Investigating the Impact of Supply Chain Practices on the Financial Performance of Active Firms in Egyptian stock Market

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***Abstract*--- Managing supply chain is one of the big tasks for enterprises with sustaining the competitive advantages that reflected in their bottom-line financial figures. Therefore, this research aims at exploring the impact of supply chain practices i.e. supply chain integration, complexity management, aligning strategy and supply chain, IT with process improvement, and operational innovation on the financial performance i.e. Return on Assets (ROA) and Return of Equity (ROE) of different manufacturing companies in the Egyptian market. Qualitative and quantitative approaches have been followed to use theories and literature to cover the supply chain concepts and practices in order to test it empirically. In addition, research data was collected from 98 managers who are representing 14 manufacturing companies, which are registered in the market of Egypt Stock Exchange from the year 2005 to 2010. In addition, secondary data on financial performance of the participated companies were obtained from their websites and/or other publications. Research findings indicate a strong relationship between supply chain practices and bottom-line profits of an organization. In addition, the supply chain managers decrease the use of large fixed assets such as plants, warehouses and transportation vehicles in the supply chain. This research fills the gap in the literature of the developing countries specifically Egypt regarding supply chain practices and their relationship with financial performance. Therefore results yield useful insights to both academics, and corporate practitioners about the importance of synthesizing supply chain with financial performance.**

***Keywords*---** Supply Chain Practices, Financial Performance, Active Listed Firms, Developing Countries, Egypt.

1. Introduction

Companies can no longer focus only on optimizing their own operations to the exclusion of their suppliers and customers' operations. Financial performance reflects the effectiveness of supply chain systems. Measuring the financial performance can facilitate a greater understanding of the supply chain and improve its overall performance [27]. Therefore, companies have understood that for competing in continuously changing environment, it is necessary to monitor and understand firm performances. Measurement has been recognized as a crucial element to improve business performance [44] and [30]. Moreover, business organizations need to capitalize on Supply Chain (SC) capabilities and resources to bring products and services to the market faster, at the lowest possible cost, with the appropriate product and service features and the best overall value [18]. Interest on performance measurement has notably increased in the last 20 years [44]. Various performance metrics are in place for measuring effectiveness of SC. Different perspectives of Supply Chain Performance Measures (SCPM) are cost and non-cost perspective; strategic, tactical or operational focus [18], business process perspective and financial perspective [6]. Moreover, logistics and supply chain are consisted of the flow of materials and products to customers and in the supply side of spare parts and return of defective products. In other words, supply chain consisted of upstream or supply side; downstream or customer side while the company is in the middle [23]. The aim of logistics is to give competitive advantage to company and increase the performance. Therefore, by developing an understanding of the impact of supply chain practices on performance, firms will be better off by building and taking into consideration such practices and to have their own models for supply chain excellence. Therefore, by using a financial performance measure (i.e., Return on Assets, ROA) as an outcome of supply chain practices adoption – as we do in this research –managers who are more familiar with such measures than with subjective perceptual performance measures will understand the benefits of adopting such kind of practices. Relating supply chain practices to ROA and other financial measures will result in a higher impact on

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changing their current applications. Therefore, the aim of this study is to investigate the relationship between supply chain practices and financial performance and whether the application of suitable supply chain practices will positively influence the financial performance of the most active listed companies working in Egypt. This research reviews the literature of three main areas; supply chain practices, financial performance and the status of manufacturers' business environment in Egypt to support the research hypotheses. Almost very limited research has been conducted to examine this relationship between supply chain practices and financial performance in the Middle East and specifically in Egypt. Then, the research methodology introduces the measures used, and describes the sample of the questionnaire. In addition to assess the reliability and validity of the measures and followed by regression analyses. Then, the research presents the results and provides theoretical and managerial implications. Finally, the research concludes with limitations and suggestions for future research.

2. Background Literature

The major supply chains practices which are directly linked to the companies' performance is a significant starting point for this research's main argument that the supply chain practices would be positively related to financial performance of the Egyptian companies. Therefore, it will briefly discuss supply chain practices, financial performance and the status of manufacturers' business environment in Egypt.

2.1 Supply Chain Practices and Performance

As a discipline supply chain management first appeared in the literature in the mid-1980s [10]. Ref. [9] stated that it is based upon fundamental assumptions emanating from managing organizational operations, which in turn can be traced back to channels and systems integration. Ref. [21] highlighted that the practice of supply chain management is guided by some basic underlying concepts that have not changed much over the centuries. Ref. [40] stated that SCM is a set of practices utilized to efficiently and effectively integrate all different stages in the supply chain in order to produce and deliver goods at the right time, place, quantities, qualities, and at the required prices to meet the diversified customer needs [13]. Therefore, the authors classified the supply chain practices into five types: Supply Chain Integration, Supply Chain Complexity, Strategy Alignment, Information Technology and Operational Innovation.

Supply chain integration includes integration with customers, suppliers, and across the internal organization including integrated collaborative of product development. Many studies i.e. [34]; [35] stressed on that the entire concept of SCM is really predicated on integration. Manufacturers have implemented Supply chain integration strategies to improve business performance [25]. However, successful manufacturers integrate their supply chains for different product development projects to achieve either cost saving or improved customer responsiveness [31]. Supply chain integration is to break down the "silos" across the whole supply chain in order to achieve best utilization of stages across the firm's supply chain [26]. It includes supplier-side collaboration such as information sharing, internal integration through cross-functional process teams, and customer-side collaboration through the integrating of customers' needs and wants into the whole supply chain process [41]. From the product perspective, supply chain integration is reflected in integrated collaborative product development [3].

Supply Chain Complexity is coping with supply chain complexity in a cost effective way [41]. Therefore, the supply chain integration expands the scope of the management issues and thus increases complexity [33]. However, Supply Chain Complexity resides in few main areas: physical supply chain, product and service portfolio. The bigger each of these groups is the greater the complexity e.g. the more warehouses in the physical supply chain or a broader product offering [16]. Supply Chain Complexity could include complexity-reducing methods, such as partnerships, long-term relationships, and the rationalizing of product lines. Other complexity management methods do not reduce complexity but instead manage it through modularity and postponement, which improves the efficiency and effectiveness of supply chains [32].

The Strategy Alignment is becoming an important trend as supply chain management becomes more integrated into company strategies. ASSC implies that supply chain management is well integrated into the strategic planning of a company and thus a CEO-level agenda [41]. Moreover, supply chain practices contribute to the financial performance of a company, and therefore decisions regarding these practices should be made on a strategic-level. Because the supply chain offers the best remaining opportunity for cost reduction and value improvement, the management of interfaces in the network is critical [7]. Alignment of supply chain strategies and processes between business strategy including partners enable service improvements to be achieved at lesser cost. By releasing value in this way, prices can actually be reduced if necessary whilst still maintaining the supplier's margin [20]. Clearly, there are many barriers to

successful alignment, not the least being the lack of transparency and visibility across supply chains [39]. Therefore, the substitution of information for inventory became significant which justify the role of advanced information technology applications in SCM to support the alignment of strategy and supply chain.

The role of advanced information technology applications connect business activities across firms to enhanced business performance [28]. It transformed supply chain practices by enabling the integration among supply chain members and coordinating streamlined value creation operations flows. Advanced information technology in supply chain heightened information-sharing, real-time dissemination of information and analytic decision-making among collaborative partners, from the more traditional information systems such as traditional EDI, legacy based-information systems that aid basic transactions such as buy/sell, order entry and tracking [22]. Advanced information technologies can also enable companies to manage higher levels of supply chain complexity. The combination of supply chain integration and supply chain complexity is the key role for companies to synchronize across customers, products, suppliers, and employees, as well as across supply chain strategies and operations [27]. Effectively applying these two supply chain practices allows firms to move away from sub optimization and to create a profit cycle: a series of coordinated activities meant to squeeze the greatest profit from each product or product line [41].

As companies move towards increased global competitiveness, supply chains face new issues and challenges. These include increasing demands to reduce costs, increase quality, improve customer service and ensure continuity of supply [37]. Firms must realize that operational Innovation is crucial if they want to gain competitive advantage in supply chain management [48]. SCI means creating and implementing leading-edge practices and technologies in supply chain management [41]. As supply chain integration is truly deep change, affecting the very essence of a company: how its work is done, so the effects ripple outward to all aspects of the enterprise. Breakthrough innovations in operations can help destroy competitors and shake up industries, and ultimately contribute to the financial success of the company [42]. Sustainability of growing technologies, the focus on best-in-class delivery, cost and flexibility are crucial to meet the increasingly demanding customer requirements. In addition to go-to-market approach with outsource production and delivery are the main aspects of SCIn.

On the other hand, Ref. [37] stated that Performance Measurement System (PMS) as a balanced and dynamic system that enables support of decision-making processes by gathering, elaborating and analyzing information. In addition, both references [43] and [19] suggested that performance be defined as the efficiency and effectiveness of action, which leads to the following definitions: (i) Performance measurement is defined as the process of quantifying the efficiency and effectiveness of action; (ii) A performance measure is defined as a metric used to quantify the efficiency and/or effectiveness of an action; and (iii) Performance Management System is defined as the set of metrics used to quantify the efficiency and effectiveness of an action. Furthermore, most of the models have gone through some empirical testing and some have only theoretical developments [30]. Furthermore, it is clear that one of the primary benefits of SCM systems are inventory (level and cost) reductions associated with inbound, operations and outbound processes. We thus predict, along with increases in ROA and ROS that increased total inventory turnover will be observed in firms adopting SCM systems [41]. Supply chain practices contribute significantly to financial performances. Thus, companies need to closely integrate themselves into the supply network, carefully manage the complexity that ensues, align their business strategy with supply chain operations, leverage information technology with process improvement, and pioneer supply chain innovation for superior firm performance [32].

2.2 Financial Performance

To support profitability objectives, companies need to optimize supply chain performance. Companies are challenged to continuously improve their performance indicators and increase their compliances. Optimizing supply chain performance includes cost management. As supply chain management extends wider girths of the value chain, therefore, cost management encompasses more components, and the effective control of those supply chain costs is critical to a company's bottom line. Supply chain cost includes inventory costs, logistics costs, and any other costs incurred to serve customers [41]. Especially, in recent recession, the importance of decreasing the costs has been highlighted more. Logistics can play an important role for decreasing costs to keep the performance high. Supply chain management (SCM) has the potential to improve financial performance. For example, Ref. [4] explored the financial benefits of collaborating different functions of SCM for several companies, including Procter & Gamble, Wal-Mart, Sara Lee, and Nabisco. The study found that sales increased 12 percent on average from lower stock-out losses, improved promotional planning, and increased service levels. Inventory and related expenses decreased 20 to 40 percent because of lower safety

stock because of greater confidence in the forecasting and planning process, and there was a 3.5 to 7.5 percent decrease in production capital requirements because of better scheduling. Despite SCM's potential, relatively few companies utilize SCM as a tool to drive financial performance [45]. Failure to make the financial-SCM connection is caused by several factors. First, viewing SCM as only a tactical back-room cost-center activity by many high level executives. As only about one-third of SCM's most senior managers directly report to their company's C level -C-Level usually refers to the top positions in an organization like Chief Executive Officer and Chief HR- and a much smaller percentage actually sits on the executive committee. Therefore, the high-level executives may fail to fully appreciate SCM's tactical and strategic use for enhancing financial performance. [8] recommends the establishment of a supply chain executive council composed of senior executives to align the organization from the top down to achieve best SCM performance. Second, lacking the finance expertise for most of the SCM professionals, hence, they lack the ability to link SCM to key financial measures and to articulate how SCM drives financial performance. Third, ignoring the enterprise-wide perspective of SCM that should drive performance throughout the enterprise. Therefore, SCM strategic and tactical decisions cannot be made in a vacuum. Yet most measures and analyses of SCM initiatives are incomplete, as they are not from an enterprise-wide perspective. Decisions on items such as modes of transportation, sourcing, and replenishment are often based solely on a single measure such as operating expenses and omit the impact on inventory, warehousing requirements, and possible stock-out losses [46]. Financial performance could be measured by the financial ratios that can be used to construct the financial items of the financial performance [39]. Financial ratios derived from income statement and balance sheet adapted from [29] are: Cash Flow, Growth Profit Margin, Return on Assets (ROA), Return on Equity (ROE), Return on Sales (ROS), Profit Margin, and Inventory turnover. These are important terms that comes from the mostly spoken financial indicator groups of: sales growth, profitability indicators relating to income, return on assets, inventory turnover, and cash flow. The point is that these ratios are the most common ones, but there is not any standard for some of them due to inability to find overall accepted denominators. ROA as the ratio of the net income over the total assets is one of the most important measures for business performance. Return on Assets (ROA) was used to tap the financial performance of the firm. ROA sometimes refer to as ROI (Return on Investment) which is the same as the net income divided by total assets to show how effectively a firm utilizes its assets in generating profits [11]. Cash flow is the summation of net income, depreciation, amortization, and depletion. Inventory turnover shows how successfully the firm could sell its inventory and it is a standard to check inventory performance [15]. Cost of Goods Sold is an operational identity of the firm [14] and gross income is the income before subtracting depreciation and maintenance costs [24]. Meanwhile due to approximation depreciation, the net income is not reliable [24]. Operating income is the income of the company due to its different activities before accounting taxes [17]. Sales growth is an important factor for companies and it can be assessed in percent of changes in the net sales [5].

Return on Equity (ROE) is the amount of net income returned as a percentage of shareholders equity. Return on equity measures a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested. Net income is for the full fiscal year (before dividends paid to common stock holders but after distributed dividends to preferred stock). Shareholder's equity does not include preferred shares. In addition, Return on Sales (ROS) is a ratio widely used to evaluate a company's operational efficiency. ROS is also known as a firm's "operating profit margin". This measure is helpful to management, providing insight into how much profit is being produced per dollar of sales. As with many ratios, it is best to compare a company's ROS over time to look for trends, and compare it to other companies in the industry. An increasing ROS indicates the company is growing more efficient, while a decreasing ROS could signal looming financial troubles.

3. Research Methodology

The following research question will guide the study in testing for significant relationships between the supply chain practices and the financial performance in order to enhance this performance for the most active listed companies in Egypt. The major research question will be the following:

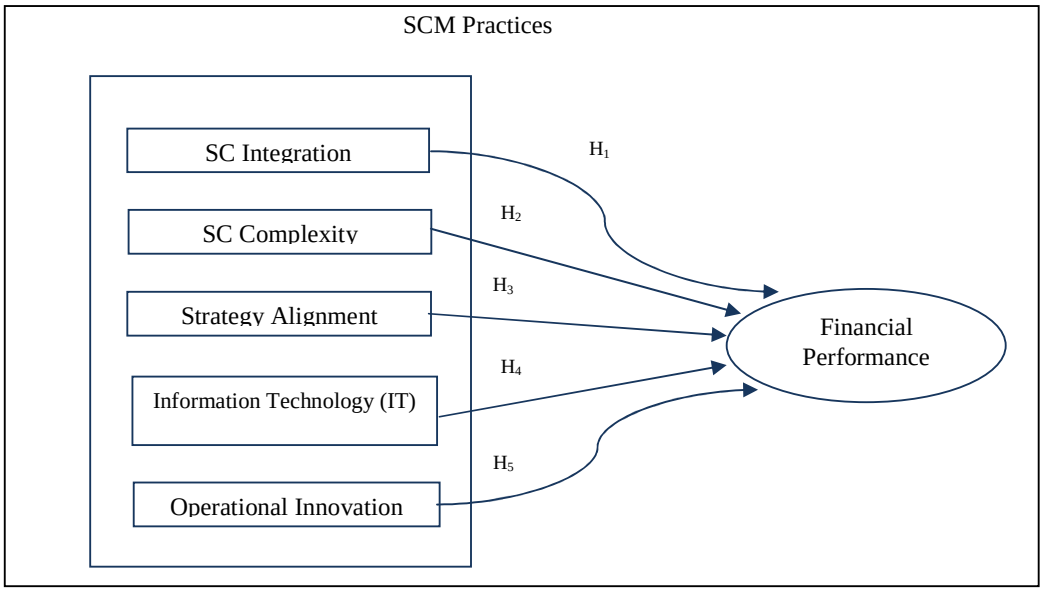
"*Do supply chain practices influence the financial performance of Egyptian most active listed companies*?" In order to answer this question the following hypotheses presented in Figure 1 and formulated as follows:

H_1: Supply Chain Integration has a significant relationship with the financial performance of the Egyptian most active listed companies.

H_2: Supply Chain Complexity has a significant relationship with the financial performance of the Egyptian most active listed companies.

H_3: Strategy Alignment has a significant relationship with the financial performance of the Egyptian most active listed companies.
H_4: Information Technology has a significant relationship with the financial performance of the Egyptian most active listed companies.
H_5: Operational Innovation has a significant relationship with the financial performance of the Egyptian most active listed companies.

Figure 1: Conceptual Model



In order to test the research hypotheses, a questionnaire pretested by several executives and managers from different fields: logistics/supply chain, marketing, finance, production, accounting, IT and planning were asked to review the questionnaire for readability, ambiguity, and completeness. The questionnaire was also critiqued by several academics who were asked to review its statements for ambiguity and clarity, and to evaluate whether individual items appeared to be appropriate measures of their respective constructs and then uploaded online to get easy accessibility for the respondents and for the data analysis afterwards. From September 2013 to April 2014 the authors collected data from different managers of the 14 most active listed firms in Egypt. A purposive sampling technique was used to identify the respondents for this research. More specifically, the research focused on the period from 2005 until 2010 as the most stable period before the disruptions that started since the 25th of January 2011 revolution in Egypt. On the other hand, the authors tracked the manufacturing companies, which are listed in the Egyptian stock market during the mentioned period, which resulted in 14 companies from six sectors. The questionnaire targets seven functions within each company: logistics/supply chain, marketing, finance, production, accounting, IT and planning. These seven functions were selected by the research team due to their high involvement in the five supply chain practices addressed in the questionnaire and due to their ability in providing valid and reliable data that would support the aim of the study. Respondents were contacted by telephone to introduce the research's objectives before sending out Emails, which contains the questionnaire URL.

Based on the results of the telephone calls, the website of the online questionnaire was useful to track the respondents who had agreed to participate. Some companies did not participate due to either management policy of non-participation or a lack of time. Follow-up telephone calls were also made every 3 weeks. The survey instrument was adopted [40]. The online questionnaire had 42 statements that were completed by the managers and executives of logistics/supply chain, marketing, finance, production, accounting, IT and planning from the selected 14 Egyptian manufacturing companies. These statements were extracted from the previous literature surveys and were revised to suit the aim of this study. Thus, a total of 98 questionnaires were collected from those companies. Table (1) presents the profile of companies' sample.

Table 1: Sample Demographics

Industry Sector	Companies
Building Material & Construction *(N=4)*	• El Ezz Steel Rebars • Orascom Construction Industries (OCI) • South Valley Cement • Upper Egypt Contracting
Chemicals *(N=1)*	• Sidi Kerir Petrochemicals
Electrical Equipment & Engineering *(N=1)*	• Elswedy Cables
Food & Beverage *(N=1)*	• Extracted Oils
Housing & Real Estate *(N=4)*	• El Kahera Housing • Heliopolis Housing • Medinet Nasr Housing • Six of October Development & Investment (SODIC)
Textiles & Clothing *(N=3)*	• Arab Cotton Ginning • Arab Polvara Spinning & Weaving Co. • Nile Cotton Ginning
Total	14 Companies

Respondents had to indicate the degree of different supply chain practices they exercise in their companies on a 5-point Likert scale (1- least practiced, 5-most practiced). The first part of the questionnaire included some demographic questions about the organization, the respondent details such as their years of experience and their job position. The second part of the questionnaire covered the main five supply chain practices which were highlighted in the literature section; Supply Chain integration, Supply Chain Complexity, Strategy alignment, Information Technology (IT) and operational Innovation. Furthermore, the dependent variables used in this study were the three most common financial measures, namely; Return on Equity (ROE), Return on Sales (ROS) and Return on Assets (ROA). These measures are calculated from the financial statements of the participated firms as follows:

Return on Equity (ROE) which is expressed as a percentage and calculated as:

Return on Equity **= Net Income / Shareholder's Equity**

Return on Sales (ROS) which is expressed as a percentage will be calculated as follows:

Return on Sales **= Net Income (Before Interest and Taxes) / Sales**

Return on Assets (ROA) is an indicator of how profitable a company is relative to its total assets. ROA gives an idea as to how efficient management is at using its assets to generate earnings. Calculated by dividing a company's annual earnings by its total assets, ROA is displayed as a percentage.

Return on Assets **= Net Income / Total Assets**

Measurement implies issues of both reliability and validity of the scales used. Where scales are highly reliable and valid, their ability to test the proposed model is stronger (Peters, 2002). The reliability of a measuring instrument is defined as its ability to consistently measure the phenomenon it is designed to measure. Reliability, therefore, refers to test consistency. Reliability concerns the extent to which a measuring procedure yields the same results on repeated trials, which means that the items of the scale are homogeneous [36]. The importance of reliability lies in the fact that it is a prerequisite for the validity of a test. Simply for a measuring instrument to be valid, it must be demonstrably reliable. Any measuring instrument that does not reflect some attribute consistently has little chance of being considered a valid measure of that attribute. Internal consistency refers to the extent to which the items in a test measure the same construct [38]. Items that measure the same construct should logically cling/hang together in some consistent manner. Examining the internal consistency of the test enables the researcher to determine which items are not consistent with the test in measuring the phenomenon under investigation. Therefore, the object is to remove the inconsistent items and improve the internal consistency of the test. An internally consistent test increases the chances of the test being reliable [11].

Reliability, or the internal consistency, of the scales may be assessed by calculation of the "Cronback alpha". The empirical criterion used is often that proposed by [47] of .70 or higher for reliability. Therefore, Cronbach's alpha-values in this research were all greater than 0.70 with a minimum value of 0.71 and a maximum value of 0.98 that confirm the significantly high consistency of the questionnaire.

The validity of a scale refers to the degree to which it measures what it is supposed to measure. Unfortunately, there is no one clear-cut indicator of a scale's validity. According to [38] and [47], scale validity could be described into three types: Firstly, content validity refers to the adequacy with which a measure or scale has sampled from the intended universe or domain of content. In other words, how well the indicators measure the different aspects of the concept. Secondly, criterion validity concerns the relationship between scale scores and some specified, measurable criterion. Finally, construct validity involves testing a scale, not against a single criterion, but in terms of theoretically derived hypotheses concerning the nature of the underlying variable or construct.

Construct validity could be assessed through techniques such as factor analysis. Factor analysis attempts to identify underlying variables (factors) that explain the pattern of correlations within a set of variables. According to [17], regardless of how construct validity is defined, there is no single best way to study it and that construct validity could be demonstrated from a number of perspectives. Therefore, from the factor loading shown in table (2), we can confirm that the extent to which the constructs are measured are of high correlation and reliably can measure and be used to capture the construct of interest, thus the survey is valid.

4. Research Analysis and Results

Descriptive statistics are those that summarize responses such as frequency distributions, averages, and standard deviations. Descriptive statistics are used to organize, summarize, and describe measures of a sample. No predications or inferences are made regarding the population parameters. These statistics usually include the mean and standard deviation. Table (2) shows the descriptive statistics for the sample.

Table 2: Descriptive Statistics

Scale	Items	Mean	Std. Dev.	Factor Loading	Cronbach's Alpha
Supply Chain integration	A1	3.0510	1.28731	.849	.942
	A2	3.2245	1.36624	.862	.941
	A3	2.9592	1.28367	.947	.936
	A4	3.5000	1.58114	.804	.946
	A5	2.9082	1.39281	.757	.948
	A6	2.8061	1.41900	.810	.945
	A7	3.2143	1.35654	.815	.944
	A8	3.2347	1.36072	.724	.950
Supply Chain Complexity (SCC)	B1	3.5306	1.47281	.835	.924
	B2	3.2041	1.36192	.935	.911
	B3	3.0612	1.29086	.929	.913
	B4	3.2041	1.36192	.935	.911
	B5	3.4082	1.49112	.882	.917
	B6	2.5306	1.51422	.444	.972
Strategy Alignment (SA)	C1	3.0408	1.37667	.939	.967
	C2	2.9184	1.26551	.848	.969
	C3	3.4592	1.51398	.855	.968
	C4	3.5102	1.50768	.900	.968
	C5	2.8469	1.43126	.541	.973
	C6	3.4592	1.34063	.830	.969
	C7	3.5204	1.59399	.748	.970
	C8	3.5408	1.56092	.826	.969
	C9	3.4898	1.59409	.807	.969
	C10	3.5204	1.59399	.784	.969
	C11	3.4286	1.59251	.765	.970
	C12	3.3673	1.33461	.815	.969
	C13	3.4184	1.46381	.763	.970
	C14	3.2245	1.34341	.909	.968
	C15	3.4388	1.37778	.744	.970
	C16	3.2959	1.27796	.834	.969
	C17	3.4898	1.24557	.790	.969
Information Technology (IT)	D1	3.6224	1.43243	.921	.979
	D2	3.5918	1.49112	.971	.971
	D3	3.5408	1.52754	.984	.969
	D4	3.3980	1.36026	.862	.987
	D5	3.5306	1.54121	.974	.971
Operational Innovation (OI)	E1	3.2143	1.42330	.918	.940
	E2	3.3673	1.33461	.887	.944
	E3	3.5612	1.55362	.947	.936
	E4	3.4592	1.57407	.890	.943
	E5	3.1122	1.34611	.796	.953
	E6	3.3163	1.33623	.726	.960

Financial data and ratios of this research was collected and calculated from companies' annual reports for the period from 2005 until 2010. The main data analysis technique utilized is regression with the help of SPSS. Regression is a more powerful tool when compared to correlation as it does not only show the direction and strength of a relationship, but determines the casual effect of this relationship. Regression analysis was conducted between all independent variable (Supply Chain Management Practices) and each annual financial ratio in order to investigate the relationship between research variables on an annual manner. This will help us to find out if there is any change in this relationship due to certain events. Regression analysis is used here because we wanted to investigate the correlation of different variables on a single variable [38]. First, the correlation among variables was calculated and then in the regression analysis the standardized coefficient beta and also the R-squared was estimated to see how much the independent variables describe the dependent variable. The method of regression is linear as data was checked for linearity assumption through the use of histograms, the assumption of linearity was proven for all models. Also, autocorrelation of residuals problem, which often occurs in the analysis of time series data, was checked through Durbin-Watson test. All values were near two which should indicate no significant autocorrelation. In addition, multicollinearity problem -that is a statistical phenomenon in which two or more predictor variables in a multiple regression model are highly correlated, meaning that one can be linearly predicted from the others with a non-trivial degree of accuracy. Multicollinearity does not reduce the predictive power or reliability of the model as a whole, at least within the sample data themselves; it only affects calculations regarding individual predictors- was checked through the values of the VIF (Variance Inflation Factor) and models were repeated after excluding insignificant variables to make sure that VIF for all significant variables was lower than 10. Econometrically, the regression model equation that will be applied for all models is represented below:

$$Y_t = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + e$$

Where the left hand variable, Y_t represents the dependent variable on year t, α represents the firm-specific intercept, β represents the coefficients; where, x represents the set of explanatory variable (independent variables), where e represents error term, the subscript t denoting the time series dimension.

Table 3: Regression analysis results for ROE

Variables		Model 1	Significance	Model 2	Significance	Model 3	Significance	Model 4	Significance	Model 5	Significance	Model 6	Significance
SC Integration	Coefficient	-1.981	Significant	Insignificant		-1.827	Significant	The whole model is insignificant		The whole model is insignificant		-1.761	Significant
	P>|z|	0.021*				0.034*						0.042*	
SC Complexity	Coefficient	Insignificant		Insignificant		Insignificant						Insignificant	
	P>|z|												
Strategy Alignment	Coefficient	-1.692	Significant	- 1.517	Significant	-1.426	Significant					Insignificant	
	P>|z|	0.011*		0.005**		0.040*							
IT	Coefficient	Insignificant		Insignificant		1.275	Significant					Insignificant	
	P>|z|					0.046*							
Operational Innovation	Coefficient	1.940	Significant	1.232	Significant	Insignificant						Insignificant	
	P>|z|	0.033*		0.016*									
R square		75.20%		53.30%		76.90%						43%	

Notes: **Significant at 0.01 level * Significant at 0.05 level

As shown in table (3), the regression results are analyzed for the period 2005-2010 using ROE as the dependent variable and the five supply chain dimensions; namely, SC Integration, SC Complexity, Strategy Alignment, Information Technology and Operational Innovation as independent variables. Six regression models have been developed to be regressed against ROE, one for each year from 2005 until 2010. Each model includes the same previously mentioned independent variables with the data of ROE of this year. Regression models one, two and three (from 2005-2007) showed mixed results, however, the three models agree that Strategy Alignment is a significant and important independent variable associated negatively with ROE. Two models of the three agree that Integration and Innovation are significant variables of which Integration is negatively associated with ROE and Innovation is positively associated with ROE. Only one model showed that Information Technology (IT) is a positively significant variable. During years 2008 and 2009, all models were insignificant as the effect of the financial crisis was widely prevailed all over the world affecting all sectors and industries. Year 2010, the model showed that only Integration was the significant variable by that time and the rest was insignificant ones.

Table 4: Regression analysis results for ROS

Variables		Model 1	Significance	Model 2	Significance	Model 3	Significance	Model 4	Significance	Model 5	Significance	Model 6	Significance
SC Integration	Coefficient	Insignificant		Insignificant		- 1.402	Significant	0.553	Significant	The whole model is insignificant		- 1.257	Significant
	P>|z|					0.050*		0.050*				0.021*	
SC Complexity	Coefficient	- 1.256	Significant	- 1.203	Significant	Insignificant		Insignificant				Insignificant	
	P>|z|	0.005**		0.011*									
Strategy Alignment	Coefficient	Insignificant		Insignificant		Insignificant		Insignificant				Insignificant	
	P>|z|												
IT	Coefficient	0.820	Significant	1.003	Significant	1.471	Significant	Insignificant				Insignificant	
	P>|z|	0.043*		0.027*		0.008**							
Operational Innovation	Coefficient	Insignificant		Insignificant		Insignificant		Insignificant				Insignificant	
	P>|z|												
R square		54.90%		52.90%		64.30%		30.60%				51.40%	

Notes: **Significant at 0.01 level * Significant at 0.05 level

As shown in table (4), the regression results are analyzed for the period 2005-2010 using ROS as the dependent variable and the five supply chain dimensions; namely, SC Integration, SC Complexity, Strategy Alignment, Information Technology and Operational Innovation as independent variables. Six regression models have been developed to be regressed against ROS, one for each year from 2005 until 2010. Each model includes the same previously mentioned independent variables with the data of ROS of this year. Regression models one, two, three and four (from 2005-2008) showed mixed results, however, the four models found some significant relationships with SC Integration, SC Complexity and Information Technology. Integration was found to be significant in 2007, 2008 and 2010 with a mixed direction of the relationship in these years. Complexity was found to be negatively related to ROS in 2005 and 2006. And finally, Information Technology was found to be positively related in years from 2005 till 2007. No evidence was found on any significant relationship with Strategy Alignment or Innovation in any model. Model 5 (year 2009) was found to be totally insignificant and again maybe the poor results from 2008 and afterwards were because of the effect of the financial crisis that widely prevailed all over the world affecting all sectors and industries. Year 2010, the model showed that only Integration was the significant variable by that time and the rest was insignificant ones.

Table 5: Regression analysis results for ROA

Variables		Model 1	Significance	Model 2	Significance	Model 3	Significance	Model 4	Significance	Model 5	Significance	Model 6	Significance
SC Integration	Coefficient	Insignificant		Insignificant		Insignificant		The whole model is insignificant		The whole model is insignificant		The whole model is insignificant	
	P>|z|												
SC Complexity	Coefficient	Insignificant		Insignificant		Insignificant							
	P>|z|												
Strategy Alignment	Coefficient	- 1.584	Significant	- 1.255	Significant	- 1.229	Significant						
	P>|z|	0.011*		0.015*		0.017*							
IT	Coefficient	1.453	Significant	1.004	Significant	1.152	Significant						
	P>|z|	0.002**		0.042*		0.024*							
Operational Innovation	Coefficient	Insignificant		Insignificant		Insignificant							
	P>|z|												
R square				43.30%		42.10%							

Notes: **Significant at 0.01 level * Significant at 0.05 level

As shown in table (5), the regression results are analyzed for the period 2005-2010 using ROA as the dependent variable and the five supply chain dimensions; namely, SC Integration, SC Complexity, Strategy Alignment, Information Technology and Operational Innovation as independent variables. Six regression models have been developed to be regressed against ROA, one for each year from 2005 until 2010. Each model includes the same previously mentioned independent variables with the data of ROA of this year. Regression models one, two and three (from 2005-2007) showed very consistent results, as the three models agree that Strategy Alignment is a significant and important independent variable associated negatively with ROA. Also, the three models agree that Information Technology (IT) is significant and important independent variable associated positively with ROA. During years 2008 and afterward, all models were insignificant as the effect of the financial crisis was widely prevailed all over the world affecting all sectors and industries. Therefore, no evidence was found of any significant relationships with Integration, Complexity and Innovation within any year.

5. Discussion and Hypotheses Testing

Findings of the relationships between supply chain practices namely SC Integration, SC Complexity, Strategy Alignment, Information Technology and Operational Innovation on the financial performance utilized in this research namely Return on Assets (ROA), Return on Sales (ROS) and Return of Equity (ROE) could be summarized in the following table (6) for the purpose of hypotheses testing. In addition results along with the relevant research literature which have similar results will be discussed and presented.

Table 6: Hypotheses Testing Results

SC Practices	FP Measures	Hypotheses Results	Relevant Literature
SC Integration	ROE ROS	H1 Accepted	[29],[40], [30], [2], [36]
SC Complexity	ROS	H2 Accepted	[29], [47]
Strategy Alignment	ROE ROA	H3 Accepted	[29], [40], [30], [2], [47]
Information Technology	ROE ROA ROS	H4 Accepted	[40], [30], [2], [36]
Operational Innovation	ROE	H5 Accepted	[29], [30], [47]

Most of the supply chain practices have significant relationships from year 2005 -2007, while there are insignificant relationships staring right after 2008 due to the financial crisis on most of the national and international companies working in the Egyptian market. The negative consequences of this financial crisis had bitten the Egyptian economy in many fields. Egypt's growth rate witnessed setbacks and may have posted its slowest annual growth in half a decade in 2008–2009 as the global crisis hit revenue from tourism, migrant labor remittances, the Suez Canal, export revenues, investment and overall business. The severity of the crisis and its uncertainties demonstrated the need for urgent action to restore financial stability, lead the economic recovery and secure a sustainable future for the country [1]. Therefore, the influence that was analyzed of the supply chain practices on the financial performance of the selected Egyptian companies was only restricted for the period 2005-2007.

Results of supply chain integration on financial performance were mixed. As these results prove to have significant negative relationships with ROE and mixed significant relationships with ROS. In addition, the SC complexity result showed only a significant relationship with ROS and it was negative. Both variables have this kind of negative relationship with different financial performance measures due to the lack of integration between the functional departments and among the supply chain stakeholders.

Results related to strategy alignment variable and its relationship with the ROA and ROE revealed that a significant but negative relationship exists because supply chain management concepts and practices were newly adopted in many Egyptian companies starting from the year 2005 [12]. The Egyptian companies relied on the concept of trial and error rather than learning from the best practices approach. This is in line with different scholars who found significant relationships between strategy alignment and financial.

On the other hand, the IT and operational innovation variables proved to have positive significant relationships with the financial performance measures. The first one had this positive relationship with three measures; namely, ROE, ROA and ROS. However, the latter had only one positive significant relationship with ROE. This could be explained by the new era of advanced technology as most of these companies are migrating their systems to new technological advancements such as the RFID, artificial intelligence and ERP (Enterprise Recourses Planning Systems) and similar new software. Hence, this is definitely helping companies to do their business easily and quickly which in turn help to heighten their turnover that will positively enhance their financial performance.

6. Research Conclusion and Recommendations

This paper explores the impact of supply chain practices namely SC Integration, SC Complexity, Strategy Alignment, Information Technology and Operational Innovation on the financial performance of the most active listed companies in the Egyptian Stock Market from the period 2005 to 2010 using three different measures i.e. Return on Assets (ROA), Return on Sales (ROS) and Return of Equity (ROE). Data of the research was tested and the results of the different models related to different financial performance measures revealed that the supply chain practices have significant relationships with at least one of the financial performance measures.

The contribution of this paper shed light on the necessity that companies need to optimize supply chain performance effectiveness. In terms of supply chain performance, the five practices studied in this paper should ultimately affect customer service and responsiveness which are directly linked to financial metrics. Managing the supply chain costs is a very challenging mission and balancing between these costs and service levels is yet much more challenging. This research fills the gap in the literature of the developing countries specifically

Egypt regarding supply chain practices and their relationship with financial performance. Further research would be needed to further investigate the relationships between bottom line supply chain operation measures and its impact on financial performance.

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