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Doing Business Globally

Managing inventory on a global basis from an investment perspective

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Introduction:

Two very core decisions for any organization is to determine how much of an item to order or produce and how much inventory of an item to keep on hand. This seemingly simple task is at the foundation of daily operational decisions, yet when it comes to Inventory Management, today's software packages treat these decisions separately and are using methods developed in 1913 in order to lower costs and improve customer service. It is time to upgrade to an Inventory Investment Management system that considers these decisions simultaneously from an investment perspective. This paper outlines ePhiphony's patent pending product suite, **Phitch**, which automatically maintains the optimum inventory level using the optimum order quantity from an investment perspective and its impact on doing business globally.

Market Drivers:

According to a survey of CFOs by RSM McGladrey, 18 percent of companies in 2007 are relying solely on international growth strategies. An additional 26 percent are relying on combined international and domestic growth strategies. The remaining 56 percent of respondents reported no strategy for international growth. Among respondents who utilize a global strategy, more than half that are "mostly distribution" or "mostly manufacturing" are experiencing revenue growth in foreign markets. Forty-six percent of those describing themselves as "manufacturing" and 23 percent who describe themselves as "distribution" are experiencing such growth. These responses suggest there is a synergy between manufacturing and distribution functions that makes growth in foreign markets easier to achieve.

Problems:

According to a survey of CFOs and CEOs by RSM McGladrey ¹⁰, indicates smaller companies are missing international growth opportunities. Smaller companies are 45% less likely to move production or services offshore in 2007; however, data suggests they can achieve comparable success in key areas such as lowered costs, improved margins, and





revenue growth by doing so. By not undertaking a global business strategy, smaller companies are missing opportunities to access t foreign markets by not undertaking a global business strategy.

According to RSM, the most common barriers to pursuing international growth are “difficulty obtaining funding,” “lack of expertise in exporting or importing,” and “threat of intellectual property theft and brand piracy” Furthermore geographic location indicated a tendency to pursue a global strategy as small companies located on the coast are 50% more likely to have a global strategy than those located inland.

This paper addresses the “lack of expertise” by discussing the inability of today’s Inventory Management software packages to provide the decision support tools to implement a Global Business Strategy.

Historical Approach:

According to a survey conducted by Microsoft⁴, the top supply chain objectives are lower costs and improved customer service. Business leaders struggle with balancing today’s objectives with methods developed in 1913 that treat objectives of Lower Costs and Improved Customer Service, especially when implementing a global business strategy.

Today’s ERP software packages are not capable of simultaneously determining order quantity and safety stock to minimize cost with customer service included. The core method employed by software packages all over the world utilizes the EOQ formula the Economic Order Quantity (EOQ).. Still in use today, the model was originally developed by F.W. Harris in 1913 to determine the lot size which is in turn utilized separately to determine the safety stock. The safety stock quantity is inventory in excess of forecast demand that is kept on-hand to avoid stockouts and to maintain a high value of customer service.

To make matters worse, the lot size employed is often times arbitrary or set to a general frequency. According to Aberdeen⁷, 21% of companies use a monthly frequency. While updating capability to minimize cost with





customer service included would be an improvement, cost is not the best metric to measure effectiveness of Supply Chain Management (SCM), especially relative to the complex issues pertaining to importing and exporting goods and services. According to a study by Microsoft⁴, the most common metrics utilized to measure the effectiveness of Supply Chain Management (SCM) processes are the following: Gross Margin (58.7% of companies), On-Time Delivery to Customer (57.4% of companies), and Inventory Turns (36.1% of companies). In other words, the metrics most frequently employed are often times in conflict with the two approaches to Lower Costs and Improve Customer Service.

Generic Solution:

With today's pressures for financial performance in an ever increasing global market, an inventory investment method that simultaneously determines order quantity and safety stock at maximum economic profit is preferred to the cost and or arbitrary methods previously outlined. Economic profit is often referred to as ECONOMIC VALUE ADDED or EVATM (Trademarked by Stern Stewart & Co.)⁵. According to Stern⁶, companies using EVA have outperformed their competition by an average of 49%.

By utilizing economic profit, inventory can managed from an investment perspective by utilizing tools that consider important factors to consider when pursuing business on a global basis, including: income tax, cost of capital, labor cost, productivity, material cost, lead time, and order/transportation costs.

Examples:

The paper examines a product that currently costs an inland food distributor in the United States \$50. The labor content is 50% of the cost of the item. The distributor would like to compare supply from China, Poland, and Mexico.

Using labor rates from US Department of Labor (www.bls.gov/fls/) the cost of the item can be estimated, assuming that the cost of materials





and productivity rates remain the same. The distributor can estimate the ocean transit times from www.searates.com/container/transit/. Furthermore, the road transit times can be estimated from www.fedexfreight.fedex.com/transit.do. The end result is a comparison of prospective item costs and lead times.

The spreadsheet below outlines the opportunity. Note that the EOQ does not vary significantly as it is limited to changes in material cost in this case. EPQ, on the other hand weighs all the factors. The decision appears quite clear. Both a cost perspective and an economic perspective recommend the cost savings from China will outweigh the added lead time. This paper will now analyze the factors that can impact this decision when doing business globally.

Region	%RM	Cost of Capital	Order Cost	Cost of Storage	Tax	Total Material Cost	Lead Time	Price	EOQ	Cost Benefit	EPQ	EPSS	EP Benefit
US	50%	0.07	10	0.10	0.32	50.00	4	100	301	\$ -	411	309	\$ -
China	50%	0.07	10	0.19	0.32	25.70	24	100	419	\$ 1,270,880	774	1513	\$ 853,471
Poland	50%	0.07	10	0.16	0.32	31.57	15	100	378	\$ 964,658	610	974	\$ 648,293
Mexico	50%	0.07	10	0.18	0.32	27.89	6	100	403	\$ 1,160,864	483	424	\$ 781,913

Impact of Tax: The spreadsheet below compares the tax and cost of capital of a typical food distributor to that of a typical food processor. While EPQ and EPSS do change as a result of the change in tax rate, the point to highlight that the food processor gains more wealth as result of lower taxes.

Region	%RM	Cost of Capital	Order Cost	Cost of Storage	Tax	Total Material Cost	Lead Time	Price	EOQ	Cost Benefit	EPQ	EPSS	EP Benefit	
Changing Tax (industry)	US	50%	0.07	10	0.10	0.32	50.00	4	100	301	\$ -	411	309	\$ -
	China	50%	0.07	10	0.19	0.32	25.70	24	100	419	\$ 1,270,880	774	1513	\$ 853,471
	Poland	50%	0.07	10	0.16	0.32	31.57	15	100	378	\$ 964,658	610	974	\$ 648,293
	Mexico	50%	0.07	10	0.18	0.32	27.89	6	100	403	\$ 1,160,864	483	424	\$ 781,913
Changing Tax (processor)	US	50%	0.063	10	0.10	0.19	50.00	4	100	301	\$ -	369	317	\$ -
	China	50%	0.063	10	0.19	0.19	25.70	24	100	419	\$ 1,287,510	789	1507	\$ 1,018,964
	Poland	50%	0.063	10	0.16	0.19	31.57	15	100	378	\$ 964,658	627	968	\$ 774,388
	Mexico	50%	0.063	10	0.18	0.19	27.89	6	100	403	\$ 1,160,864	501	420	\$ 933,109





Impact of Labor Content: As the amount of labor content decreases or differences in productivity and or materials erode the different in cost, the differences between the candidate supplier countries erodes.

	Region	%RM	Cost of Capital	Order Cost	Cost of Storage	Tax	Total Material Cost	Lead Time	Price	EOQ	Cost Benefit	EPQ	EPSS	EP Benefit
Changing RM percent	US	75%	0.07	10	0.10	0.32	50.00	4	100	301	\$ -	411	309	\$ -
	China	75%	0.07	10	0.13	0.32	37.85	24	100	346	\$ 630,487	750	522	\$ 422,185
	Poland	75%	0.07	10	0.12	0.32	40.79	15	100	333	\$ 479,787	596	979	\$ 321,585
	Mexico	75%	0.07	10	0.13	0.32	38.94	6	100	341	\$ 580,022	466	428	\$ 390,829
	US	90%	0.07	10	0.10	0.32	50.00	4	100	301	\$ -	411	309	\$ -
	China	90%	0.07	10	0.11	0.32	45.14	24	100	316	\$ 246,249	738	1527	\$ 163,386
	Poland	90%	0.07	10	0.11	0.32	46.31	15	100	312	\$ 188,870	583	983	\$ 125,626
	Mexico	90%	0.07	10	0.11	0.32	45.58	6	100	315	\$ 231,511	149	432	\$ 155,580

Impact of changing order costs: As the amount of cost per order increases, the differences between the candidate supply countries diminishes.

	Region	%RM	Cost of Capital	Order Cost	Cost of Storage	Tax	Total Material Cost	Lead Time	Price	EOQ	Cost Benefit	EPQ	EPSS	EP Benefit
Changing Order Cost	US	75%	0.07	100	0.10	0.32	50.00	4	100	951	\$ -	1111	223	\$ -
	China	75%	0.07	100	0.13	0.32	37.85	24	100	1093	\$ 630,486	1458	1317	\$ 423,473
	Poland	75%	0.07	100	0.12	0.32	40.79	15	100	1053	\$ 479,787	1319	811	\$ 322,443
	Mexico	75%	0.07	100	0.13	0.32	38.94	6	100	1078	\$ 580,022	1199	323	\$ 390,997
	US	75%	0.07	15	0.20	0.32	50.00	8	100	301	\$ -	408	782	\$ -
	China	75%	0.07	15	0.26	0.32	37.85	48	100	346	\$ 622,658	1128	2991	\$ 359,590
	Poland	75%	0.07	15	0.25	0.32	40.79	30	100	333	\$ 476,172	768	1922	\$ 280,459
	Mexico	75%	0.07	15	0.26	0.32	38.94	12	100	341	\$ 581,006	436	835	\$ 357,789

Impact of cost of capital and cost of storage: In today's uncertain economic environment where capital is tough to obtain and in cases where the item requires special storage or the item is bulkier, the point can be reached where the cost benefits do not outweigh the inventory impact.

In fact, the point has been reached where a cost based approach is misleading. In the example, Mexico has an economic profit potential that is 20% greater than China.



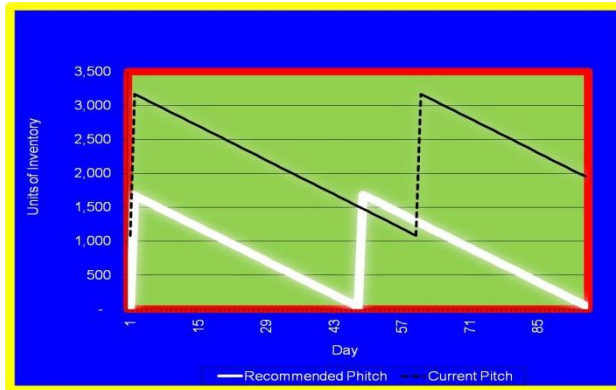


	Region	%RM	Cost of Capital	Order Cost	Cost of Storage	Tax	Total Material Cost	Lead Time	Price	EOQ	Cost Benefit	EPQ	EPSS	EP Benefit
Changing capital and storage cost	US	75%	0.2	15	0.20	0.32	50.00	16	100	301	\$ -	408	782	\$ -
	China	75%	0.2	15	0.26	0.32	37.85	96	100	346	\$ 622,658	1128	2991	\$ 359,590
	Poland	75%	0.2	15	0.25	0.32	40.79	60	100	333	\$ 476,172	768	1922	\$ 280,459
	Mexico	75%	0.2	15	0.26	0.32	38.94	24	100	341	\$ 581,006	436	835	\$ 357,789
	US	90%	0.2	15	0.20	0.32	50.00	16	100	301	\$ -	408	782	\$ -
	China	90%	0.2	15	0.22	0.32	45.14	96	100	316	\$ 233,181	1124	2992	\$ 119,181
	Poland	90%	0.2	15	0.22	0.32	46.31	60	100	312	\$ 181,212	763	1924	\$ 99,280
	Mexico	90%	0.2	15	0.22	0.32	45.58	24	100	315	\$ 229,000	428	838	\$ 142,383

In conclusion, today's method of using cost based approaches to determine how much to order and how much inventory to hold are not only capable of analyze the factors involved in making global supply chain decisions but they can lead to the wrong decisions.

How It Works: : Each enterprise exhibits a fundamental frequency or pitch relative to inventory level with time. This sound comprises the following: order size (amplitude), time between orders (wavelength), and inventory on hand (displacement).

In the example to the right, the enterprise is tuned to order smaller quantities more frequently at a lower base stock by using the Economic Profit Quantity (EPQ) and the Economic Profit Safety Stock (EPSS). The business is



making a sound that balances operational efficiency with and customer service.

ePhiphony's patent pending product suite, **Phitch**, works by pulling available information from existing ERP systems and maintaining a database of additional information to automatically maintain the





optimum inventory level (EPSS) and to order at the optimum order quantity (EPQ).

Phitch provides the following:

1. Process to automatically respond to changes in business conditions and tune.
2. Visibility of data and analysis to optimize business performance in a common language.
3. Performance based metric based on the maximizing the economic value created.
4. Organization to orchestrate the supply chain from a common performance based metric.
5. Technology platform to link day to day operations to a common strategic objective.

Call to Action:

Phitch includes a fully featured user interface which includes the capability to maintain Economic Profit Quantities (EPQ) and Economic Profit Safety Stocks (EPSS) as well as the tools required for on-going data analysis to track the benefits for continuous improvement.

ePhiphony can work with you to assess your current inventory and present the optimum inventory policies required to meet your financial and customer service objectives. Contact us for a free analysis and quote at www.ehiphony.com



How sound is your business?

Ask what **Phitch** can do for you?





Footnotes:

1. R. Shecterle, N. Viswanathan, and M. Spinks, The Supply Chain Executive's Strategic Agenda 2008: Managing Global Supply Chain Transformation, Aberdeen Group, January 2008.
2. V. Sadlovska and N, Viswanathan, Working Capital Optimization: Improving Performance with Innovations and New Technologies in Inventory Management and Supply Chain Finance , Aberdeen Group, June 2007.
3. D. Erlenkotter, "Ford Whitman Harris and the Economic Order Quantity Model", 38 Operations Research, 937 (1990).
4. E.A. Silver, D.F. Pyke, and R. Peterson, Inventory Management and Production Planning and Scheduling, Wiley (3rd ed. 1998).
5. G.B. Stewart, The Quest for Value, Collins (27th ed. 1991).
6. J.M. Stern, The EVA Challenge: Implementing Value-Added Change in an Organization, Wiley (2003).
7. N. Viswanathan, Technology Strategies for Closed Loop Inventory Management, Aberdeen Group, April 2008.
8. C. Jutras, The ERP in Manufacturing Benchmark Report, Aberdeen Group, August 2006.
9. C. Silberstein, Supply Chain Management Preparedness Survey: Report & Analysis, Microsoft, March 2006.
10. T. Murphy, 2007 Manufacturing and Wholesale Distribution National Survey, RSM McGladrey Inc., 2007.





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About the Author:

John Krech is the President and Founder of e**Phiphony** Incorporated and the inventor of **Phitch** (johnkrech@ephiphony.com). John is an acknowledged expert in the fields of Manufacturing, Lean Thinking, Six Sigma, Materials Management, and implementation of Inventory Management software. John is a graduate of the University of Minnesota Institute of Technology with B.A.s in Chemical Engineering and in Materials Science and Engineering. John also holds a MBA from the University of St. Thomas. John is a certified Six Sigma Black Belt and has worked with manufacturers all over the world for 20 years.

About **Phitch**:

Every business buys, produces, and sells goods at some rhythm. This fluctuation in the amount of inventory on-hand can be viewed as a fundamental frequency in sound or pitch. With each product or item within a business being a unique sound, the whole is brought together in a symphony that is orchestrated by management. **Phitch** permits today's leaders or maestros to conduct their inventory management with each instrument at its optimum sound from a financial investment perspective. **Phitch**, e**Phiphony**'s commercially released product suite was designed to provide "best in class" inventory investment management capabilities to Wholesalers/Distributors, Manufacturers, and Retailers to help their businesses grow. Inventory management, order management, supplier selection, and quantity discount optimization are just some of the advanced features that **Phitch** provides.

About e**Phiphony** Incorporated:

e**Phiphony** Incorporated is the developer and publisher of the patent pending inventory management solution suite **Phitch**. e**Phiphony** was founded in 2007 on global expertise in inventory and manufacturing management systems going back 20 years. Phi is referred to as the "golden ratio" and has been studied in mathematics, art, music, and in





nature. To **ePhiphony**, Phi represents the optimum amount of inventory from an investment perspective to maximize wealth (economic profit). Economic profit combines income statement and balance sheet performance. In other words, Phi represents the point at which the income statement and balance sheet ratios are maximized. **ePhiphony** truly is about revealing wealth that already exists and leveraging that wealth for continued growth.

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