DEVELOPING A FINANCIAL STATEMENT-BASED EFFECTIVENESS MEASURE OF INTERORGANIZATIONAL SYSTEMS' CONTRIBUTION

RONEN BAR-LEV
University of Haifa, The Academic College of Tel Aviv-Yaffo
Tel Aviv-Yaffo, 6108301, Israel

NITZA GERI
The Open University of Israel
Raanana 4353701, Israel

DAPHNE R. RABAN
University of Haifa
Haifa 3498838, Israel

ABSTRACT

Measuring the contribution of interorganizational systems (IOS) is challenging, and mainly based on subjective surveys. The purpose of this study is to objectively examine the effectiveness of IOS, through data from corporate financial statements. We developed a novel performance measure: an effectiveness ratio that reflects changes in average inventory level in comparison with change in annual sales. This measure reflects a certain aspect of improvement in supply chain management achieved by the evident developments of IOS, while considering external events that affected the companies. Two samples of American and Israeli companies were used for developing and empirically examining the suggested effectiveness ratio over 20 years (1993-2012). The results show considerable improvement as measured by the average effectiveness ratio of randomly selected American international companies in the cosmetics and toiletry products sector. However, the Israeli sample of food suppliers and importers, showed average marginal improvement, and major variance among the companies.

Keywords: measurement of interorganizational systems (IOS) effectiveness, financial statement analysis, supply chain management, longitudinal study, performance measurement, value creation.

INTRODUCTION

Measuring the value of intra-organizational information systems is challenging [26]. While it is possible to assess most of the direct and indirect financial investments in these systems, it is difficult to evaluate the direct, and even more so, the indirect, financial contribution arising from their use. Measuring the value of interorganizational systems (IOS) is even harder, because their contribution is not limited to one company [9], but is associated with inter-company workflow within the supply chain and, as a result, affects the value of more than one company. Since most companies are tied in supply chains and affect each other, their decision making processes depend on the decisions of the other partners in the supply chain. Because of this interdependency, it is important to measure the contribution of IOS to value creation.

Most studies conducted on the contribution of IOS to date, such as Dedrick and Kraemer [4] and Yao et al. [36], used questionnaires and interviews as their major research tool. Those tools elicit the subjective opinions of the participants. We try to evaluate the contribution of IOS to a company's economic value by using a relatively objective source of data: the annual financial reports. These reports enable the examination of historical data over time, in order to assess relatively objective the contribution

of IOS, while taking into account the problems involved in preparing objective financial statements. Profit is influenced by intangible assets held by the company (i.e. goodwill), and by non-operational factors (i.e. tax rate). Notwithstanding, the present research offers a quantitative operational measure.

We suggest that three major operational factors take part in the supply chain affecting the profitability and, consequently, the economic value of the partners in this process. The factors involved are: the ability to give credit to customers and to collect the debt, the level of inventory at any given moment, and the willingness of suppliers to extend credit. Of these three factors, companies can relatively easily control the average level of inventory. Average inventory level is partly an economic decision and partly a strategic one, based, in part, on the cost of inventory to the company (e.g., holding, storage, and obsolescence) [6].

Due to the lack of means for direct measurement of IOS contribution to value creation, we propose an indirect measure as an indication of the contribution of IOS. This new measure, which we call the effectiveness ratio, involves two factors that are strongly connected over time: sales volume and inventory levels. Sales volume influences the level of activity of any given company in the supply chain and thus, is one of the most influential factors on the average inventory levels. However, we suggest that the level of inventory over time is modified by the use of IOS and that this modification affects most of the companies regardless of their area of activity. We propose that this connection characterizes business sectors rather than specific firms. We developed a novel effectiveness ratio, which expresses the effectiveness of a specific company by tying the changes in sales over the years with the changes in the average inventory level.

In the following, we combine approaches for measuring the value of IOS and financial measures of efficiency.

THEORETICAL BACKGROUND

The Information Systems Value Perspective

Interorganizational systems are electronic linkages between trading partners, which may predominantly enhance collaboration between members of supply chains [24, p. 18]. Over the years, the need to reduce costs due to the intense competition among companies has increased the importance of IOS as a factor that can lead to improved competitiveness [9, 14, 19, 33].

Assessment of the contribution of IOS is important from a financial standpoint, first and foremost, to decide on further investments in these systems. Geri and Geri [10] emphasized

the difficulty to assess the economic profitability and value of investment in information systems based on two main reasons: first, many of the costs are intangible and cannot be quantified using financial terms, and second, this investment involves considerable uncertainty. However, in the absence of economic evaluation, managements will not agree to invest in such systems. Raban [26] argued that the value of information is in the eyes of the beholder. It is user-centered and therefore it is dynamic: the value of information perceived by the user may change with changing market or social influences. It may change over time or due to the accumulation of experience. The three main approaches to measuring the value of information are: normative value (theoretic and based on mathematical models that define ex-ante the best course of action), real value (empirical, quantitative, and objective measures) and perceived value (also referred to as subjective value) [11]. Geri at al. [11] observed that perceived value is the most common in empirical research literature, since it may be easier to measure.

The Supply Chain Management Perspective

The concept of supply chain has evolved from a term that referred to the integration of internal functions within a firm (i.e., purchasing, manufacturing, sales, and distribution) [5], to a concept that expanded to include 'upstream production chains' and 'downstream distribution channels', beyond the boundaries of a single firm. These interorganizational interactions, were called supply chain management (SCM), and were critically supported by IOS, which enabled SCM partners to run cost-effective operations while providing fast response to diverse customer demands [20].

The next stage in the evolution of SCM was competition among supply chains rather than competition among the single companies within a certain supply chain [6]. Accordingly, the purpose of an SCM was regarded as improving the performance of all its members, and not just selected firms within the chain [27]. The SCM concept has been applied to all sorts industries, and it involves diverse services, such as aviation and financial services. Furthermore, their management has evolved to encompass current issues, including: supply chain risk management [34, 35], and green supply chain management [31, 32].

In a literature review of published research during 1992-2011, Osborn and Nault [25] demonstrated the significant impact of SCM problems on profitability of all members of a given supply chain. These problems were classified into three main categories, with some related to more than one category: material flow problems (i.e., delays, demand fluctuations, excess/unused resources, insufficient resources, long tail, and pricing); information flow problems (i.e., delays, excess/unused resources, inaccuracy, insufficient resources, and security); and relationships problems (i.e., conflict, excess/unused resources, insufficient resources, and pricing). Effective use of IOS may solve or at least reduce some of the unfavorable consequences of these problems.

Inventory holding costs are influenced by the time needed to turn raw materials into finished goods, and to sell them to customers. Inventory holding costs include the cost of capital required for purchasing raw materials and of the activities in the production process, as well as storage costs, insurance, and spoilage. Firms should strive to have low levels of inventory, in order to reduce inventory holding costs, as well as to avoid other negative consequences of having high levels of work-in-process inventory.

Another major issue related to inventory management is inventory obsolescence, meaning losses that are caused by the inability of a firm to use obsolete inventories, either as raw materials or saleable products, as well as the costs associated with depreciated-value products [6]. Inventory obsolescence is relevant to any industry, such as perishable products, or clothing, and may even be relevant for service organizations. Unoccupied seats on a flight after take-off are also considered as obsolete inventory [12]. Information sharing across entities in the supply chain can minimize obsolete inventory costs.

Information systems carry paramount importance for SCM. A study of 227 firms in Korea showed that that the quality of shared information between the SCM partners positively affected the chain's operational performance, as well as the overall performance of the involved firms [15]. However, information sharing in a multi-level supply chain is far from obvious, since the partners may have varying levels of incentives to share their information [8].

Different types of information can be shared within a supply chain, including logistics, business processes, strategies, and tactics. Partners like to share inventory information the most [21]. Sharing inventory information decreases out-of-stock situations and stock surplus. It also reduces the total stock level and inventory holding cost, allowing more accurate forecasts and decisions to be made. Sales data sharing can eliminate orders of unnecessary products, represent accurate customer demand, and decrease the loss caused by shortage of products. There are certain barriers to sharing information within a supply chain, among which are confidentiality of the information shared, incentive issues, reliability, costs of the required information technology, anti-trust regulations, timeliness and accuracy of shared information, and finally the development of capabilities that allow companies to utilize the shared information in an effective manner [21].

The Financial Statement Analysis Perspective

Financial statement data are rarely used for measuring the value of information systems. Galy and Sauceda [7] employed an econometric analysis, and combined financial data and subjective data collected by a survey, for evaluating the impact of an ERP implementation. The major strength of financial statement data is their relative objectivity, and their auditing by external certified public accountants. However, Revsine [28, p.137] used the phrase "selective financial misrepresentation" for describing deliberate faulty financial reporting. He argued that these misrepresentations enable managers to supposedly achieve their bonus goals, and shareholders may benefit from unjustified higher share prices, while auditors avoid confrontation with their clients. Revsine [28] further claimed that extreme incidents such as the Enron scandal, caused, in part, by lack of auditors' independence [23], were inevitable in the financial reporting environment that existed at that time.

Nevertheless, efforts are constantly made by regulatory and other agencies to improve the quality of financial reporting, and decrease the risk of misconduct. Bushman and Smith [3] used the classic agency perspective, and suggested that corporate managers had an inherent conflict of interest with outside investors, as well as other parties that have any kind of relationships with the firm, such as customers and suppliers. They defined "corporate control mechanisms" [3, p.238] as the means by which managers are disciplined to act in the investors' interest. From the perspective of shareholders and creditors of the company, financial accounting systems provide direct input to corporate control mechanisms. Therefore, financial statement data can serve as an adequate source of information, for evaluating corporate performance.

Managerial accounting is the domain within accounting that focuses on performance measurement. The drawbacks of traditional methods of managerial accounting have been widely studied for over three decades [12, 16]. This study follows the Theory of Constraints (TOC) approach [10, 13, 22, 30], and relies on two of its main performance measures: throughput, and inventory, for evaluating the contribution of IOS to value creation.

Since the study is based on available external financial data, sales are used as a proxy for throughput, and the inventory data set includes conversion costs, as per generally accepted accounting principles.

Research Question

Tying together the three perspectives: the value of information systems, supply chain management, and financial statement analysis, we offer the following research question: To what extent do interorganizational systems contribute to the management of inventory levels of companies and thus lead to an increase in the economic value created by the company? If interorganizational information systems are effective and improve supply chain management, it should be reflected over time, in lower inventory levels with respect to sales.

METHODOLOGY

The study was performed using secondary data analysis from public companies' annual financial reports. Annual financial reports are audited by accountants, so the information presents a fair reflection of the company's financial condition and therefore can be relied upon. The financial reports used for this study are the balance sheet, which contains data of inventory levels, and the profit and loss report, which contains the annual sales.

Longitudinal data analysis was performed in order to identify changes in the examined variables, as further explained later, for the period 1993-2012, especially considering the rapid development of interorganizational information systems during this period.

The generic data in monetary terms for each year included:
- Inventory level at the end of the year as reported in the balance sheet
- Sales volume data that was obtained from the profit and loss report

The average inventory level for each year was calculated as the mean of the starting and ending inventory per year. Average inventory levels reflect changes in inventory during the year and reduce the effect of an occasional exceptional inventory level change at the end of a specific year (e.g., because of a business opportunity to buy raw materials at an attractively low cost).

For every year, two indices were calculated, as follows: sales index and average inventory level index ("average Inventory Index"). The "base year" was 1993, which is the year in which the internet was opened for public and commercial use [17], and therefore represents a turning point in the evolution of IOS. For every year thereafter, the indices were calculated compared to the base year. For example, a sales index of 1.2 in any given year reflects an improvement of 20% in sales volume during that year, compared to 1993.

We propose that the efficiency of a company in terms of inventory levels can be expressed mainly in relation to sales and in this manner reflect the economic and financial performance of the company. Using a ratio

enables to neutralize the effects of economic and financial factors like changes in the value of money, changes in exchange rates, and different accounting measurement methods.

The proposed measure represents the ability of a specific company to be efficient in its inventory management considering changes in the level of sales. For each year we calculated a ratio between the two indices. This ratio, called the "effectiveness ratio", was calculated as a ratio between the two aforementioned indices through dividing the sales index by the average inventory level index. The ratio itself is presented as an index with 1993 as the base year. This choice enabled us to examine a period of 20 years. For 1993, each of the first two indices was defined as 1, so the ratio between them, which is shown as an index, is also 1. Generally, an effectiveness ratio that is larger than one in a given year indicates that the company has achieved some degree of efficiency compared to the base year. This measure disregards external factors, such as unexpected recession, that may affect sales levels. Figures 1 and 4 show a comparison of the effectiveness ratio between two companies, and figures 2-3 show the changes in the two basic indices as well as in the effectiveness ratio for each company. Further explanations are provided in the Results section.

In addition to examining the change of the three measures (i.e., sales index, inventory index, and effectiveness ratio) over the years, we compared their values in 2012 relative to 1993. This examination attempted to neutralize random changes, like the deterioration in the indices after the 2008 financial crisis.

Subsequently, to counteract changes in any specific company within a specific industry, the analysis was done in terms of what we defined as an "industry weighted average", which takes into account the volume of sales of each company as a measure of its share in the relevant industry. This allowed to examine the total efficiency of a specific industry, taking into consideration the size of companies included in the sample (e.g., one company dominates the industry and improved by 20%, while the others are smaller and managed, for some reasons, to improve their effectiveness by 0%-10%). We suggest that the industry structure reflects the level of competition in the specific industry and, in turn, might reflect the degree of investment in improving the efficiency of the companies, considering other factors like bargaining power of customers [29].

To examine the validity of the calculated measure, we conducted a study of Israeli food supply companies, and of international companies, which are traded in the U.S. and are part of household and personal products industry according to the North American Industry Classification System (NAICS) code No. 3256 of the Federal Statistical Agencies. We assume

TABLE 1. Indices of Food Manufacturers and Importers in 2012

Company	Sales (thousands of NIS*)	Percentage of total (%)	Sales Index 2012 (%)	Inventory Index 2012 (%)	Effectiveness Ratio (%)
Strauss Group Ltd.	8,182,000	46.7	563	437	129
Osem Investments Ltd.	4,091,593	23.3	674	678	99
Neto M.E Holdings Ltd.	2,048,008	11.7	1,074	1,329	81
Tempo Beverages Ltd.	1,066,672	6.1	326	559	58
Shemen Industries Ltd.	703,236	4.0	202	248	81
Frutarom Ltd.	618,001	3.6	2,078	1,426	146
Maabarot Products Ltd.	385,465	2.2	433	534	81
Willy-Food Investments Ltd.	286,827	1.6	568	985	58
Barkan Wineries Ltd.	146,301	0.8	502	643	78
Total sales	17,528,103	100%			
Weighted average			670%	621%	108%

* The average value of the Israeli shekel (NIS) in 2012 was 3.86 NIS for 1 USD; hence the total sales volume of the sample is about 4.6 Billion USD

that, although each group is small (nine Israeli companies and eight U.S. traded companies), the differences in the features of the companies (both industry and economic differences) allow an examination of the effectiveness ratio, and the factors that may affect it.

RESULTS

A Study of Israeli Food Manufacturers and Importers

The relevant data of nine Israeli food supply companies were collected from their publicly-available annual financial statements. Table 1 summarizes the values of the three indices in 2012 for each company.

The average weighted effectiveness ratio was 108%, indicating that an 8% improvement occurred during the examined period. This ratio expresses a growth in the weighted average sales during the examined period by 6.7 times relative to 1993, whereas the average inventory level grew 6.2 times at the same period. Yet, there are differences in the effectiveness ratio among companies with similar activities in the food industry. Figure 1 depicts the differences in effectiveness ratio between "Strauss group" and "Osem Investments", which is a majority owned by Nestlé S.A. of Switzerland.

According to Figure 1, despite the similarity in their areas of operation, during most of the years the difference in the effectiveness ratio of the two companies was in favor of "Strauss Group".

Figures 2 and 3 demonstrate the development in the effectiveness ratio in these companies during the examined years, by presenting the changes in the three indices.

Figure 2 shows that both the sales index and the inventory index had increased, but the improvement in the sales index was greater than the increase in the inventory index. Thus, Strauss group achieved a total improvement in the effectiveness ratio. The difference between the indices began in 2004, following a major merger, and remained almost similar until 2012.

Figure 3 shows that both the sales index and the inventory index of Osem grew, but their growth was mostly in similar rates, except for differences in the two indices during 2001-2007.

A Study of American and International Cosmetics and Other Toiletry Products

The relevant data of eight American and international household and personal products industry were collected as explained above. Table 2 summarizes the values of the three indices in 2012, for each company.

Figure 4 shows prominent differences in the effectiveness ratio of Colgate Palmolive

and Avon Products, two quite similar companies, in terms of product types. Both are American international companies that manufacture and distribute consumer products. Colgate Palmolive provides household, health care, and personal products that are sold primarily through retail stores, while Avon produces beauty,
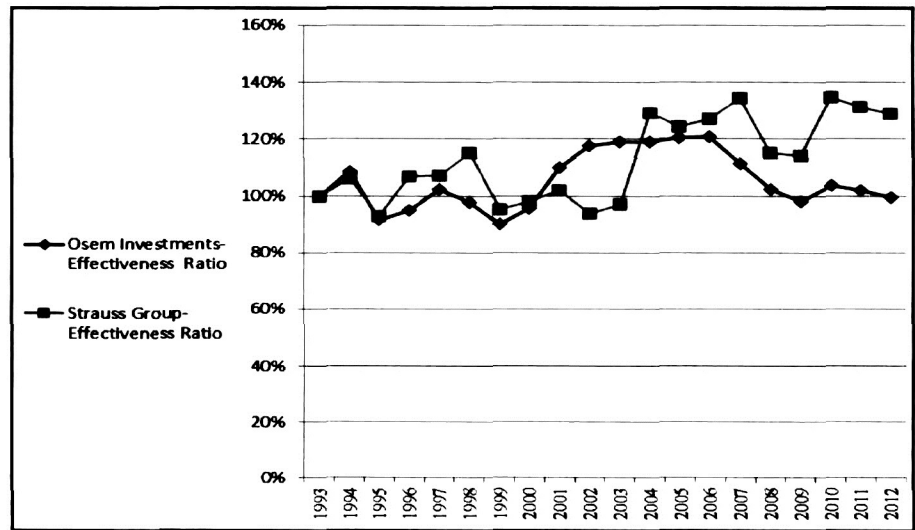

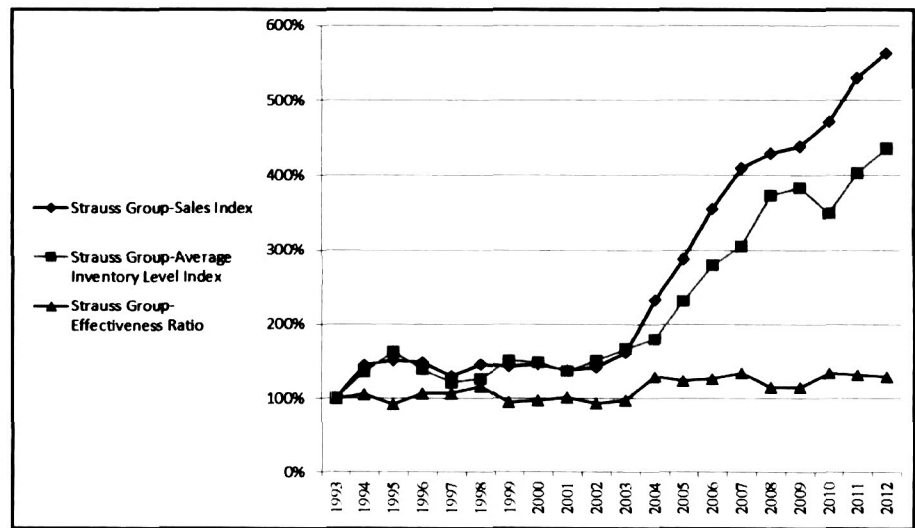**FIGURE 1. Osem and Strauss Effectiveness indices 1993-2012**
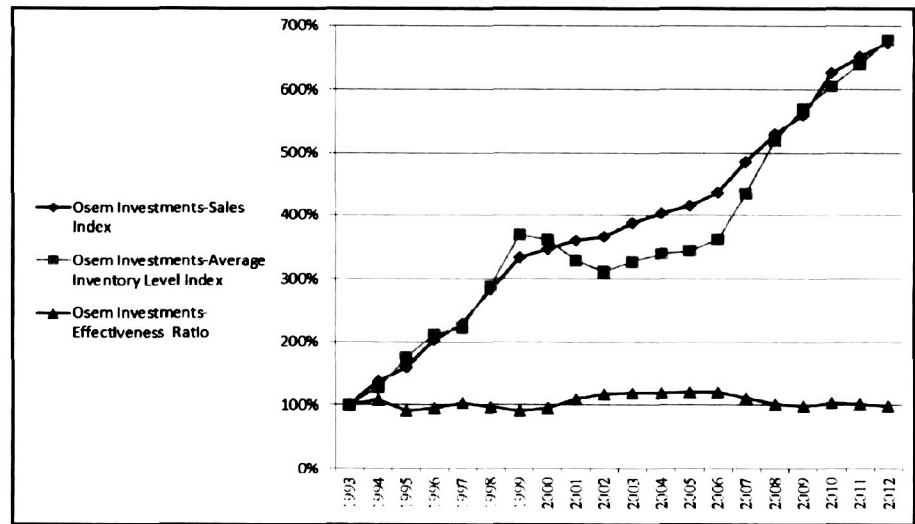

FIGURE 2. Strauss Indices

FIGURE 3. Osem Indices

TABLE 2. Indices of Cosmetics and Other Toiletry Products in 2012

Company	Sales (M$)	Percentage of total (%)	Sales Index (%)	Average Inventory index (%)	Effectiveness Ratio (%)
Procter & Gamble Co.	83,680	64.5	275	227	121
Colgate Palmolive Co.	17,085	13.1	239	196	122
Avon Products Inc.	10,546	8.1	263	325	81
Estee Lauder companies Inc.	9,714	7.5	397	256	155
Clorox Co.	5,468	4.2	335	362	93
Revlon Inc.	1,426	1.1	82	42	197
Elizabeth Arden Inc.	1,238	1.0	2,686	1,273	211
Inter Parfums Inc.	654	0.5	1,099	974	113
Total sales	**129,811**	**100%**			
Weighted Average			**437%**	**329%**	**133%**

FIGURE 4. Colgate Palmolive and Avon Products Effectiveness Indices 1993-2012
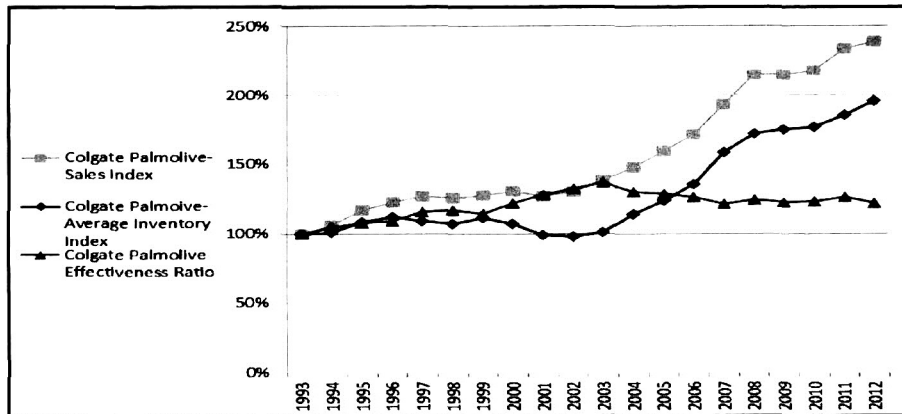
FIGURE 5. Colgate Palmolive Indices 1993-2012

FIGURE 6. Avon Indices 1993-2012

household, and personal care products, which are mainly distributed door-to-door by its special sales force [18]. *Despite the difference* in their business model, the products of these two companies are similar in terms of their inventory management characteristics. Most items are small, personal care products, must c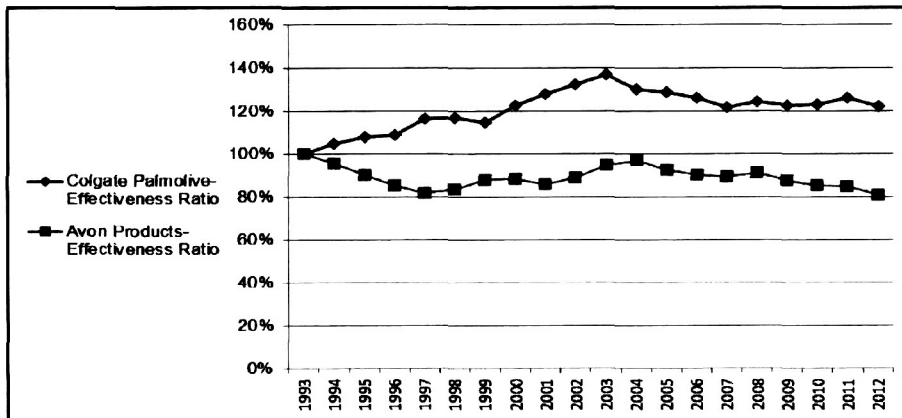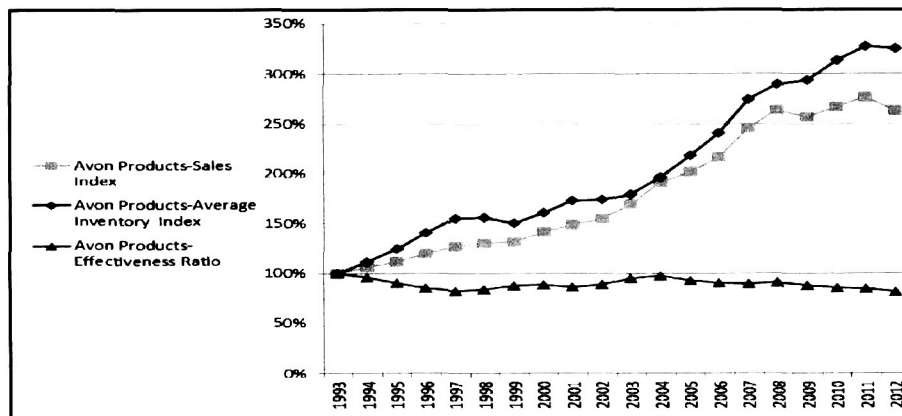omply with similar relevant regulations, and have a *limited shelf-life of several months* (e.g., tooth pastes and lipsticks).

Figures 5 and 6 demonstrate the development in the effectiveness ratio of these companies during the examined years, by presenting the changes in the three indices.

Figures 5 and 6 indicate that in each company the two generic indices developed in a similar manner and yet a different range of effectiveness ratio was created: in Colgate Palmolive the range was 100%-137% and in Avon, 81%-100%.

Figure 7 demonstrates the changes in the three indices of Clorox and displays a different pattern of the indices compared to those presented in Figures 2, 3, 5, and 6. The most prominent observation is the drop in the effectiveness ratio in 2000-2001 due to a sharp increase in average inventory. However, already in 2002, the company adjusted the average inventory to the sales level and kept the gaps between the two indices relatively stable.

DISCUSSION

Implications for Theory and Practice

This study developed an index for measuring the effectiveness obtained by the introduction and the widespread adoption of interorganizational information systems over the past 25 years. The effectiveness ratio is based on the ratio between the average inventory index and the sales index. Effectiveness was measured per company and also per industry sector, and the sample included leading companies of the examined sectors. Our findings suggest that the weighted average effectiveness ratio (i.e., the aggregate measure of the sector) is influenced by the type of industry and the economic environment. This means that prior to examination of a specific index, the characteristics, as well as changes in the economic environment during the examined period, should be studied. Moreover, since the economic environment is not isolated, one has to examine other related environments, like regulatory changes.
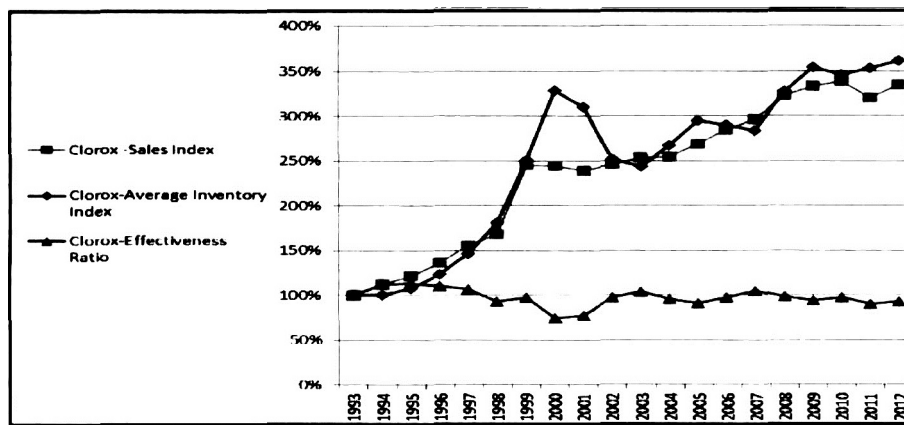
FIGURE 7. Clorox Indices 1993-2012

The divergences among firms located in different geo-economic environments, are demonstrated in the Results section. On the one hand, the Israeli food industry, a very centralized and small in scale with geopolitical entry barriers, and on the other hand, large-scale, North American based companies operating in an international market.

In any industry, there may be substantial differences in the effectiveness ratio between companies. First, variance in corporate size affects relative bargaining power [1, 9], and therefore may affect the effectiveness ratio. It requires a detailed examination of changes in one or more companies in order to understand what other factors, besides size, influence these differences. Notwithstanding, a significant difference might be observed in very similar companies in terms of activity or size, which raises the issue of internal differences among companies, such as strategy differences (e.g., cost-leadership versus differentiation) that affect the level of inventory.

Just examining the change in the suggested effectiveness ratio, which measures one of the aspects of effectiveness, is not enough. In order to understand the nature of differences among firms and industries, an examination of the changes in the two generic indices (sales index and average inventory level index) throughout the years is needed. The reason is that changes of those indices or even only one of them can provide valuable information about the impact of external changes, like economic or regulatory changes, on the individual company and its ability to adapt to change, which may affect not just that particular company but other participants in its supply chain, as well.

Further longitudinal examination of the three measures can shed light on some of the decision making processes and their internal impact on the company. For example, the effectiveness ratio of Revlon Inc. decreased from an average of 1.31 during the years 2001-2004 to 1.1 and 1.02 in 2005-2006, respectively. During 2007, the company implemented several restructuring plans designed to reduce costs and improve the company's operating profit margins, including consolidation of facilities and certain functions. The result was an improvement in effectiveness ratio as early as in 2007 to 1.21, mainly because of a sharp decrease in average inventory level that year. This positive trend continued through 2012, and may be attributed, in part, to adoption of Radio Frequency Identification (RFID) technology [2], as reflected in an effectiveness ratio, which rose up to 1.97, as shown in Table 2.

The two samples presented here may characterize two different aspects of the answer to the research question, regarding the effect of IOS on economic value creation at the single company level. On one hand, as shown in the Israeli sample (Table 1), the size of a company may have a strong positive impact on the effectiveness ratio, probably because size is usually an antecedent of increased industrial competitive strength [1, 9].

Together with the contribution of IOS to reduction in inventory levels, our sample demonstrated that companies such as Strauss (Table 1, and Figures 1, 2) have improved their effectiveness ratio while increasing their sales, which is a position that any company strives to achieve. On the other hand, the American sample (Table 2) may suggest a certain level of standardization in information systems and in work processes, which is expressed in the increased level of effectiveness achieved by six out of the examined eight companies (75%) over a period of 20 years. The answer to the research question is complex, and we expect that continuing research will shed light on this important issue.

Limitations and Further Research

This study was limited to 17 companies because we performed an in-depth analysis of each company over a period of 20 years in order to gain the insights that have led to the development of the effectiveness ratio. The Discussion section suggested several other factors, such as company size, economic environment, and industry entry barriers, which may affect the effectiveness ratio. Further research with larger and more diverse samples is needed for corroborating the present findings, and for identifying major factors that influence the effectiveness ratio.

The sample included only public companies, because the information about them is accessible. Therefore, the sample may not fully represent the entire relevant industry.

In order to evaluate the contribution of interorganizational information systems to value creation, there is a need to consider the volume of investments in these systems. However, information related to investments in information systems in organizations, as presented in the financial statements, is rare and does not distinguish between intra-organizational and interorganizational systems.

The balance sheet refers to a particular day (usually December 31). This means that companies may manipulate some of the data to their needs. For example, deliberately showing low inventory quantities to hide operational problems. This brings a total inventory at the end of the year that does not reflect economic reality. As a result, the suggested effectiveness ratio, which is based on inventory turnover data, would not reflect the contribution of information systems, and particularly IOS, to that firm's economic value. One possible solution to sporadic distortions at the single firm level is to compare a number of companies in the same industry and to counteract such biases, as done in this paper.

Another possible problem is the difficulty and even inability to measure the examined variables separately for sectors or other material sub-activities of firms. This is due to lack of sufficiently detailed data in the balance sheet and its notes. It should be noted that, despite the level of detail in the reports, much operational data is not listed, for competitive reasons.

This study examined an operational ratio that may change due to unfavorable economic or strategic conditions, such as the economic crisis of 2008. The way to deal with this problem, at least to some extent, is to study the characteristics of the industry examined, before calculating the required data for the analysis, thus, taking into consideration the possible impact of major intervening variables.

CONCLUSIONS

This study attempted to define indices that would enable to

assess the contribution of IOS to the economic value of companies. Most of the studies concerning this issue used subjective tools that were based on the opinions of the participants. We tried to provide an objective answer through data of financial reports, which contain quantitative audited information. Two out of the three measures used in this study are based on data derived directly from the financial reports (sales and average inventory level). The sales and inventory indices were the basis for the third measure that was developed in this study: the effectiveness ratio. We suggest the effectiveness ratio may represent the performance of companies in improving their inventory management, while considering external factors that influence their sales volume, like economic crises or mergers of customers. Furthermore, this longitudinal study has provided a novel important measure that may enable to evaluate the effectiveness of interorganizational systems over time.

REFERENCES

[1] Adegbesan, J.A. and Higgins, M.J. "The intra-alliance division of value created through collaboration," *Strategic Management Journal* (32:2), 2011, 187-211.

[2] Attaran, M. "Critical success factors and challenges of implementing RFID in supply chain management," *Journal of Supply Chain and Operations Management* (10:1), 2012, 144-167.

[3] Bushman, R.M. and Smith, A.J. "Financial accounting information and corporate governance," *Journal of Accounting and Economics* (32:1-3), 2001, 237–333.

[4] Dedrick, J. and Kraemer, K.L. "Impacts of internal and interorganizational information systems on the outsourcing of manufacturing," *Journal of Strategic Information Systems* (19:2), 2010, 78–95.

[5] Dubois A., Hulthen, K. and Pedersen, A.C. "Supply chains and interdependence: A theoretical analysis," *Journal of Purchasing & Supply Management* (10:1), 2004, 3-9.

[6] Elrod, C., Murray, S. and Bande, S. "A review of performance metrics for supply chain management," *Engineering Management Journal* (25:3), 2013, 39-50.

[7] Galy, E. and Sauceda, M.J. "Post-implementation practices of ERP systems and their relationship to financial performance," *Information & Management* (51:3), 2014, 310-319.

[8] Ganesh, M., Raghunathan, S. and Rajendran, C. "The value of information sharing in a multi-product, multi-level supply chain: Impact of product substitution, demand correlation, and partial information sharing," *Decision Support Systems* (58:1), 2014, 79-94.

[9] Geri, N. and Ahituv, N. "A Theory of Constraints approach to interorganizational systems implementation," *Information Systems and e-Business Management* (6:4), 2008, 341-360.

[10] Geri, N. and Geri, Y. "The information age measurement paradox: Collecting too much data," *Informing Science* (14), 2011, 47-59.

[11] Geri, N., Neumann, S., Schocken, R. and Tobin, Y. "An attention economy perspective on the effectiveness of incomplete information," *Informing Science* (11), 2008, 1-15.

[12] Geri, N. and Ronen, B. Relevance lost: The rise and fall of activity-based costing. *Human Systems Management* (24:2), 2005, 133-144.

[13] Goldratt, E.M. and Cox, J. *The goal: A process of ongoing improvement*, North River Press, Croton-on-Hudson, New York, 1986.

[14] Gunasekaran, A., Lai, K.H. and Cheng, T.C. E. "Responsive supply chain: A competitive strategy in a networked economy," *Omega* (36:4), 2008, 549-564.

[15] Hartono, E., Li, X., Na, K.S. and Simpson, J.T. "The role of the quality of shared information in interorganizational systems use," *International Journal of Information Management* (30:5), 2010, 399–407.

[16] Johnson, H.T. and Kaplan, R. S. *Relevance lost: The rise and fall of management accounting*, Harvard Business School Press, Boston, Massachusetts, 1987.

[17] Klotz, R.J. *The politics of Internet communication*, Rowman & Littlefield, Lanham, Maryland, 2004.

[18] Kumar, S. "Exploratory analysis of global cosmetic industry: Major players, technology and market trends," *Technovation* (25:11), 2005, 1263-1272.

[19] Li, S., Ragu-Nathan, B., Ragu-Nathan, T.S. and Rao, S.S. "The impact of supply chain management practices on competitive advantage and organizational performance," *Omega* (34:2), 2006, 107-124.

[20] Lin, C.C. and Wang, T.H. "Build-to-order supply chain network design under supply and demand uncertainties," *Transportation Research Part B : Methodological* (45:8), 2011, pp. 1162–1176.

[21] Lotfi, Z., Mukhtar, M., Sahran, S. and Zadeh, A.T. "information sharing in supply chain management," *Procedia Technology* (11), 2013, 298-304.

[22] Mabin, V.J. and Balderstone, S.J. *The world of the Theory of Constraints: A review of the international literature*, St. Lucie Press, Boca Raton, Florida, 2000.

[23] Nagy, A.L. "Mandatory audit firm turnover, financial reporting quality, and client bargaining power: The case of Arthur Andersen," *Accounting Horizons* (19:2), 2005, 51-68.

[24] Madlberger, M. "What drives firms to engage in interorganizational information sharing in supply chain management?," *International Journal of e-Collaboration* (5:2), 2009, 18-42.

[25] Osborn B.E. and Nault, B.R. "A classification of supply chain problems". *Engineering Management Research* (1:2), 2012, 1-15.

[26] Raban, D.R. "User-centered evaluation of information: A research challenge," *Internet Research* (17:3), 2007, 306-322.

[27] Rajaguru, R. and Matanda, M.J. "Effects of inter-organizational compatibility on supply chain capabilities: Exploring the mediating role of inter-organizational information systems (IOIS) integration," *Industrial Marketing Management* (42:4), 2013, 620-632.

[28] Revsine, L. "Enron: sad but inevitable," *Journal of Accounting and Public Policy* (21:2), 2002, 137–145.

[29] Rivard, S., Raymond, L. and Verreault, D. "Resource-based view and competitive strategy: An integrated model of the contribution of information technology to firm performance," *The Journal of Strategic Information Systems* (15:1), 2006, 29-50.

[30] Ronen, B. (Ed.) *The Theory of Constraints: Practice and research*, IOS Press, Amsterdam, Netherlands, 2005.

[31] Sarkis, J. "A boundaries and flows perspective of green supply chain management," *Supply Chain Management: An International Journal* (17:2), 2012, 202-216.

[32] Srivastava, S.K. "Green supply-chain management: A state-of-the-art literature review," *International journal of management reviews* (9:1), 2007, 53-80.

[33] Subramani, M. "How do suppliers benefit from information technology use in supply chain relationships?," *MIS Quarterly* (28:1), 2004, 45-73.

[34] Tang, C.S. "Perspectives in supply chain risk management," *International Journal of Production Economics* (103:2), 2006, 451-488.

[35] Thun, J.H. and Hoenig, D. "An empirical analysis of supply

chain risk management in the German automotive industry," *International Journal of Production Economics* (131:1), 2011, 242-249.

[36] Yao, Y., Palmer, J. and Dresner, M. "An interorganizational perspective on the use of electronically-enabled supply chains," *Decision Support Systems* (43:3), 2007, 884–896.