover according to the cost of sales to sales ratio. Management does not want to tie up inventory with high cost, and that implies the positive relationship between inventory turnover and cost of sales as a percentage of sales.

This thesis also expects that inventory turnover is positively affected by capital intensity.

Based on the above hypothesis, the following model is suggested:

$$IT = a + b_1 COS + b_2 CIN$$

Where:

IT — Inventory Turnover (Sales / Inventory)

COS — Cost of Sales as a percentage of sales

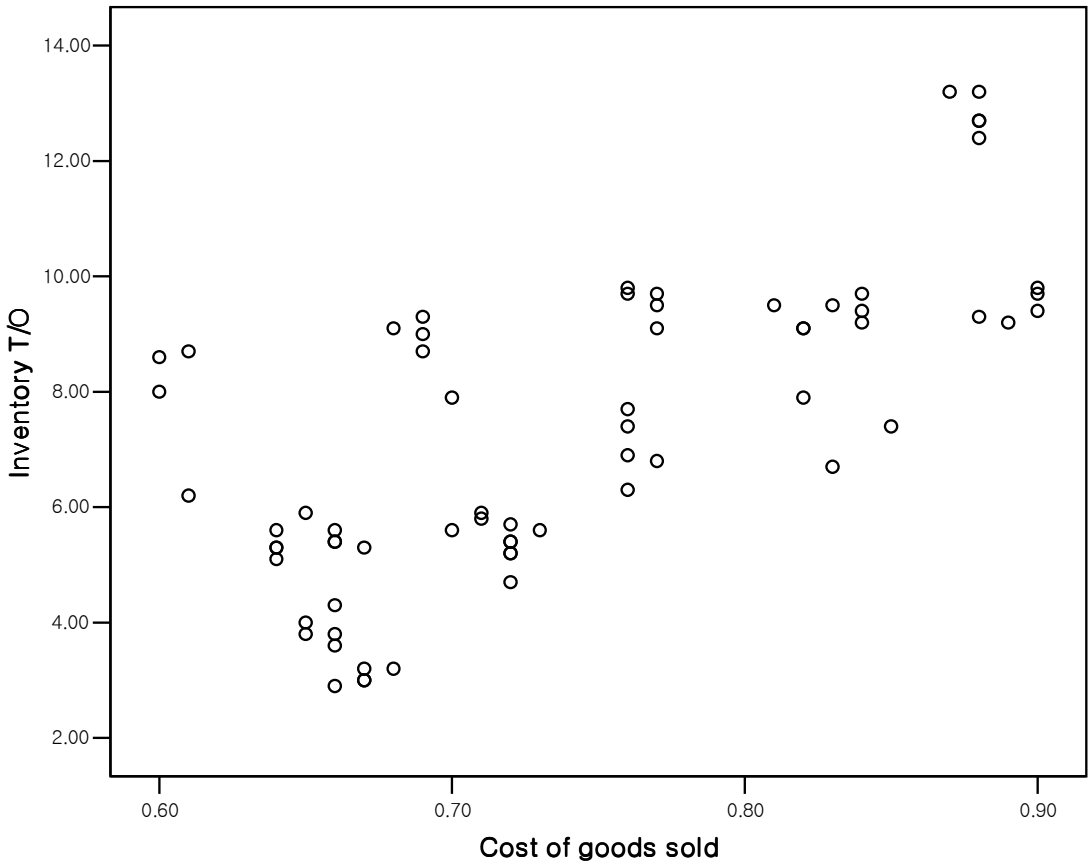
CIN — Capital Intensity (Fixed assets / Total Assets)

Regression analysis was conducted to plot the relationship between these two factors and inventory turnover. The estimation result of the model is as following:

$$IT = -8.630 + 16.165\ COS + 8.762\ CI$$

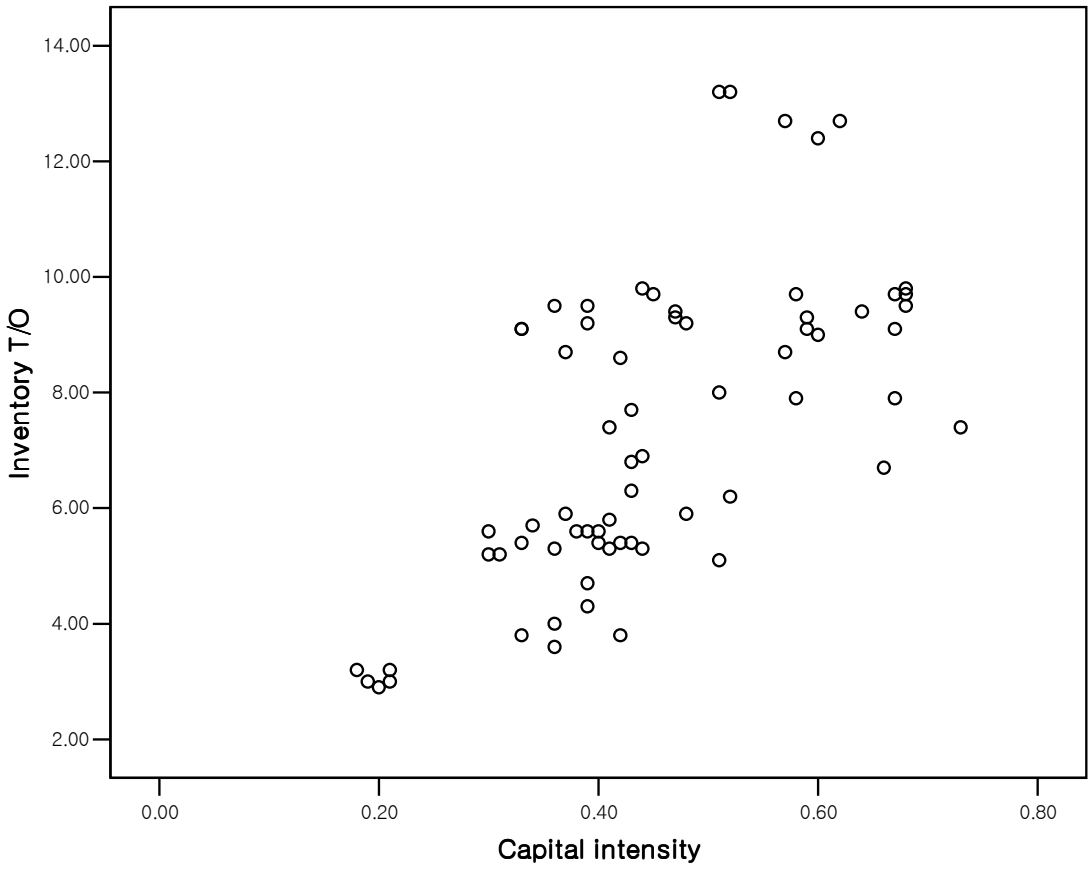
The result shows that there are positive relationship, between inventory turnover and cost of sales as a percentage of sales, and between inventory turnover and capital intensity. Appendix 4 represents the estimation results. Figure 6.5 and 6.6 below show the regression results.

Figure 6.5 Annual Inventory Turnover and Cost of Sales as a percentage of Sales for the period 2001- 2005



Source: Depicted by the Researcher

Figure 6.6 Annual Inventory Turnover and Capital Intensity for the period 2001- 2005



Source: Depicted by the Researcher

Chapter 7
Conclusion and Directions for Future Research

7.1 Conclusion

As shown, a useful way to determine how a proposed system changes will influence profit performance and Return on Net Worth is by using SPM. The application of the SPM to the retail industry yielded some very interesting results.

The role of logistics on inventory decision-making has been a major factor in the operational performance of the firms examined.

The results of this investigation reinforce the importance of logistics and Supply Chain Management can have on firm's financial performance.

The results of this research also indicate that the financial and operational performances of firms in retail sector are heavily affected by inventory and cost of sales (COS) related issues. Therefore, SPM was chosen to illustrate the impact of the supply management (purchasing) department on corporate financial performance. Given the importance of inventory in the research results, illustrating the impact of supply management using the SPM is imperative since it has such a direct effect on sales, Cost of Sales, operating expenses, and inventory. Specifically, members of this department can affect sales by increasing sales volume through service improvement. Furthermore, they can affect Cost of Sales by reducing costs associated with purchasing and sourcing. They also affect operating expenses by reducing freight and indirect labor costs as

well as general overhead and administrative costs. The supply management department can affect inventory level by reducing purchased goods inventories.

This investigation illustrates the direct or indirect impact of inventory on ROA, financial leverage, and RONW. For example, increasing sales growth would result in as increasing in Inventory, working capital, and total assets consequently. As a result, financial leverage will increase, in other words increasing the financial risk of the firm.

Another example is that increasing inventory turnover will reduce working capital and total assets consequently. As a result, financial leverage (financial risk) will be reduced.

Therefore, logistics decisions can influence the financing decisions through impacting the financial leverage which can affect positively or negatively the desired level of RONW (shareholder value).

Applying technologies such as RFID will have a great potential impact on efficiency and performance, and will help to improve RONW.

Finally, this thesis aims to study inventory performance. There is a large variation in inventory turnover performance of retailers across firms as well over time. This thesis aims to analyze this variation and factors affecting this variation. This thesis finds that inventory turnover increase as cost of sales and capital intensity increase. The results are useful in helping managers make inventory decisions, employing inventory turnover in performance analysis, and identifying the causes of performance differences among firms and over time.

7.2 Directions for Future Research

This methodology developed for retailers, but can also be applied to other supply chain partners such as suppliers, manufacturers, wholesalers, and distributors.

It will be more useful if connections can be made between real logistics related decisions and strategies, and SPM matrices, because one of the limitations is that the SPM does not tell the logistics manager how to increase sales, lower expenses or lower assets. Another limitation is that some weak areas identified by the model may not be easily changed in some firms, or may not be easily modified in the short-term. Therefore, the SPM is offered as a tool designed to assist management in strategy formulation.

The model should be extended and applied to various supply chain networks in an attempt to evaluate supply chain strategies and the effect these strategies can have on RONW of a firm. The new model could be used to evaluate the overall supply chain performance by encompassing the performance characteristics of all supply chain participants.

This research supports using SPM to examine the potential impact of adjustments in logistics strategy. However, due to inconsistencies in corporate structures, strategy implementation techniques, and a variety of other firm-specific issues, the impact of applying the SPM can vary greatly. As a result, other industries should be examined.

Lastly, the model has been applied to the logistics function of six firms. While the results of this investigation yield some interesting insight into the operating characteristics that differentiate successful firms from those that are less successful, the focus was only on the logistics function.

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Appendix 1

Retail Sales Growth by Industry Retail kind from 1999-2004							
Retail Kind	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**Avg Year %**
Retail Sales Total	6.42%	2.64%	2.17%	4.18%	6.49%	6.96%	4.81%
Motor Vehicle and Parts dealer	4.18%	0.02%	0.41%	2.55%	2.81%	3.52%	2.25%
Furniture and home furnishing stores	8.14%	0.0%	3.24%	3.08%	8.15%	5.51%	4.69%
Electronics and appliance stores	4.08%	-0.02%	4.36%	3.65%	9.24%	5.74%	4.51%
Building mat. And garden equip. and supplies dealers	5.08%	0.05%	3.83%	6.49%	12.78%	9.39%	6.27%
Food and Beverage Stores	2.55%	0.04%	0.53%	2.43%	3.90%	4.76%	2.37%
Health and Personal care stores	8.78%	0.07%	8.08%	6.71%	3.31%	4.93%	5.31%
Gasoline stations	17.53%	0.01%	-0.30%	9.09%	17.26%	21.03%	10.77%
Clothing and Clothing accessory Stores	4.95%	0.00%	3.00%	3.57%	6.39%	6.03%	3.99%
Sporting goods, hobby, books, and music stores	4.60%	0.01%	-0.19%	0.45%	3.72%	2.05%	1.77%
General merchandise stores	6.32%	0.06%	4.46%	4.94%	6.08%	5.73%	4.60%
Miscellaneous Store Retailers	2.34%	-0.03%	-0.21%	-1.06%	2.48%	5.10%	1.44%
Nonstore retailers	18.86%	0.00%	4.83%	7.58%	10.20%	10.82%	8.72%
Source: US department of Commerce.							

Appendix 2

The Real Data 2005

Figure A2.1 SPM for BJ's Whoesale Club, Inc.

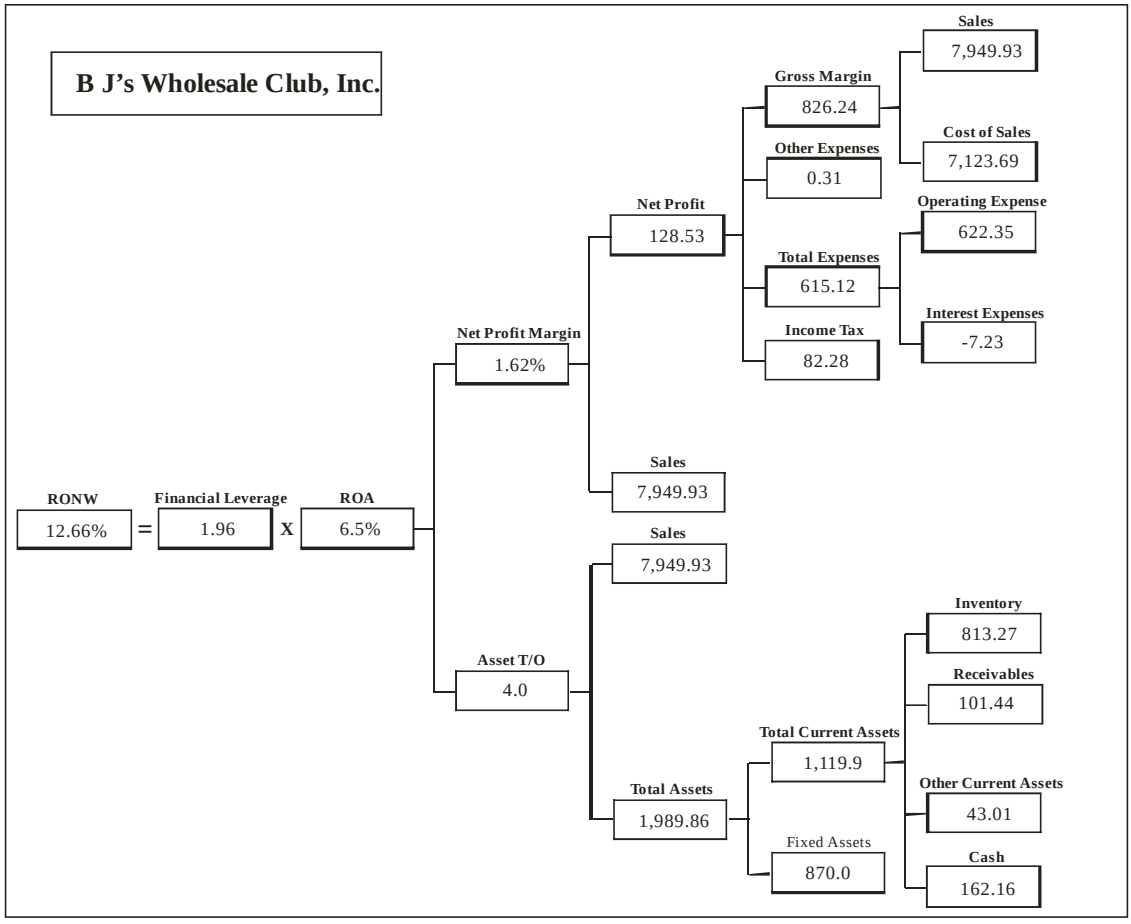


Figure A2.2 Cost Plus, Inc -SPM

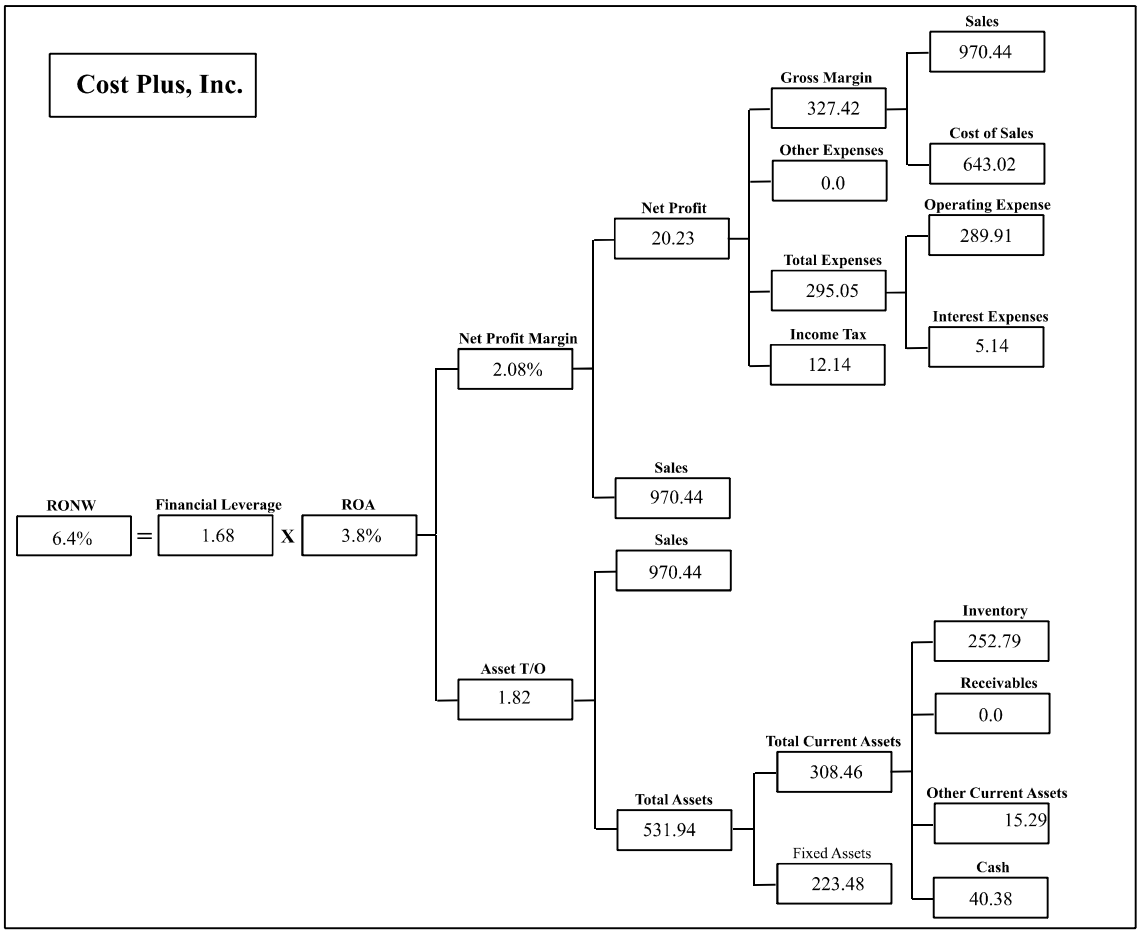


Figure A2.3 Cost-U-Less

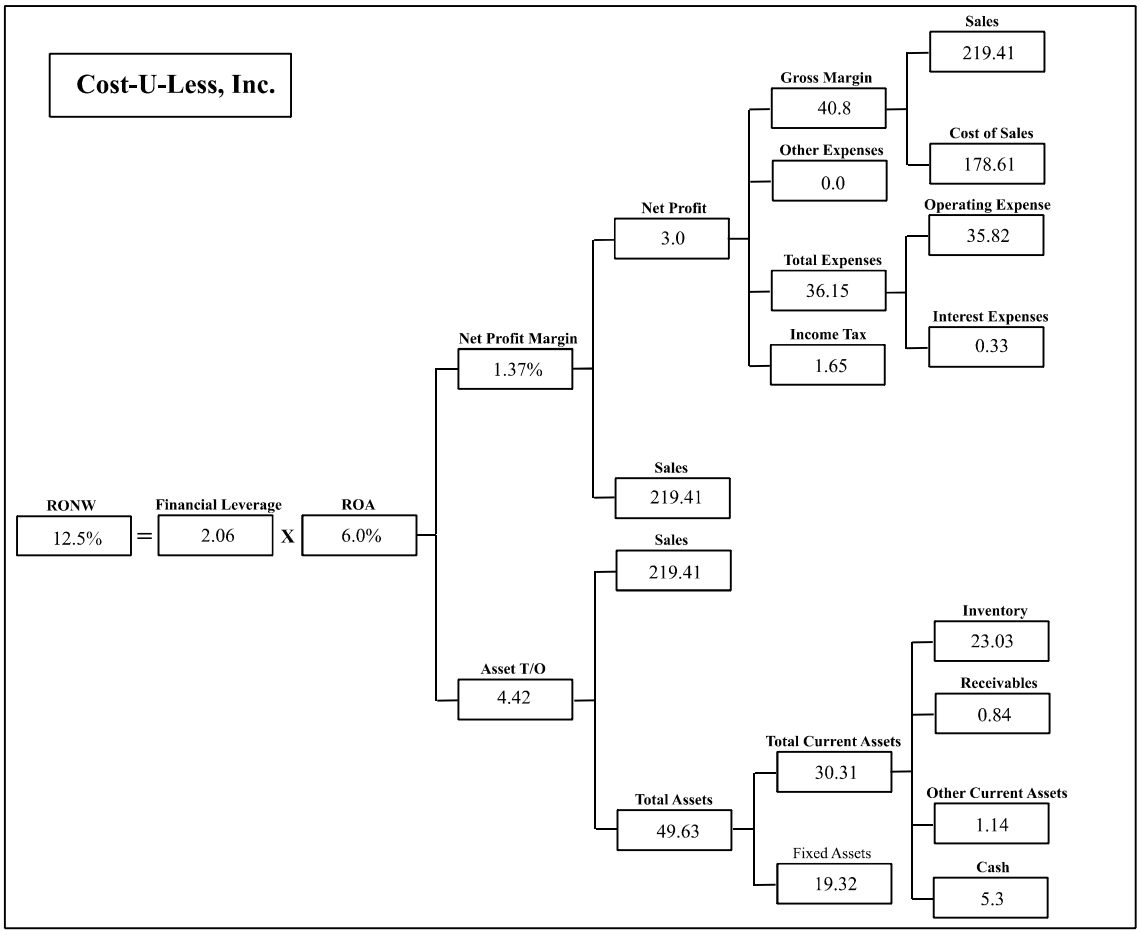


Figure A2.4 Costco Wholesale Corporation

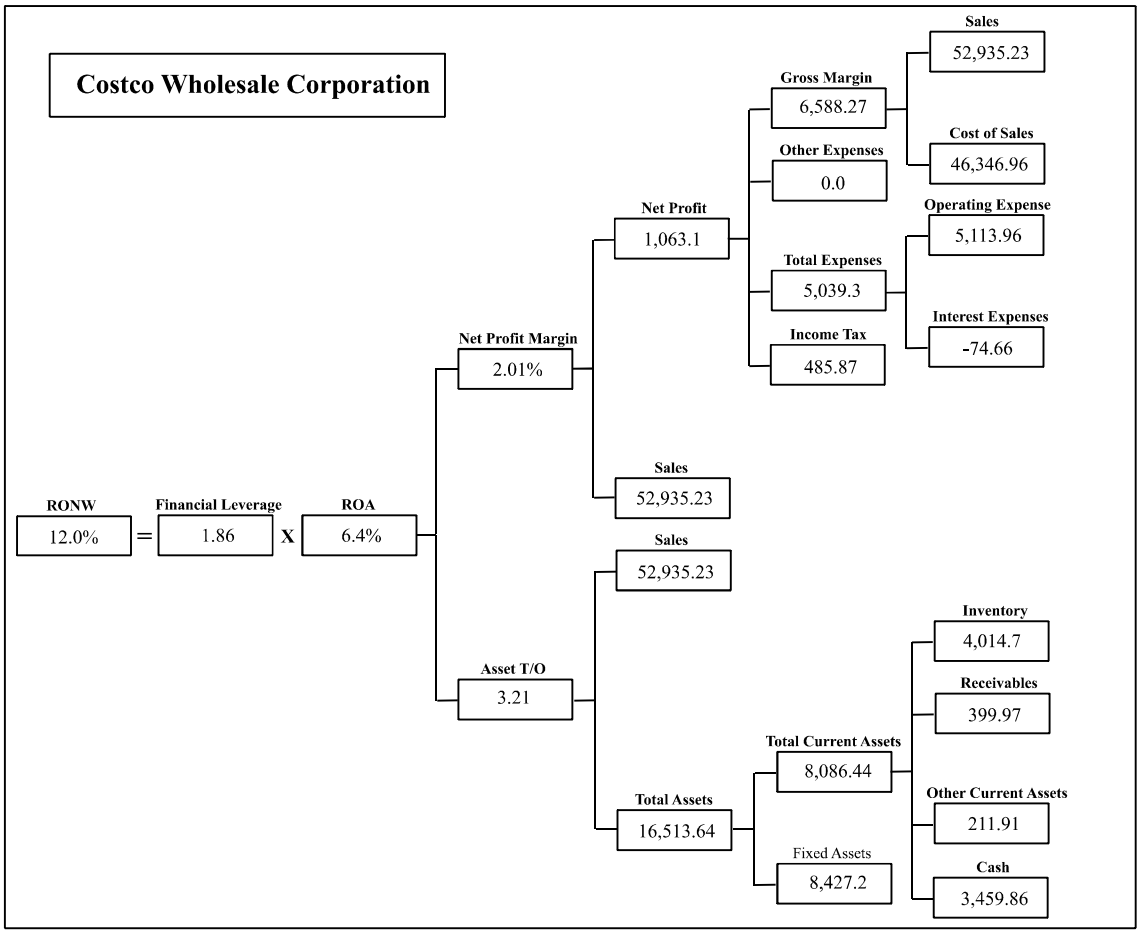


Figure A2.5 Dollar Tree Stores, Inc.

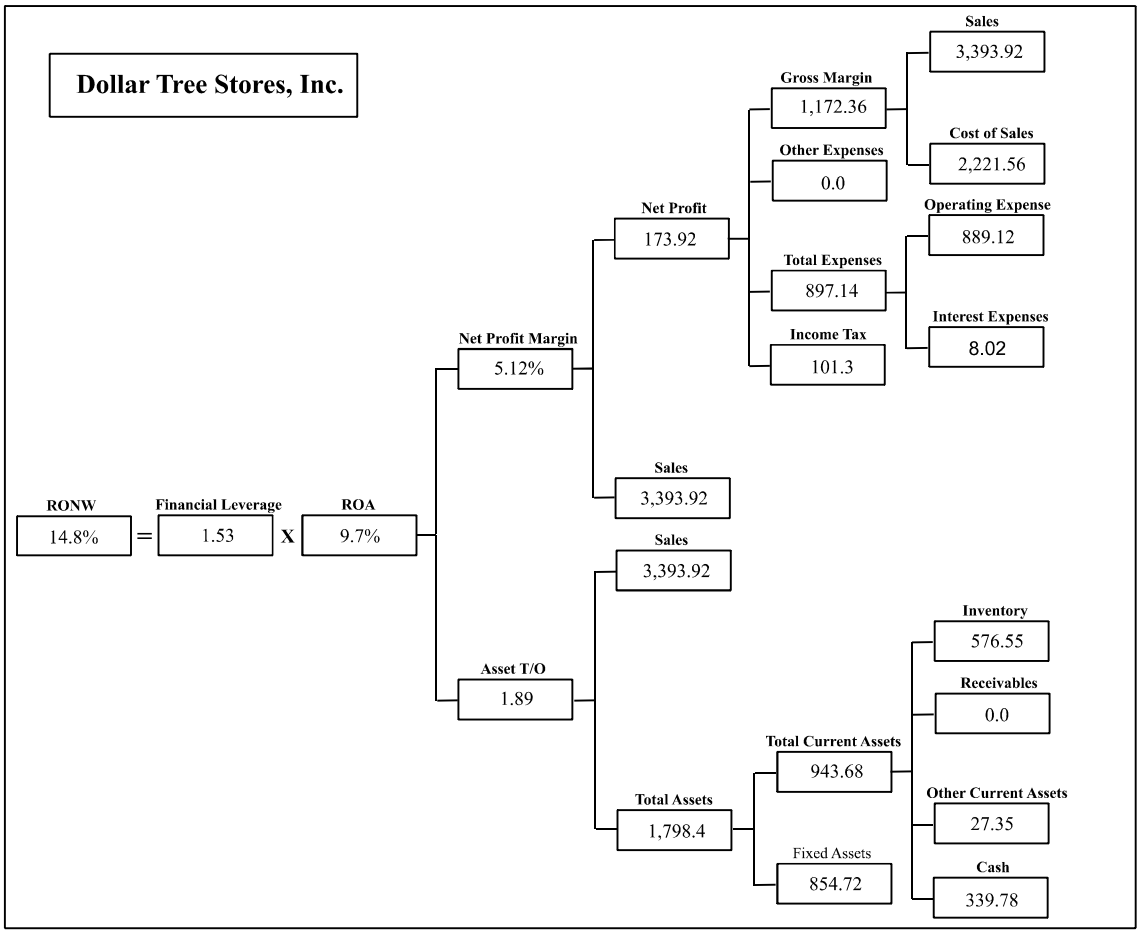


Figure A2.6 Dollar General Corp.

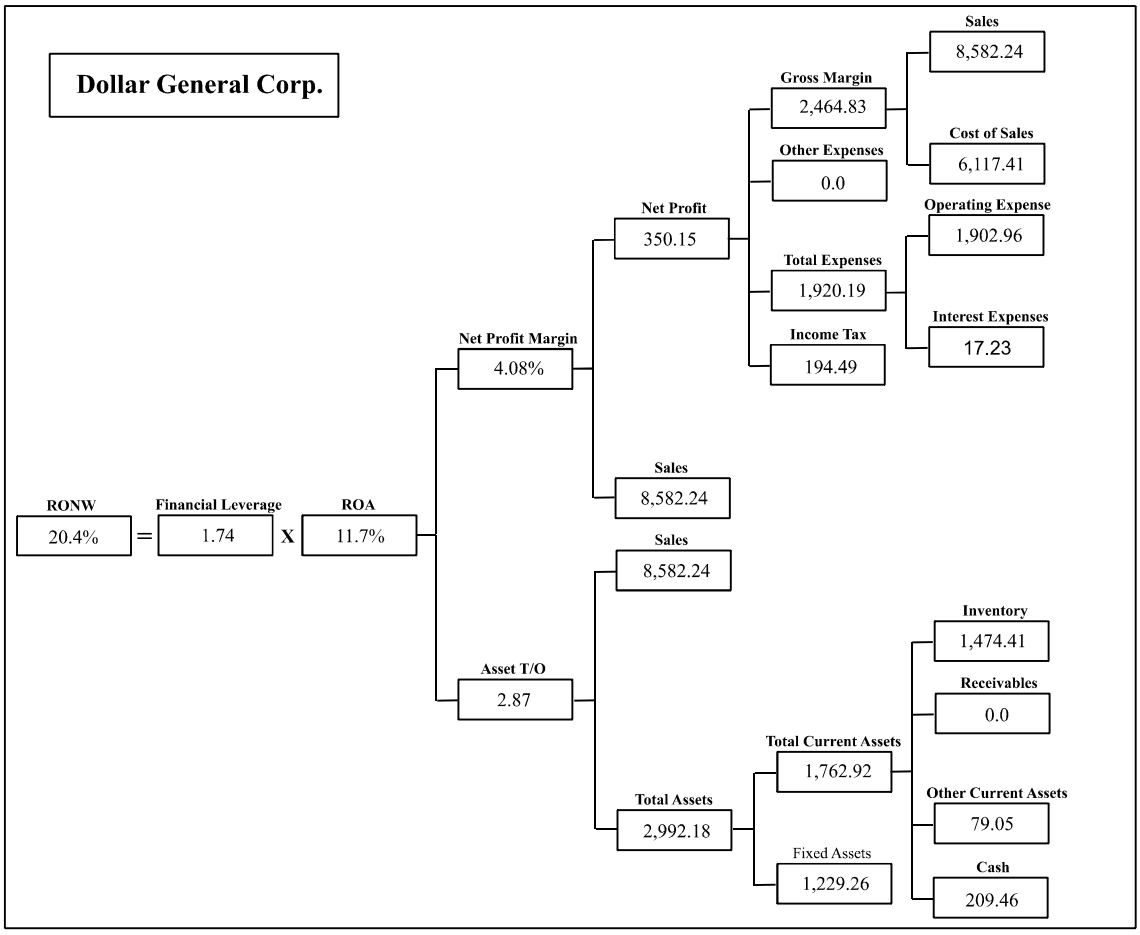


Figure A2.7 Duckwall-Alco Stores, Inc.

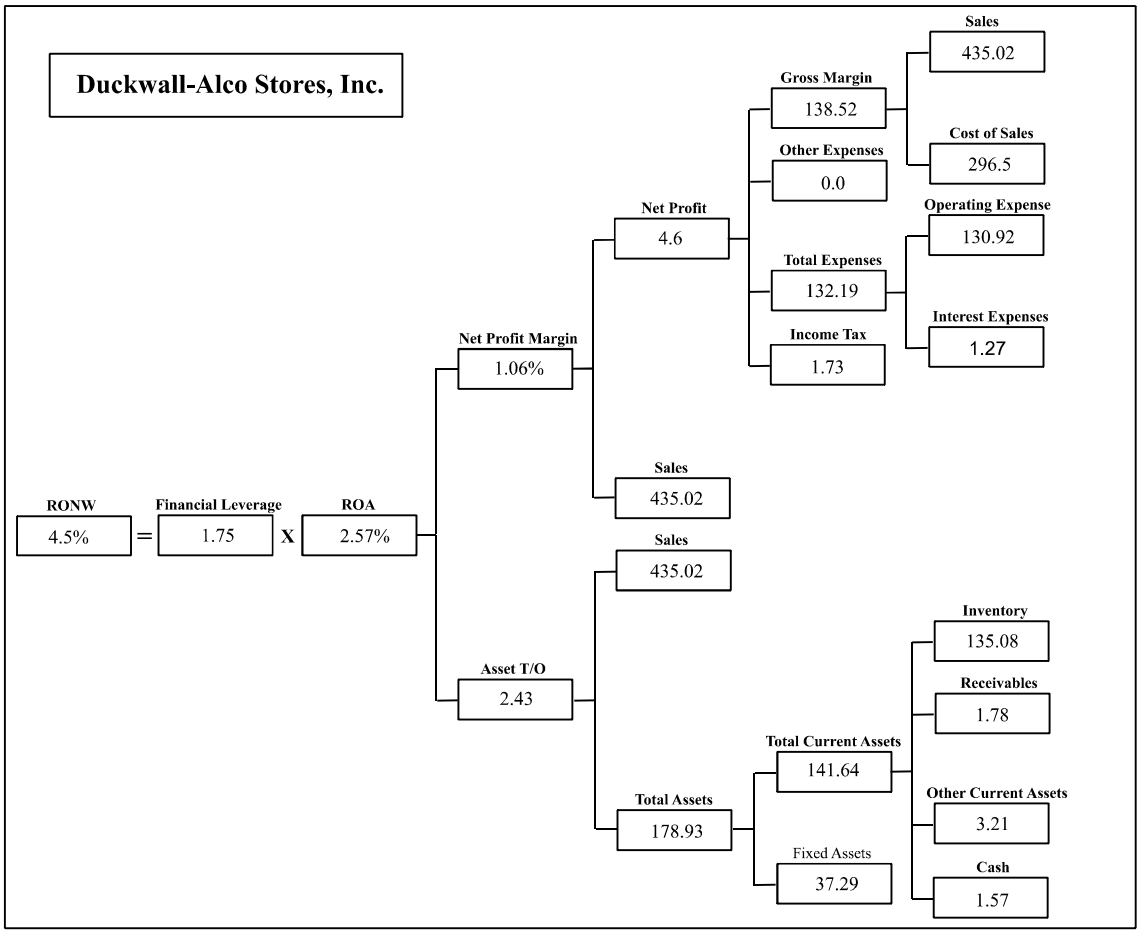


Figure A2.8 Family Dollar Stores, Inc.

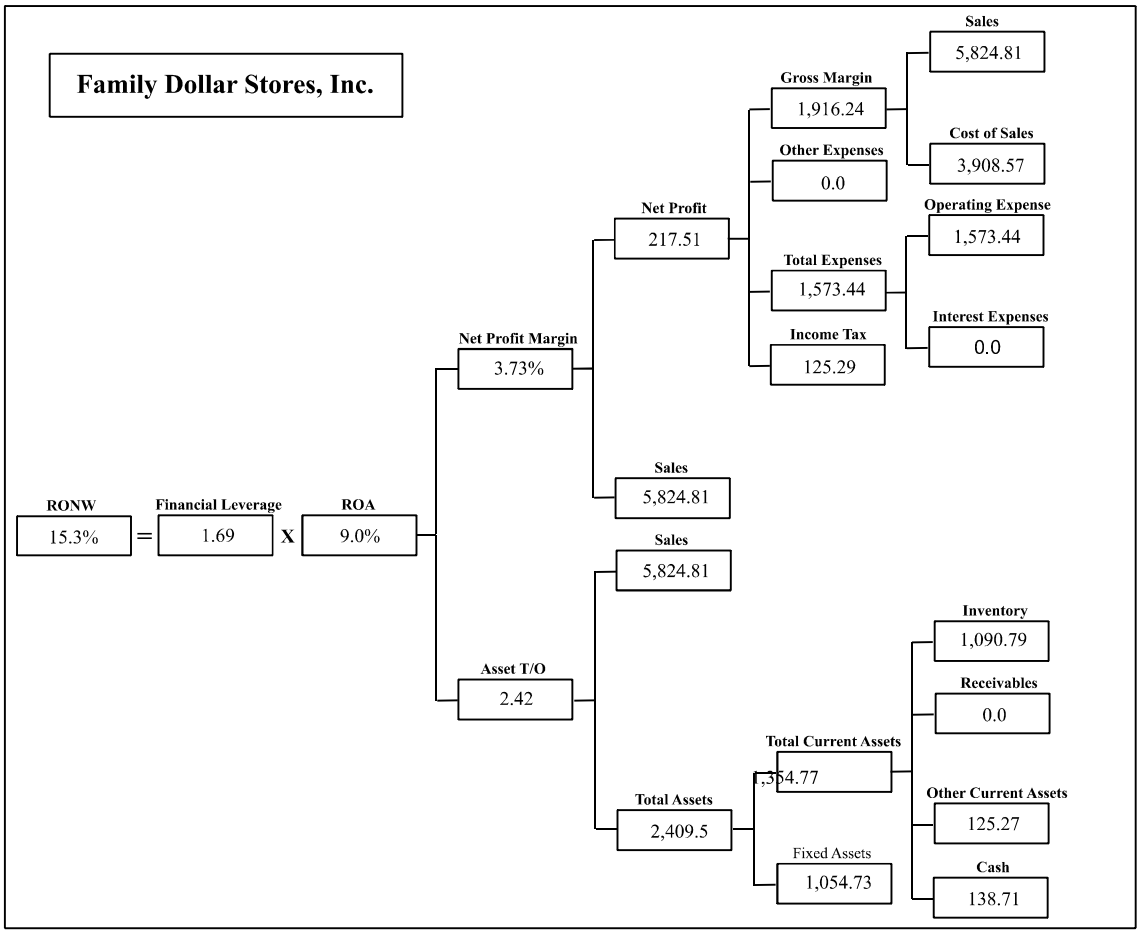


Figure A2.9 Fred's Inc.

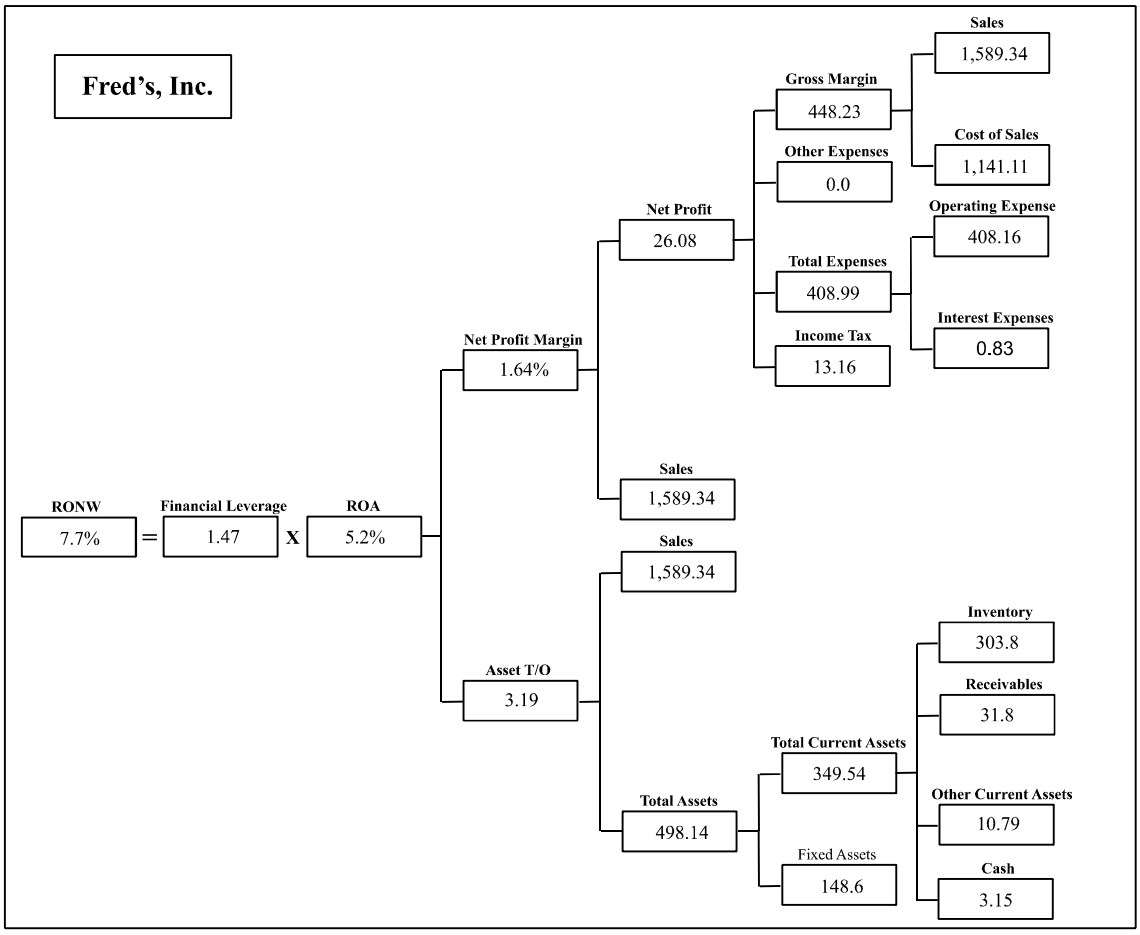


Figure A2.10 PriceSmart, Inc.

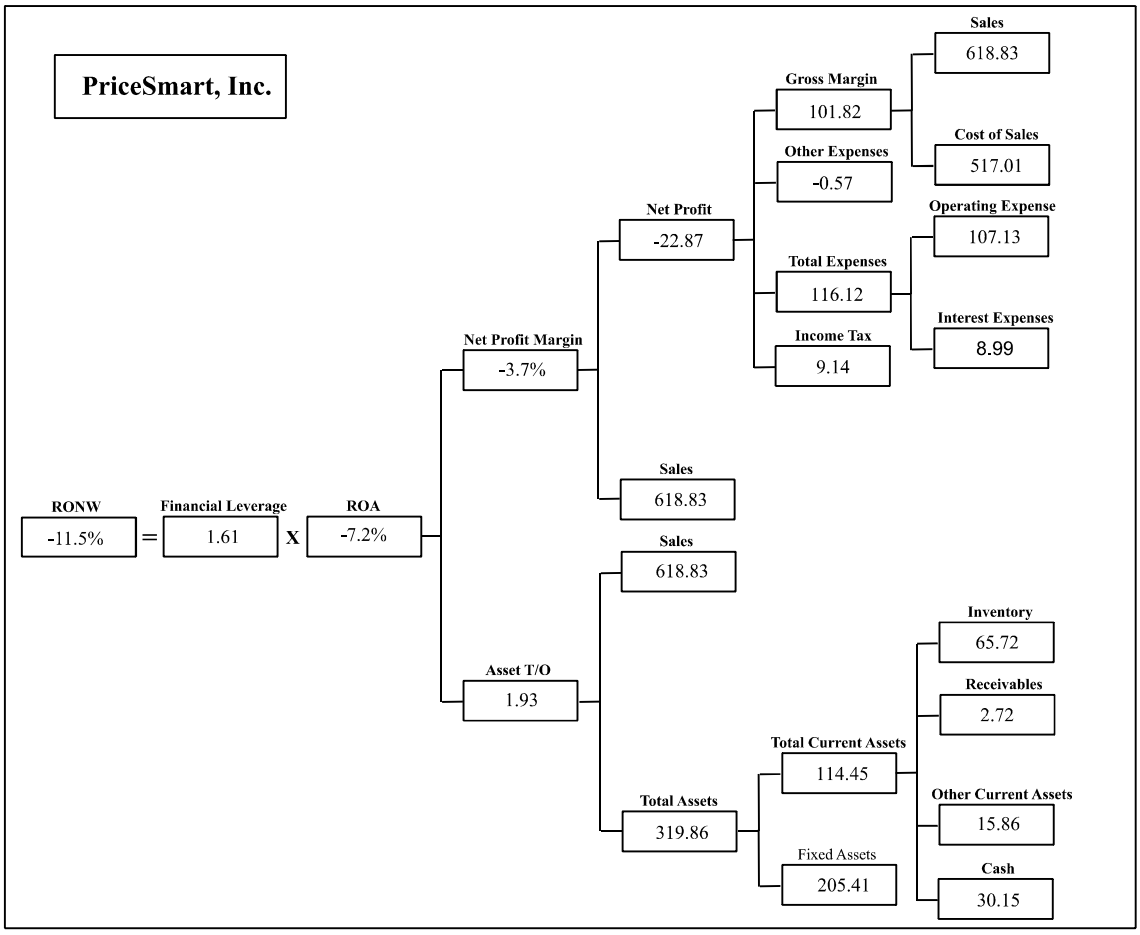


Figure A2.11 Target Corporation

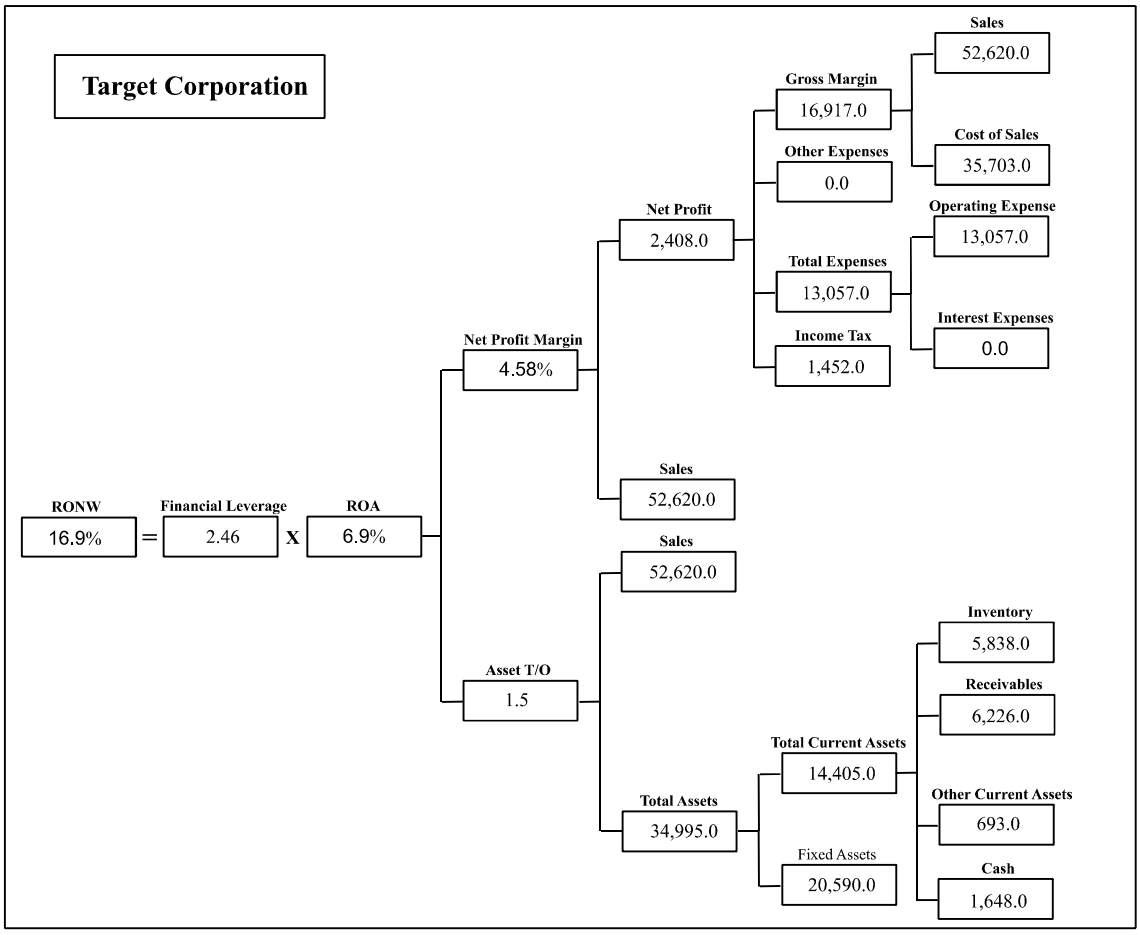


Figure A2.12 The TJX Companies

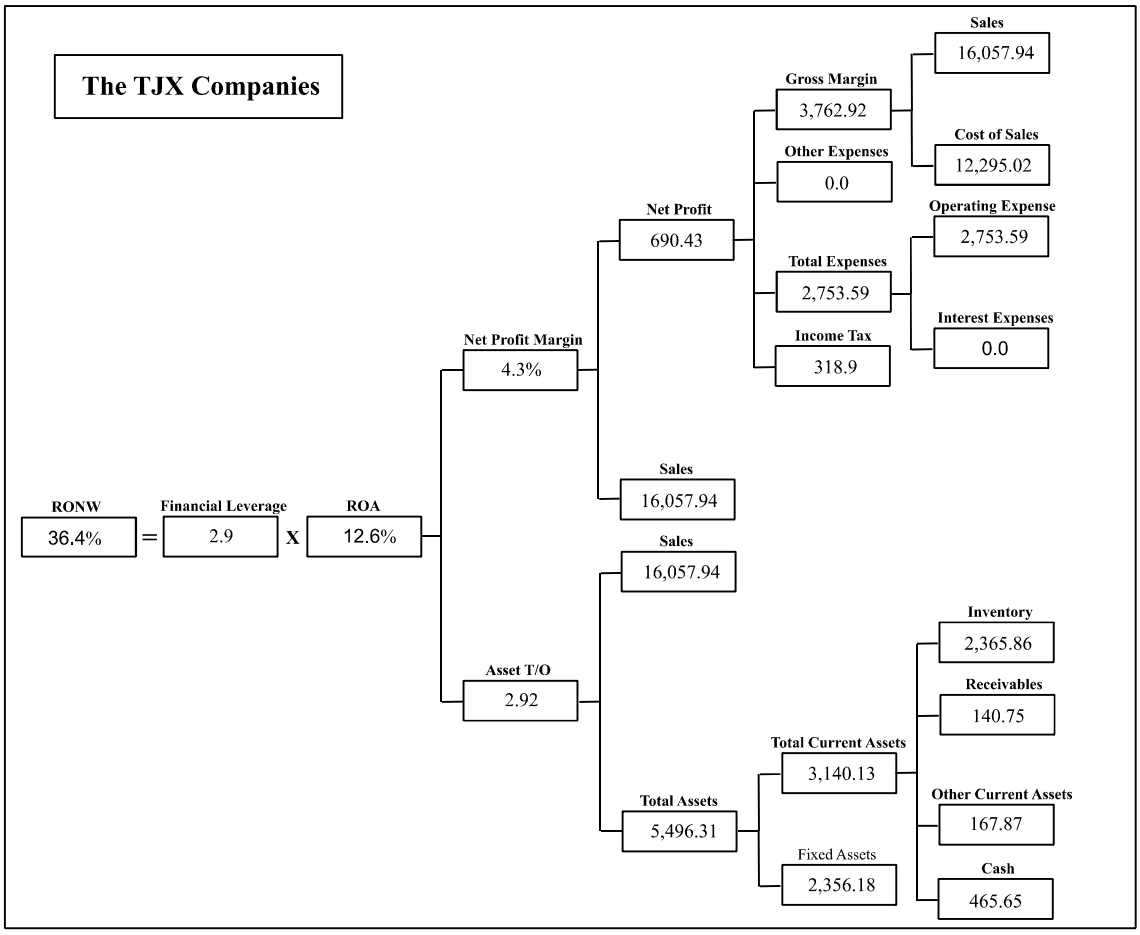
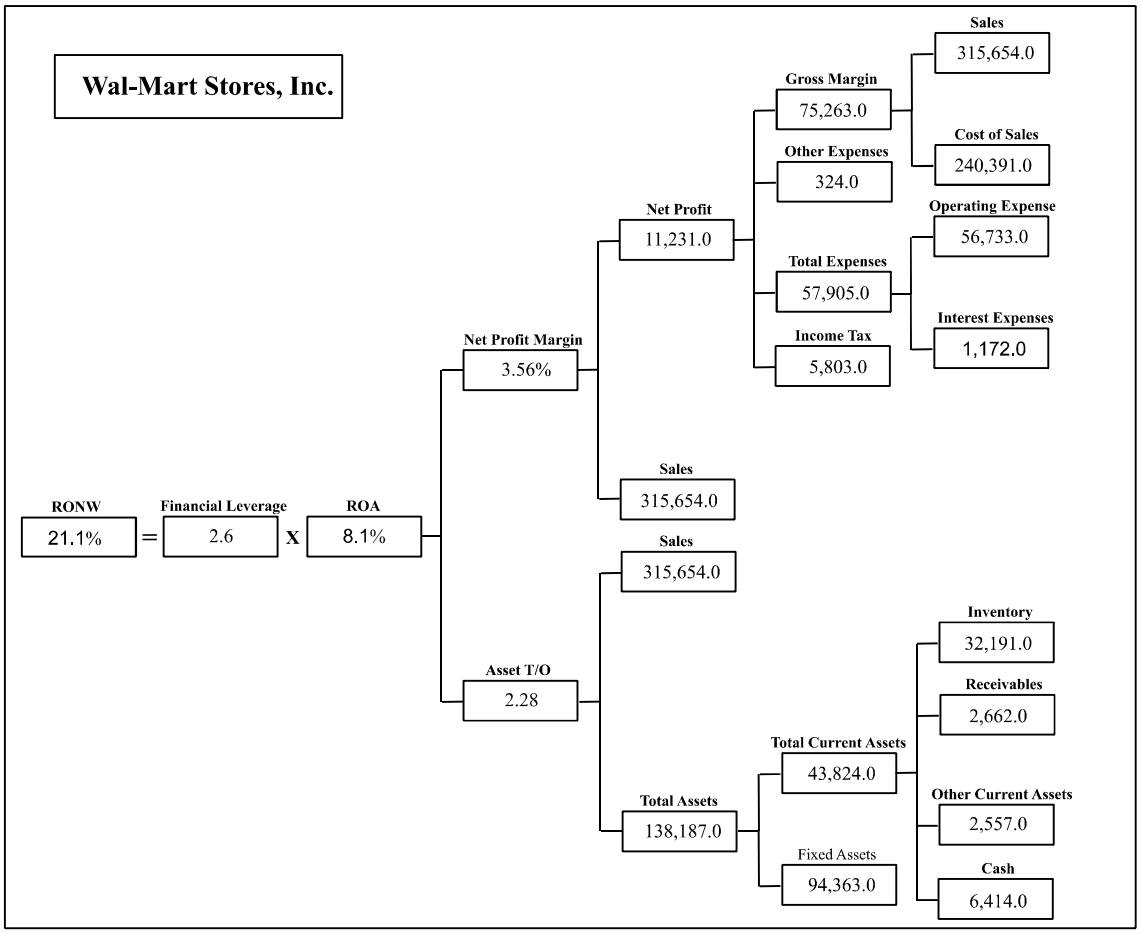


Figure A2.13 Wal-Mart, Inc.



Appendix 3

Recommended Models

Figure A3.1 Cost Plus, Inc.

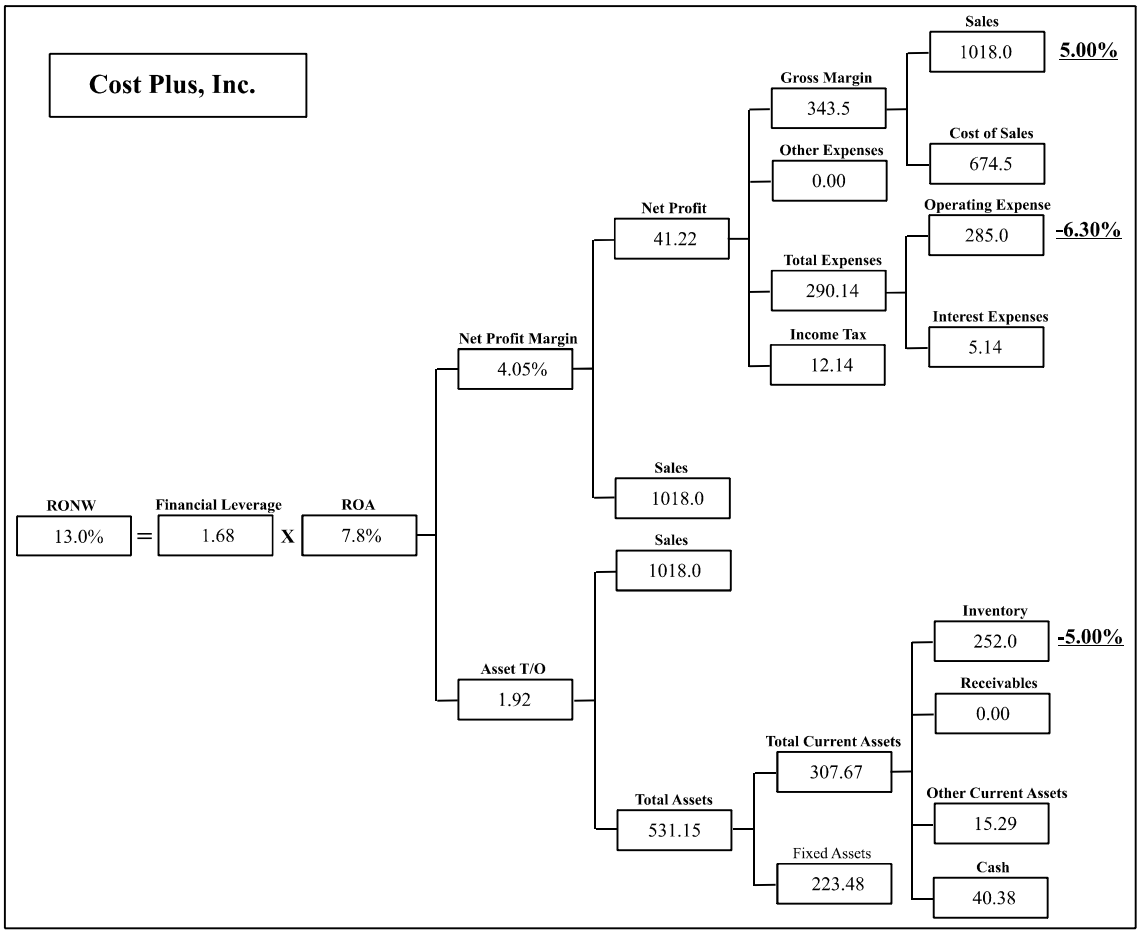


Figure A3.2 Costco Wholesale Corporation

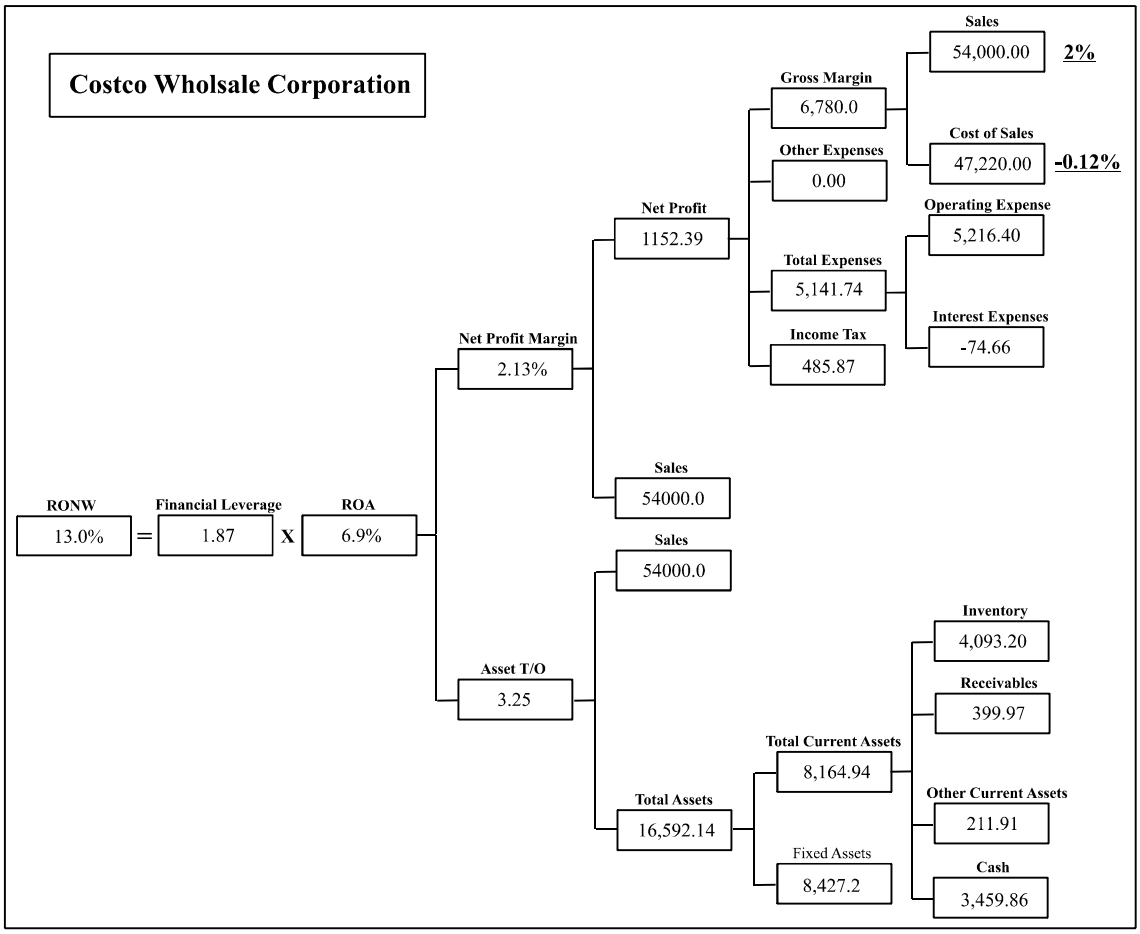


Figure A3.3 Cost-U-Less, Inc.

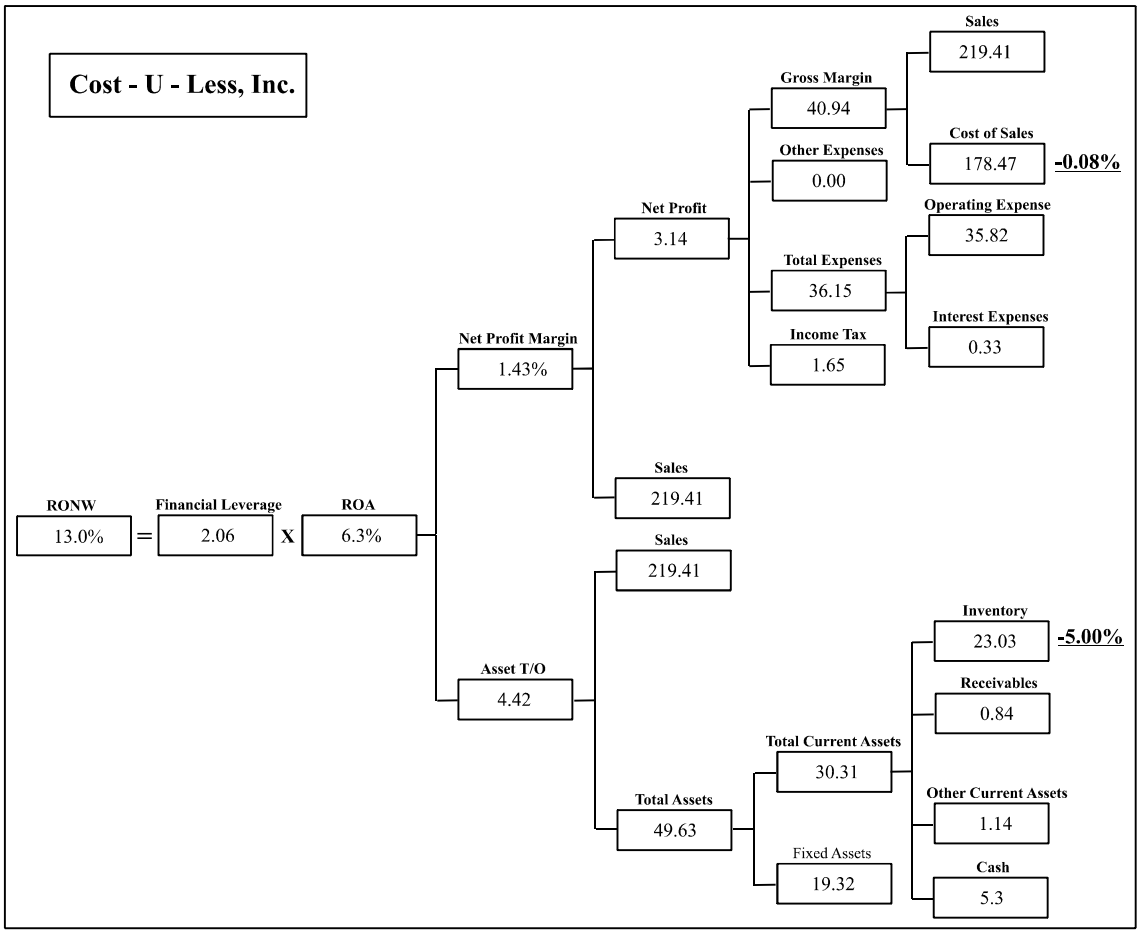


Figure A3.4 Duckwall-Alco Stores, Inc.

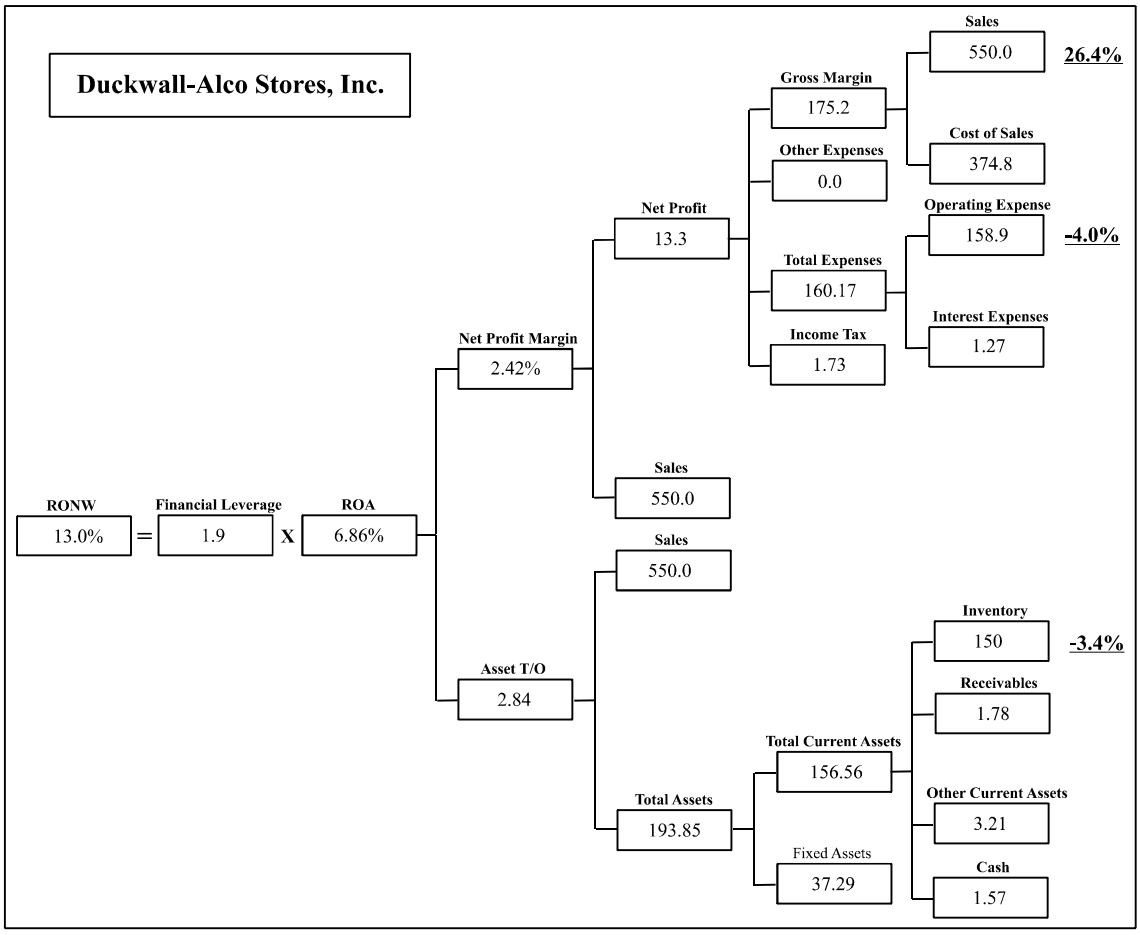


Figure A3.5 Fred's, Inc.

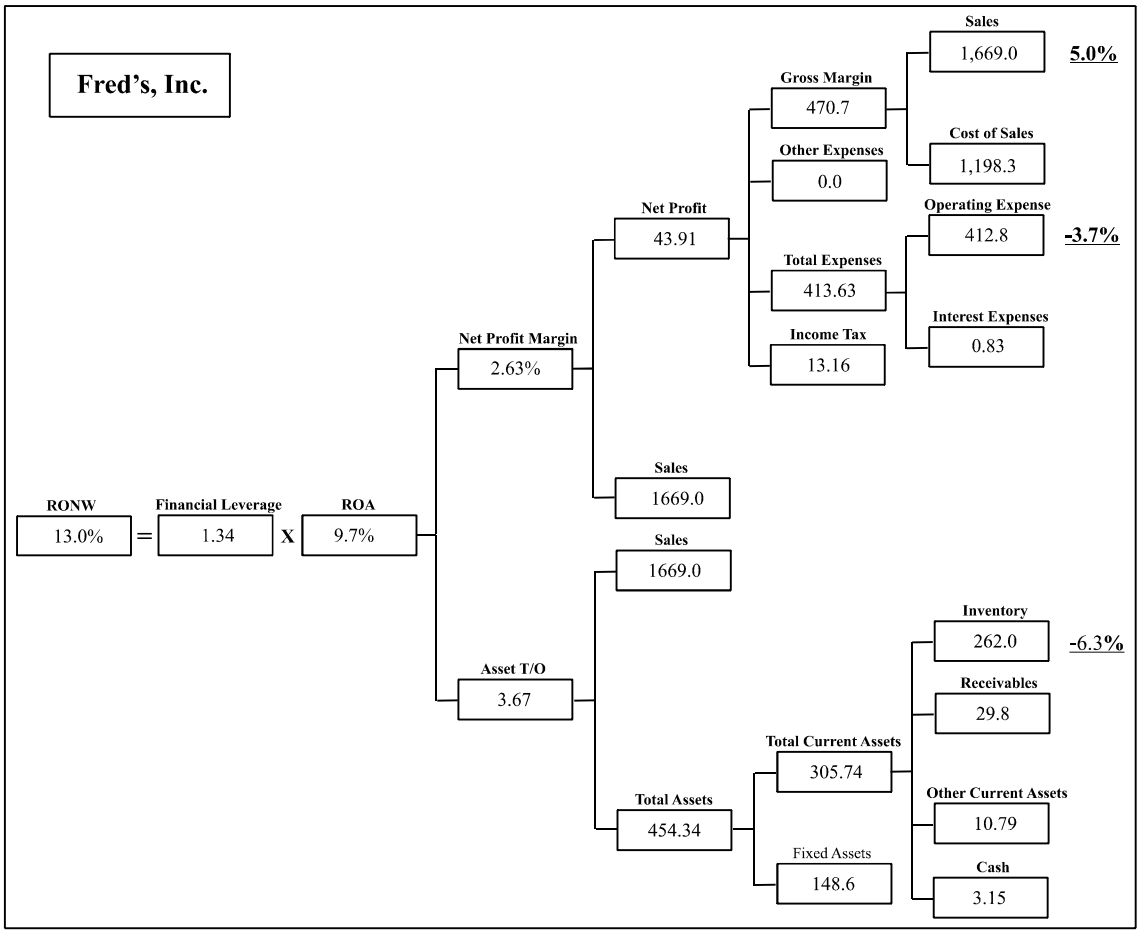
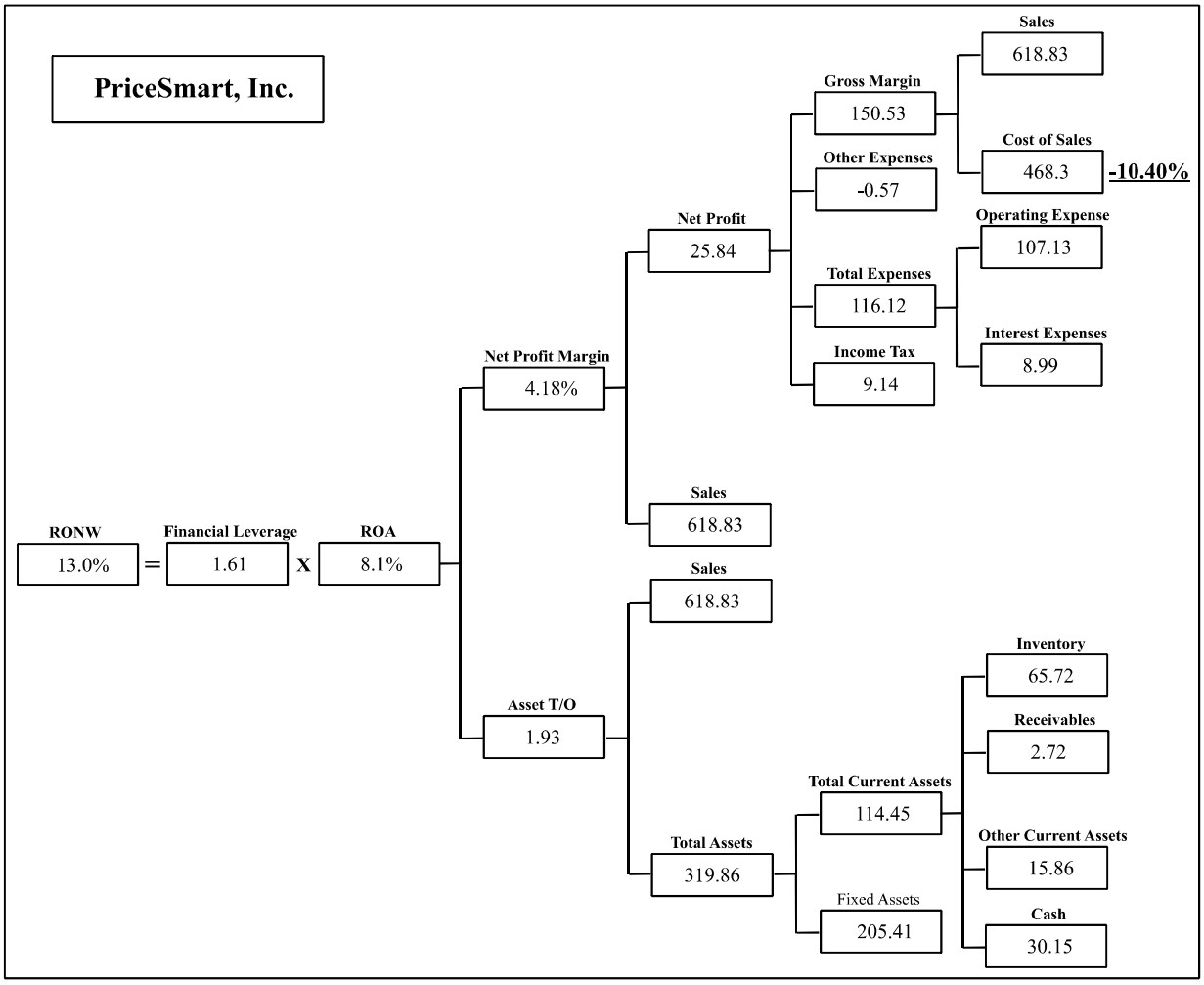


Figure A3.6 PriceSmart, Inc.



Appendix 4

Estimation of relationship between Inventory Turnover and Cost of Sales, and between Inventory Turnover and Capital Intensity.

$$IT = a + b_1 COS + b_2 CIN + e$$

(R^2 = 66.2%)

parameter	Estimate	Standard error	t-statistics	p-value
a	-8.409	1.580	-5.461	0.000-
b_1	16.165	2.294	7.047	0.000
b2	8.762	1.522	5.758	0.000