

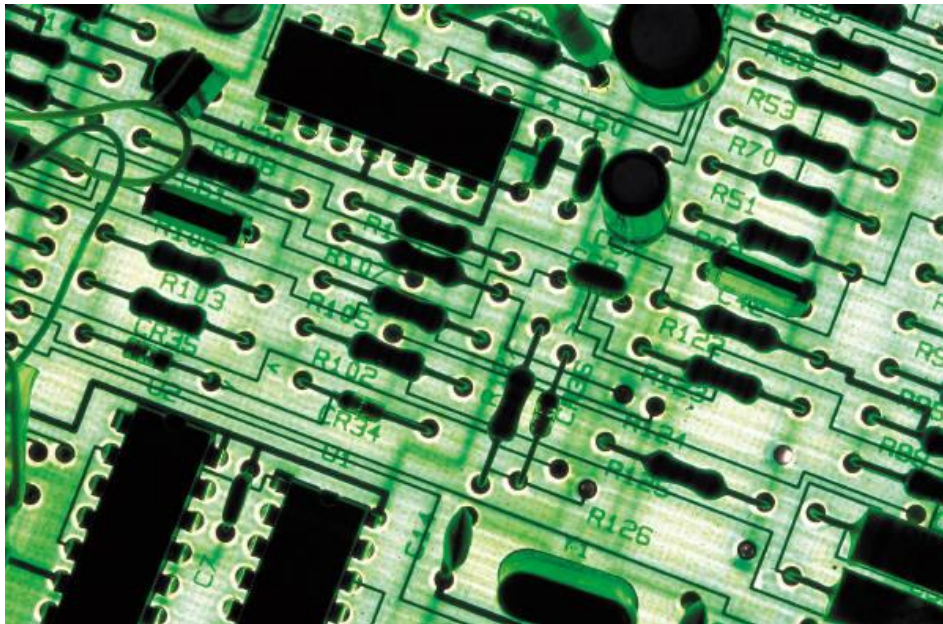


Quantifying the Value of Authorized Distribution

An Outlook of Electronics Industry Authorized Distribution Channel

Executive Summary

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National Electronic Distributors Association

Thomas and Joan Read Center for Distribution Research and Education
Industrial Distribution Program
Texas A&M University



NATIONAL ELECTRONIC DISTRIBUTORS ASSOCIATION

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INTRODUCTION

The National Electronic Distributors Association (NEDA) commissioned a study on the "Value of Distribution." in 2000. The study's intent is to identify and, to the greatest extent possible, quantify the value of distribution in the authorized electronics distribution channel. The first phase of the study was conducted during 2000-2001 to identify the values provided by the distributors to customers and suppliers. The second phase of the study seeks to define and quantify these values.

DISTRIBUTION VALUE

Supply Chain Management (SCM) has challenged all members of the supply chain to demonstrate their value to the target audience: the end user. Under SCM, the end user is in control with the entire chain directing all activities at serving their needs. This reorganization has caused an evaluation of the contribution of every function performed by every member of the supply chain. While few question the importance of distribution, the role of distributors themselves has been questioned in light of possible disintermediation in favor of "infomediaries" (as the dot coms were called) or shortened supply chains like manufacturer direct or third party enabled scenarios. In spite of the issues surrounding distribution value, authorized distribution has grown dramatically over the past ten years with other channels of distribution now adopting franchise relationships or limited distribution strategies similar to those pioneered in the electronics channel.

A major driving force behind the growth of authorized distribution is the risk of product commoditization marginalizing the manufacturer thereby reducing profitability and reducing the barriers to entry for competitors. A logical response is to wrap the manufacturer's offering in services provided by authorized distributors. The purpose of the NEDA study is to establish the significance of distribution in general and distributors in particular. The findings demonstrate not only where distributors can add value, but also what that value is, and where distributors should focus future efforts to better serve both the end users and their supplier partners.

Three primary reasons for the existence of a distributor are local inventory availability, credit assistance, and technical support. Many believed these to be the principal distributor functions throughout the 1980's and early nineties. Customer service metrics were based on these activities and distributors were measured against the associated metrics. The late 1990s, however, saw a major growth in global distribution and outsourced services. Inventory management programs such as Vendor Managed Inventory became popular as well. Services such as kitting, labeling and IC programming also came to be considered basic distributor functions. Next came the dot.com revolution and the information age. The role of distributors changed significantly again. Managing information became a central distributor function. As the list of functions managed by the distributor grew, measuring their performance also became

complicated. In particular, measuring distributor performance from a supply chain perspective became more important.

The distribution industry is service oriented. Service, in fact, is the key reason for the distributor's existence. Therefore, product cost is not the only criteria in decisions made by customers. Service and its quality are also key components. These services offered as a package with products or as standalone offerings are termed 'valued added services'. Value added services vary from design service, logistical support, packaging, financial services, and technical support. Quantifying the value added services offered by a distributor means to determine a numerical value and express these services in terms of this value. Another reason to quantify is to compare the cost versus benefit of these services. This quantification not only provides a definition of the cost of providing these services and the direct savings associated with their existence but also the indirect savings in cost, time, effort, and synergy.

The quantification gives an estimated savings to both customers and suppliers from utilizing authorized distributors' services. This project presents a framework to quantify the value provided by authorized distributors to the electronics distribution supply chain. Quantification of value is provided for both customers and suppliers. A detailed description of the value, the calculation methodology and the savings are demonstrated with examples. Values are divided into logical groups, each group quantifies the service and provides an estimated savings that the customer or supplier will incur by using distributor value-added services.

VALUE CALCULATOR

Values were grouped in to logical categories and within each category the value is divided into quantifiable services. A separate value calculation spreadsheet has been set up for both customers and suppliers. Each calculator has a list of questions to be asked of customers and suppliers. Distributors were also asked questions regarding information to which they had the greatest access and highest probability of accurate data (distributor input was validated wherever possible by customer and supplier input). The input data was then processed for the estimated savings.

CUSTOMER VALUE CALCULATOR

The list of services provided by distributors to customers was divided into three major categories by function:

1. Inventory Management
2. Convenience services
3. Value Added services

A major function for distributors is inventory management. The advantages for customers who use distributors rather than manufacturers include the ability to purchase in smaller quantities (break bulk) than with manufacturer direct delivery, lower lead times for transportation (due to the distributor's local presence), and access to inventory value added services offered by the distributor such as Vendor Managed Inventory (VMI). The calculator captures the cost savings created by smaller lot sizes, shorter lead times, and higher fill rates especially in light of order fill rates as opposed to item fill rates. Smaller lot sizes directly translate into more frequent smaller buys (higher inventory turns), thereby lowering inventory-holding costs. Reduced lead times and higher fill rates reduce supply chain variability thus reducing the need for safety stock (the most expensive form of inventory). In addition, greater reliability (higher fill rates) from the distributor also reduces the need for expediting and risk of stockout thereby reducing line shut down costs for customers.

Convenience costs include the costs of activities related to transportation, inventory planning, purchasing, receiving and inspecting. The convenience of aggregating these activities at a single point (the distributor) is analogous to maintaining a centralized inventory planning and regional distribution center. The savings associated with this type of activity have been detailed in many studies and include reduction in head count due to reduced need for specialists in the planning area. However, the biggest savings come from the reduction in transportation and handling costs associated with maintaining these products. Even if we assume the supplier/customer already has these capabilities in place and the processes are not capacitated, we must also assume that future growth will mandate eventual expansion of said capabilities leading ultimately to the firm incurring the equivalent of maintaining a separate set of resources. Transportation costs, in particular, would also include the cost associated with managing carrier relationships and contracts as well as the increased cost of smaller size shipments.

Convenience costs also include the expenses involved in accounting, finance, contract negotiation, price protection, and product availability. The net effect is an increased pressure on the entire organization and its resources. The cost of managing a broad product range and short delivery window times has been well documented as a driving force behind the outsourcing movement. Convenience costs are mostly hidden costs when compared to the more obvious inventory holding costs. The distributor's services can account for a considerable savings in both cost and time.

Distributors offer valued added services as a part of the product offering or as a standalone service. Small and mid-sized electronic manufacturers and customers depend on services of distributors for design and technical support. Many of the electronics customers also access kitting and assembly services from the distributor. These also include IC (integrated circuit) & PLC programming. Information technology services include online technical resources, inventory availability, order tracking, design team collaboration, etc. Training and education services offered by the distributor bring technical and product knowledge to design, manufacturing, and purchasing personnel. Some of the other services include dock-to-stock, bonded inventory, and manufacturing services. The quantification of these services is specific to the firm's environment, size of distributor, types of service offered, types and level of service required by the customer, among other variables. The calculator quantifies these savings in terms of what it would cost to outsource these activities or to build an in-house expertise at either the customer or supplier's operations.

TABLE 1: CUSTOMER VALUE CATAGORIES

Inventory Management costs	Convenience costs
Cost of capital	Transportation
Warehousing	Planning
Shrinkage	Purchasing
Obsolescence	Receiving and Inspecting
Inventory Insurance	Accounting/ finance cost
Property Tax	Negotiation/Switching cost
Warehousing Labor	Price protection cost
Expediting cost	Product Availability
Cost of line shut down	Value Added Services
	Technical Support - Field Application Engineer
	Kitting & Assembly services
	Information Technology services
	Design Services
	Training & Educational Services

There are sub functions in each category that are quantified with respect to the cost incurred by using distributors and cost incurred if using supplier direct or contract manufacturers or performing the functions in-house with increased capabilities developed explicitly for that purpose. The savings are calculated in each sub category.

SUPPLIER VALUE CALCULATOR

The distributor provides the electronics and semiconductor manufacturers with services beyond just simple distribution and acting as an inventory buffer for the supply chain. Over the past decade, logistics, information technology, and technical support services have been outsourced, to a constantly increasing degree, to the distributor in addition to the more traditional services such as sales, credit, and financial management. Product marketing, identifying, and creating demand for the manufacturer's products, and customer technical services are only a few of the services carried out by the distributor in support of the supplier's product offering.

The commoditization of manufacturers' products continues to threaten the electronics manufacturing community. This movement, supported by customers interested in increasing their flexibility and reducing raw material costs has caused many suppliers to rely more heavily on authorized distributors to wrap their products in services. Authorized distributors are also expected to create demand for the manufacturer's products through introducing them into transactions with customers buying complementary products from the distributor. In some cases, the distributor will also offer product customization, assembly, and/or special labeling packing needs for the customer that would otherwise have to be provided by the manufacturer.

Information management has also become a major requirement as part of authorized distribution arrangements. The distributor not only controls considerable information on a customer-by-customer basis but also has a broader market view than can be achieved from the manufacturer's position in the supply chain. More and more manufacturers are requiring Point-of-Sale (POS) data for product and market analysis from distributors and distributors are also beginning to offer more services in information management to further support the supplier's analysis. Information exchange of this nature requires strong alliances and is a major value add of the authorized distributor relationship. Most activities in this area are relatively new and specific to the manufacturer/distributor relationship as well as to distributor capability and positioning in information management. The report addresses current cost savings and potential future value if the trend continues to expand.

The calculator specifically captures the savings incurred by the manufacturer through using the authorized distribution channel as opposed to selling direct to the customer and managing their needs. The first category is sales effort. This calculation captures the savings by calculating the cost of inside and outside sales resources that the manufacturer has to use if directly dealing with a large number of customers. There is also a great deal of effort and cost involved in extending credit, finances, and maintaining bad debt expenses. The savings associated with these costs are captured in the second category. The third category, inventory, is a major category, where supply chain holding costs are transferred to the distributor.

The list of services provided by the distributor to the supplier is divided into four major categories by function.

1. Sales effort
2. Inventory Management
3. Extending credit
4. Value Added services

TABLE 2: SUPPLIER VALUE CATEGORIES

Sales Effort	Extending Credit
Manufacturer Outside Sales	Accounting/Finances
Manufacturer Inside Sales	Bad Debt Expenses
Annual Inside Sales Savings	Opportunity Cost/Cash Cycle
Picking and Packing Orders	
Inventory Management	Value Added Services
Cost of Capital	Sales Force
Warehousing Cost	Demand Identification
Shrinkage	Manufacturer Customer Service
Obsolescence	Technical Seminars
Insurance	
Property Tax	
Labor	

SURVEY PROCEDURE

The customer and manufacturer distribution value calculators were developed and tested in the summer/fall of 2002. The National Electronic Distributors Association with the help of six distributors (large to small sized) arranged for sessions with 24 customers and 14 manufacturers. These participating companies were drawn from various segments of the industry and represented multiple size firms. The Texas A&M research team met with a varied range of specialists from purchasing, sales, and senior management like Chief Operating Officer, V.P. operations, head of global logistics, etc. Table 3 demonstrates the composition of the participants. The participants were asked a series of specific questions and for their overall view of the value of distribution. The participants shared several insightful opinions and concerns. Data was also collected from the participating distributors on the participating companies.

TABLE 3: CUSTOMER AND SUPPLIER MATRIX

Customers (Total of 24)		
Contract Manufacturers	<\$1 billion	>\$1 billion
	4	4
OEM	<500 Million	> 500 Million
Industrial	2	2
Medical	2	2
Military	2	2
Telecom	2	2
Manufacturers/Suppliers (Total of 14)		
Technology	Broad line	Niche
Semiconductor	3	3
Interconnect	1	2
Passive	2	1
Electro-Mechanical	2	0

Validation of the calculator: The Texas A&M research team set up a model calculation with estimated savings and visited six distributors to validate the model developed. The input and suggestions from distributors were incorporated into the calculator.

DATA COLLECTION

Data required for analysis was collected from several sources. Customers, suppliers, and distributors provided most of the required data. Some data was also extracted from SEC filings of Annual Reports. Most of the data collected is for 2001. All the data is for the North American operations of the companies. On-site visits, tele-conferences, and follow-up e-mail exchanges were the primary modes of data collection. The data collected from the distributors were only for their customers or suppliers listed in the survey.

Information from the Customer

Purchase Volumes

What is your annual cost of purchases from Distributors?
How many distributors do you use?
How many direct suppliers do you use?
What is the total number of orders to suppliers?
What is the total number of orders to distributors?

Lot Size

What is your average demand per week?
What is your demand variability per week?

Lead Time

What is the lead-time variability with distributors?

Fill rates

What is the desired fill rate for your company?
Actual fill rate by Distributor (on-time delivery)

Line Shutdown cost

What is your cost of production line shutdown/day?

Holding Cost (Expressed as a % of Inventory cost)

What is your current cost of capital?
What is your current cost of warehousing?
What is your current obsolescence cost?
What is your current inventory related labor cost?

Planning

Total number of line items that you carry
Your total departmental cost of planning for all items

Purchasing

Current number of orders to direct suppliers
Total departmental cost of purchasing

Information from the Suppliers

Sales

What are your annual sales?
What is your annual sales volume direct to customers?
What is your gross margin %?
How many sales reps are currently serving distribution?

How many accounts does a sales rep typically handle?

What is the cost of a fully loaded outside sales rep (salaries, benefits, travel, and training):

What is the cost of a fully loaded inside sales rep (salaries, benefits, travel, and training):

Inventory Management

What is your Inventory turnover (turns/year)

What is your total current warehousing space?

What is your current warehousing cost per sq.ft.?

What is your current obsolescence?

What is your current inventory insurance cost?

What is your company's cost of capital?

What is your property tax %?

Extending credit

What is your current allowance for bad debt as a % of sales?

Average days of accounts receivables A/R - with distributors:

Information from the Distributors

Sales Volume

What is your annual sales volume for this supplier?

What was the total number of shipments?

What percent of this supplier's sale were of multi-sourced product?

Customer Base

How many customers (locations) have you sold to in the last 12 months?

Inventory

What is the average amount of inventory carried for this supplier?

How many, including customer sites, locations are this supplier's product stocked in?

How many part numbers, SKU's, are you carrying in inventory?

How many shipments have you received from this supplier?

What is your inventory turns for this supplier?

Technical Support/Demand Creation Activities

How many design wins have you recorded in the last twelve months.

What sales volume was generated by these wins.

Total cost of customer technical and product seminars in the past 12 months.

Resources

How many technical support and or Field Application Engineers do you have?

What percent of their time is spent supporting this product line?

What is your estimated fully loaded cost for each technical support person?

How many marketing and asset people do you have supporting this supplier?

What is your estimated fully loaded cost for these marketing and asset personnel?

Number of accounts per sales reps

Value Added Services

What percent of sales of this supplier's product involve value-added services?

List the value added-services you performed?

Financial

What is your average customer A/R?

What is your allowance for bad debt?

What is your estimated inventory obsolescence for this supplier?

FINDINGS

Customer Value Quantification

The data collected during interviews and from public sources, along with industry standards are aggregated into groups. The following results represent an aggregate range of savings for a typical customer using an electronic distributor. The results depend on several variables such as purchase volumes, demand variability, distributor and manufacturer reliability, customer fill rate requirements, services accessed by the customer etc.

For example, a less than one billion dollar contract manufacturing customer with the following purchase volumes, fill rates and cost structure would realize a savings potential of between 15.93 and 25.65 percent. The savings are expressed as a percent of purchase volumes. All calculations are performed for one customer procuring materials and services from one distributor.

Customer Variables

Customer purchase volume from distributor	: 5 M – 45 M
Number of orders	: 500 - 2000
Lot sizes	: 600 – 3500 units
Lead time with distributor	: 2 weeks
Lead time with supplier	: 8 weeks
Lead time variability: distributor	: 1 day
Lead time variability: supplier	: 8 days
<u>Fill rates</u>	
Customer expectation	: 98.50 – 99.99
Distributor fill rates	: 98.00 – 99.00
Supplier fill rates	: 80.00 – 95.00
<u>Holding cost*</u>	
Cost of capital	: 20 % – 40%
Cost of warehousing	: 15 % – 25 %
Obsolescence	: 1% - 5%
Insurance & Tax	: 1% - 4%

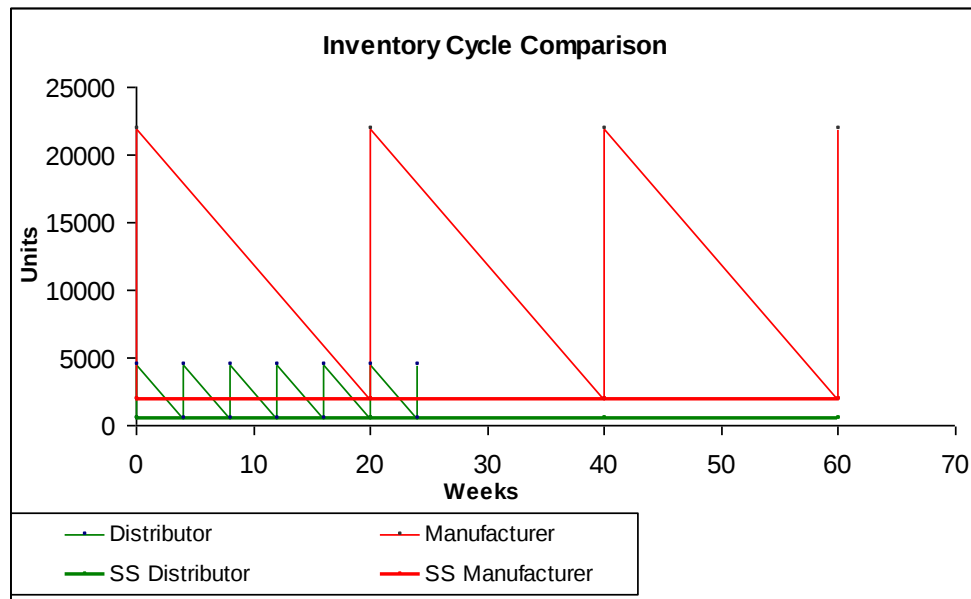
** Expressed as a % of inventory cost*

Savings*:

Inventory Management	: 9.15% - 11.93%
Convenience Cost	: 6.78% - 13.72%
Total	: 15.93% - 25.65%

**All savings are expressed as a % of Sales*

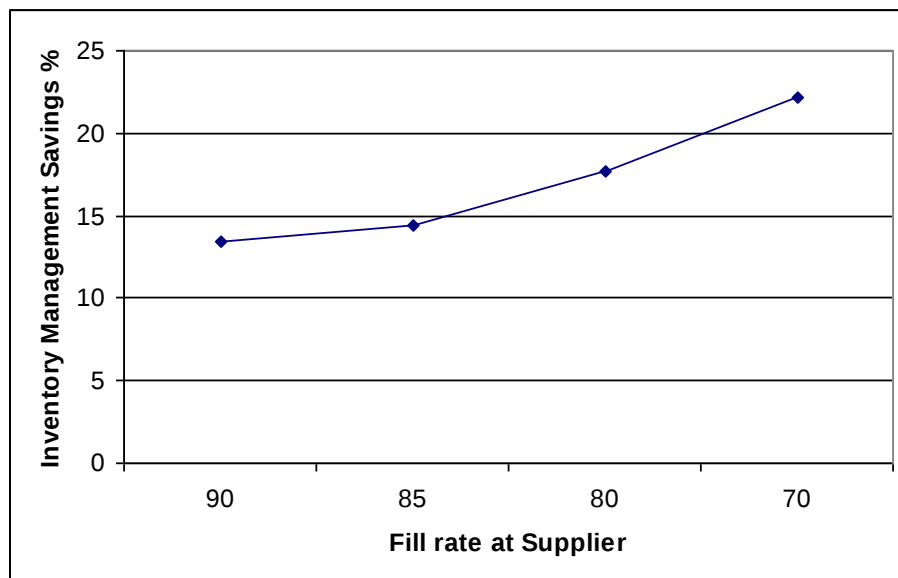
FIGURE1: INVENTORY CYCLE COMPARISON



Analysis:

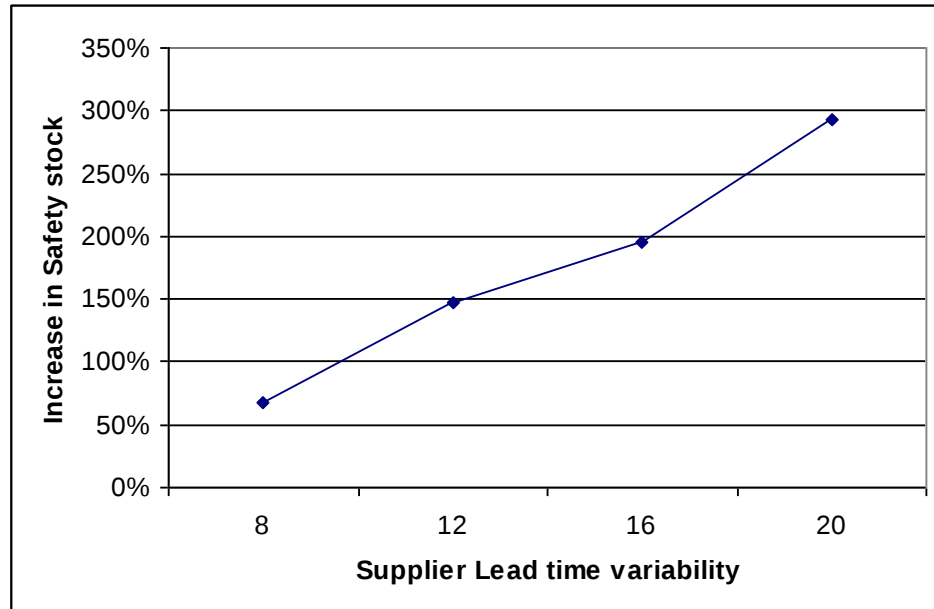
As stated in the earlier section, the savings are dependent on several variables. This section explains the variability in savings by changing one variable and while keeping all others constant. The fill rates by distributors and manufacturers have a direct effect on the inventory savings. For example, if the customer expected fill rate is 99.9% and distributor fill rate is 95%, the following graph demonstrates for various levels of supplier (manufacturer direct) fill rates, the savings will vary based on changes in the supplier's fill rate. A decrease in supplier fill rate, for example, will increase required safety stock, expediting costs incurred, as well as line shut down costs.

FIGURE 2: FILL RATE ANALYSIS



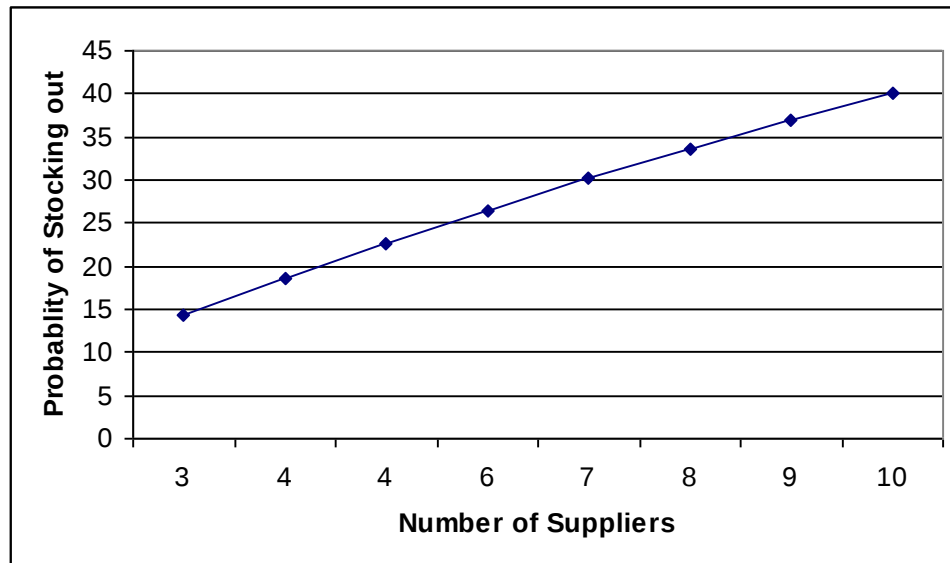
Safety stock is dependent on demand variability and supplier reliability. For example, if we increase the supply variability from 8 days to 24 days, with all other variables fixed, the safety stock increases rapidly. Since safety stock is the most expensive form of inventory, significant savings can be achieved by increasing the supply reliability.

FIGURE 3: SAFETY STOCK ANALYSIS



One reason to use a distributor is to procure multiple items from multiple suppliers on a single order. If we use multiple manufacturers to procure these items, the probability of a stock out increases dramatically. As the number of manufacturers increase their combined fill rate drops.

FIGURE 4: STOCK OUT ANALYSIS



The following table provides the aggregate ranges for different customer segments by size and type.

TABLE 4: CUSTOMER SAVINGS

Customer Type and Volume		Inventory Savings	Convenience Savings	Total Savings
> 1 Billion, Contract Manufacturer	Low	10.22	8.66	18.88
	High	17.32	9.23	26.55
< 1 Billion Contract Manufacturer	Low	9.15	6.78	15.93
	High	11.93	13.72	25.65
> 500 Million OEM Customer	Low	9.43	8.14	17.57
	High	12.45	13.58	26.03
< 500 Million OEM Customer	Low	10.61	7.49	18.10
	High	15.03	12.56	27.59

These savings are non-inclusive of the inventory savings that can be obtained by accessing one or more of the distributor's value added inventory services such as VMI, which greatly reduces the inventory holding and order expediting cost. Adding the convenience cost savings and value added services savings, the total savings could account for more than 15-40%. This is a significant savings when one considers the single digit margins that many electronics end customers are operating on.

Supplier Value Quantification

Distributors bring value to suppliers by assisting in sales and inventory functions. Also, the distributors carry out the credit function for a large number of customers and provide technical support as well. The savings that a distributor brings to the supplier is primarily categorized into sales effort, inventory management, extending credit and value-added services. As in the customer calculator, the savings depend on a number of variables. For example, the following variables for a broad line semiconductor supplier will save between 25 and 64 percent if they used a distributor channel as opposed to going customer direct.

Supplier Type: Broadline
Market Segment: Semiconductor

Variables:

Supplier sales volume : 500 M – 1 B
Gross margins : 20 % - 40%
Turns : 6 – 4

Holding costs

Cost of Capital : 20% - 40%
Warehousing cost : 15% - 25%
Obsolescence : 3% - 9%
Insurance & tax : 1% - 3%

Cost of outside sales rep : 100 K
 Cost of inside sales rep : 50 K
 Write-off : Distributor : 0.01% - 1%
 Write off: Customer : 1% - 6%
 Days outstanding- distributor : 30 Days – 45 days
 Days outstanding – customer : 45 days – 60 Days

Savings*:
 Sales Effort : 6.75% - 13.38%
 Inventory Management Savings : 8.60% - 15.30%
 Extending Credit : 7.32% - 35.33%

 Total : 25.27 % - 64.01%

*All savings are expressed as a % of Sales

Analysis

The following exhibits detail the variations in savings under different scenarios for the above-mentioned variables.

TABLE 5: SAVINGS FOR DIFFERENT VALUES OF COST OF CAPITAL

Low Range			
Gross Margins & Cost of Capital	20%	30%	40%
Sales Effort	6.75	6.75	6.75
Inventory Management	8.6	9.28	9.45
Extending credit	7.32	8.99	10.66
Total	22.67	25.02	26.86
High Range			
Sales Effort	13.38	13.38	13.38
Inventory Management	15.07	15.52	15.3
Extending credit	29.67	33	36.33
Total	54.74	58.52	61.63

TABLE 6: AVERAGE DAYS OF A/R VS EXTENDING CREDIT SAVINGS

Avg. Days of A/R	45	50	55	60
Extending Credit Savings				
Low Range	7.32	8.43	9.55	10.66
High Range	19.14	20.56	21.95	32.33

FIGURE 5: HOLDING COST Vs INVENTORY SAVINGS

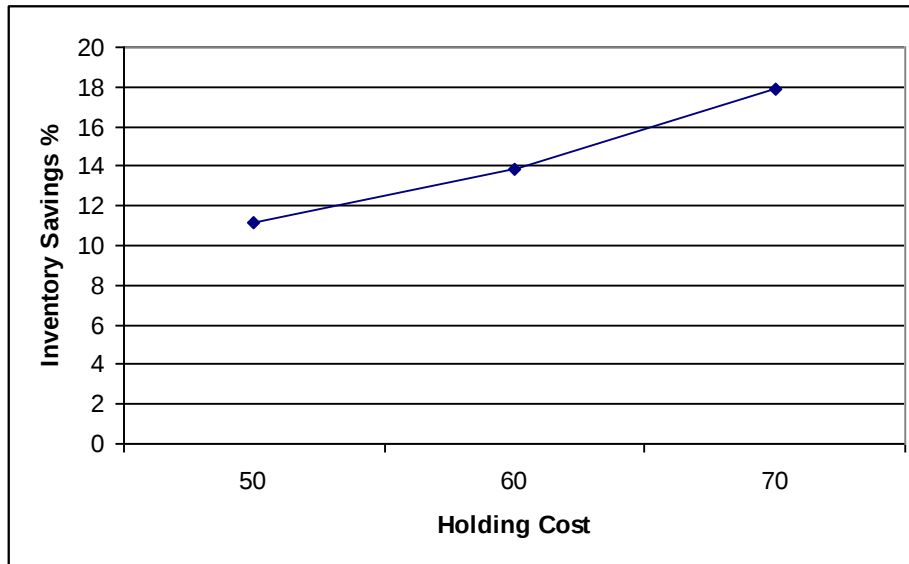


TABLE 7: SALES EFFORT Vs NUMBER OF ACCOUNTS PER SALES PERSON

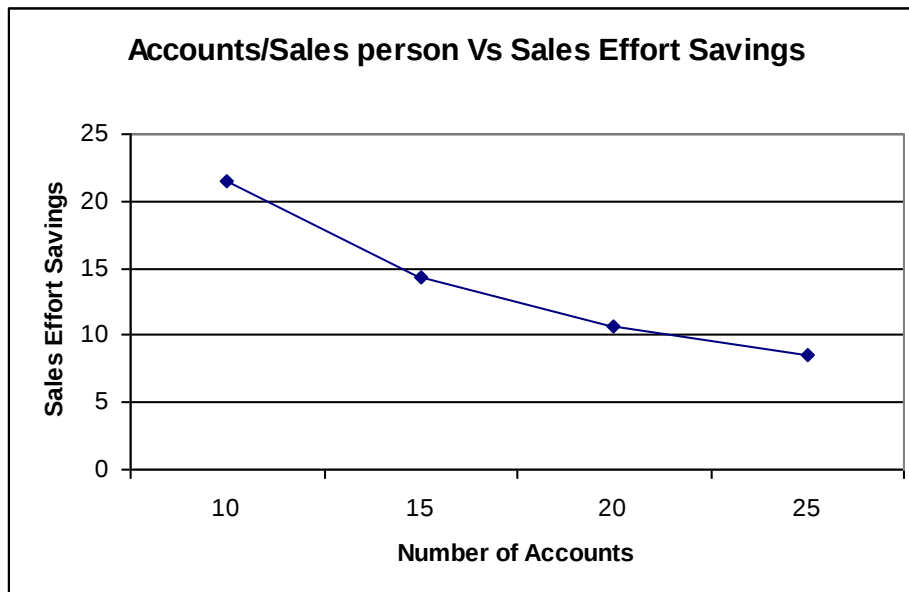


TABLE 7: SUPPLIER SAVINGS

Supplier Type and Volume		Sales Effort Savings	Inventory Savings	Extending Credit Savings	Total Savings
Semiconductor	Low	8.57	5.31	2.63	16.51
	High	21.43	14.81	4.15	40.39
Interconnect	Low	8.04	5.31	2.06	15.41
	High	15.18	12.99	5.09	33.26
Passive	Low	10.00	5.51	2.78	18.29
	High	18.33	12.60	3.57	34.50
Electro-mechanical	Low	7.39	5.43	2.51	15.33
	High	18.75	13.71	4.67	37.13

The distributor's savings in sales effort and inventory related categories add up to 10% to 25%. Distributors also offer other value added services such as extending credit to customers (2 to 6% depending on environmental characteristics), technical support (very dependent on customer needs), and other value added services (wide variation based on customer needs, distributor size, individual product characteristics, etc). Technical support, and other value add services are covered in more detail in the final report. The final savings for manufacturers using distribution falls in a range between 10% for the highest volume, greatest forecast accuracy, and least value add requirements to well over 40% for the lower volume, more complex environments.

Distribution Total Savings

Authorized distributors save a significant amount of time and effort for their customers and suppliers in terms of market reach and logistical support. Inventory management and sales effort are the two major cost saving categories affecting the distributor's value add to the supply chain. Due to the dynamic nature of the electronics industry (especially considering the impact of shortened product life cycles), effectively managing inventory and information will be a key critical success factor for all members of the supply chain. In addition, distributors also bring a number of difficult to quantify synergistic values to customers and suppliers that are time and place dependent but that also create considerable value over the long term. The calculators created as part of this study can be used to determine where and how distribution services can best be accessed for supply chain optimization. The study details the various environments and parameter settings relevant to different relationships and conditions that may exist at any particular point or time.

CONCLUSION

This study quantifies the services of the authorized electronics distributor. These services were quantified on the basis of the how much it would cost if the customer used manufacturer direct, third party service providers, or built an in-house expertise to replace distributor value add. The cost savings to the manufacturer (supplier) is quantified based on the sales effort and cost associated with dealing with a large number of customers as opposed to a limited number of distributors. Preliminary findings are that the distributor not only saves time and money but also allows the customer and supplier to concentrate on their core competencies. The final results

and the calculator will be an effective tool for customers, distributors, and suppliers to use in supply chain planning.

This study was commissioned by the National Electronic Distributors Association (NEDA) with the intent to educate distributors, suppliers, and customers on the value added by authorized distribution. The study details the environments and conditions and quantifies the value offered by authorized electronics distributors. We wish to thank NEDA for its support of this seminal study and its continued support of research designed to improve the electronics supply chain. We also wish to thank the volunteer firms that participated in this study and made its findings possible.

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