DOCTORAL THESIS

INTEGRATED INFORMATION TECHNOLOGY AND FIRM PERFORMANCE: MEDIATING AND MODERATING EFFECTS IN SUPPLY CHAIN MANAGEMENT CONTEXT

Alaa Abdelaziz Abdelfattah Abousamra

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Dir. Emilio Ruzo Sanmartín

PROGRAMA DE DOUTORAMENTO EN ECONOMÍA E EMPRESA
FACULTADE DE CIENCIAS ECONÓMICAS E EMPRESARIAIS

SANTIAGO DE COMPOSTELA
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AUTORIZACIÓN DO DIRECTOR DA TESE

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D. Emilio Ruzo Sanmartín

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Que a presente tese, correspóndese co traballo realizado por D. Alaa Abdelaziz Abdelfattah Abousamra, baixo a nosa dirección, e autorizamos a presentación da tese indicada, considerando que reúne os requisitos esixidos no artigo 33 do regulamento de Estudos de Doutoramento da USC, e que como director desta non incorre nas causas de abstención establecidas na lei 40/2015.

En Santiago de Compostela, 24 de marzo de 2017

Asdo. José A. Varela González

Asdo. Emilio Ruzo Sanmartín

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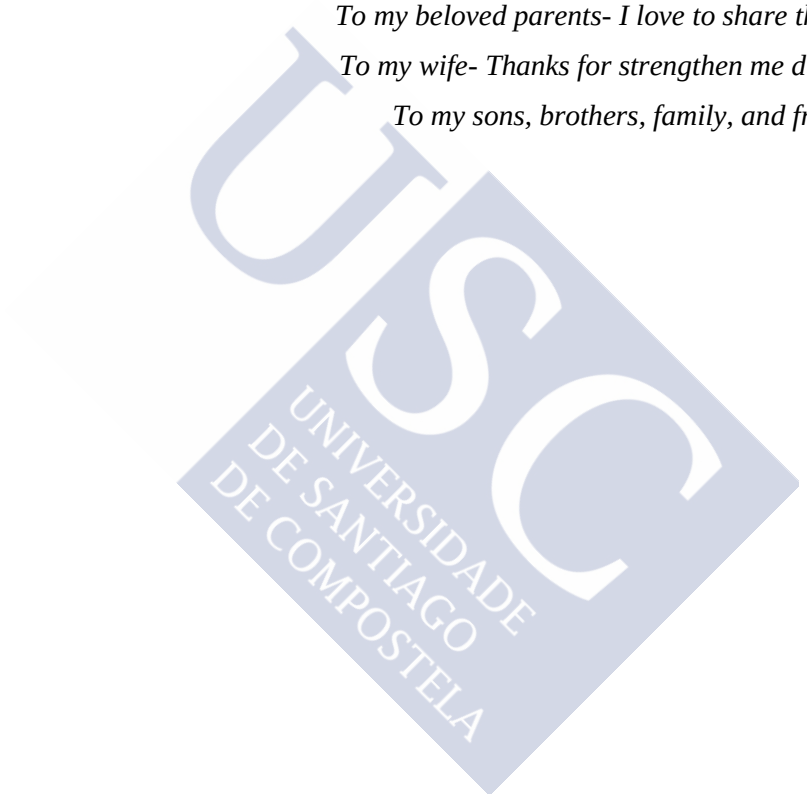
To my beloved parents- I love to share this moment with you

To my wife- Thanks for strengthen me during the hard times

To my sons, brothers, family, and friends- I love you all



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I hope my work makes you all proud.

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RESUMO – RESUMEN – SUMMARY

RESUMO

Esta tese amplía o crecente corpo da literatura sobre a integración da cadea de subministro, o cal fai referencia ao grao no que unha empresa coopera estratexicamente cos seus socios da cadea de subministro e xestiona de xeito cooperativo os procesos intra- e inter-organizacionais, para acadar de xeito efectivo e eficiente fluxos de produtos e servizos, información, diñeiro e decisións, coa finalidade de proporcionar o máximo valor ás partes da cadea de subministro. A partir de diferentes teorías (Teoría do Procesamento da Información, Visión baseada nos Recursos, Teoría da Aprendizaxe Organizacional e Teoría do Compromiso – Confianza do Marketing Relacional), desenvolvemos e examinamos hipóteses que propoñen relacións positivas entre a tecnoloxía da información integrada, a integración de provedores, a integración de clientes, a integración interna e o rendemento financeiro. Asemade, investigamos os roles complementarios do tamaño do departamento de TI e o apoio da alta dirección na rede nomolóxica mencionada previamente.

Os modelos conceptuais e as hipóteses teóricas foron contrastadas mediante o uso da Análise Factorial Confirmatoria e da Modelización de Ecuacións Estruturais. A partir de unha enquisa a 205 empresas de Exipto os resultados obtidos indican que a tecnoloxía da información integrada, a integración de provedores, a integración de clientes e a integración interna poden mellorar o rendemento financeiro. Adicionalmente, a tecnoloxía da información integrada ten un efecto positivo directo sobre as dimensións da integración da cadea de subministro (integración de provedores, integración de clientes e integración interna). Ademais, confírmase que o tamaño do departamento de TI e o apoio da alta dirección están relacionados significativamente coa tecnoloxía da información integrada. Finalmente, analizáronse os efectos directos e moderadores da confianza, do compromiso relacional e da cultura organizacional xerárquica sobre as dimensións da integración da cadea de subministro, así como sobre as relacións entre a tecnoloxía da información integrada e as dimensións da integración da cadea de subministro.

Estes resultados suxiren que as empresas deberían enfocarse nos importantes roles da tecnoloxía da información integrada para mellorar o rendemento financeiro a través da

integración da cadea de subministro. Este estudo abre novas vías de investigación para a tecnoloxía da información integrada e a integración da cadea de subministro, e suxire futuras liñas de investigación e aplicación a través da análise das condicións baixo as cales a tecnoloxía da información integrada e a integración da cadea de subministro poden axudar a mellorar o rendemento financeiro.

PALABRAS CHAVE

Xestión da Cadea de Subministro, Integración da Cadea de Subministro, Tecnoloxía da Información Integrada, Rendemento, Exipto.

RESUMEN

Esta tesis amplía el creciente cuerpo de la literatura sobre la integración de la cadena de suministro, el cual hace referencia al grado en el que una empresa coopera estratégicamente con sus socios de la cadena de suministro y gestiona de forma colaborativa los procesos intra- e inter-organizacionales, para alcanzar de forma efectiva y eficiente flujos de productos y servicios, información, dinero y decisiones, con la finalidad de proporcionar el máximo valor a las partes de la cadena de suministro. A partir de diferentes teorías (Teoría del Procesamiento de la Información, Visión basada en los Recursos, Teoría del Aprendizaje Organizacional y Teoría del Compromiso – Confianza del Marketing Relacional), desarrollamos y examinamos hipótesis que proponen relaciones positivas entre la tecnología de información integrada, la integración de proveedores, la integración de clientes, la integración interna y el rendimiento financiero. Además, investigamos los roles complementarios del tamaño del departamento de TI y el apoyo de la alta dirección en la red nomológica mencionada previamente.

Los modelos conceptuales y las hipótesis teóricas fueron contrastadas mediante el uso de Análisis Factorial Confirmatorio y de Modelización de Ecuaciones Estructurales. A partir de una encuesta a 205 empresas de Egipto, los resultados obtenidos indican que la tecnología de información integrada, la integración de proveedores, la integración de clientes y la integración interna pueden mejorar el rendimiento financiero. Adicionalmente, la tecnología de información integrada tiene un efecto positivo directo sobre las dimensiones de la integración de la cadena de suministro (integración de proveedores, integración de clientes e integración interna). Además, se confirma que el tamaño del departamento de TI y el apoyo de la alta dirección están relacionados significativamente con la tecnología de información integrada. Finalmente, se analizaron los efectos directos y moderadores de la confianza, del compromiso relacional y de la cultura organizacional jerárquica sobre las dimensiones de la integración de la cadena de suministro, así como sobre las relaciones entre la tecnología de información integrada y las dimensiones de la integración de la cadena de suministro.

Estos resultados sugieren que las empresas deberían enfocarse en los importantes roles que posee la tecnología de información integrada para mejorar el rendimiento financiero a través de la integración de la cadena de suministro. Este estudio abre nuevas vías de investigación para la tecnología de información integrada y la integración de la cadena de suministro, y sugiere futuras líneas de investigación y aplicación a través del análisis de las

condiciones bajo las cuales la tecnología de información integrada y la integración de la cadena de suministro pueden ayudar a mejorar el rendimiento financiero.

PALABRAS CLAVE

Gestión de la Cadena de Suministro, Integración de la Cadena de Suministro, - Tecnología de Información Integrada, Rendimiento, Egipto.

SUMMARY

This thesis extends the developing body of literature on supply chain integration, which is the degree to which a firm strategically cooperates with its supply chain partners and collaboratively manages intra- and inter-organizational processes, to achieve effective and efficient flows of products and services, information, money and decisions, to provide maximum value to supply chain parties. Conceptualizing from various theories (Information Processing Theory, Resource Based View, Organizational Learning Theory, and Commitment-Trust Theory of Relationship Marketing), we develop and examine hypotheses proposing positive relationships between integrated information technology, supplier integration, customer integration, internal integration, and financial performance. Also, we investigate the complementary roles of information technology department size and top management support in the above mentioned nomological network.

Conceptual models were designed and hypotheses were tested with Confirmatory Factor Analysis and Structural Equation Modeling analysis. Our findings from a survey of 205 firms in Egypt indicate that integrated information technology, supplier integration, customer integration, and internal integration can improve financial performance. In addition, integrated information technology has a direct positive effect on supply chain integration dimensions (supplier integration, customer integration, and internal integration). Also, it is confirmed that information technology department size and top management support are significantly related to integrated information technology. Finally, our analysis examined the direct and moderating effect of trust, relationship commitment, and hierarchical organizational culture on the supply chain integration dimensions, and on the relationship between integrated information technology and supply chain integration dimensions.

This finding suggests that firms should focus on the important roles of integrated information technology to improve financial performance through supply chain integration. This study opens new research avenues for integrated information technology and supply chain integration, and suggests directions for future research and practice by exploring under what conditions integrated information technology and supply chain integration can help to improve financial performance.

KEYWORDS

Supply Chain Management, Supply Chain Integration, Integrated Information Technology, Performance, Egypt.

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ABBREVIATION	FULL TERM
AHP	Analytic Hierarchy Process
APICS	American Production and Inventory Control Society
AVE	Average Variance Extracted
CA	Cronbach Alpha
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CI	Customer Integration
CR	Composite Reliability
CRM	Customer Relationship Management
CSCMP	Council of Supply Chain Management Professionals
CVF	Competing Value Framework
EDI	Electronic Data Interchange
ERP	Enterprise Resource Planning
FB	Financial Performance
FMCGs	Fast Moving Consumer Goods
GDP	Gross Domestic Product
IFI	Incremental Fit Index
II	Internal Integration
IIT	Integrated Information Technology
HOC	Hierarchical Organizational Culture
IPT	Information Processing Theory
IT	Information Technology
ITSIZE	IT Department Size
JIT	Just-In-Time
PGP	Pre-emptive Goal Programming
MENA	Middle East and North Africa
RBV	Resource Based View
RC	Relationship Commitment
RFID	Radio Frequency Identification
RMSEA	Root Mean Square Error of Approximation
ROI	Return On Investment
SCI	Supply Chain Integration
SCM	Supply Chain Management
SCOR	Supply Chain Operations Reference
SEI	Supply-side electronic integration
SEM	Structural Equation Modeling
SI	Supplier Integration
TCE	Transaction Cost Economics
TMS	Top Management Support
TLI	Tucker-Lewis Index

INTRODUCTION

Why some companies have higher financial performance than others? Does supply chain integration influence the financial performance?

Financial performance refers to the action of performing financial activity. It is the degree to which financial objectives are being or have been carried out and achieved. In other words, it refers to measuring the results of a firm's policies and operations in monetary terms. Financial performance is essential for each company, since it is related to measuring the level of performance of a business over a specified period of time, expressed in terms of overall profit and loss during that time. In addition, financial performance can be used to compare similar firms across the same industry or to compare industries or sectors in accumulation.

Evaluating the financial performance of a business allows decision-makers to judge the results of business strategies and activities in objective monetary terms. Proper systems and processes help tighten everything up and make companies run efficiently and effectively. The use of everyone's time to do things quickly, effectively and efficiently is needed. This Doctoral Thesis aims to contribute to explain financial performance in terms of Supply Chain Management.

Supply Chain Management (SCM) is the management of multiple relationships across the supply chain. This means that SCM is not considered as a chain of businesses with one-to-one, business-to-business relationships, but a network of multiple businesses and relationships (Lambert and Cooper, 2000).

One of the worthiest pattern mutations of modern business management is that individual businesses no longer compete as solely independent entities, but in fact as supply chains. Firms can no longer actively and successfully compete in segregation of their suppliers and other entities in the supply chain (Lummus and Vokurka, 1999). The competition has been shifted from brand versus brand or store versus store, to suppliers—brand—store versus suppliers—brand—store, or supply chain versus supply chain (Lambert and Cooper, 2000). Gattorna (1998) has indicated that, in this rising, competitive environment, the success of a single business will depend on management's ability to integrate the company's complicated

and sophisticated network of business relationships. SCM represents a new way of managing the business and relationships with other members of the supply chain, such as suppliers and customers, which means it deals with the total business process.

The term SCM was primarily presented by consultants in the early 1980s, before gaining enormous attention thereafter (Oliver and Webber, 1992). Since the 1980s, interest in the concept of SCM has steadily increased, when companies saw the benefit of collaborative relationships within and beyond their own organization (Lummus and Vokurka, 1999). Researchers (e.g., Cooper, Lambert, & Pagh 1997; Fisher 1997) have used the term SCM to explain the planning and control of material and information flows, in addition to the logistical activities not only internally within a company, but also externally between companies.

In SCM framework, supply chain integration (SCI) has been a highly-researched topic during the last 20 years. Many researchers agree that integration between supply chain partners is a key driver of effectiveness and efficiency, by speeding up the information flow, shortening the response time to customers' needs, providing enhanced coordination and collaboration between partners and sharing the risks as well as the benefits (Li and Lin, 2006).

I focus on SCM for two reasons. Firstly, its importance as an essential element to operational efficiency, customer satisfaction and company success, as well as it can be applied within societal settings, including medical missions; disaster relief operations and other kinds of emergencies; cultural evolution and it can help improve quality of life.

The impact of SCM on business is significant and exponential. SCM impacts customer service by making sure the right product assortment and quantity are delivered in a timely fashion. Additionally, those products must be available in the location that customers expect. Customers should also receive quality after-sales customer support. Furthermore, SCM has a tremendous impact on the bottom line. Firms value supply chain managers because they decrease the use of large fixed assets such as plants, warehouses and transportation vehicles in the supply chain. Also, cash flow is increased because if delivery of the product can be expedited, payments will also be received quickly.

SCM involves optimizing company's operations to maximize both speed and efficiency. Speed is important to achieve customer value and fast service. Increasing speed however, can

increase costs, so maximizing efficiency is equally important. The most effective supply chains deliver products as fast and as cheaply as possible, without sacrificing quality. Top companies accomplish this by using complicated logistical tools, such as computer algorithms that choose optimal routes for product shipping and large company databases, which allow distant employees to pool order information and coordinate their efforts in real time.

SCM is not just a process for reducing costs and achieving greater operational efficiencies within an organization. Although these are important considerations, modern SCM involves the strategic alignment of end-to-end business processes, to achieve market and economic value, as well as competitive advantage. Lowering your prices is a standard way to out-compete other businesses, but that's not always feasible. For example, the cost of doing business limits how low you can drop your prices, without going into the red. SCM provides a way to develop a competitive advantage, without having to lower your prices. For instance, by developing a more efficient supply chain, you can deliver orders faster to customers. All else being equal, customers will choose the company that meets their needs fastest, giving you a competitive advantage in your industry.

SCM touches major issues, including the rapid growth of multinational corporations and strategic partnerships; global expansion and sourcing; fluctuating gas prices and environmental concerns, each of these issues dramatically affects the corporate strategy and bottom line. Because of these emerging trends, SCM is one of the most critical business disciplines in the world today.

SCM helps streamline everything from day-to-day product flows, to unexpected natural disasters. With the tools and techniques that SCM offers, you'll have the ability to properly diagnose problems, work around disruptions and determine how to efficiently move products to those in a crisis situation.

A clear example of the effect of SCM within societies is Hurricane Katrina – 2005. In 2005, Hurricane Katrina flooded New Orleans, LA, leaving residents without access to food or clean water. As a result, a massive rescue of the inhabitants had to be made. During the first weekend of the rescue effort, 1.9 million meals and 6.7 million liters of water were distributed to the town (Wikipedia, 2016).

SCM is achieved by an organization proactively adopting initiatives, to move suppliers and customers into collaborative relationships for mutual gain. Business professionals who want to make a significant impact on the efficiency, effectiveness or profitability of their organizations should consider learning more about SCM and its value for companies operating in a competitive global marketplace.

Secondly, my particular interest of SCM resulted in my previous experience as a supply chain manager in multinational organizations. Investigating SCM has a definite correlation with my practical knowledge and experiences. I believe that combining practical experiences with the academic and theoretical part of science, became essential to help managers and companies to achieve their goals and gain an outstanding, competitive advantage in the strong global markets all over the world.

Also, I believe that this kind of merger between the practical side of SCM and the academic side of science's theories will have a positive impact on myself and will affect my future career positively.

Four theories serve to support the development of this Doctoral Thesis: Information Processing Theory, Resource Based View, Organizational Learning Theory, and Commitment-Trust Theory of Relationship Marketing.

Information Processing Theory (IPT) assumes that, "the greater the task uncertainty, the greater the amount of information that must be processed among decision makers during task execution, in order to achieve a given level of performance" (Galbraith 1974, 28). The profitability of a firm may well depend on the efficiency and effectiveness of the enterprise's supply chain, by coordinating the activities of each member to facilitate efficient flow of goods and services; and by matching of supply with demand. Accordingly, researchers have attempted to identify the factors that assist chain members in achieving such efficiency and effectiveness from a collective standpoint. To fulfil the above objectives, firms need to consider the information flow among the supply-chain members as an important mechanism.

IPT identifies three important concepts: information processing needs, information processing capability, and the fit between the two, to obtain optimal performance. Organizations need quality information to cope with environmental uncertainty and improve

their decision making. Environmental uncertainty comes from the environment dynamism and complexity, or the frequency of changes to various environmental variables (Premkumar, Ramamurthy, and Saunders, 2005).

According to previous studies, organizations have two strategies to cope with uncertainty and increased information needs, either to develop buffers to reduce the effect of uncertainty, or to enhance the information flow and reduce uncertainty, by implementing structural mechanisms and information processing capabilities. Therefore, organizations are highly recommended to build up inventory buffers to reduce the effect of uncertainty in demand or supply or to redesign their business processes by implementing integrated information system that improve information flow and reduce uncertainty within organizational subunits.

Information flows have a direct impact on production scheduling, inventory control, and delivery plans of the members in the supply chain (Lee, Padmanbhan, and Whang, 1997). The bullwhip effect refers to time delays in order and material movement, order batching, as well as a lack in the sharing of production information and market demand among members, that results in higher amplification of order and inventory fluctuations (Chen and Lee, 2009). A good solution to reduce this effect is to increase information sharing throughout the entire supply chain (Lee, Padmanbhan, and Whang, 1997).

SCI has been considered as a response of uncertainty. Whereas, SCI is recognized by both inter-organizational information flows and rich informal information sharing mechanisms, that help supply chain members cope with uncertainty (Flynn, Koufteros, and Lu, 2016).

Resource Based View (RBV) is a major theory in strategic management. RBV assumes that the competitive advantage of an organization is determined by the key resources owned by that organization. Barney (1991) agreed that organizational resources that can create advantage, must be valuable in the way in which the resource can enable a firm to conceive or implement strategies, that improve its efficiency or effectiveness. These valuable resources should not be possessed by a large number of competing firms, should not be easily imitated and should not be easily replaced by others substitutes. RBV argues that firm resources with these attributes, have the potential to generate sustained competitive advantage. Moreover, RBV focuses on specific relational resources, exchanged through the supply chain networks, which are

important in improving information sharing as well as enhancing supply chain performance (Cheng, 2011).

Previous empirical research based on IPT and RBV has examined the relationship between SCM and firm performance. Although recent studies have concentrated on the benefits associated with information sharing in the supply chain context (Sahin and Robinson Jr., 2005; Zhou and Benton Jr., 2007; Li et al., 2006; Guo, Fang, and Whinston 2006; Koçoğlu et al., 2011), very few studies investigated the specific impact of integrated information technology on supply chain relationships and firm performance and many researchers agreed that this area deserves further research attention (Liang, You, and Liu 2010; Oh, Teo, and Sambamurthy, 2012; Wu et al., 2006). To fill this gap, this Doctoral Thesis focuses integrated information technology and supply chain integration and analyses the effect of these variables on financial performance.

Organizational Learning Theory in general, is based on two premises (Bontis, Crossan, and Hulland, 2002). First, organizational learning includes not only reconnaissance (exploration) by assimilating new learning but also profiteering (exploitation) by using what has already been learned through feedback and feed-forward flows. Second, organizational learning is multi-level—individual, group, and organizational (Argyris and Schön, 1978).

Organizational learning is defined as "the development of new knowledge or insights that have the potential to influence behavior" (Slater and Narver 1995, 63). Also it refers to "an organizationally regulated collective learning process in which individual and group-based learning experiences concerning the improvement of organizational performance and/or goals are transferred into organizational routines, processes and structures, which in turn affect the future learning activities of the organization's members" (Schilling and Kluge, 2009, 338). Organization can increase its learning potential in the future and develop on a cognitive level by focusing on the gathering and development of information (Fiol and Lyles, 1985). This, in turn, leads to a superior competitive advantage for the organization.

Several researchers (Cangelosi and Dill, 1965; Crossan, Lane, and White, 1999; Crossan and Berdrow, 2003) indicate that organizational learning takes place at three levels: the individual, group, and organization. These distinguished levels in organizational learning work

together effectively to formalize information gathered on customers, competitors, and others in the marketplace which leads to organizational profit in the future.

The Commitment-Trust Theory assumes that the presence of relationship commitment and trust is essential to successful relationship marketing by playing an important central role. Commitment and trust are major keys for firms because they support marketers to (1) work at protecting relationship investments by cooperating and integrating with exchange partners, (2) focus on the expected long-term benefits of staying with existing partners instead of attractive short-term alternatives, and (3) view prospectively high-risk actions as being cautious because of the credence that their partners will not act opportunistically (Morgan and Hunt, 1994). Therefore, when both commitment and trust are present, they produce outcomes that encourage and support productivity, efficiency and effectiveness. Substantially, commitment and trust lead directly to cooperative and integrative behaviors that are contributory to relationship marketing success (Morgan and Hunt, 1994).

Commitment is ‘‘an essential part of successful long-term relationships’’ (Gundlach, Achrol, and Mentzer, 1995, 78) and has been defined as ‘‘an implicit or explicit pledge of relational continuity between exchange partners’’ (Dwyer, Schurr, and Oh, 1987, 19). Trust is considered as important and essential to all inter-organizational relationships and enables companies ‘‘to focus on the long-term benefits of the relationship’’ (Doney and Cannon, 1997, 35).

Therefore, the purpose of this study is to improve the SCM, financial performance and the relationships between customers and suppliers, through supply chain integration and integrated information technology. More particularly, it proposes a model in which supplier integration, internal integration and customer integration directly contribute to a firm’s financial performance. Moreover, I focus on the direct and indirect effect of integrated information technology through supply chain integration. In addition, I investigate the moderating role of relationship commitment, trust and hierarchical organizational culture in the relationship between integrated information technology and supply chain integration. Finally, I expect that the Information Technology (IT) department’s size and top management support, influence integrated information technology.

The Doctoral Thesis focuses on manufacturing and service firms in Egypt. I have selected the Egyptian market due to two reasons. Firstly, it is a virgin market in the field of SCM research and second, Egypt has a strong industrial sector, with a high level of competition and a differentiation and diversity of firms and products. To make the empirical analysis, our research questionnaire targets a specific segment and has been completed by a senior person in charge in the supply chain area of manufacturing and services companies such as CEO, General Manager, Supply Chain Manager, Purchasing/Logistics Manager, Production Manager, or Sales and Marketing Manager.

The current Doctoral Thesis responds to calls research and helps to increase awareness of the SCM phenomenon in various ways. Firstly, while some studies (Das, Narasimhan, and Talluri 2006; Cuijpers, Guenter, and Hussinger, 2011) argue that SCI may impair financial performance, some literature (Flynn, Huo, and Zhao 2010; Kim, 2009) confirmed that SCI has a positive effect on financial performance. Our examination extends this research stream by considering the positive effect of SCI.

Secondly, past evidence (Devaraj and Kohli, Hitt and Brynjolfsson 1996; 2003; Kettinger et al., 1994; Weill, 1992; Lee and Barua 1999) suggests that the investment in IT does not guarantee enhanced SCI and organizational performance. Our research is testing the impact of integrated information technology on SCI and financial performance.

Thirdly, in this research we focus on the effect of IT department size and top management support, considering them as antecedents for integrated information technology.

Fourth, the moderating role for trust, relationship commitment and hierarchical organizational culture in the relationship between integrated information technology and supply chain integration dimensions is one of our goals in this analysis.

Finally, our Doctoral Thesis is structured as follows. In chapter one, we are introducing SCM as a start base for the study, and then we discuss the dimensions of SCI, the importance of integrated information technology and financial performance. Also in chapter one, we examine the research theoretical background, including Information Processing Theory, Resource-Based View Theory, Organizational Learning Theory and Commitment-Trust Theory.

Chapter two focuses on the research model and hypothesis development including all the proposed relationships between all constructs. Antecedents are IT department size and top management support, mediators are integrated information technology and supply chain integration, result is financial performance and finally, research moderators are trust, relationship commitments and hierarchical organizational culture.

Chapter three will be about research methodology, data analysis and results. In this section, we present research methodology performed to test our theoretical hypotheses with data collected in empirical study. First, data collection procedure and measurement of construct are described, ending this section with statistical description of data collected. Second, conceptual models are tested with CFA and SEM analysis, ending this section with results of analysis for each conceptual sub-model.

Chapter four will present detailed discussion, contributions and implications, conclusion, limitations and future research. In this section, we will discuss our research result and show if it is consistent or contrast with previous studies. Also, we will present contributions related to our finding as well as theoretical and managerial implications. Finally, we will set a clear conclusion for our study, indicate the research limitations and suggest future lines of research to be highly recommended for the scholars in the future.

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CHAPTER (1): THEORETICAL BACKGROUND

1.1 Egyptian economy

The distinctive location a crossroads between Africa, Asia and Europe, Egypt remains one of the world's most strategically important countries, as it has been for millennia. Egypt has the third-largest GDP in the Arab world, after oil-rich Saudi Arabia and the UAE. In next table we show a summary of Egypt profile.

Table 1: Summary of Egypt profile

Region	2015	Northern Africa
Surface area (sq km)	2014	1,002.000
Population (proj., 000)	2016	93,384
Pop. density (per sq km)	2016	93.8
Capital city	2015	Cairo
Capital city pop. (000)	2015	18,772
Currency	2015	Egyptian Pound (EGP)
UN membership date	2013	24 October 1945

Source: ("UNdata | Country Profile | Egypt" 2016)

According to the ("Central Bank of Egypt" 2015), this country is considerably more diversified than many economies in the region, with manufacturing and agriculture contributors, making up 14.5% and 15.7% of GDP, respectively. Large domestic market, diversified economic base, favorable trade relations with major partners such as the EU, and geographic location are the country's economic strengths. As Egypt continues to rebuild its economy it faces a number of risks. External challenges include regional turmoil and a slowdown in exports due to muted global growth, although the nation's limited exposure to Asian markets lends it some degree of protection. The possibility of turmoil also features in the domestic risk matrix and security remains a national concern. Nevertheless, Egypt's economy has continued to expand, with GDP growth of roughly 4% for 2015 and 4.4% for 2016 (The Report: Egypt 2016).

Situated in the middle of trade routes linking West, East, North and South, Egypt has long been at the heart of regional and global commerce. For the past century and a half, the Suez Canal has been a major aqueduct for international trade, including oil. Building on decades of leadership in the Arab world, Egypt is undergoing major governmental transformation in the aftermath of the 2011 revolution. Presidential and parliamentary elections in recent years have helped the country to get political stability, reforming the constitution and the responsibilities

and scope of Egypt's leading institutions. While 2015 was characterized by greater political stability and growth, Egypt still faces challenges. Establishing companies and factories, creating jobs, building homes for its growing population, and improving living standards for the poorest are among the most pressing and closely linked to stability in the long term.

In the years since the 2011 revolution, the industrial sector has been put at the forefront of government plans for economic growth. New industrial zones, substantive training programs and development plans along the Suez Canal corridor have all been committed to paper as part of a strategy to boost the manufacturing sector's contribution to economic output over the next decade. The proposals and initiatives are of considerable value, particularly given that Egypt's industries have had to face headwinds over the past few years, both globally and domestically. In the shorter term, industrial growth is likely to be constrained by electricity and dollar shortages, but the government is working to address these issues and conditions should ease over the medium term. This would clear the way for more robust industrial expansion, as the growing population and rising incomes ensure that demand in segments from building materials to FMCGs remains strong. This will, in turn, result in significant opportunities for growth over the next decade.

1.1.1 Egypt GDP

The Gross Domestic Product (GDP) in Egypt was worth 330.78 billion US dollars in 2015. The GDP value of Egypt represents 0.53 percent of the world economy. GDP in Egypt averaged 68.54 USD Billion from 1960 until 2015, reaching an all-time high of 330.78 USD Billion in 2015 and a record low of 4.00 USD Billion in 1962.

Figure 1: Egypt GDP

Source: ("Egypt GDP | 1960-2016 | Data | Chart | Calendar | Forecast | News" 2016)

The Gross Domestic Product (GDP) in Egypt expanded 2.3 percent year-on-year in the nine months to March of 2016. GDP Annual Growth Rate in Egypt averaged 3.76 percent from 1992 until 2016, reaching an all-time high of 7.30 percent in the first quarter of 2008 and a record low of -4.30 percent in the first quarter of 2011.

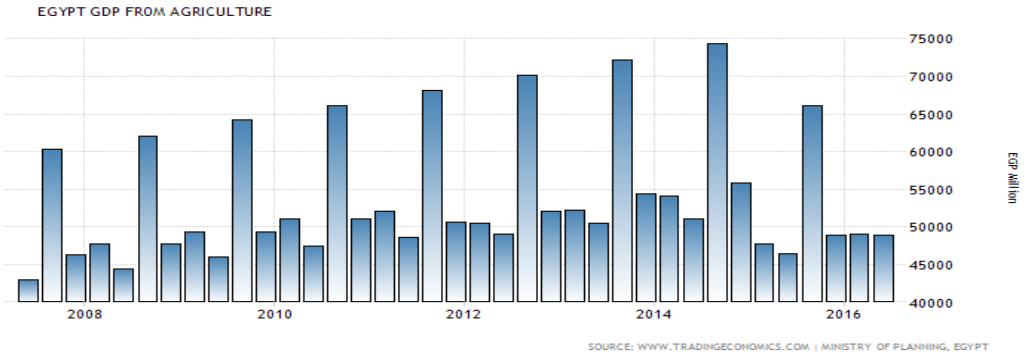
Figure 2: Egypt GDP annual growth rate

Source: ("Egypt GDP | 1960-2016 | Data | Chart | Calendar | Forecast | News" 2016)

Egypt GDP from Agriculture

GDP from Agriculture in Egypt decreased to 48,859.20 EGP Million in the second quarter of 2016 from 49,031.90 EGP Million in the first quarter of 2016. GDP From Agriculture in Egypt averaged 53,735.01 EGP Million from 2007 until 2016, reaching an all-time high of 74,376.50 EGP Million in the third quarter of 2014 and a record low of 42,897.60 EGP Million in the second quarter of 2007.

Figure 3: Egypt GDP from agriculture



Source: ("Egypt GDP | 1960-2016 | Data | Chart | Calendar | Forecast | News" 2016)

Egypt GDP from Construction

GDP from Construction in Egypt increased to 28,430.60 EGP Million in the second quarter of 2016 from 22,392.50 EGP Million in the first quarter of 2016. GDP From Construction in Egypt averaged 16,964.41 EGP Million from 2007 until 2016, reaching an all-time high of 28,430.60 EGP Million in the second quarter of 2016 and a record low of 10,878.70 EGP Million in the third quarter of 2007.

Figure 4: Egypt GDP from construction

Source: ("Egypt GDP | 1960-2016 | Data | Chart | Calendar | Forecast | News" 2016)

Egypt GDP from Manufacturing

GDP from Manufacturing in Egypt decreased to 72,717.90 EGP Million in the second quarter of 2016 from 74,196 EGP Million in the first quarter of 2016. GDP From Manufacturing in Egypt averaged 62,325.29 EGP Million from 2007 until 2016, reaching an all-time high of 77,639.80 EGP Million in the second quarter of 2015 and a record low of 51,326.60 EGP Million in the third quarter of 2007.

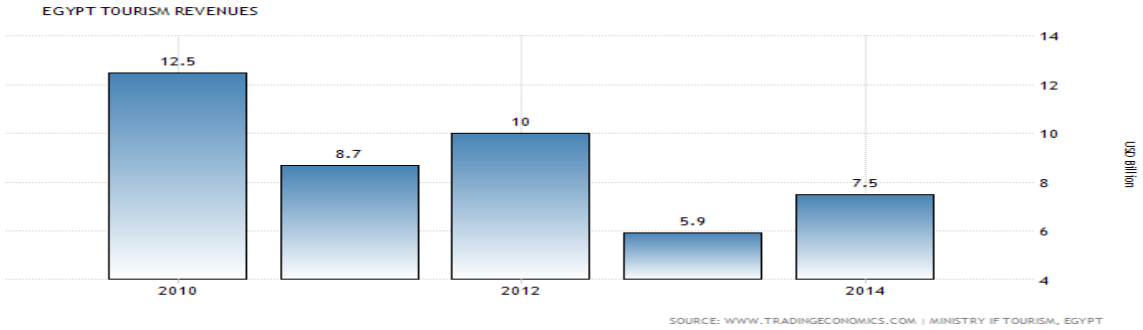
Figure 5: Egypt GDP from Manufacturing

Source: ("Egypt GDP | 1960-2016 | Data | Chart | Calendar | Forecast | News" 2016)

Egypt Tourism Revenues

Tourism Revenues in Egypt increased to 7.50 USD Billion in 2014 from 5.90 USD Billion in 2013. Tourism Revenues in Egypt averaged 8.92 USD Billion from 2010 until 2014, reaching an all-time high of 12.50 USD Billion in 2010 and a record low of 5.90 USD Billion in 2013.

Figure 6: Egypt GDP from Tourism

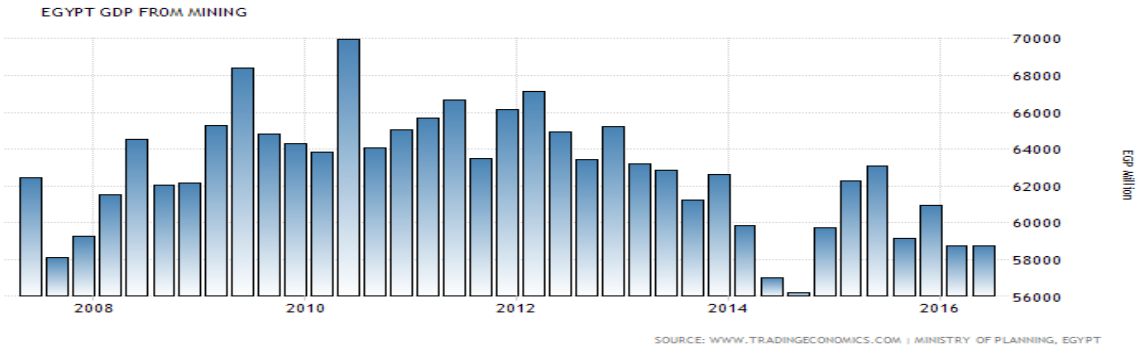


Source: ("Egypt GDP | 1960-2016 | Data | Chart | Calendar | Forecast | News" 2016)

Egypt GDP from Mining

GDP from Mining in Egypt increased to 58,744.10 EGP Million in the second quarter of 2016 from 58,741.10 EGP Million in the first quarter of 2016. GDP From Mining in Egypt averaged 62,808.97 EGP Million from 2007 until 2016, reaching an all-time high of 69,974.30 EGP Million in the second quarter of 2010 and a record low of 56,209.00 EGP Million in the third quarter of 2014.

Figure 7: Egypt GDP from mining

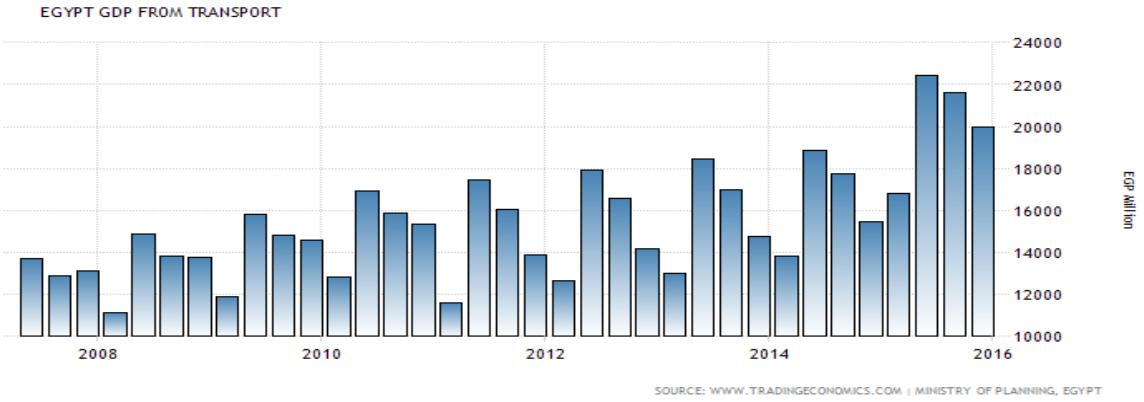


Source: ("Egypt GDP | 1960-2016 | Data | Chart | Calendar | Forecast | News" 2016)

Egypt GDP from Transport

GDP from Transport in Egypt decreased to 19,953.20 EGP Million in the fourth quarter of 2015 from 21,625.30 EGP Million in the third quarter of 2015. GDP From Transport in Egypt averaged 15,478.15 EGP Million from 2007 until 2015, reaching an all-time high of 22,462.50 EGP Million in the second quarter of 2015 and a record low of 11,148.90 EGP Million in the first quarter of 2008.

Figure 8: Egypt GDP from transport



Source: ("Egypt GDP | 1960-2016 | Data | Chart | Calendar | Forecast | News" 2016)

Finally, the GDP in Egypt expanded 4.90 percent in the first quarter of 2016 over the previous quarter. In next table we show an Egypt GDP summary.

Table 2: Egypt GDP summary

EGYPT GDP	1Q 2016	4Q 2015	UNIT
GDP Growth Rate	4.90	3.80	percent
GDP Annual Growth Rate	2.30	3.80	percent
GDP	330.78	301.50	USD Billion
GDP Constant Prices	482839.10	451842.00	EGP Million
Gross Fixed Capital Formation	58.00	64.00	EGP Billion
GDP per capita	2707.09	2653.90	USD
GDP per capita PPP	10249.96	10048.57	USD
GDP From Agriculture	48859.20	49031.90	EGP Million
GDP From Construction	28430.60	22392.50	EGP Million
GDP From Manufacturing	72717.90	74196.00	EGP Million
GDP From Mining	58744.10	58741.10	EGP Million
GDP From Transport	19953.20	21625.30	EGP Million

Source: ("Egypt GDP | 1960-2016 | Data | Chart | Calendar | Forecast | News" 2016)

1.1.2 Egyptian Manufacturing Industry

The Egyptian industry sectors were developed and diversified during early ancient times. Traditionally, agriculture was the primary source of employment. Majority of the population inhabited the Nile basin and were involved in agricultural production and agro-based industries. Trade through the Suez Canal was another source of revenue for the Egyptian government by providing the main access point to water transportation between Europe and Asia. Egypt's economy used to depend heavily on trade through the Suez Canal.

Today Egypt is one of few African economies with diverse industry sectors and minimal dependency on agricultural production. The steel industry dominates Egypt's industry sectors. Other major sectors include automobile, chemicals, cables and wires, construction, and consumer goods.

The future path for the industrial sector is to become the engine of growth, employment creation, and export promotion with the objective of deepening Egypt's integration into the global economy as a competitive player. As such, Egypt is bound to become the leading industrialized country in the Middle East and North Africa (MENA) region, positively integrated into the world economy; and an investment magnet in the region.

In fact, as part of investments in Egypt, Russia selected the East Port Said area to establish its industrial zone. The Russian industrial zone would include tailored industries such as engineering, machineries, equipment, ship manufacturing and food. The value of Russian investments in Egypt was estimated at US$ 107.8 million, equivalent to 398 firms in various sectors.

Additionally, Egypt opened the 35-kilometer expansion to the Suez Canal in August 2015, which runs parallel to the existing waterway and a widening of almost 40 kilometers of the existing canal. The expansion is part of a wider program to increase the Suez Canal's economic contribution, including the establishment of an economic zone for manufacturing and logistics. The total cost for the expansion of around US$ 8 billion was raised entirely from domestic sources via the issuance of five-year non-tradable Suez Canal investment certificates.

The following is a brief reference to the main companies of the most relevant industrial sectors in the Egyptian economy.

Steel

EZDK is a State-owned corporation and is the largest steel company in Egypt and the Middle East. Now a part of Ezz Industries, which consists of four steel plants in Alexandria, Sadat City, Suez and 10th of Ramadan City. In addition, it includes also Al-Jawhara (Gemma) Company for Ceramic and Porcelain tiles. EZDK is the largest independent producer of steel in the Middle East and North Africa (MENA) region and is the market leader in Egypt. It is ranked at the 65th place in the world biggest steel producers as per the World Steel Institute with total production of 4.5 Million Tons per year representing about three quarters of Egypt total annual production (6 Million Tons).

Cables and wires

Elsewedy family established the first private sector cable factory in Egypt (Arab Cables) in 1984. At that time, all other cable manufacturers in Egypt were solely owned by the Egyptian government. The company was located in 10th of Ramadan industrial zones, 60 km east of Cairo with expressways linking it to Egypt's major Mediterranean and Red Sea ports. It was specialized in the manufacturing of: low, medium & high voltage power cables, control cables, and overhead transmission lines. In 1996, a second factory was built specializing in power cable manufacturing for export, Egytech. Egytech was awarded quality standards such as (ISO, KEMA, BASEC, CE, VDE, and SGS) and was capable of exporting products to Algeria, Angola, Bahrain, Chad, Cyprus, India, Iraq, Ireland, Italy, Jordan, Kazakhstan, Kenya, KSA, Kuwait, Libya, Mauritius, Nigeria, Qatar, Romania, Russia, Rwanda, Spain and South Africa.

By the years, Elsewedy electric start aligning with the expansion strategy of the company, by operating in 8 diversified energy segments including wires and cables, transformers, telecom, energy management, turnkey projects, electrical products, solar energy solutions and wind energy generation. Elsewedy Electric has become a significant contributor to the economic growth in Egypt through its development into a well-established group with extensive holdings, both locally and beyond borders in several other Middle Eastern & African countries as well as some European & Asian countries. In 2010, Elsewedy Cables renamed itself Elsewedy Electric, to reflect the recent diversification of its portfolio of energy products and services.

Automobiles manufacturing

El Nasr Automotive Manufacturing Company is Egypt's state owned automobile company, founded in 1960 in Helwan, Egypt. Established in 1962, the company manufactures various vehicles under license from Zastava Automobili, Daimler AG, Kia, and Peugeot. Their current lineup consists of the Jeep Cherokee; the open-top, Wrangler-based Jeep AAV TJL; the Kia Spectra; the Peugeot 405; and the Peugeot 406.

Other manufacturers such as AAV - Arab American Vehicles, the Ghabbour Group, WAMCO - the Watania Automotive Manufacturing Company, and Manufacturing Commercial Vehicles (MCV) produce automobiles in Egypt. MCV was established in 1994 to represent Mercedes-Benz in the commercial vehicle sector in Egypt, producing a range of buses and trucks for domestic sale and for export throughout the Arab World, Africa, Latin America and Eastern Europe. The manufacturing plant at Salheya employs approx. 2500 people. Also there is Russian AutoVAZ manufacturing Lada.

Chemicals

Abu Qir Fertilizers Company (AFC) is one of the largest producers of nitrogen fertilizers in Egypt and the Middle East. It produces about 50% of the Egyptian Nitrogen Fertilizers. The company and the 1st Ammonia Urea plant were established at 1976. It is located at Abu Qir bay, 20 kilometers East of Alexandria, and there is Egypt Basic Industries Corporation (EBIC), one of the largest producers of greenfield ammonia plant.

Consumer electronics and home appliances

Olympic Group is the largest Egyptian group of companies operating mainly in the field of domestic appliances. The main products it manufactures are washing machines, refrigerators, electric water heaters and gas cookers.

Fresh Electric Company for Home Appliances is one of the major players in the home appliances field. Fresh was founded in Egypt in 1987 with a dream of introducing cutting-edge technology and affordable quality products to enhance customers' lives. Covering an area of 310920 m^2 between manufacturing, know-how and joint venture factories, Fresh currently runs more than ten state-of-the-art factories located in 10th of Ramadan City industrial zone, Badr

City, Kantara City and Ethiopia. Fresh is producing over 1000 varied models of premium products manufactured and assembled in its own facilities to exceed not only local, but global expectations. Driven by 25 years of expertise in the market and a passion to always innovate, Fresh currently exports to over 51 countries serving more than 150 million customers in Europe, Africa, the Middle East and Asia and USA while maintaining its position as a leader in the local market.

Bahgat Group is a leading company in the fields of electronics and electrical home appliances, industries, constructions, internet service providing, and T.V. stations. The group is composed of the following companies: Egy Aircon, International Electronics Products, Electrical Home appliances, General Electronics and Trading, Goldi Trading, Goldi Servicing, Egy Medical, Egyptian Plastic Industry, Egy House, Egy Speakers, Egy Marble, Dreamland and Dream TV.

Textiles and clothing

Textiles and clothing is one of the largest manufacturing and exporting processes in the country and a huge employment absorber. The Egyptian apparel industry is attractive for two reasons. Firstly, its proximity to European markets, whose rapidly changing fashions require quick replenishment. Egypt's geographical proximity to style-conscious Europe is a logistical advantage. Secondly, the production of garments is a low-capital and high-labor-intensive industry, and the local population of 66 million provides a ready workforce as well as a natural local consumer market that acts as a springboard for exports.

The textile industry contributes with one quarter of Egypt's non-oil export proceeds, with Cotton textiles comprising the bulk of Egypt's TC export basket. The public sector accounts for 90% of cotton spinning, 60% of fabric production and 30% of apparel production in Egypt. Misr Fine Spinning and Weaving is the largest enterprise of its kind in Africa and the Middle East. The private sector apparel industry is one of the most dynamic manufacturing processes in Egypt. Arafa Holding is a global apparel manufacturer and retailer, operating through a strong vertically integrated platform at the local & international levels.

1.1.3 Challenges of Egyptian companies

Today's business climate has rapidly changed and has become more competitive than ever before. Businesses now not only need to operate at a lower cost to compete, they must also develop their own core competencies to distinguish themselves from competitors and stand out in the market. In creating the competitive edge, companies need to divert their resources to focus on what they do best and outsource the process and tasks that are not important to the overall objective of the company.

Global markets are expanding beyond borders and re-defining the way to manage demand and supplies. Egyptian companies are driven by markets across continents. They are forced to keep looking to set up production centers, where the cost of raw materials and labor is cheap, to keep the cost of manufacturing down. Moreover, they work hard on sourcing raw materials and vendors, to supply the right quality, quantity and price which call for dynamic procurement strategy, spanning across countries.

With such scenarios, Egyptian companies need to procure materials globally from various vendors to supply raw materials to their factories situated in different continents. The finished goods out of these different factory locations, then pass through various chains of distribution networks involving warehouses, exports to different countries or local markets, distributors, retailers and finally to the end customer. Egyptian firms need to manage the value chain more effectively and efficiently.

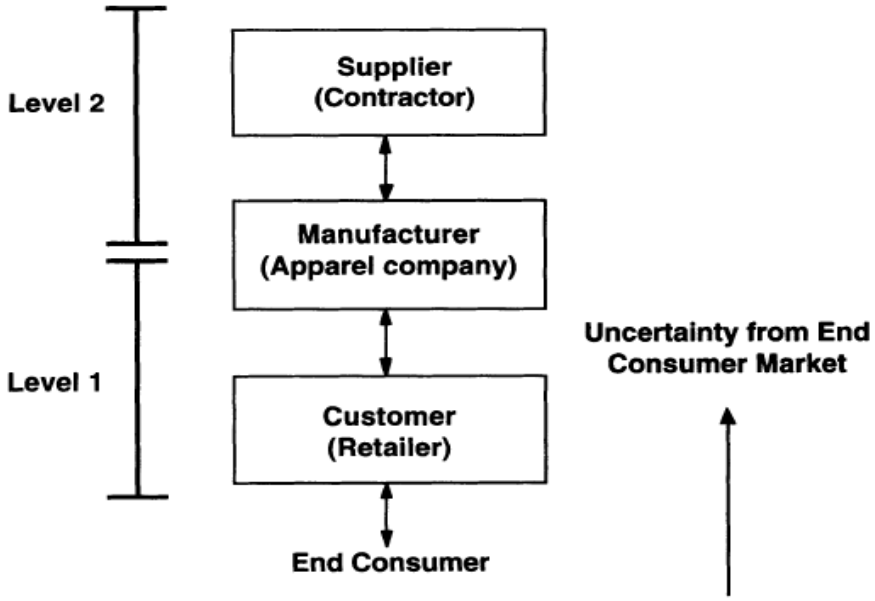
1.2 Supply chain

One of the worthiest pattern mutations of modern business management is that individual businesses no longer compete as solely independent entities, but in fact as supply chains.

A supply chain is a set of firms that pass materials forward (La Londe and Masters 1994). Whereas, many independent firms such as raw material and component producers, product assemblers, wholesalers, retailer merchants and transportation companies are involved in manufacturing a product and placing it in the hands of the end user. Moreover, Lambert, Ellram, and Stock (1998) described supply chain as the alignment of firms that brings products or services to market including in their concept the final consumer as part of the supply chain.

As defined by The Supply Chain Council (2002), a supply chain encompasses every effort involved in producing and delivering a final product from the supplier's supplier, to the customer's customer. Wathne and Heide (2004) have implemented a vertical supply chain network that involves relationships at two different levels: (1) between a manufacturer and a (downstream) customer and (2) between the manufacturer and an (upstream) supplier as per presented in next figure.

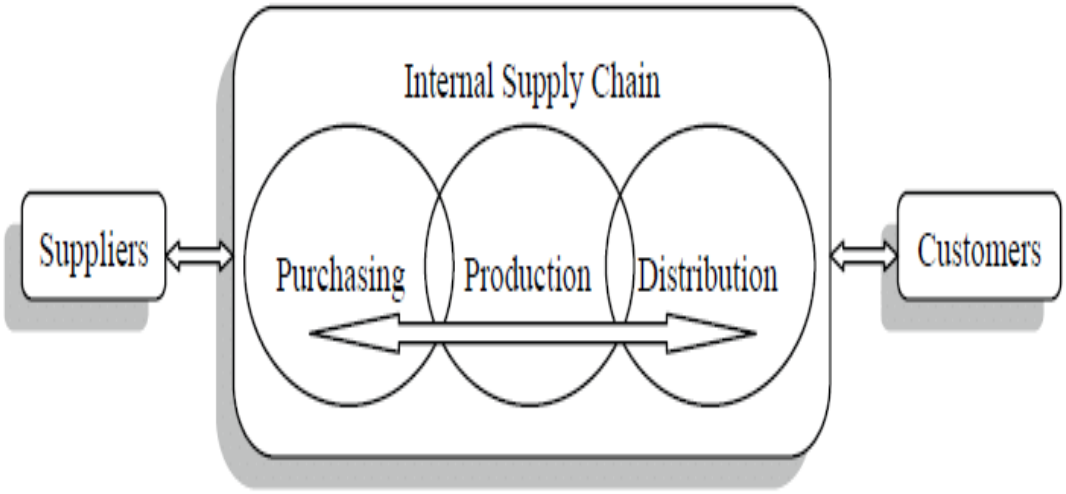
Figure 9: Supply Chain Network



Source: Wathne and Heide (2004)

The supply chain conceptually covers the entire physical process, from obtaining and procuring the raw materials, through all process steps until the finished product reaches the end consumer. According to several researchers (e.g., Thomas and Griffin, 1996), there are three traditional stages in the supply chain: procurement, production and distribution, as you can see in the next figure. Each stage may be shaped by several facilities in different locations around the world.

Figure 10: An illustration of a firm's supply chain

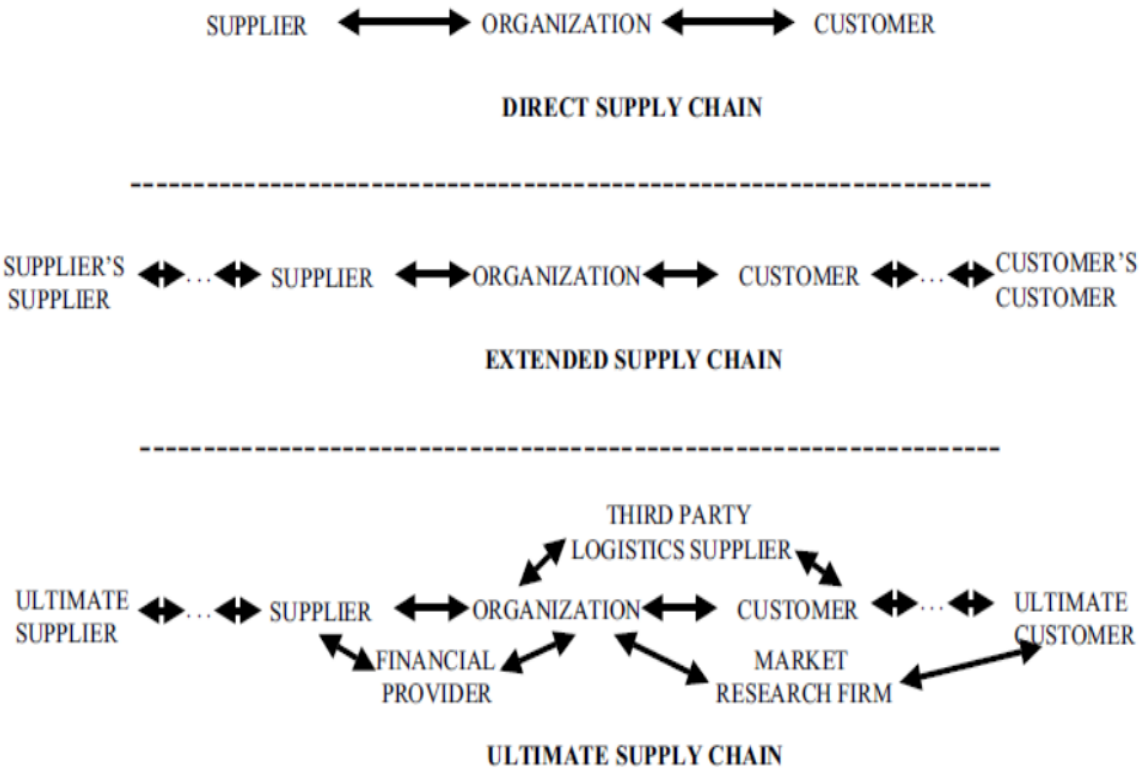


Source: Chen and Paulraj (2004)

Mentzer et al. (2001) considered supply chain as, "a set of three or more entities (organizations or individuals), directly involved in the upstream and downstream flows of products, services, finances and/or information from a source to a customer". They showed three degrees of supply chain complexity: a "direct supply chain," an "extended supply chain" and an "ultimate supply chain" (see next figure). The direct supply chain consists of a central organization, its suppliers and its customers. The extended supply chain includes suppliers of the immediate supplier and customers of the immediate customer. Finally, the ultimate supply chain includes all organizations that are involved in all flows of products, services, finance and information from the ultimate suppliers, to the ultimate customers. Also, the ultimate supply chain involves functional intermediaries, such as market research firms, financial and logistics services providers.

Meanwhile, Waller (2003) indicated three interrelated flows for integrated supply chain models. The first one is material flow, which has itself three different stages (purchasing, transformation and distribution), the second one is informational flow, which includes electronic data exchange or website linkages, and the last one is financial flow, that contains the payment to suppliers and subcontractors for the goods and services and the payment by the customer to the retailer for the final product. Therefore, the physical distribution is a critical part of the supply chain and information and financial components are as important as the physical flow in many supply chains.

Figure 11: Types of channel relationships



Source: Mentzer et al. (2001)

Christopher (2016) showed that supply chain is the network of organizations that are involved, through upstream and downstream linkages in the different processes and activities, that produce value in the form of products and services, delivered to the ultimate consumer. This means that a supply chain can consist of multiple firms, such as upstream suppliers, downstream distributers and ultimately the consumer.

Firms can no longer actively and successfully compete in segregation of their suppliers and other entities in the supply chain (Lummus and Vokurka, 1999). Swink, Golecha, and Richardson (2010) has supported the same idea by confirming that consistently the firms with an outstanding superior supply chain, outperform their rivals.

Every day supply chain maturity increases and their complexity increases accordingly. Improving productivity and increasing customer service, becomes the manager's main role. Profitability is usually expected to grow quarter over quarter. These internal and external forces have an impact on the tasks that were previously implemented internally, which shows the

importance of outsourcing (Leuschner, Rogers, and Charvet 2013; Williamson, 2008). Gattorna (1998) has indicated that, in this arising competitive environment, the maximum success of the single business will depend on management's ability to integrate the company's complicated and sophisticated network of business relationships.

Increased interaction among firms in a supply chain requires closer relationships to ensure that the flow of products, information, and payments operate efficiently (Flynn, Huo, and Zhao, 2010; Frohlich and Westbrook 2001; Leuschner, Rogers, and Charvet 2013; Thun 2010; Wagner 2003).

1.3 Supply Chain Management

The competition changed to be between supply chain instead of company, supply chain management examines improved performance, through better use of internal and external capabilities and building up coordinated supply chains (Anderson and Katz, 1998; Birou, Fawcett, and Magnan 1998; Christopher 1996; Lummus, Vokurka, and Alber 1998; Monczka and Morgan 1996). The increased competition recently pushed many firms to use their supply chain management as a competitive advantage to improve the firm's performance (Wowak et al., 2013).

Supply chain management (SCM) has grown in importance over the years. SCM has become such a hot topic. Today it is difficult to find a periodical on manufacturing, distribution, marketing, customer management, or transportation without seeing an article about SCM or SCM-related topics. The explosion of SCM literature has resulted from a number of fields, such as purchasing and supply, logistics and transportation, operations management, marketing, organizational theory, management information systems, and strategic management (Chen and Paulraj, 2004).

1.3.1 SCM Definition

According to the APICS Dictionary, SCM is defined as the design, planning, execution, control, and monitoring of supply chain activities, with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronising supply with demand, and measuring performance globally.

Council of Supply Chain Management Professionals (CSCMP) and the board of directors, comprise of industry experts, created official definitions for SCM. CSCMP described SCM as the planning and management of all activities involved in sourcing and procurement, conversion and all logistics management activities. It includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, SCM integrates supply and demand management, within and across companies. Therefore, SCM is the management of a network of all business processes and activities involving procurement of raw materials, manufacturing and distribution management of finished goods. SCM is also called the art of management of providing the right product, at the right time, in the right place, and at the right cost to the customer. In other words, managing all of the above activities means to manage demand and supply on a global scale which is SCM.

Growingly, SCM refers to the management of multiple relationships across the supply chain, which means it is not considered as a chain of businesses with one-to-one, business-to-business relationships, but a network of multiple businesses and relationships (Lambert and Cooper, 2000). Therefore, performance in the context of supply chain management is affected by all members involved, that contribute to the overall performance of the entire supply chain and no longer by a single firm (Chen and Paulraj, 2004).

Operating an integrated supply chain requires continuous information flows, which in turn help to create the best product flows. The customer remains the primary focus of the process. Achieving a good customer-focused system, requires processing information both accurately and in a timely manner for quick response systems, that require frequent changes in response to fluctuations in customer demand. Controlling uncertainty in customer demand, manufacturing processes and supplier performance, are critical to effective SCM.

Researchers have utilized supply chain management to describe strategic, inter-organizational issues (Harland, Lamming and Cousins, 1999), to discuss the relationship between a company and its suppliers (Helper, 1991; Hines 1994; Narus and Anderson, 1995), to identify and describe an alternative organizational form to vertical integration (Hakansson and Snehota, 1995; Thorelli, 1986) and to address the purchasing and supply perspective (Monczka and Morgan, 1996; Farmer, 1997). In next table we show a summary of presented definitions of SCM.

Table 3: SCM Definition

AUTHOR(S)	DEFINITIONS
(Wisner, Tan, and Leong, 2014)	"Supply chain management is the integration of trading partners' key business processes from initial raw material extraction to the final or end customer, including all intermediate processing, transportation and storage activities and final sale to the end product customer."
(Bozarth and Handfield, 2008)	"Supply Chain Management is the active management of supply chain activities and relationships in order to maximize customer value and achieve a sustainable competitive advantage."
(Simchi-Levi, Kaminsky, and Simchi-Levi, 2007)	"Supply Chain Management is a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses and stores, so that merchandise is produced and distributed at the right quantity, to the right locations and at the right time, in order to minimize system wide costs, while satisfying service level requirements."
(Sweeney, 2007)	"Supply Chain Management is the systemic, strategic coordination of the traditional business function and tactics across these business functions, within a particular company and across business within the supply chain, for the purpose of improving the long-term performance of the individual companies and the supply chain as a whole."
(Krajewski, Ritzman, and Malhotra, 2006)	"Supply Chain Management consists of developing a strategy to organise, control and motivate the resources involved in the flow of services and materials within the supply chain."
(Bowersox, Closs, and Cooper 2002)	"Supply chain (sometimes called the value chain or demand chain) management consists of firms collaborating to leverage strategic positioning and to improve operating efficiency. For each firm involved, the supply chain relationship reflects strategic choice. A supply chain strategy is a channel arrangement based on acknowledged dependency and relationship management. Supply chain operations require managerial processes, which span across functional areas within individual firms and link trading partners and customers across organizational boundaries."
(Tan, Kannan and Handfield, 1998)	"Supply chain management encompasses materials/supply management from the supply of basic raw materials to final product (and possible recycling and re-use). Supply chain management focuses on how firms utilise their suppliers' processes, technology and capability to enhance competitive advantage."
(Monczka, Trent, and Handfield, 1998)	SCM requires traditionally separate materials functions to report to an executive responsible for coordinating the entire materials process, and also requires joint relationships with suppliers across multiple tiers. SCM is a concept, "whose primary objective is to integrate and manage the sourcing, flow and control of materials using a total systems perspective across multiple functions and multiple tiers of suppliers."
(La Londe and Masters, 1994)	Supply chain strategy includes: "... two or more firms in a supply chain entering into a long-term agreement; ... the development of trust and commitment to the relationship; ... the integration of logistics activities involving the sharing of demand and sales data; ... the potential for a shift in the locus of control of the logistics process."
(Cooper, Lambert, and Pagh, 1997)	Supply chain management is "... an integrative philosophy to manage the total flow of a distribution channel from supplier to the ultimate user."
(Christopher, 1992)	"Supply chain management (SCM) is the process of planning, implementing, and controlling the operations of the supply chain with the purpose to satisfy customer requirements as efficiently as possible. Supply chain management spans all movement and storage of raw materials, work-in-process inventory and finished goods from point-of-origin to point-of-consumption."
(Stevens, 1989)	"The objective of managing the supply chain is to synchronise the requirements of the customer with the flow of materials from suppliers in order to affect a balance between what are often seen as conflicting goals of high customer service, low inventory management and low unit cost."

(Houlihan, 1988)	Differences between supply chain management and classical materials and manufacturing control: "1) The supply chain is viewed as a single process. Responsibility for the various segments in the chain is not fragmented and relegated to functional areas, such as manufacturing, purchasing, distribution, and sales. 2) Supply chain management calls for, and in the end, depends on, strategic decision making. "Supply" is a shared objective of practically every function in the chain and is of particular strategic significance because of its impact on overall costs and market share. 3) Supply chain management calls for a different perspective on inventories, which are used as a balancing mechanism of last, not first, resort. 4) A new approach to systems is required—integration rather than interfacing."

Often times SCM can be confused with the term "logistics management". However, according to CSCMP, logistics management is the part of SCM that plans, implements and controls the efficient, effective forward and reverse flow and storage of goods, services and related information, between the point of origin and the point of consumption, in order to meet customers' requirements. Cooper, Lambert, and Pagh (1997) have used the term SCM to explain the planning and control of materials and information flows, in addition to the logistics activities, not only internally within a company, but also externally between companies.

Logistics management activities typically include inbound and outbound transportation management, fleet management, warehousing, materials handling, order fulfilment, logistics network design, inventory management, supply/demand planning, and management of third party logistics service providers. To varying degrees, the logistics function also includes sourcing and procurement, production planning and scheduling, packaging and assembly and customer service. It is involved in all levels of planning and execution - strategic, operational, and tactical.

Successful SCM requires a change from managing individual functions to integrating activities into key supply chain processes. In fact, interaction between both upstream and downstream portions of the supply chain is highly requested by sending and receiving flows of information over time.

SCM has allowed companies to rethink their entire operation and restructure it, so that they can focus on its core competencies and outsource processes that are not within the core competencies of the company. Due to the current competitive market, it is the only way for a company to survive.

1.3.2 Objectives and strategies of the SCM

SCM is a critical backbone to business organisations today. The effectiveness of SCM leads to effective market coverage, availability of products at locations that hold the key to revenue recognition. Very simply stated, when a product is introduced into the market and advertised, the entire market in the country and all the sales counters, need to have the product where the customer can buy and take delivery of it. Any lack of the product being available at the right time, can result in a drop-in customer interest and demand, which can be disastrous.

Enhance productivity, reduce inventory and lead time are the short-term objectives of SCM. However, increase market share and integration of supply chain are the long-term objectives of SCM (Koh et al., 2007). SCM will not only impact their market positioning, but also strategic decision on choosing the right partners, resources and manpower. By focusing on core competencies, this will allow the company to create niches and specializations in core areas. In order to create a niche for competitive advantage, companies must look at the bigger picture of the whole process and figure out which process can be reduced, eliminated, raised and created. SCM has allowed business nowadays to not just have productivity advantage alone, but also a value advantage.

Vonderembse et al. (2006) classified SC strategies to describe: (i) efficient supply chains, (ii) risk-hedging supply chains, (iii) responsive supply chains, and (iv) agile supply chains. Other researchers (e.g., Qrunfleh and Tarafdar, 2014) explain and discuss two distinct supply chain strategies: (i) lean and (ii) agile and we follow the same direction in this research.

Lean strategy

‘‘Lean’’ strategy is the strategy that focus on creating a cost-efficient supply chain, by reducing inventory lead times and waste (Vonderembse et al., 2006; Wang, Huang, and Dismukes 2004).

Lean strategy is best fit when demand is relatively stable and predictable and product variety is low (Qi, Boyer, and Zhao, 2009). A higher degree of lean supply chain will lead to better supply chain performance. Meanwhile, the agile supply chain has a higher capacity, adapting changes in customer demand effectively (Qi, Boyer, and Zhao, 2009; Vickery, Calantone, and Dröge 1999).

Lean supply chain strategy is highly requested within the frame work of just-in-time (JIT) principles (Qrunfleh and Tarafdar, 2014). The lean supply chain strategy aims to efficiently manage the supply chain by eliminating waste and utilizing continuous improvement techniques, thus enhancing the quality of parts, minimizing inventory and reducing delivery times. This strategy includes organizations that work in a collaborative and integrative mode with suppliers on key operational parameters, such as inventory levels and lead times, to execute practices such as mass-production and just-in-time (Qi, Boyer, and Zhao 2009; Thun, 2010). Therefore, supply chain is able to reduce set-up time, adjust capacity, enhance product quality and respond quickly to the customer, due to eliminating waste inventory and improving the quality of parts.

Wal-Mart is one of the best examples showing that applying lean supply chain strategy depends on the quality of shared information. They use inter organizational software applications, that allow them to provide real time, point of sale data to major suppliers (e.g. Procter & Gamble) through integrated satellite based communication systems, thus facilitating a continuous view of inventory, replenishment requirements. This system can analyze long term ordering and inventory trend data, to circulate systems that provide decision guidance to suppliers with regard to safety, stock and order quantities.

Works in this area are mostly Operation Research oriented, without considering manufacturing aspects. Recently, researchers have begun to realize that the decision and integration effort in supply chain design, should be driven by the manufactured product, specifically, product characteristics and product life cycle. In addition, decision-making processes should be guided by a comprehensive set of performance metrics. Effective supply chain design calls for robust analytical models and design tools. Wang, Huang, and Dismukes (2004) relate product characteristics to supply chain strategy and adopt supply chain operations reference (SCOR) model level I performance metrics, as the decision criteria. An integrated analytic hierarchy process (AHP) and pre-emptive goal programming (PGP) based multi-criteria decision-making methodology, is then developed to take into account both qualitative and quantitative factors in supplier selection. While the AHP process matches product characteristics with supplier characteristics (using supplier ratings derived from pairwise comparisons) to qualitatively determine supply chain strategy, PGP mathematically determines the optimal order quantity from the chosen suppliers. Since PGP uses AHP ratings as input, the

variations of pairwise comparisons in AHP will influence the final order quantity. Therefore, users of this methodology should put greater emphasis on the AHP progress to ensure the accuracy of supplier ratings. Also, they describe a typology for designing supply chains that work in harmony to design, produce and deliver products with different characteristics and customer expectations. Moreover, they discuss supply chain types that are necessary for success across three types of products: standard, innovative and hybrid. The key success factor for a product change as the product moves through its life cycle may require different supply chain characteristics and capabilities. Finally, that research blends literature and theory development, with cases study research to create the typology and develop a set of research questions for further investigation.

In lean strategy, ERP software plays a vital role by integrating work flows across supply chain functions, such as procurement and production planning, by coordinating materials' ordering between purchasing and production functions, which result in a lower raw material inventory.

Bendoly and Schoenherr (2005) conducted a research which showed that applying lean strategy using ERP leads to lower procurement costs for maintenance-repair-order (MRO) type standardized. Moreover, it leads to improved availability of operational data that is required for day-to-day control of operations by maximizing productivity and minimizing errors (Qrunfleh and Tarafdar, 2014).

Using RFID based inventory tagging and tracking will lead to successful lean supply chain strategy, by increasing the accuracy of inventory records (Qrunfleh and Tarafdar, 2014). This kind of application has a positive effect, that results in reducing the inventory on hand, safety stock levels and inventory loss/robbery, which therefore enhances efficiencies and increases the benefits of leanness in the supply chain (Ketikidis et al., 2008; Roh, Kunnathur, and Tarafdar, 2009; Shah, Goldstein, and Ward, 2002).

Agile strategy

An ''agile'' strategy is the other strategy that focus on achieving flexibility and adaptability in the face of changing customer needs and competitive environments through

quick, dynamic and continual response (Gunasekaran, Lai, and Cheng 2008; Lin, Chiu, and Chu 2006).

Agility supply chain strategy is required when a firm seeks flexibility in the production and delivery processes. From information processing support perspective view, the agile supply chain strategy requires a high level of analyzing data on customer trends, competitor actions and product-market strategic options to be done by firms (Qrunfleh and Tarafdar, 2014).

Puckridge and Woolsey (2003) indicated that applying agile supply chain strategy required a high level of information sharing, flexibility and information technology (IT) capabilities, which lead firms to be able to respond rapidly to unpredictable changes in the market. Market information systems are one of the IT capabilities that can support supply chain agility in various ways, whereby it facilitates quick observation, quick response, and deep analysis in the context of changing customer and market demand. Also, strategic decision support systems are important as IT facilitators use them to contribute corresponding entry and exit decisions for new or existing product-markets.

A great example of agile supply chain strategy is Zara, the Spanish clothier known for rapid design and worldwide delivery of new fashion. It represents a perfect model of how agile supply chain strategy through information sharing, enables better execution of agility and leads to increased supply chain flexibility (Lee, 2004).

Ferdows, Lewis, and Machuca (2004) indicated three types of information sharing that managed Zara's ability to design, produce and make available a new garment in stores worldwide in just 15 days. Firstly, they use a combination of wireless hand held tools and networks to obtain and upload market and customer data from its stores and submit it immediately to product managers in its central design office. Secondly, using decision-making systems that analyze the collected data by groups of collaborated designers and product managers, to determine new designs and order quantities. Finally, using applications to facilitate the exchange of information between the firm and its suppliers, for integration, communication and coordination in the context of distribution and delivery of raw cloth and finished clothes.

Qrunfleh and Tarafdar (2014) have summarised the differences between lean and agile supply chain strategies as per below next table.

Table 4: The differences between lean and agile supply chain strategies.

SUPPLY CHAIN STRATEGY	LEAN	AGILE
Objective	Focuses on cost reduction and incremental improvements for existing products Focuses on elimination of waste and non-value added activities across the supply chain	Tracks and understands customer requirements by interfacing closely with the market Aims to produce in any volume (and not just the optimal capacity utilization volume) and deliver simultaneously to a wide variety of markets Provides customized products at short lead times (i.e. focuses on responsiveness)
Inventory strategy	Generates high inventory turnover and minimizes inventory through the supply chain	Deploys significant stocks of parts to tide over unpredictable market requirements
Lead time focus	Shortens lead-time only so long as doing so does not increase delivery or inventory costs	Reduces lead times to customer specifications and requirements
Manufacturing focus	Maintains high average capacity utilization rate	Deploys excess/buffer capacity to ensure that raw material/components are available to manufacture the product according to market requirements
Product design strategy	Reduces the cost of production	Produces to modular designs, by using a limited number of basic components and processes that can be assembled into different products

Source: Qrunfleh and Tarafdar (2014)

1.3.3 Activities, practices, and processes of SCM

Understanding the essence of SCM has been targeted, studied and progressed by many researchers (Chen and Paulraj, 2004). SCM implies activities and practices. The supply chain activities recently became more sprinkled among customers and suppliers, which request customers and suppliers to work together more closely. One of the highly researched topics during the last 20 years, is supply chain integration (SCI) (Leuschner, Rogers, and Charvet, 2013).

There are several definitions for SCM practices. For example, several researchers (Koh et al., 2007; Li, Ragu-Nathan, et al., 2006) defined SCM practices as a set of activities undertaken in a firm to manage its supply chain effectively. Otto and Kotzab (2003) viewed SCM practices as a special combination of strategic partnership between retailers and suppliers. There are many aspects for SCM practices, including close partnership with suppliers, close partnership with customers, just-in-time supply, strategic planning supply chain benchmarking,

few suppliers, holding safety stock and sub-contracting, e-procurement, outsourcing and many suppliers (Koh et al., 2007).

SCM also integrates processes. According to Ellram (2007) supply chain has seven theoretical processes which are: (i) information flow, (ii) customer relationship management, (iii) supplier relationship management, (iv) capacity and skills management, (v) demand management, (vi) service delivery management and (vii) cash flow. Meanwhile, Wu et al. (2011) identify: (i) customer relationship management, (ii) supplier relationship management, (iii) information and technology management, (iv) demand management, (v) capacity and resource management, (vi) service performance, (vii) service supply chain finance and (vii) order process management.

A wide range of supply chain practices that generate superior performance have been identified (Chen and Paulraj, 2004). For example, purchasing, supplier selection and involvement, customer focus, top management support, relational governance and inter-organizational communication (Bensaou and Venkatraman, 1995; Buttermann, Germain, and Iyer, 2008; Paulraj, Chen, and Lado, 2012).

Purchasing is one of the most important supply chain practices. Purchasing plays an important strategic role in supply chain management. Recently, it has been considered as a strategic weapon in many firms, due to the rapidly changing competitive environment. Chen, Paulraj, and Lado (2004) mentioned that, purchasing performance can be measured in terms of contributions to overall firm success and more purchasing professionals are trained in the cross-functional areas and strategic elements of the competitive strategy. Ramsay and Croom (2008) considered purchasing as an integral, strategic function that facilitates the mobilization and deployment of supply chain competencies to achieve a firm's strategic goals. At the strategic level, Paulraj, Chen, and Flynn (2006) found that purchasing can enhance supply integration, leading to enhanced supply chain performance.

Supplier involvement refers to the extent of the engagement between buyer firm and supplier firm, in the knowledge development and exchange (Takeishi, 2001) as well as participating in design and development of products (Wynstra and Pierick, 2000). Involving suppliers in product development moderates quality and lead-time problems and also allows the

buying firm to gain competitive advantage, by leveraging the supplier's knowledge-based competencies (Takeishi, 2001).

Many scholars have confirmed that there are potential benefits of early involvement of suppliers in new product development, which might outbalance the costs involved (Paulraj, Chen, and Lado, 2012). Moreover, it has been agreed that involving and working closely with suppliers in knowledge and product development might facilitate internal integration and coordination within and between supply chain partners, enable knowledge-sharing routines within supply chains and facilitate the effective leveraging and deployment of relation-specific assets (Cousins and Menguc, 2006; Dyer and Singh, 1998).

Supplier involvement can increase when a firm uses a limited number of suppliers, who are allocated a majority of the purchased material (Kekre, Murthi, and Srinivasan, 1995) and when a firm has a long-term relationship orientation.

The policies of reducing number of suppliers has been found to be positively related to the buyer–supplier, product design relationship (Toni, 1999). Various approaches and processes to develop different types of supply base reduction, have been adopting by organizations including systematic elimination and standardization (Ogden and Carter, 2008).

A long-term relationship orientation becomes one of the firms goals, that reflect cooperative arrangements between two or more independent firms, engaged in mutual beneficial business exchanges for a long period of time (Smith, Carroll, and Ashford, 1995). This long term relationship enables the supply chain partners to develop a deeper understanding and knowledge of each other's discriminatory capabilities (Shin, Collier, and Wilson, 2000). Therefore, supplier contracts become long-term oriented and suppliers are providing customers with information regarding their processes, quality performance and even cost structure (Carr and Pearson, 1999). Exchanging knowledge between firms facilitates effective integration and interactions (Mowery, Oxley, and Silverman, 1996). A significant positive relationship between long-term orientation and buyer–supplier performance has been evidenced (Humphreys, Li, and Chan, 2004).

Customer focus refers to managing customer relationships and committing to customers in the way firms and customers share interdependencies, values and strategies over the long

term (Lengnick-Hall, 1996). Focusing on customers facilitates assembling and deploying relational capabilities within the context of buyer–supplier relationships (Dyer and Singh 1998; Kale, Singh, and Perlmutter, 2000; Paulraj, Lado, and Chen, 2008). Organizations are looking for outstanding performance to gain competitive advantage not only by meeting customer's needs and expectations, but also by exceeding it. Due to regular changes in customer's needs, organizations need to regularly review and reappraise these needs and expectations to rearrange and revise its customer focus and adjust its supply chain strategy accordingly (Sila and Ebrahimpour, 2005). Therefore, in order to create and deliver greater value for customers and to achieve sustainable strategic advantage through supply chain management systems, firms must constantly recheck their customer base, needs and expectations (Lado, Paulraj, and Chen, 2011).

Top management support plays an important role in gaining and sustaining competitive advantage for firms (Mahoney, 1995). Top managers need to create strategic vision, communicate that vision throughout the organization, ingrain the main core values and manage members to work in an integrative and cooperative mode to realize the vision (Lado, Boyd, and Wright, 1992). Moreover, they play a vital role in enhancing the firm's environment by improving the relationship. Therefore, by creating the firm values that support strategic integration and collaboration, supply chain partners will achieve the competitive advantage over others.

Top management support is not only critical to build, maintain and enhance relationships, but also allows firms to develop specific, relational capabilities for mutual gain (Paulraj, Chen, and Lado, 2012). Relational governance and interfirm relationships issues are receiving more attention in the supply chain literature. Different aspects and directions of a firm's relationship have been addressed in many researches, with various partners from different theoretical perspectives (Bergen, Dutta, and Walker, 1992; Cannon and Perreault, 1999; Wilson 1995)

Relational governance refers to the mechanisms, such as relational norms and actions, which are used by supply chain partners, to maintain their upstream and downstream relationships based on common goals (Heide and John, 1992; Joshi and Campbell, 2003). Relationship continuity and mutuality is included in relational governance, which can organise

and adjust opportunism by shaping a visible future and moral controls (Joshi and Campbell, 2003). There are many relational governance mechanisms like trust, commitment, coordination and joint problem solving, which play a significant role in the relationships among supply chain partners.

Electronic communication networks as an interpersonal and formal communication channel plays a significant and vital role in establishing, facilitating and improving supply chain integration through a collaboration process. Also, it can be considered as relational investment for collaborative value creation (Dyer and Singh, 1998; Madhok and Tallman, 1998).

Information technology is prevailing the supply chain at every point and each stage by transforming all the performed related activities (Palmer and Griffith, 1998). A study performed by Fawcett et al. (2011) indicated that investments in information technology was the greatest competitive weapon that assists the supply chain, to effectively manage inventory using more complete, accurate and timely information.

Successful internal cross-functional integration within a firm and external integration with suppliers or customers, is highly requested to implement SCM practices that achieve superior supply chain performance including cost, quality, flexibility and time performance (Cagliano, Caniato, and Spina, 2006; de la Fuente, Ros, and Cardós, 2008; Kim, 2009; van der Vaart and van Donk, 2008; Wang and Wei, 2007).

Supply chain practices and capabilities are completely integrated together. Practices reinforce and effectively deploy supply chain capabilities to achieve beneficial outcomes and capabilities provide the basis for implementing those practices. Paulraj, Chen, and Lado (2012) suggested that supply chain practices may lead to sustainable collaborative advantage when such practices are based on, and foster relational capabilities. They indicated that coping and transferring supply chain practices across organisations may not generate sustainable competitive advantage, that is why they confirmed that supply chain practices must be combined in unique and synergistic ways and integrated with organizational capabilities that explain the sustainability of competitive advantage.

Coordination and integration of the various functions within and across collaborating organisations, have been highly stressed by researchers in areas of cross-functional teams

(Narus and Anderson, 1995). Cross-functional knowledge provides the team members with a complete picture about all organisation's functions (Keller, 2001). The use of cross-functional teams in organisations, enables supply chain partners to solve a wide range of problems and complicated issues that affect performance (Denison, Hart, and Kahn, 1996; Keller, 2001), by enhancing integration, coordination, cooperation, capability and connection between supply chain partners (Gulati, 2007). Therefore as a result, supply chain partners are able to gain and sustain strategic competitive advantage, through improving product design, reducing cost, initiating total quality and creating knowledge, by using cross-functional teams (Johnston and Kristal, 2008).

1.3.4 Supply chain integration

Many researchers indicated that SCM is an integrative function (Ellram and Carr 1994; Freeman and Cavinato 1990; Gadde and Håkansson 1994). Supply chain integration (SCI) refers to the linkages of supply chain processes across organizations in the context of scope and strength (Leuschner, Rogers, and Charvet, 2013). Information, operational, and relational integration represent the most important part that facilitate such processes (Flynn, Koufteros, and Lu, 2016).

Romano (2003) mentioned that SCI indicates to the business processes of coordination mechanisms that should be stream lined and inter connected both within and outside company boundaries. SCI consists of three dimensions: internal integration, supplier integration and customer integration. Internal integration includes interaction and collaboration that link a firm's internal functions into a coherent and concrete system (Flynn, Huo, and Zhao, 2010). It also includes sharing of information across functions (Morash and Clinton, 1997) to improve collaboration and enable better understanding of customer's needs and expectations (Wong, Boon-itt, and Wong, 2011). Supplier and customer integration represent the same behaviors and relations between a firm and its suppliers or customers (Zhao et al., 2011)

Closely integrating the internal functions within a company and effectively linking them with the external operations of suppliers, customers, and other channel members is the aim of SCM to improve competitive performance. Firms that aim to have effective construction of supply chain management practices, need to pay attention to supply chain integration by

applying efficient linkage amongst various supply chain activities to gain these benefits (Kim, 2009).

To ensure that the supply chain is efficient and responsive to dynamic market needs, it was essential for firms to look outside their organizations for opportunities to collaborate and integrate with partners.

Integration could take place between firms in terms of material and information. Chen and Paulraj (2004) confirmed that to study the extent of information integration; information technology must be included. The integrated networks structure should include computer systems, distribution centers, factories and support organizations to achieve a shared vision, which allows customers to gain benefits from new services and pricing.

By facilitating collaboration, coordination and controlling materials and information between members of a supply chain, SCI has been considered as an effective behavioral response to some types of uncertainty (Koufteros et al., 2014; Wong, Lai, and Bernroider, 2015). Such integration between supply chain members develops the capability to cope with changing conditions through quick response (Wu and Barnes, 2012). Firms that have achieved greater supply chain integration are able to leverage the resources and knowledge of their suppliers and customers (Fawcett and Magnan, 2004).

However, achieving supply chain integration is not an easy mission due to its complexity. It is stretched to control material, information, and product flow from vendors to final consumers and coordinate external activities with customers and suppliers, as well as internal functions within a firm. Integrated networks of suppliers, manufacturers, distributors, and customers must be activated to maintain superior supply chain performance and firm performance.

According to Frohlich and Westbrook (2001) there is a main concept called arc of integration, which includes operationalization of the scope of integration within and across organizational boundaries. This concept confirmed that it is relatively easier to achieve a narrower arc (i.e. integrating within internal functions) as compared to a wider arc (i.e. integrating within internal functions and across organizational boundaries) (Jayaram and Tan, 2010). In other words, internal integration is more easily achievable than external integration.

1.3.5 Consequences of the SCM

Competitive performance can be enhanced through SCM by applying deep internal integration for the core functions within a company and effectively linking them with the external operations of suppliers, customers and other channel members (Kim 2009; Yu et al., 2013).

The integration of key business processes from design to delivery, from original suppliers to end users, through SCM leads to the provision of products, services and information, which add value for customers and stakeholders (Gunasekaran and Ngai, 2004; Lambert, Cooper, and Pagh, 1998). SCM is an effective weapon that helps firms not only competing, but also having more versatility and superiority over their rivals (Craighead, Hult, and Ketchen Jr. 2009).

1.4 Theoretical background

The current Doctoral Thesis is based on four important theories: (1) the information processing (IP) view of the firm (Galbraith, 1973), (2) the resource-based view (RBV) of the firm (Barney, 1991, 2012; Richey, Daugherty, and Roath, 2007; Yang, Marlow, and Lu, 2009; Fugate, Mentzer, and Stank, 2010; Leuschner, Charvet, and Rogers, 2013), (3) the organizational learning theory (Argyris and Schön, 1978; Cangelosi and Dill, 1965; Crossan, Lane, and White, 1999), and (4) the commitment-trust theory of relationship marketing (Morgan and Hunt 1994; Wallenburg et al. 2011).

1.4.1 Information Processing Theory

Information Processing Theory (IPT) is particularly relevant to our study in integrated information technology and supply chain. IPT considers organizations as information processing structures that collect, analyze, and coordinate information, in order to make operational and strategic decisions. Firms have to design the processes then, apply either structural means; such as rules, procedures and lateral communication mechanisms or the application of information system in order to create information processing capabilities that support information requirements for decision making (Qrunfleh and Tarafdar, 2014).

IPT suggests that organizational design needs to focus on resolving uncertainty. The theory considers uncertainty as a lack of information about conditions of tasks and environment (Galbraith, 1974). The level and types of uncertainty differ across organizations and among individual sub-units within organizations.

Information processing theorists have suggested various sources or types of uncertainty, including: the characteristics of the independent tasks that sub-units must perform, instability of the external environment, interdependence with other sub-units (Tushman and Nadler, 1978) and differentiation among subunits (Daft and Lengel, 1986).

Many styles of coordination exist and these vary in the degree to which they are suited for dealing with various types and levels of uncertainty. For example, the theoretical literature indicates that mechanisms, such as hierarchical referral and standard operating procedures, are best fit when uncertainty is low, while computerized information sharing and lateral relations are appropriate in high uncertainty situations. Therefore, the organization must match the appropriate style(s) of coordination with its particular uncertainties (Galbraith, 1974)

The frequency of changes to various environmental variables and the complexity of the environment, lead to environmental uncertainty (Duncan, 1972). According to (Premkumar, Ramamurthy, and Saunders, 2005) there are two strategies to cope with uncertainty and increased information needs: (1) creating and developing buffers that reduce the effect of uncertainty and (2) executing Information Technology (IT) structural mechanisms and information processing capabilities, that improve the level of information flow and thereby reduce uncertainty. Building inventory buffers to reduce the effect of uncertainty in demand or supply and adding extra safety buffers in product design are clear examples for the first strategy. However, redesigning of business processes in organizations and creating integrated information sharing that improve information flow and reduce uncertainty within a firm, is a clear example for the second strategy. These two strategies help organizations to achieve a better information flow that supports beating the uncertainties in the supply chain.

The importance of information processing capabilities in organizations has been identified by early researchers (Anderson, 1968; Galbraith, 1973; Tushman and Nadler, 1978). There is bounded rationality, which suggests that a single entity can never have complete knowledge regarding a decision, it restricts and controls organizational behavior (Galbraith,

1973; Gattiker and Goodhue, 2004). While others have utilized IPT to debate the direct benefits of internal integration (Hult, Ketchen, and Slater, 2004; Rosenzweig, 2003; Swink, Narasimhan, and Wang, 2007; Wong, Boon-itt, and Wong, 2011), consider the importance of information processing capabilities created by internal and integration efforts, as characteristics by interconnected information systems and approaches which target improvement in cross-functional relations. In our view, internal integration and external integration processes create information processing capabilities, which enable the absorption and application of knowledge, which leads to better business performance.

Theoretical studies (Daft and Weick, 1984) and empirical studies (Gioia and Thomas, 1996; Thomas, Clark, and Gioia, 1993) agreed that shared meaning between supply chain members provides a basis for commonly directed effort among organization members. We support the same direction of applying organizational information processing theorizing to the strategic supply chain context, which will help in achieving better outcomes if firms develop a shared meaning amongst chain members. Sharing vision, strategies and operations has a positive impact on the supply chain and firm performance.

In recent years, SCM has attracted significant attention especially from IT perspectives. The successful utilization of new IT-enabled processes has motivated firms to examine inter-organizational business processes, where there are significant operational inefficiencies to reduce these inefficiencies in internal operations (Premkumar, Ramamurthy, and Saunders, 2005). IT needs to be considered among the supply chain partners, since it deals with multiple trading partners with a wide range of communication. The aim of such IT needs is to reflect a suitable fit between the technology capability and the requirements of the business process (Premkumar, Ramamurthy, and Saunders, 2005).

Lee (2000) mentioned that firms sharing information with the business partners, will maximize their winnings and earnings from the supply chain integration. There are two major dimensions of supply chain integration at the operational level, information sharing and decision-making coordination (Sahin and Robinson, 2002; Sahin and Robinson Jr. 2005).

Information sharing refers to the level of integration, coordination and collaboration between firms and channel partners, to meet customer demands (Sanders, 2008). In other words, information sharing including critical and effective information exchanges among supply chain

partners, whereas operational coordination refers to getting the maximum benefits from the shared information, then the ability to change business processes as necessary, both of which can be achieved through a strong system of integrated information technology.

Many researchers have agreed on a general basis, that sharing or integrating information is the foundation of SCI (; Kulp, Lee, and Ofek, 2004; Kulp, Ofek, and Whitaker, 2004; Lau, Tang, and Yam, 2010; Lee and Whang, 2004; Liu et al., 2013; Sahin and Robinson, 2002). Sharing information means the exchange of information among the members of the supply chain, while reflecting the operational coordination on exchange of decision rights, knowledge and resources across the supply chain to facilitate the coordination process for the workflow activities (Kulp, Ofek, and Whitaker, 2004; Lee, 2000; Lee and Whang, 2004).

Schoenherr (2012) applied the IPT to supply chain processes, then he agreed that integration of external (i.e. supplier and customer facing) processes leads to improved supply chain performance and showed that integration of internal (i.e. intra-firm logistics, operations and supply chain management) processes positively moderates this relationship.

Researchers and practitioners from varied disciplines see that the benefits of integrated information in supply chain networks are a growing area of interest (Arshinder, Kanda, and Deshmukh, 2008). Information sharing significantly contributes in reducing supply chain costs (Barrett and Konsynski, 1982; Ding, Guo, and Liu, 2011), improving partner relationships (Barratt and Barratt, 2011), increasing material flow (Lee, So, and Tang, 2000), enabling faster delivery (Zhao et al., 2011), improving order fulfilment rates, thus contributing to customer satisfaction (Li and Lin, 2006), enhancing channel coordination (Sahin and Robinson Jr. 2005), and facilitating the achievement of competitive advantage (Charu Chandra, 2007).

Enterprise resource planning (ERP) is one of computerized information systems that work as an appropriate coordination mechanism under many circumstances. Investing in IT by implementing a computerized system, such as computer integrated manufacturing, ERP, advanced planning and scheduling software, has been studied by many researchers. IPT suggests that higher interdependence among organizational subunits is related and connected to higher benefits from ERP. On the other hand, differentiation among organizational subunits can lead to some significant ERP-related costs (Gattiker and Goodhue, 2004).

1.4.2 Resource-Based View

The Resource-Based View (RBV) is one of the main theories that considers competitive advantage to achieve sustainable superior performance, through a firm's resources and capabilities (Barney, 1991; Mahoney and Pandian, 1992; Peteraf, 1993). The performance is not only directly driven by its products, but also is indirectly driven and eventually aligned to the resources used as inputs (Barney, 1986). The direction of a firm's resources and capabilities was progressed and advanced in the 80's, being the pioneer of knowledge management, during the following decade a theory more closely linked to the business domain developed.

The original founding of RBV attributed to Penrose (1959) who considered a firm as a set of resources that would only contribute to the competitive position of the organization, when used in such a way that its valuable services are placed at the firm's disposal (Barney, 1991; Kor and Mahoney, 2004) identified that firms should first start developing resources in order to make them valuable. Firms need to focus on the value of analyzing its resources instead of its products. Therefore, Wernerfelt (1984) developed a set of tools to manage different resource profiles in order to optimize the product – market activities in organizations. Also, he suggested that firms might obtain above average returns through identifying and acquiring resources, which leads to greater development of demanded products. More development on the resource benefits has been continued by many researchers (Barney, 1986; Dierickx and Cool, 1989; Hansen and Wernerfelt, 1989; Wernerfelt, 1995).

RBV has defined a firm as a set of resources and inputs, assets and capabilities (Penrose, 1959; Wernerfelt 1984). The resource-based view divided the competitive advantages into two concepts: resources and capabilities. Resources are those intangible and tangible assets, linked to the firm in a semi-permanent way, whereas capabilities are related to the way of achieving different activities, depending on the available resources (Wernerfelt, 1984; Grant, 1991). Also, capabilities are a result of complex patterns of interactions, integration and co-ordination between resources. Several researchers (Menor, Roth, and Mason, 2001; Roth and Menor, 2003; Sinkovics and Roath, 2004; Swafford, Ghosh, and Murthy, 2008) suggested that the source of capabilities are the firm's resources including tangible and intangible factors, such as physical assets, inter-organizational routines and procedures and human capital.

The RBV suggests that firms with non-imitable resources and capabilities can achieve sustainable competitive advantage, by deploying valuable resources and capabilities that are inelastic in their availability (Barney, 1986, 1991; Peteraf, 1993; Wernerfelt, 1984). Therefore, RBV emphasize that organizations can take advantage of opportunities in its environment or widespread threats developing and deploying a set of unique resources by producing above average returns and values (Barney, 1991). Competitive advantage can be created and established when firms positively use its portfolio base of unique resources (Dierickx and Cool, 1989; Barney, 1991; Lippman and Rumelt, 1982; Peteraf ,1993).

The RBV examines the effect of firm resources and capabilities on competitive advantage that leads to the firm's overall performance. Resources and capabilities must be conditioned into sustaining activities and business processes, in order to have a positive effect on the firm's performance (Ray, Barney, and Muhanna, 2004). The using of RBV on the overall firm's performance, has been increasingly supported by many empirical pieces literature (Ray, Barney, and Muhanna, 2004).

RBV argues that variance in a firm performance, can be explained by strategic resources, such as dynamic capability (Teece, Pisano, and Shuen, 1997), core competence (Prahalad and Hamel, 1990) and absorptive capacity (Cohen and Levinthal, 1990). Firms that combine resources in a unique way have a better chance of achieving an advantage over competing firms who are unable to do so (Dyer and Singh, 1998). In addition, according to RBV, partnering firms are able to build competitive advantage by investing in relation-specific assets due to its rare, valuable, non-substitutable, and difficult-to-imitate nature (Barney, 1991).

Both practitioners and researchers in the SCM area have spotted the relevance of effectively linking SCM practice to competitive capability. Narasimhan (1998) indicated that supply chain strategies and operational resources, should be used to support business strategies to achieve the competitive capabilities of the firm. Fleury and Fleury (2003) confirmed that the definition of competitive capabilities should begin with a thorough understanding of the strategic possibilities supplied by physical, financial, intangible and organizational and human resources on a supply chain.

Dangayach and Deshmukh (2001) also emphasized that world class SCM practices would lead to superior performance and capability, leading to increased competitiveness and

those companies that can manage their practical resources in a supply chain more efficiently, are likely to gain competitive capabilities. Definitely, sustained competitive capabilities can be acquired when key strategic SCM practices are valuable, scarce and difficult to imitate (Olavarrieta and Ellinger, 1997). Therefore, supply chain practical capabilities are the building blocks for supply chain strategy and a source of competitive advantage for a firm's success.

Supply chain capabilities have been classified into supply-side capabilities and demand-side capabilities (Morash, 2001). Whereas, supply-side capabilities focus on operational excellence, including time based technology such as just in time JIT, or lean networks that support competitive capabilities of overall cost leadership and high levels of marketing technology. Meanwhile, demand-side capabilities, focus on customer closeness based on logistical infrastructures that support competitive capabilities of differentiation, through high levels of customer services added values (Morash, 2001).

Supply chain integration allows firms to focus on their unique core activities, which increases a firm's specific skills and perceived economies of scale and learning effects, thereby enhancing their competitive positions (Park, Mezias, and Song, 2004). Several researchers (Barney, 1991, 2012; Leuschner, Charvet, and Rogers, 2013; Richey, Daugherty, and Roath, 2007; Yang, Marlow, and Lu, 2009; Fugate, Mentzer, and Stank, 2010) have recommended the RBV of the firm as a theoretical background in explaining supply chain integration.

Many scholars have utilized RBV as evidence to proof the value of supply chain integration (Chen, Daugherty, and Roath, 2009; Das, Narasimhan, and Talluri, 2006; Devaraj, Krajewski, and Wei, 2007; Rosenzweig, 2003; Swink, Narasimhan, and Wang, 2007; Wang and Wei, 2007). These researchers indicate that firms are able to earn and take advantage of unique knowledge in ways that improve transactional efficiencies, as they gain competence in managing intensive supply chain integration processes (Wang and Wei 2007) characterized supply chain integration as a means for creating a system of integrative and effective relational governance. A firm has to create effective communication protocols, shared knowledge and understandings, and shared collaborative values with supply chain partners in order to promote and improve the organizational capabilities, which lead to growth in the firm's relational and collaborative competence. According to Cao and Zhang (2011) this competence is considered as a key resource that provides operational and competitive advantages. According to this view, SCI can empower firms to gain and obtain capabilities and resources for sustained competitive

advantage. Recently, SCI has been considered as important sources of capabilities and resources for a firm to improve its financial performance (Huo, 2012).

Linked to SCI, IT is considered as one of the firm's resources that provide a sustained, competitive advantage if it does not act alone (Wu et al., 2006), and, consequently it has become one of the major research topics in recent years. IT can simplify and assist the development of supply chain capabilities (Wu et al., 2006). Bharadwaj (2000) confirmed that the information advantage can be achieved through the adoption of sophisticated technologies, he also agreed that integrated systems can provide the source of sustained, competitive advantage for a firm and lead to synergistic benefits.

Within the above theoretical directions, we believe that maintaining superior supply chain integration, including internal and external integration through integrated information technology as one of the firm's resources can lead to a superior competitive advantage and therefore improve financial performance. Following that, and in order to provide a more cohesive support for our view of supply chain management, we have directed our attention to the effect of supply chain integration on financial performance, focusing more on the role of integrated information technology and top management support.

1.4.3 Organizational Learning Theory

The topic of organizational learning has been introduced by Cangelosi and Dill (1965), then after that it has received more attention from researchers and practitioners (Crossan, Lane, and White, 1999). Although early concepts already addressed factors that might prevent and stop organizational learning, such as the discussion on obstruction of the learning cycle (March and Olsen, 1975) or on defensive routines (Argyris 1990), the literature is still prevailed by an optimistic belief that firms can easily create strategies, structures, values and norms for organizational learning and will generally lead to positive results for the organization and its members (Dierkes et al., 2003; Schilling and Kluge, 2009).

Organizational learning refers to the process of learning through interaction with organizations' environments (Cyert and March, 1963), and to the dynamic process of strategic renewal (Bontis, Crossan, and Hulland, 2002). Therefore, strategic renewal of the organization is the ultimate outcome of effective organizational learning. Strategic renewal is defined as "an

evolutionary process associated with promoting, accommodating, and utilizing new knowledge and innovative behavior to bring about change in an organization's core competencies" (Floyd and Lane 2000, 155)

According to Bontis, Crossan, and Hulland (2002) organizational learning theory is based on two premises. First, (exploration) by assimilating new learning and (exploitation) by using what has already been learned through feedback and feed-forward flows. Second, organizational learning is multi-level —individual, group, and organizational (Argyris and Schön, 1978).

Organizations need not only to take advantage of and exploit existing ideas and opportunities but also to find and explore new ones to be successful in changing environments (March, 1991). Exploitation is associated by including the aspect of transferring the experiences into organizational routines, structures and processes. Exploration is linked with the notion of learning experiences made by individuals and groups.

According to Popper and Lipshitz (2000) organizational and individual learning are reciprocally dependent on each other. Individuals always have a chance to learn as representatives of their organization, while all knowledge gained must be retained fittingly as documents, routines, processes and structures to be available as an asset, even if an individual leaves the organization.

Sinkula (1994) indicated four processes that are linked with organizational learning: knowledge acquisition, information distribution, information interpretation, and organizational memory. Knowledge acquisition is the process of obtaining knowledge by organizations (Huber, 1991). It includes gathering information about the external environment and then getting that information into the boundaries of the organization and transforming it to organization-related knowledge (Moorman, 1995). Customer needs, market segmentation, competitor practices, and the changing role of channel partners are the most important information to be acquired by organizations (Day, 1994b). Clearly, knowledge acquisition is essential and important for organizations in order to be able to keep up with market changes (Sinkula, Baker, and Noordewier, 1997).

To understand market needs and effectively respond to it, organizations need to acquire market information and communicate it to its departments and individuals (Kohli and Jaworski, 1990; Sinkula, Baker, and Noordewier, 1997). Information distribution is the process of sharing information from different sources (Huber, 1991). Information can flow throughout organization (Hult, 2011) also from the marketing department to other departments and in the opposite direction (Kohli and Jaworski, 1990). Organizations can improve their ability to make and perform prompt decisions by eliminating the functional barriers that obstruct the flow of information between departments (Slater and Narver, 1995). Therefore, effective information distribution helps to facilitate integration and coordinate the actions of different departments, which accordingly helps organizations to achieve its objectives (Kohli and Jaworski, 1990).

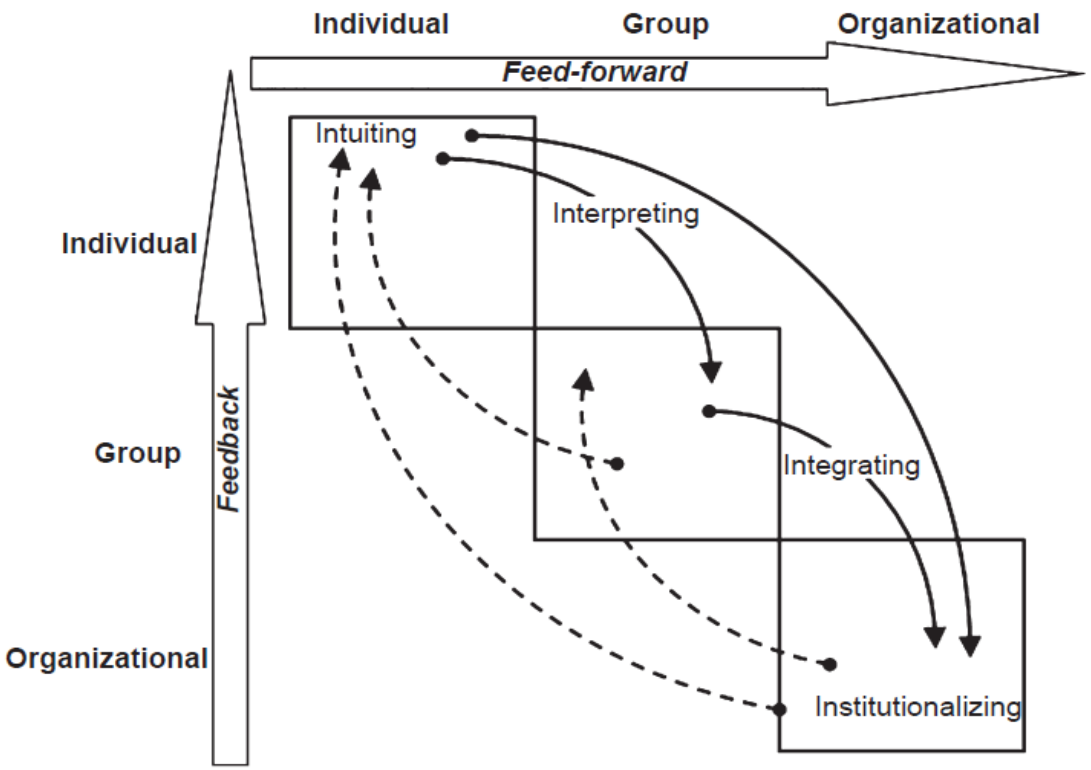
Organizations need to explicate any new information before using and utilizing it (Day 1994b; Sinkula, Baker, and Noordewier, 1997). Information interpretation is the process of giving one or more commonly understood meanings for distributed information (Huber, 1991). Individuals need to share their interpretations of market information during team meeting (Moorman, 1995), such communication and disagreement among participants leads to a better examination of the validity of different alternatives (Slater and Narver, 1995).

Retaining and maintaining the knowledge within organizations is very important and fundamental (Levitt and March, 1988). Organizational memory refers to the process of storing knowledge for future use (Huber, 1991). It may be appeared as formal and informal routines (e.g., operating procedures and scripts), shared beliefs (e.g., models, values, frames of reference, norms, and organizational stories), and physical artifacts (e.g., organizational structure and features of products) (Moorman and Miner, 1997). Organization that utilize these processes is able to protect its organizational memory (Slater and Narver, 1995).

Learning new knowledge is the logical result of the information gained from recognizing a change in the environment and acting to this change, whereas learning is the application of the information for definitional purposes and establishing or developing relationships (Yu et al. 2013). Therefore, the interaction that takes place between parties either individuals or organizations represent a key aspect of organizational learning (Argyris and Schön 1978).

Crossan, Lane, and White (1999) found that it is essential to combine and integrate the two premises of organizational learning theory and thus created a framework called 4I to facilitate understanding the combination. This framework (see next figure) connects the feed-forward and feedback flows across the individual, group, and organizational levels by four broad categories of social and psychological micro-processes: intuiting, interpreting, integrating, and institutionalizing. Intuiting is the beginning process of organizational learning that takes place at the individual level and includes acknowledgement and recognition of past patterns and/or future possibilities. Interpreting is the circumspect process of learning in which individuals create cognitive maps about their language and communication within a group in which they work. Integrating refers to the process of promoting and developing shared understanding among individuals through communication and joint action. Institutionalizing is the process that guarantees and secures a routine action takes place by embedding individual and group learning into the organization.

Figure 12: Types of channel relationships



Source: 4I organizational learning process Crossan, Lane, and White (1999).

According to Ketchen and Hult (2007), organizational learning theory represents the early stage of introduction into operations management and the SCM literature. To create effective coordination and integration amongst supply chain partners, organizational learning and shared knowledge is highly requested to enable the effective management of activities (Yu et al. 2013). Therefore, knowledge with its success in the organizational relationships becomes a flow in its own right (Alhashmi, Siddiqi, and Akhgar, 2006).

According to the above point of view and following the same direction, we support and believe that supply chain integration between partners becomes a unique tool for transferring and sharing knowledge and thus establishing and creating organizational learning.

1.4.4 Commitment-Trust Theory of Relationship Marketing.

Many relationship marketing studies indicated that commitment and trust are key variables that help organizations to build productive collaborations (Gounaris, 2005). Commitment and trust generate values for parties by reducing relationship uncertainty and increasing resource utilization efficiency (Wallenburg et al., 2011). Therefore, successful and stable relationships among parties are the logical outcome and result of commitment and trust (Morris, Barnes, and Lynch, 2009).

Commitment–trust theory introduced by Morgan and Hunt (1994) considered commitment and trust function as key mediating variables between five antecedents (relationship termination costs, relationship benefits, shared values, communication, and opportunistic behavior) and five relationship outcomes (acquiescence, propensity to leave, cooperation, functional conflict, and decision-making uncertainty).

Relationship commitment defined as “an exchange partner believing that an ongoing relationship with another is so important as to warrant maximum efforts at maintaining it; that is, the committed party believes the relationship is worth working on to ensure that it endures indefinitely” (Morgan and Hunt, 1994, 23). This definition corresponds with that created by Moorman, Zaltman, and Deshpande (1992, 316), "Commitment to the relationship is defined as an enduring desire to maintain a valued relationship."

In the services relationship marketing area, Berry, Conant, and Parasuraman (1991, 139) confirm that "Relationships are built on the foundation of mutual commitment." Relationship

commitment improves learning for requisite new technologies and procedures, as well as enhancing supply chain cooperation and flexibility (Joshi and Campbell, 2003). A common topic arises from the various literatures on relationships: Parties identify commitment among exchange partners as major key to achieve valuable outcomes for themselves, and they aim to develop and maintain this precious attribute in their relationships.

The other key aspect of commitment–trust theory is trust. Trust has a risk reducing effect and it was evidenced that remaining with a trustable supplier is more beneficial than switching to an unknown or untrustworthy alternative (Wallenburg et al., 2011).

Trust has been defined as “an implicit or explicit pledge of relational continuity between exchange partners” (Dwyer, Schurr, and Oh 1987, 19). Trust requires partners to understand each other as dependable and trustworthy, and ability to do it without opportunistic behaviors. Moorman, Deshpandé, and Zaltman (1993, 82) defined trust as “ a willingness to rely on an exchange partner in whom one has confidence”, while Rotter (1967, 651) conducted a similar definition viewed trust as "a generalized expectancy held by an individual that the word of another... can be relied on”. As per all definitions, confidence is the most important part of trust. The literature on trust indicates that confidence on the trusting party outcomes from the firm belief that the trustworthy party is reliable and has high integrity, which are linked with qualities such as consistent, competent, honest, fair, responsible, helpful, and benevolent (Altman and Taylor, 1973; Larzelere and Huston, 1980).

Through the years, trust has been studied widely from different points of view in the social exchange literature and others (Wallenburg et al., 2011). In services marketing, Berry, Conant, and Parasuraman (1991, 144) indicate that "customer-company relationships require trust." In buyer-seller haggling situations, trust has been considered as central to the process of achieving cooperative problem solving and constructive dialogue. As same as in the organizational context, it was agreed that trust leads to higher levels of loyalty and commitment to the haggling partner (Schurr and Ozanne, 1985).

Studies conducted by the Industrial Marketing and Purchasing Group considered trust as central to all relational exchanges and influencer to relationship commitment (Håkansson 1982; Ford, 2002). Relationships identified and recognized by trust are so highly valued that parties will desire to commit themselves to such relationships (Hrebiniak, 1974).

SCI provides all partners with a strong base of supply chain trust, supply chain culture and shared values (Flynn, Koufteros, and Lu, 2016). Building such trust between supply chain partners makes them respect their commitment which will reflect positively on both sides (Doney and Cannon, 1997). Trust is developed through repeated exchanges between supply chain members that align and integrate their differentiated interests by sharing planning information, sharing responsibility, and coordinating problem solving and flexibility in order to deal with the unexpected situations (Ireland and Webb, 2007).

Stability, trustable, and integrated supply chain relationships leads do outstanding supply chain memory between firms that provides a depository for shared supply chain experiences, including all strong values, traditions, and beliefs, as well as experience with its processes (Hult, Ketchen, and Slater, 2004; Hult, Ketchen, and Arrfelt, 2007).

Supply chain identity is one of the expected outcome for SCI (Nahapiet and Ghoshal, 1998). Face-to-face meetings are effective in helping to form supply chain identity through sharing knowledge among teams and supply chain partners (Ireland and Webb, 2007). SCI and trusting supply chain partners will facilitate the development of shared meaning which is very critical in the supply chain management (Hult, Ketchen, and Slater, 2004; Ireland and Webb, 2007).

1.5 Literature Gap Analysis

We have conducted the following gap analysis from the recent studies and we focused on the future line research recommendations and the non-significant relationships as mentioned in next table.

Table 5: Literature Gap Analysis

Paper	Authors / Year	Journal	Gap – Future Line Research Recommendations
Is more supply chain integration always beneficial to financial performance?	(Zhao, Feng, and Wang, 2015)	Industrial Marketing Management	H2. Internal integration →financial performance. (Not Supported).
The effects of supply chain integration on customer satisfaction and financial performance: An organizational learning perspective	(Yu et al., 2013)	International Journal of Production Economics	Customer integration →financial performance. (Not Supported). 1- Future studies can broaden their scope by collecting data from various supply chain partners providing services or processed goods. 2- The effect of business environment, relationship commitment, trust, and power on internal and external integration must be studied in the future.

Paper	Authors / Year	Journal	Gap – Future Line Research Recommendations
A meta-analysis of supply chain integration and firm performance	(Leuschner, Rogers, and Charvet, 2013)	Journal of Supply Chain Management	Additional research is necessary before we can make generalizable statements. As such we call for more research on the relationship between SCI and firm performance
The impact of supply chain integration on performance: A contingency and configuration approach	(Flynn, Huo, and Zhao, 2010)	Journal of Operations Management	H2b. Customer and supplier integration → the business performance of the manufacturer within a supply chain, given the relationship between internal integration and business performance. (Not Supported) H3a. Customer and supplier integration → the relationship between internal integration and operational performance. (Not Supported) H3b. Customer and supplier integration → the relationship between internal integration and business performance. (Not Supported) 1- Future studies can broaden their scope by collecting data from all supply chain partners, including suppliers, manufacturers and customers. 2- Future research should examine cross-cultural differences in the relationship between SCI and performance. 3- Future research should examine the impact of these contextual factors (company sizes, industries or regions) on SCI patterns and their relationship with performance.
A resource-based perspective on information technology and firm performance: a meta-analysis	(Liang, You, and Liu, 2010)	Industrial Management & Data Systems	H1. IT resources are positively associated with → firm performance. (Not Supported) H1a. Technological resources are positively associated with → the firm's financial performance. (Not Supported) 1- More studies may be needed in the future to investigate why certain relationships are insignificant and whether there are better measures that can reveal more insights into the role of IT in enhancing firm performance.
Supply chain technology: the role of environment in predicting performance	(Davis-Sramek, Germain, and Iyer, 2010)	Journal of the Academy of Marketing Science	H1: B2B e-commerce integration associates with → (b) financial performance. (Not Supported) H2: Supply chain analytic IT associates with → (b) financial performance. (Not Supported) 1- Further research could expand this context to other parts of the supply chain, such as wholesalers or retailers.
Defining and operationalising supply chain process integration	(Chen, Daugherty, and Roath, 2009)	Journal of Business Logistics.	1- Data were collected in China; future studies should validate the proposed conceptualizations in the U.S. or other countries. 2- The current study was conducted in a single industry—the electronics industry. Research in other industries can be used to test the generalizability of our conceptualisation.

Paper	Authors / Year	Journal	Gap – Future Line Research Recommendations
The impact of IT implementation on supply chain integration and performance	(G. Li et al., 2009)	International Journal of Production Economics	H1. IT implementation → positive effect immediately on SCP. (Not Supported) 1- It may be important for future work to consider the impact of different types of ITs on different types of SCI and SCP. 2- It remains unanswered whether investment in IT implementation will lead to greater enhancements in SCI and SCP outcomes than will other investment alternatives such as vertical integration. Future research should explore such alternatives to help managers find the best way to enhance SCI and SCP.
The impact of power and relationship commitment on the integration between manufacturers and customers in a supply chain.	(Zhao et al., 2008)	Journal of Operations Management	1- Future studies should seek additional drivers of CI and examine their impact. 2- The impact of industry and region were not explicitly investigated in this study. In some industries or regions, the relationship between power, relationship commitment and SC integration may be different, due to differences in customer requirements and preferences.
The impact of information technology on supply chain capabilities and firm performance: A resource-based view	(Wu et al., 2006)	Industrial Marketing Management	1- Other types of IT resources could influence a firm's supply chain capabilities as well. For example, IT utilisation, internal IT integration, and management commitment to IT for supply chain management, among others, are possible IT-related resources that deserve further research attention. 2- Future research should incorporate these in exploring the effects of IT on supply chain relationships as well as firm productivity.
Relationship governance in a supply chain network	(Wathne and Heide, 2004)	Journal of Marketing	1- There are potentially three different components: (1) production and inventory management, (2) relationship management, and (3) information technology.
The Role of Relational Information Processes and Technology Use in Customer Relationship Management	(Jayachandran et al., 2005)	Journal of Marketing	H3: Customer relationship potential will have a positive association with → relational information processes. (Not Supported) 1- Examination of the customer consequences of relational information processes, such as trust and commitment, could also provide rich insights.
The effects of an integrative supply chain strategy on customer service and financial performance: an analysis of direct versus indirect relationships	(Vickery et al., 2003)	Journal of Operations Management	H4. Supply chain integration → financial performance. (Not Supported)

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CHAPTER (2): RESEARCH MODEL AND HYPOTHESES DEVELOPMENT

2.1 Introduction

Increasing global competition has forced organizations to revise and rethink the need for cooperative, mutually beneficial supply chain partnerships, through a systematic approach to SCI (Lambert and Cooper, 2000; Wisner and Tan, 2000). The challenge is to determine how to successfully accomplish this integration. We present a framework for supply chain management, as well as questions for how it might be implemented for future research.

Individual organizations working alone may find difficulties in achieving their business goals, which might be achieved through value-based chain relationships. Therefore, recently collaborative behavior and activities in supply chain management are considered as fundamental conditions of staying competitive and enhancing performance, which leads to building enhanced, value based relationships through the supply chain network (Koçoğlu et al., 2011).

Although researchers have raised for years (e.g. (Lambert, Robeson, and Stock, 1978; Armistead and Mapes, 1993) the need for a close, strong and integrated relationship between organizations and their supply chain partners, today, researchers have accepted the concept and empirical issues addressed in the literature related to the importance of SCI (Frohlich and Westbrook, 2001; Flynn, Huo, and Zhao, 2010; Yu et al., 2013). SCI consists of three dimensions: supplier integration, customer integration, and internal integration.

2.2 Research Model

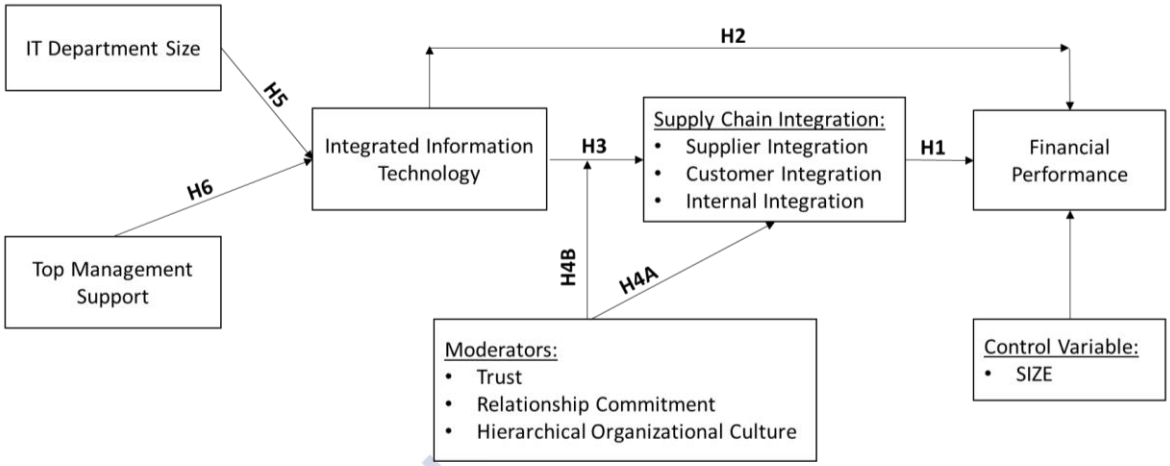
Creating customer value and improving the profitability of firms through supply chain management require strong coordinating flows of materials, information and funds (Warkentin, Bapna, and Sugumaran, 2001). Trading partners can apply a high level of coordination by sharing knowledge, which leads to managing the activities in an effective way (Alhashmi, 2006).

Firms can improve their performance by coordinating the internal processes and activities with their boundary spanning partners (Jayaram, Tan, and Nachiappan, 2010). Therefore, supply chain management enhances the competitive advantages of firms (Kim, 2009), through reciprocally beneficial perspectives and objectives of different supply chain partners, according to a common set of objectives, integrated relationships among supply chain members and arranging resources and value propositions, to deliver the highest value to customer (Yeung et al., 2009; Wolf, 2011). Lambert and Cooper (2000) consider the integration as the focal concept of SCM. Parallel to this argument, supply chain integration indicates the degree to which firms strategically collaborate with their supply chain partners and exert unified control over inter and intra-organization processes, to achieve effective and efficient flows of products, services, information, money, and decisions. Therefore, supply chain integration provides maximum value at low cost and high speed to the customer (Flynn, Huo, and Zhao, 2010).

This study proposes that integrated information technology (IIT) is one of the resources that influence supply chain integration and financial performance. As we aim to extend the understanding of how IIT impacts on SCI and financial performance, we develop a set of hypotheses based on the literature, to empirically test the direct impact of IIT on financial performance and the indirect impact of IIT on financial performance mediated by SCI.

Also, we focus on the effect of IT department size and top management support, considering them as antecedents for IIT. We expect that both antecedents have a positive impact on the integrated information technology. In addition, we also examine the roles for trust, relationship commitment, and hierarchical organizational culture as moderators for the relationship between IIT and supply chain integration. Collectively, these relationships are summarized in our conceptual model research framework in next figure.

Figure 13: Conceptual model research framework: graphical description



Our main, conceptual model research framework can be divided into three individual sub-models, showing each specific relationship along with its moderator as per indicated in next figures.

Figure 14: Conceptual Sub-model (1): graphical description

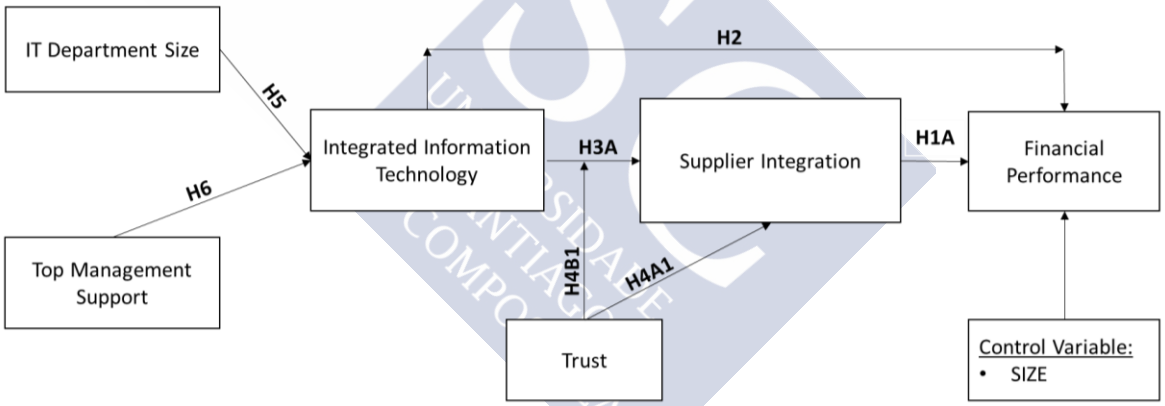


Figure 15: Conceptual Sub-model (2): graphical description

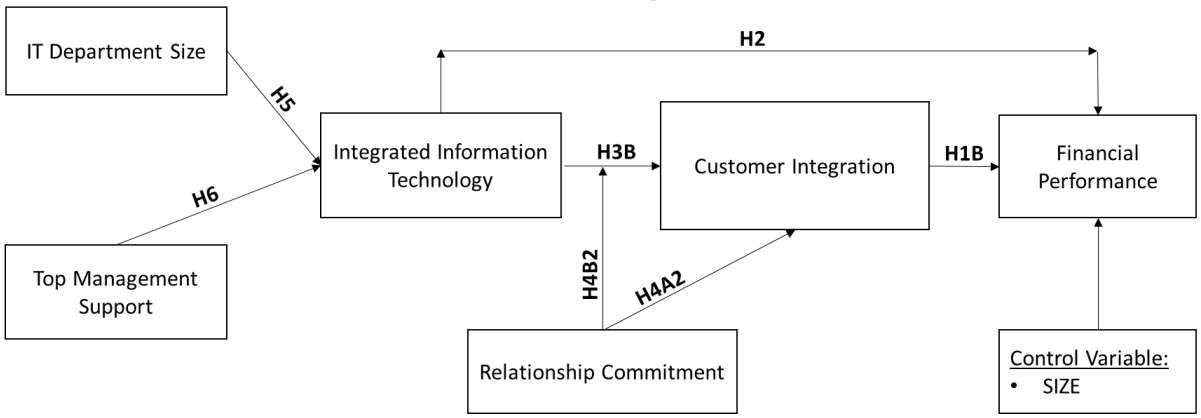
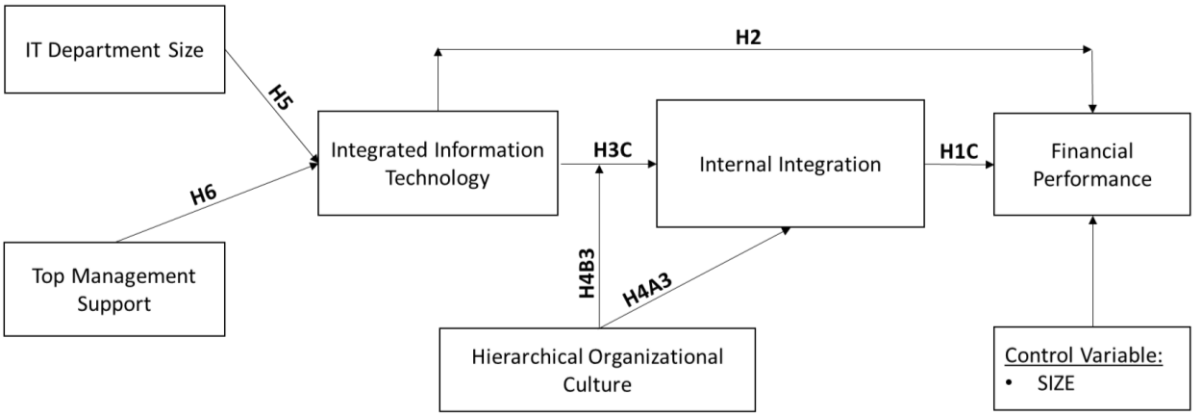


Figure 16: Conceptual Sub-model (3): graphical description



2.2.1 Firm performance

Firm performance refers to how far a firm achieves its financial objectives and market criteria (Li, Ragu-Nathan, et al., 2006; Koh et al., 2007; Flynn, Huo, and Zhao, 2010). Firm performance can be measured, amongst others, by business performance, organization effectiveness, financial performance (e.g. profit or return on investment), market performance (e.g. market share) and innovation performance measures. According to Demirbag et al., (2006) firm performance can be measured from both a financial and non-financial perspective.

Liu et al. (2013) indicated that clarifying the multidimensional relationship between supply chain integration and firm performance requires a clear definition of performance. There are many sides to the concept of firm performance; each side has its own unique way of activation according to the previous supply chain management studies.

Many scholars have studied the firm performance from a supply chain management perspective (Lee, Lee, and Schniederjans, 2011; Wu et al., 2011; Wong, Boon-itt, and Wong, 2011; Zacharia, Nix, and Lusch, 2009). These studies include many measures of firm performance such as market share, return on investment, growth of sales, profit margin on sales, growth of return on investment, and growth of market share (Wong, Boon-itt, and Wong, 2011).

Other studies from a supply chain management perspective have focused on firm operational performance, including measures such as lead time, inventory turnover, product return, sales level, cost reduction, and meeting customers' requirements (Petrovic-Lazarevic, Sohal, and Baihaqi, 2007) or costing accuracy, higher sales and improved coordination between

departments, improved coordination with suppliers, and improved coordination with customers (Koh et al., 2007).

Although the two most common measures of performance in the SCM literature are operational performance and business performance (Flynn, Huo, and Zhao, 2010; Liu et al., 2013), recently several researchers (e.g., Germain and Iyer, 2006; Zhao, Feng, and Wang, 2015) have used financial performance. Therefore, in this Doctoral Thesis we use financial performance as the measure of firm performance and focus ITT – financial performance and SCI – financial performance relationships. Financial performance construct includes the following items: growth in sales, return on sales, growth in return on sales, growth in profit, growth in market share, return on investment and growth in return on investment.

Next table provides a representative sample of studies from SCM perspective that analyzes different measures of performance.

Table 6: Performance measures in previous studies in supply chain management

STUDY	PERFORMANCE	THEORETICAL BACKGROUND
(Zhao, Feng, and Wang, 2015)	Financial Performance	Resource-Based View (RBV) Transaction Cost Economics (TCE)
(Luque, Garcia, and Lopez 2015)	Organizational Performance: Flexibility Delivery Quality Inventory Customer satisfaction	Frame work of the value chain The resource- based view (RBV) of the firm
(Xue, Ray, and Sambamurthy, 2013)	Customer Service Performance - Cost savings - Cross selling - Customization - Customer Satisfaction	Transaction cost economics (TCE) Agency theory
(Wong, Boon-itt, and Wong, 2011)	Quality performance Delivery performance Flexibility performance Cost performance	Information processing theory Contingency theory
(Zhao et al. 2011)	n/a	Development of a theory of supply chain integration
(Flynn, Huo, and Zhao, 2010)	Operational performance Business performance	Contingency theory Configuration theory
(Koufteros, Rawski, and Rupak, 2010)	Glitches On-time execution of engineering change orders Market success	Development of a theory of supply chain integration

STUDY	PERFORMANCE	THEORETICAL BACKGROUND
(Lau, Yam, and Tang, 2010)	Product modularity Product performance	Theory of modular product design
(Narasimhan, Swink, and Viswanathan, 2010)	Cost performance Quality performance Delivery performance Process flexibility New product flexibility	Development of a theory of supply chain integration
(Robert Handfield et al., 2009)	Sourcing enterprise performance Buyer financial performance	Development of a theory of supply chain integration, link to organizational entrepreneurship
(Braunscheidel and Suresh, 2009)	External flexibility Supply chain agility	Development of a theory of supply chain integration
(Devaraj, Krajewski, and Wei, 2007)	Operational performance (cost, quality, flexibility, delivery)	Resource-based view Relational view Theory of swift and even flow
(Swink, Narasimhan, and Wang, 2007)	Cost efficiency Quality Delivery Process flexibility New product flexibility Market performance Customer satisfaction	Strategic fit theory Information processing theory Knowledge-based view
(Koufteros, Cheng, and Lai, 2007)	Product innovation External quality	Social network theory
(Das, Narasimhan, and Talluri, 2006)	Manufacturing cost reduction Quality improvement Manufacturing cycle time reduction New product introduction time Delivery	Resource-based view Transaction cost economics Institutional isomorphism theory
(Germain and Iyer, 2006)	Logistical performance Financial performance	Development of a theory of supply chain integration
(Koufteros, Vonderembse, and Jayaram, 2005)	Product innovation performance Quality performance Profitability	Contingency theory

2.2.2 Supply chain integration and financial performance

Researchers and practitioners in supply chain management have strongly agreed that supply chain integration is a new field of innovation, with great opportunities to improve the firm's performance (da Silveira and Arkader 2007; Frohlich 2002; Kim 2006; Lau, Tang, and Yam 2010; Lee and Whang 2004; Liu et al. 2013; Sahin and Robinson 2002). Supply chains need to be integrated and collaborated in mutual partner relationships to maximize profit and improve financial performance (Ding, Guo, and Liu, 2011).

Supply chain integration means the strategic collaboration level between a firm and its supply chain partners, which facilitate coordinating and managing the internal and external processes to realize and achieve the effective and efficient flows of products and services, information, capital and decisions to provide the maximum value to the customer at low cost and high speed (Huo 2012; van der Vaart and van Donk, 2008; Zhao, Feng, and Wang, 2015). In other words, supply chain integration means that the level of collaboration and coordination amongst firms and channel partners to manage intra- and inter- organizational processes (Flynn, Huo, and Zhao, 2010; Froehlich, 2002; Lee and Whang, 2004; Liu et al., 2013) to provide maximum value to the customer, by achieving effective and efficient flows of products and services, information, money, and decisions (Bowersox, Closs, and Stank, 1999; Froehlich and Westbrook, 2001; Naylor, Naim, and Berry, 1999). Then, supply chain integration should focus on intra- and inter-organization processes (Bowersox and Morash, 1989; Hillebrand and Biemans, 2003).

Furthermore, some researchers concentrated on dyadic relationships with supply chain partners (Lee, 2001), while others concentrated on managing a supply chain as a single system, instead of trying to improve the fragmented, subsystems individually (Bowersox and Morash, 1989; Vickery et al., 2003; Stevens, 1989; Hammer, 1990; Naylor, Naim, and Berry, 1999).

While some studies investigated supply chain integration as an unidimensional or single construct (Armistead and Mapes, 1993; Marquez, Bianchi, and Gupta, 2004; Rosenzweig, 2003), most researchers have considered supply chain integration as a multi-dimensional construct separating supply chain integration into internal and external integration (Morash and Clinton, 1998; O'Leary-Kelly and Flores, 2002; Pagell, 2004; Petersen, Handfield, and Ragatz, 2005; Ragatz, Handfield, and Petersen, 2002; Stanley and Wisner, 2001; Stank, Keller, and Daugherty, 2001; Swink, Narasimhan, and Wang, 2007; Vijayasarathy, 2010; Yu et al., 2013).

Internal integration and external integration are the two faces of a coin called supply chain integration; each face plays a different role. External integration consists of supplier and customer integration (Droge, Vickery, and Jacobs, 2012; Cousins and Menguc 2006; Homburg and Stock, 2004; Koufteros, Cheng, and Lai, 2007). Customer (supplier) integration is considered as the degree to which a firm can collaborate with its major customers (suppliers), to frame its inter-organizational strategies, practices, procedures and behaviors into collaborative, coincided and manageable processes to accomplish customer demands (Zhao et

al., 2011; Huo 2012). Customer and supplier integration represents the external integration part, which refers to the integration between firms and their external partners to structure inter-organizational strategies, practices and processes into collaborative, synchronized processes (Stank, Keller, and Daugherty, 2001). At present, there is an increasing attention regarding the strategic importance of the term of integration among suppliers, manufacturers and customers.

Supply chain integration also includes internal integration. Internal integration refers to the extent to which a firm can frame its organizational strategies, practices, procedures and behaviors into collaborative, coincided and manageable processes to accomplish customer demands (Zhao et al., 2011; Huo, 2012).

While external integration admits the importance of establishing close, interactive relationships with customers and suppliers, internal integration admits that the departments and functions within a firm should function as part of an integrated process. In this study, we follow the same direction of the existing literature on the supply chain integration construct, which includes the internal integration inside organizations and external integration in both directions with customer and supplier.

A fundamental research trend has examined the impact of supply chain integration on performance and consequently empirical different studies have related dimensions of supply chain integration to firm performance. For example, researchers have connected supplier integration to better product development performance (Koufteros, Cheng, and Lai, 2007; Ragatz, Handfield, and Petersen, 2002). Other studies have linked customer integration to different measures of performance (Wong, Boon-itt, and Wong, 2011; (Germain and Iyer, 2006).

Moreover, several researches focused on the beneficial role of supply chain integration from many sides such as achieving superior competitive advantage (Liqun Du, 2007), improving operational and financial performance (Flynn, Huo, and Zhao, 2010; Kim, 2009;), increasing flexibility in delivery times and responding to customer demands (Clark and Lee, 2000), eliminating the bullwhip effect (Lee, Padmanbhan, and Whang, 1997) and reducing transaction costs (Zhao et al., 2008).

Supply chain integration supports firms to enhance and maintain the routine relationships with their partners through collaborating the processes globally and to rapidly respond to the technological and market changes (Rosenzweig, 2009).

In next table, we specifically indicate the dimensions of supply chain integration and the type of performance considered in the sample of studies that analyze the supply chain integration - performance relationship.

Table 7: Summary of prior literature on the dimensions of supply chain integration and type of performance

STUDY	DIMENSIONS OF SUPPLY CHAIN INTEGRATION	PERFORMANCE
(Zhao, Feng, and Wang, 2015)	Supplier Integration Internal Integration Customer Integration	Financial Performance
(Alfalla-Luque, Marin-Garcia, and Medina-Lopez ,2015)	Internal Integration Supplier Integration Customer Integration External Integration Orientation	Organizational Performance: Flexibility Delivery Quality Inventory Customer satisfaction
(Xue, Ray, and Sambamurthy, 2013)	Supply-side Electronic Integration (SEI)	Customer Service Performance - Cost savings - Cross-selling - Customization - Customer Satisfaction
(Wong, Boon-itt, and Wong, 2011)	Supplier integration Internal integration Customer integration	Quality performance Delivery performance Flexibility performance Cost performance
(Cao and Zhang, 2011)	Information sharing, Goal congruence, Decision synchronization, Incentive alignment, Resource sharing Collaborative communication, and Joint knowledge creation	Firm performance
(Lau, Tang, and Yam 2010)	Information sharing Product co-development Organizational coordination	Product performance
(Rosenzweig, 2009)	E-collaboration	Operational performance Business performance
(Fabbe-Costes and Jahre 2008)	inter-organizational SCI	Firm performance
(Sanders 2008)	Operational coordination	Operational benefits
(Devaraj, Krajewski, and Wei, 2007)	Supplier integration Customer integration	Operational performance
(Koufteros, Cheng, and Lai, 2007)	Supplier integration	Product innovation and External quality
(Swink, Narasimhan, and Wang, 2007)	Strategic supplier integration Strategic customer integration Product-process technology integration Corporate strategy integration	Manufacturing competitive capabilities Business performance

STUDY	DIMENSIONS OF SUPPLY CHAIN INTEGRATION	PERFORMANCE
(Das, Narasimhan, and Talluri, 2006)	Supplier integration	Operational performance
(Cousins and Menguc, 2006)	Supplier integration	Supplier's operational/communication performance Supplier's contractual conformance
(Germain and Iyer, 2006)	Internal integration Downstream integration	Logistics performance Financial performance
(Rai, Patnayakuni, and Seth 2006)	Physical flow integration Information flow integration Financial flow integration	Operations excellence Customer relationship Revenue growth
(Cristina Gimenez and Eva Ventura, 2005)	Logistics-production integration Logistics-marketing integration External integration	Cost reduction Stock-out reduction Lead time reduction
(Koufteros, Vonderembse, and Jayaram 2005)	Internal integration Customer integration Supplier product integration Supplier process integration	Product innovation Quality Profitability
(Petersen, Handfield, and Ragatz, 2005)	Supplier integration	Project team effectiveness Firm financial performance Design performance
(Saeed, Malhotra, and Grover, 2005)	Internal integration External integration	Process efficiency Sourcing leverage
(Pagell, 2004)	Internal integration	Performance
(Droge, Jayaram, and Vickery, 2004)	Strategic design integration Design-process integration Supplier integration Customer integration	Time to market Product responsiveness Firm performance
(Homburg and Stock, 2004)	Customer integration	Customer satisfaction
(Crespo Marquez, Bianchi, and Gupta, 2004)	SCI	Operational financial effectiveness
(Kulp, Lee, and Ofek 2004)	Information sharing Collaboration	Intermediate performance Profit margins
(Vickery et al., 2003)	SCI	Customer service Financial performance
(Eve D Rosenzweig, 2003)	SCI	Competitive capabilities Business performance
(Ragatz, Handfield, and Petersen, 2002)	Supplier integration	Cycle time results
(Narasimhan and Kim, 2002)	Internal integration Supplier integration Customer integration	Moderator of the relationship between international market/product diversification and firm performance
(Frohlich and Westbrook, 2001)	Supplier integration Customer integration	Marketplace performance Productivity performance Non-productivity performance
(Stank, Keller, and Closs, 2001)	Customer integration Internal integration Supplier integration Technology and planning Measurement integration Relationship integration	Overall logistics performance
(Stank, Keller, and Daugherty, 2001)	Internal collaboration External collaboration	Logistics service performance

STUDY	DIMENSIONS OF SUPPLY CHAIN INTEGRATION	PERFORMANCE
(Johnson, 1999)	Strategic integration	Financial performance
(Morash and Clinton, 1998)	Intra-organizational process integration Inter-organizational collaborative/operational integration	Total cost reduction strategy Differentiation strategy
(Armistead and Mapes, 1993)	SCI	Operational performance

Previous empirical studies on supply chain integration – performance relationship find that the link between these variables vary frequently not only in the degree, but also in the nature of the effects (Swink, Narasimhan, and Wang, 2007; Vickery et al., 2003;). Whilst generally the literature accept that the higher level of supply chain integration leads to an outstanding level of a firm's performance (Froehlich and Westbrook, 2001; Droge, Jayaram, and Vickery, 2004), some studies have shown that supply chain integration is not an effective strategy for improving a firm's performance (Fabbe-Costes and Jahre, 2008). For example, some scholars have found no significant links of supplier integration to dimensions of performance (Stank, Keller, and Daugherty, 2001; Cousins and Menguc, 2006; Flynn, Huo, and Zhao, 2010), while some other scholars have found negative links (Narasimhan, Swink, and Viswanathan, 2010; Swink, Narasimhan, and Wang, 2007;). Findings for customer integration are similarly mixed. Some scholars have confirmed positive and significant relationships to product innovation, quality and market success (Koufteros, Vonderembse, and Jayaram, 2005), quality, delivery, flexibility and cost performance (Wong, Boon-itt, and Wong, 2011) and logistical performance (Germain and Iyer, 2006). Others failed to confirm significant links to glitches and on-time execution of engineering changes (Koufteros, Rawski, and Rupak, 2010), operational performance (Devaraj, Krajewski, and Wei, 2007), or business performance (Flynn, Huo, and Zhao, 2010). Next table contains a more detailed description of a sample of representative studies that analyze the supply chain integration - performance relationship.

Table 8: Representative studies on impact of supply chain integration on performance

STUDY	TREND OF STUDY	MAJOR FINDINGS
(Zhao, Feng, and Wang, 2015)	Examine how supplier integration, internal integration and customer integration contribute to or impede firms' financial performance and investigate the complementary roles of top management support in this process.	SCI can impair financial performance. In addition, top management support can be considered as a complementary asset to SCI.

STUDY	TREND OF STUDY	MAJOR FINDINGS
(Alfalla-Luque, Marin-Garcia, and Medina-Lopez 2015)	The interrelationships among the different dimensions of supply chain integration. Examines the relationship between employee commitment and supply chain integration dimensions to explain several performance measures, such as flexibility, delivery, quality, inventory and customer satisfaction.	The relationship between employee commitment and operational performance is fully mediated by supply chain integration. Employee commitment contributes to improving internal integration and internal integration affects performance both directly and indirectly. Moreover, obtaining internal integration helps to achieve supplier and customer integration.
(Xue, Ray, and Sambamurthy, 2013)	Examine whether SEI generates spill-over effects on customer service performance, over and beyond firms' direct investments in customer-side digitization. Also, examine whether structural attributes of the firm (e.g. vertical integration, diversification, and centralization) moderate the effects of supply-side electronic integration on customer service performance.	SEI helps firms realize cost savings in their customer service performance, especially if they are less vertically integrated. In addition, SEI investments help diversify and centralize a firm's achievement in cross-selling with their customers. Also, SEI is more likely to help decentralized and diversified firms achieve customization in their customer service activities.
(Wong, Boon-itt, and Wong, 2011)	Relationship between individual integration dimensions and performance; environmental uncertainty as a moderator to the relationship between integration and performance.	Environmental uncertainty moderates the relationship between internal integration and cost and quality performance, between supplier integration and delivery and flexibility performance and between customer integration and flexibility performance.
(Zhao et al., 2011)	Linking internal integration, relationship commitment to customers and relationship commitment to suppliers with customer and supplier integration; examination of the moderating role of ownership, industry and region.	Relationship commitment to customers influences customer integration and relationship commitment to suppliers influences supplier integration; internal integration influences both customer and supplier integration; differences between regions and industries were also detected.
(Flynn, Huo, and Zhao, 2010)	Relationship between individual integration dimensions and their interactions on performance; the influence of integration dimensions on performance.	Supply chain integration is related to both operational and business performance; internal and customer integration is more strongly related to performance than supplier integration.
(Koufteros, Rawski, and Rupak, 2010)	Relationship between internal integration, customer integration, supplier product integration, and supplier process integration on glitches, on-time execution of engineering change orders, and market success.	Internal integration influences customer integration, supplier product integration and supplier process integration; customer integration influences market success, and supplier product and supplier process integration influence glitches and on-time execution of engineering change orders.
(Lau, Yam, and Tang, 2010)	Relationship between supply chain integration comprised of information sharing, product co-development and organizational coordination, on product modularity and product performance.	Product co-development influences product modularity and product performance, and organizational coordination influences product modularity; no support was found for the remaining links between supply chain integration and the two performance measures.

STUDY	TREND OF STUDY	MAJOR FINDINGS
(Narasimhan, Swink, and Viswanathan, 2010)	Examination of complementarities between product-process technology integration, customer integration and supplier integration and their influence on performance.	Product-process technology integration and supply chain integration are complementary in achieving quality, delivery, and process flexibility; product-process technology integration and customer integration are complementary in achieving quality and new product flexibility.
(Handfield et al. 2009)	Linking supply market intelligence and supply management influence with cross-enterprise integration and supplier integration; examining their relationship to sourcing enterprise performance and the ultimate impact on buyer financial performance.	Entrepreneurial behaviors (supply market intelligence and supply management influence) are related to cross-enterprise and supplier integration, which both have a positive influence on performance improvement.
(Braunscheidel and Suresh, 2009)	Examination of the impact of (market orientation, learning orientation) on (supplier integration, internal integration, customer integration) and ultimately on a firm's supply chain agility.	Both internal and external integration influence supply chain agility; internal integration influences external integration; market orientation influences both internal and external integration, learning orientation only influences internal integration.
(Devaraj, Krajewski, and Wei, 2007)	Examination of the influence of e-business capabilities on customer and supplier integration, with the ultimate impact on operational performance.	Supplier integration positively influences performance, while the influence of customer integration on performance is non-significant.
(Swink, Narasimhan, and Wang, 2007)	Examination of the impact of four different types of integration on business performance; examination of the mediating effect of manufacturing competitive capabilities.	Each of the four integration types is likely to result in benefits related to manufacturing competitive capabilities, market performance, or customer satisfaction; however, all but corporate strategy integration also involves potential costs to either market performance or product quality.
(Koufteros, Edwin Cheng, and Lai, 2007)	Examination of the antecedents to grey-box and black-box integration and their influence on product innovation.	Only grey-box integration positively influences product innovation; the influence of black-box integration on product innovation is negligible.
(Das, Narasimhan, and Talluri 2006)	Examination of specific configurations of supplier integration practices, including external and internal integration practices; examination of the influence of practices configuration on performance.	There exists an optimal set of supplier integration practices; departures from it lead to a deterioration in performance.
(Germain and Iyer, 2006)	Examination of the effects of internal integration and downstream integration on logistical performance and ultimately financial performance; investigation of the moderating effect of internal integration.	Both internal and downstream integration positively influence logistical performance; the relationship between downstream integration and logistical performance is moderated by internal integration; the relationship between logistical performance and financial performance is supported.
(Koufteros, Vonderembse, and Jayaram, 2005)	Relationship between internal integration in the form of concurrent engineering practices and customer integration, supplier product integration, and supplier process integration; evaluation of the moderating role of uncertainty, equivocality, and platform development strategy.	Internal and external integration are related to product innovation, quality and profitability; equivocality moderates the link between integration and performance.

As can be seen in the table, the benefits of SCI include greater information exchange (e.g., Flynn, Huo, and Zhao, 2010), operational performance (e.g., Wong, Boon-itt, and Wong, 2011), and financial performance (e.g., Flynn, Huo, and Zhao, 2010).

Thus far, empirical studies indicate that firms can need to apply integrated supply chain relationships in order to deliver the benefits to financial performance. In addition, from a cases perspective, there are many successful examples of the significant, positive effect of supply chain integration on financial performance. One of the great examples is the integrated supply chain channel partnership between P&G and Wal-Mart. According to Grean and Shaw (2002) both companies have improved profitability and increased their joint business revenues from $375 million in 1988 to over $4 billion dollars in 2002, due to the effective role of integrated supply chain channel partnership. For these reasons, this study investigates the influence of collaborative and cooperative supply chain integration, to achieve higher financial performance.

2.2.2.1 Supplier integration and financial performance

Supplier integration is described by the cooperative relationship between the buyer and upstream supplier. It refers to the level of coordination decisions related to inventory management, collaborative planning, forecasting, replenishment and the flows of physical resources between supplier and manufacturers (He et al., 2014; Wong, Lai, and Cheng, 2011). Supplier integration requires providing and sharing information to validate direct participation in making decisions (Petersen, Handfield, and Ragatz, 2005).

Sharing timely information is beneficial for both manufactures and suppliers. Manufacturers can plan and adjust their own operations more rapidly and thereby achieve greater adaptability to any unexpected events caused by suppliers. On the other hand, by providing suppliers with timely information regarding a manufacturer's change of plans, suppliers can adjust themselves to such changes more rapidly, which in return could enhance a manufacturer's flexibility (Wang, Tai, and Wei, 2006). In this relationship there are initiatives and programs which could potentially support the linkages between the trading partners (Yu et al., 2013).

Supplier integration is advantageous for buyer and supplier performance. Acquisition of quality incoming materials and parts from suppliers is the starting point for firms to produce

quality products (He et al., 2014). Das, Narasimhan, and Talluri (2006) stated that variances in incoming materials and parts can be reduced by effective supplier management, which manages suppliers to meet quality specifications and standards. In addition, supplier management reduces process variability and can have a positive effect on delivery time and product reliability. Bonaccorsi and Lipparini (1994) found that early supplier involvement is beneficial to firms by receiving higher quality products, with fewer defects.

Effective supplier partnership and integrated relationships are key determinant factors for delivery and flexibility, by providing more accurate and updated demand and supply information, more detailed production plans and forecasts and clearer future trends and directions (Narasimhan, Talluri, and Das, 2004). Manufacturers can more easily track variations in production, product quality, inventory levels and delivery capabilities of suppliers and thus a high level of supply chain visibility by building up integrated information channels connected to suppliers (He et al., 2014).

Recently the relationship between customers and suppliers became long-term, suppliers are providing customers with information regarding their processes, quality performance and even cost structure (Chen and Paulraj, 2004; Helper, 1991; Sako and Helper, 1995). Supply chain partners are more willing not only to share risks and reward, but also to maintain the relationship over a longer period of time, through closed and integrated relationship (Chen and Paulraj, 2004; Cooper and Ellram, 1993; Landeros and Monczka, 1989; Stuart, 1993).

Resource based view suggested that, establishing a long term strategic integrated partnership with suppliers has a significant positive effect on financial performance. Flynn, Huo, and Zhao (2010) indicated that suppliers can better meet the focal firm's changing requirements by reciprocal and cooperative understanding, through supplier integration. Firms can set and adopt their production plans and enhance delivery performance, producing goods on time, through supplier integration and mutual exchanging of information about processes, schedules, products and capabilities. Suppliers can improve the level of customer service that allows firms to enhance and improve its financial performance, by establishing an integrated process with focal firms.

Das, Narasimhan, and Talluri (2006) confirmed that supplier integration reduces the purchasing costs by developing close integrated relationships with suppliers, which improve

and enhance the financial performance. Moreover, supplier integration can decrease the cost of production through economies of scale and scope, focusing on enjoying bigger scales and volume consolidation with fewer suppliers. It also offers economic scope in many ways, such as product and process development and lower administrative costs (Handfield et al., 1999).

Based on the above discussion, we expect financial performance to be associated with supplier integration. On the basis of the foregoing considerations, we propose the following hypothesis:

H1A. Supplier integration is positively related to financial performance.

2.2.2.2 Customer integration and financial performance

Customer integration has been considered as a distinct, important concept of supplier integration. Customer integration refers to, "the degree to which a firm can collaborate with its major customers to structure its inter-organizational strategies, practices, procedures and behaviors into collaborative, synchronized and manageable processes to fulfil customer demands" (Zhao, Feng, and Wang 2015, 163) . It also describes the process of decisions' coordination including inventory level, production planning, demand forecasting, order tracking and product delivery between customers and manufacturers. Customer integration includes different kinds of flow, which are flows of information, service and materials; while information flowing back from customer to supplier, the services and materials flowing forward from supplier to customer (Frohlich and Westbrook, 2001; Narasimhan 1998).

Customer integration requires a clear understanding for all interactions between a customer's business and the supplier's products and processes (Wisner, Tan, and Leong, 2008). The supplier is obligated to give attention and resources for these activities, in order to help the customer improve its competitive standing (Yu et al., 2013). Also, it requires involving customers in decisions related to the products sold by the supplier (Pagh et al., 1998) and includes the methods and strategies applied to better coordination between the trading partners (Froehlich and Westbrook, 2001).

Following the resource based view, establishment of customer integration is important for achieving benefits by leveraging resources and integrated critical information owned by customers (Danese and Romano, 2013; Huo, 2012; Lau, Tang, and Yam, 2010). Deep

penetration into the customer organization through customer integration is highly necessary by firms to understand the customer's product, culture, market and organization in such a way that they can respond precisely to its needs and requirements.

A mutual integrated partner relationship with customers is a great opportunity to enhance the demand for information accuracy, which expedites product design, reduces production planning time and decreases inventory obsolescence, leading firms to become more efficient and responsive to customer needs (Flynn, Huo, and Zhao, 2010). According to He et al. (2014), a close relationship between customers and the manufacturer, offers strong support for improving the accuracy of demand information, which reduces a manufacturer's product design and production planning time and inventory obsolescence, allowing it to be more responsive to customer needs.

Although several studies have not found a direct relationship between customer and performance (Vickery et al,. 2003), most researchers have indicated that there are positive effects of customer (and supplier) integration and different measures of performance, such as responsiveness levels (Droge, Jayaram, and Vickery, 2004; Flynn, Huo, and Zhao, 2010), flexibility (Jacobs, Vickery, and Droge, 2007; Wong, Lai, and Cheng, 2011), service performance (Droge, Vickery, and Jacobs, 2012; van der Vaart and van Donk, 2008;), sales and market growth (Droge, Jayaram, and Vickery, 2004; Kim, 2009), and cost (Jacobs, Vickery, and Droge, 2007; van der Vaart and van Donk, 2008). Furthermore, a significant positive relationship between customer integration and financial performance has been found (e.g., Droge, Jayaram, and Vickery, 2004; Koufteros, Vonderembse, and Jayaram, 2005).

Based on the above discussion, we propose the following hypothesis:

H1B. Customer integration is positively related to financial performance.

2.2.2.3 Internal integration and financial performance.

Internal integration focuses on activities within a firm. Different departments and functional areas within a firm should work and act as part of an internal integrated operation process (Flynn, Huo, and Zhao, 2010). Internal integration refers to the degree by which a firm structures its own organizational strategies, practices and processes into cooperative, coincide processes, in order to fulfil its customers' requirements and efficiently interact with its suppliers

(Brundage, George, and Bowen, 1995; Cespedes, 1996; Kahn and Mentzer, 1996). Stock, Greis, and Kasarda (1998) have defined the internal integration as the coordination, collaboration and integration of functional areas within the firm. Internal integration is one of the most significant differentiators of a firm's overall performance (Stank, Keller, and Daugherty, 2001).

Internal integrated processes include activities and functions, such as sharing information, planning and cross-functional teams, which could reduce the internal functional barriers to enhance a firm's performance and gain customer satisfaction. Internal integration enhances the internal coordination and cross-functional collaboration among supply chain functions such as, planning, manufacturing, purchasing and logistics through the sharing of information.

Several studies have focused on internal integration as a main part of the supply chain integration concept. Findings of empirical studies show that internal integration, significantly enhances and improves performance (an exception is Gimenez and Ventura, 2005). For example, Droge, Jayaram, and Vickery (2004) found that internal integration was positively related to financial performance and market share and Germain and Iyer (2006) indicated that internal integration is positively related to logistical performance. Flynn, Huo, and Zhao (2010) confirmed that internal integration is positively related to operational and business performance. Moreover, quality, delivery, flexibility and cost could be associated with internal integration (Wong, Boon-itt, and Wong, 2011).

Based on the above discussion, we propose the following hypothesis:

H1C. Internal integration is positively related to financial performance.

2.2.3 Integrated information technology and financial performance.

Many researchers agree that information sharing between supply chain partners is a key driver of effectiveness and efficiency, by speeding up the information flow, shortening the response time to customer needs, providing enhanced coordination and collaboration between partners and sharing the risks as well as the benefits (Li and Lin, 2006). Moreover, a resource-based view focuses on specific relational resources exchanged through the supply chain networks, which are important in improving information sharing as well as enhancing supply chain performance (Cheng, 2011). However, although recent studies have concentrated on the

benefits associated with information sharing for organizations in the supply chain context (Guo, Fang, and Whinston, 2006; Koçoğlu et al., 2011; Sahin and Robinson Jr. 2005; Zhou and Benton Jr. 2007; Li, Sikora, et al., 2006), very few studies investigated the specific impact of information technology (IT) on supply chain relationships and firm performance. This is surprising because growth and development of technology has attracted organizations to increase their interest and investment in IT. At present many researchers agreed that this areas deserves further research attention (Oh, Teo, and Sambamurthy, 2012; Wu et al., 2006; Liang, You, and Liu, 2010).

Researchers and scholars have indicated different definitions of IT depending on their intellectual vision and perspectives. According to the definition of Michel Paquin (1990), IT is used to produce, process, store, retrieve and send information, whether it is in the form of written digital or image. The use of techniques and software is the main driver of IT, in which applications depend on several stages to its launch, starting from data acquisition, which includes the organization, tab, storage, coding and analysis to get to the results ranked stage processing, to take advantage of them at the appropriate time (Turban, McLean, and Wetherbe, 1999).

Outputs of the IT are represented in the appearance of many areas of development, like a sophisticated and complicated program, that include expert systems, artificial intelligence, databases, office automation, Internet, extranet, e-mail and remote communications technology. We agree that IT can represent the technological side of the information system and can play its part when needed.

Despite the strong faith and the widespread idea that IT is essential and fundamental to a firm's survival and growth, researchers are still striving and struggling to specify the perfect and complete mechanisms, which link IT to performance. Academic researchers debate the payoff from investing in information technology and after many years of studying and discussing, they cannot reach an unanimity result.

The research conducted by Kettinger et al. (1994) showed that 24 firms out of 30 experienced negative outcomes for market share or profits within five years of information technology circulation, and only three of those 24 firms acquired both market share and profits

after five years. A survey of retailers conducted by Powell and Dent-Micallef (1997) showed no relationship between information technology circulation and overall store performance.

Strassmann (1997) says that there is no concrete relationship between IT investments and any measure of a firm's profitability, including return on equity, return on assets and economic value added. A number of other empirical studies have failed to find any significant effect for information technology, researchers described this phenomenon as the "productivity paradox of information technology" (Lim, Richardson, and Roberts, 2004).

Several studies have showed that overall information technology ability and power are positively related to a firm's performance (Bharadwaj, 2000; Fosso Wamba et al., 2008; Kearns and Lederer, 2003;) and others have showed that a significant competitive advantage can be achieved by investment in information technology (Earl, 1993; Kathuria, Anandarajan, and Igbaria, 1999). Isobe, Makino, and Montgomery (2008) conducted another study with the purpose of identifying the nature of the relationship between technological capabilities and the performance of companies. The results showed that the technological capacity significantly and positively linked to a company's performance.

The disappointing results of past studies have been shown due to (1) that researchers dealt with the subject of IT and its impact on business organizations from several different directions, and (2) the use of inadequate measures of information technology, failing to control the factors that drive a firm's profits and having problems in sample sizes and selection (Dos Santos, Peffers, and Mauer, 1993; Hitt and Brynjolfsson, 1996; Lucas, 1993; Mooney, Gurbaxani, and Kraemer, 1996).

Integrated IT systems represent supply chain communication and integration systems, described as internally and externally integrated corporate systems that enable channel members to carry out supply chain activities, including strategic management functions, electronic transactions, quality and cost calibration and cooperative forecasting and planning (Bowersox, Closs, and Stank, 1999; Bowersox, Closs, and Cooper, 2002). Integrated IT reflects the information system whereby several functions can be integrated. Integrated functions such as database, data processing, data flow, and data outcome are the back bones that control the integrated information system of a firm. The indicators of integrated IT construct are

conceptualized to signify the existence of electronic transactions and communication in several forms between the supply chain partners.

In most companies, there is a natural flow of information. In a manufacturing company, for example, the start is in engineering. Then, the mainstream flow of product information is to manufacturing planning, manufacturing and testing. Financial information would have a different natural flow. Applying integrated data flow means to divide the company's system of information flows into modules in a planned way, so that the outputs of a processing module can be used directly as the inputs to other modules. In addition, all data, which is needed downstream in the process, is collected at the source.

The enforcement of integrated IT for supply chain management is becoming more and more important in the context of growing a globalized and competitive economy. Both managers and researchers are interested and preoccupied with the impact of integrated IT on overall organizational performance and specifically on financial performance.

The productivity and efficiency of integrated IT has been debated from the economy level to the industry, firm, and activity levels since the 1970s (Brynjolfsson, 1993). More recently, RBV represents a potential framework that enhances and improves the conceptual analysis of integrated information technology's effects on a firm's performance, which connects and relates organization performance to resources and skills (Barney, 1986, 1991). In general, it is argued that organizations can achieve many benefits through integrative IT processes. Integrated IT offers an appropriate tool that has significant effects on improving the level of prices, reducing the cost of production processes, increasing the speed of achievement and quality improvement, which leads to increasing the competitiveness of organizations and achieving its goals in survival, development and expansion in its performance.

Integrated IT has been strongly considered as a critical factor in the supply chain, due to its significant assistance in improving the firm's performance. Integrated IT could improve supply chain performance by providing timely, accurate and reliable information. Despite integrated IT implementation becoming widespread among organizations; the direct positive effect on financial performance remains elusive.

Mixed results have been reached by many empirical studies that have investigated the relationship between integrated IT and performance of a firm. For example, some scholars found a positive and significant relationship between integrated IT and a firm's performance; more specifically, integrated IT enhanced processes (Dehning, Richardson, and Zmud, 2007; Mukhopadhyay, Rajiv, and Srinivasan, 1997; Hendricks and Singhal 2003) and improved efficiency in different firm activities (Stank, Crum, and Arango, 1999). However, a few empirical studies showed ambiguous and equivocal results for the impact of information technology on performance (Hitt and Brynjolfsson, 1996; Weill, 1992).

Based on the foregoing considerations, we propose the following hypothesis:

H2. Integrated IT is positively related to financial performance.

2.2.4 Integrated information technology and supply chain integration

The technological connectivity among supply chain partners requires a high level of systems integration, that allows two supply chain proprietary systems to reduce technical barriers, inconsistency and incompatibility, which lead to better and effective communication during coordinating activities (Bowersox, Closs, and Stank, 1999). Carr and Pearson (1999) indicated that replacing inventory with perfect information is the main goal of information systems.

IT today permeates and penetrates the supply chain at every stage and transforms the way in which the implementation of activities and the nature of the links between these activities are made (Palmer and Griffith, 1998). Supply chain efficiency can be improved through IT by providing real-time information regarding product availability, shipment status, inventory level and production requirements (Radstaak et al., 1998). For example, supply chain integration by activating information exchange between supply chain partners, will have a positive impact in reaction to market velocity and/or environmental changes, as well as in developing competitive, new products (Clemons and Row, 1992).

Integrated IT can facilitate and enhance supply chain integration between firms and ultimately improve a firm's performance through improved integrative channel capabilities by, "cementing relationships with customers, enabling integration forwards or backwards in the industry value chain or in establishing a technical lead" (Roberts and Mackay, 1998, 176). That

is, integrated IT has great potential to expedite and accelerate integration among supply chain partners, through effective coordination and sharing of information on demand forecasts and production schedules, that instruct supply chain activities (Karoway, 1997; Chen and Paulraj, 2004). Supply chain members who applying technological and administrative integration, can be more active in the sharing of planning, strategies, resources and competencies among partners (Kim, Cavusgil, and Calantone, 2006).

Integrated IT supports supply chain integration in various aspects, such as enterprise resource planning, customer relationship management, advanced planning, transportation management, and warehouse management systems (Kim, Cavusgil, and Calantone, 2006). Bowersox, Closs, and Cooper (2002) indicated by evidence that many supply chain partners maintain multiple technological platforms or programs. For example, Electronic Data Interchange (EDI) alone can be performed and achieved at multiple levels and types, including proprietary vs. non-proprietary EDI, Internet-based vs. non-Internet-based EDI, automated vs. non-automated EDI and internally integrated EDI with other corporate information systems vs. stand-alone EDI (Kim, Cavusgil, and Cavusgil, 2013). Electronic data interchange (EDI) is one of the most important elements, which plays a significant and vital role in supply chain integration (Rogers, Daugherty, and Stank, 1993).

Although integrated IT requires appropriate and convenient platforms and thus demands resources, it offers varied benefits to supply chain partners (Bowersox, Closs, and Stank, 1999; Davis and Golicic, 2010). Firstly, integrated IT, which improves the functional sufficiency of communication systems, should decrease technological obstacles among the involved supply chain partners and therefore increase inter-firm interactions. Secondly, decreased communication obstacles and enhanced inter-firm integration, helps the supply chain as a whole in responding to changing market conditions and environments more efficiently and successfully (Davis and Golicic, 2010; Kim, Cavusgil, and Cavusgil 2013; Wuyts and Geyskens, 2005). Therefore, having a communication system with appropriate and convenient technology is crucial for successful and effective communication, coordination and integration between supply chain partners (Richey, Daugherty, and Roath, 2007; Kim, Cavusgil, and Cavusgil, 2013).

There is growing unanimity in the literature concerning the advantages, integrated IT provides for the supply chain partners (Barratt and Barratt, 2011; Bowersox et al., 2000; Huang,

Lau, and Mak, 2003; Lin, 2007; Douglas M. Lambert, 2008; Yu, Ting, and Chen, 2010; Zhou and Benton Jr. 2007). Integrated IT facilitates the development of constant, stabilized and close relationships between supply chain partners (Clemons and Row, 1992).

Successful firms utilize their technology base and information technology capabilities to develop a complete integrated IT system, which serves an organization's internal integration and external (supplier – customer) integration, to achieve superior performance. Bharadwaj (2000) indicated that firms can enjoy superior financial performance by decreasing their costs and increasing revenues, if they succeed in creating a superior, integrated, IT capability. On the other hand, firms that bear IT costs without developing an integrated IT capability will be in a risky position and at a comparative disadvantage.

In addition, the design of technological tools (such as information system, Internet based communication) is highly suggested to decrease the risks perceived by customers, so as to improve customer integration (Frohlich and Westbrook, ,2002; Tollin, 2002; Vickery et al., 2003; Piller and Walcher, 2006; Devaraj, Krajewski, and Wei, 2007; Füller, Faullant, and Matzler, 2010). However, He et al. (2014) agreed that customers will consider the inherent risks in integration with manufacturers, such as the loss of know-how to the outsiders, dependence on manufacturers, increased cost of coordination and inflexibility.

Therefore, most researchers consider that integrated IT is a key enabler of supply chain integration by the sharing of important information concerning business processes inside and outside organization's boundaries (Clemons, Reddi, and Row, 1993; Froehlich and Westbrook, 2001; Kelle and Akbulut, 2005; Sanders and Premus, 2002; Vickery et al., 2003). High levels of integrated IT make possible the communication technology compatibility with each other (Kim, Cavusgil, and Cavusgil, 2013; Rai, Patnayakuni, and Seth, 2006;), improving the efficiency of supply chain activities. Applying integrated IT between supply chain partners requires both their comprehensive inter-firm coordination and willingness to sacrifice their short term interests (Kim, Cavusgil, and Cavusgil, 2013; Wu et al,. 2006). To ensure the integrated IT, each partner must have compatible technology and strong resource commitment (Froehlich, 2002).

We believe that integrated IT has a positive effect on supply chain integration internally within a focal firm and externally among a focal firm and its suppliers and customers. On the basis of the foregoing considerations, we propose the following hypotheses:

H3A Integrated information technology is positively related to supplier integration.

H3B Integrated information technology is positively related to customer integration.

H3C Integrated information technology is positively related to internal integration.

2.2.4.1 Moderating role of trust on the relationship between integrated IT and supplier integration

Business firms are facing higher levels of competitive environments, which force them to find more creative and flexible intermediary for meeting competition (Doney and Cannon, 1997). To deal with such challenges, many firms have built collaborative and integrated relationships with customers and suppliers (Dertouzos, Solow, and Lester, 1989). Effective, integrative and collaborative relationships, depend on relational forms of exchange characterized by high levels of trust (Dwyer, Schurr, and Oh, 1987; Morgan and Hunt, 1994).

Trust means the level of belief and confidence of a focal firm on its partners that they are able to fulfil their obligations and promised actions (Anderson and Narus, 1990; Handfield and Bechtel, 2002; Morgan and Hunt, 1994;; Shi and Liao, 2015). Trust helps supply chain partners in fulfilling obligations and promises and makes them work more collaboratively in supply chain operations and also allow firms to foresee and predict the actions to be done by their supply chain partners (Handfield and Bechtel, 2002; Lavie, 2006; Zaheer and Venkatraman, 1995).

Trust enhances commitment by decreasing profiteering behavior and thus influencing confidentiality among supply chain partners and motivating them to commit to the relationship in future exchanges (de Ruyter, Moorman, and Lemmink, 2001; Moore, 1998). Long-term superior benefits of the relationship between organizations can be achieved by higher levels of trust characteristic of relational exchange (Ganesan, 1994). Eventually improving competitiveness and reducing transaction costs between firms (Noordewier, John, and Nevin, 1990).

Previous marketing studies focused on trusting supplier firms indicating mixed results and different concepts (Doney and Cannon, 1997). For example, establishing and building a long-term relationship with a trusted supplier could be a risky gamble with company representatives who prove to be roguish and disingenuous (Kelly and Schine, 1992). Contrariwise, organizations with higher levels of trusted salespeople, are able to maintain and protect customer commitment and promises during difficult times, created by management policies (Schiller, 1992).

In the context of supply chain integration, trust plays a key role in developing and creating a relevant supply chain environment, either by reinforcing reciprocal confidence and improving integration and relationship stability, or by reducing the transaction costs, alleviation of profiteering behavior and fostering the relationships among partners (Johnston et al., 2004; Lavie, 2006; Ring and Ven, 1994; Shi and Liao, 2015). The presence of trust between firms represents a great advantage that helps not only mind-sets in business operations, but also sincerity and loyalty in exchanging information and sharing resources among supply chain partners (Ring and Ven, 1994; Zaheer and Venkatraman, 1995). Therefore, supply chain partners trusting each other, are able to enjoy a great benefit by reducing risks and increasing opportunities through the exploration of joint actions (Anderson and Narus, 1990; Handfield and Bechtel, 2002).

Firms that trusts their suppliers will have a better chance to reduce conflicts and to improve the level of satisfaction for all channel members (Anderson and Narus, 1990). Also, trust in a supplier will lead firms to be more committed to continue and stay in the relationship (Anderson and Weitz, 1989; Morgan and Hunt, 1994). Moorman, Zaltman, and Deshpande (1992) indicated in their research study that information provided by a trusted party is more useful for a firm and thus provides superior value to the recipient. Buyers who trust sellers are able to show more coordinative and integrative strategies, which are beneficial for both sides (Schurr and Ozanne, 1985).

Trust supports supplier integration by increasing the openness in the relationship, or the degree of bilateral disclosure. From the point of view of the sender, trust reduces fears of information misappropriation and encourages openness in the relationship (McEvily, Perrone, and Zaheer, 2003). Trusting firms recognize that information is an inevitable consequence of integration but have confidence that the supplier will not use this information to exploit them

(Inkpen, 2000) to their detriment (Norman, 2002). In other words, trust is an essential factor in overcoming the trade-off between integrating new information with supplier and protecting proprietary assets (Kale, Singh, and Perlmutter, 2000).

On the basis of the foregoing considerations, we propose the following hypothesis:

H4A1. Trust is positively related to supplier integration.

In addition, trust can influence the relationship between integrated information technology of a firm and the integration process with its suppliers. Suppliers are increasingly participating in their buyer's product development processes and acting as production partners (Appleyard, 2003; Beecham and Cordey-Hayes, 1998;; Lau, Tang, and Yam, 2010). In a recent study by Rosell, Lakemond, and Wasti (2014), it is confirmed that closer and stronger collaboration with suppliers is an important trend in the manufacturing industry, for production, logistics and development activities.

Trust may serve as a control mechanism to counter opportunism in an integrated relationship with suppliers (Gulati, 1995). It may place a social control on the 'learning race' (Khanna, Gulati, and Nohria, 1998), in which firms entice in opportunistic behavior in attempts to outlearn each other. A reduced fear of opportunism decreases the protectiveness of the source firm (Norman, 2002), maximizing the joint learning outcome (Larsson et al., 1998).

From the point of view of the receiver, trust increases the veracity of the integrated information (McEvily, Perrone, and Zaheer, 2003). Where levels of trust are high the receiver is more inclined to accept the shared information at face value rather than spending time checking the its level of accuracy. This speeds up the information integration process; it can be expected that the source firm will take into account the receiver's (supplier's) best interest, only sending them information that is accurate, important and relevant.

The interface between information technology systems and supplier integration could depend on trust. That is, increased levels of trust between buyers and suppliers can influence the relationship between integrated IT of a firm and supplier integration. The moderating argument would indicate how strength of trust leads to successful supplier integration. The advantage of a moderation model is that it will account for instances of integrated IT which do not result in increased levels of trust, such as when integrated information technology is the

result of coercion (Rousseau et al., 1998) or external control mechanisms (Mayer, Davis, and Schoorman 1995).

Then, we argue that, in addition to its main effect on supplier integration, trust has potentially moderating effects on the relationship between integrated IT and supplier integration. Trust will increase the effect of integrated information technology on supplier integration by operating as a social decision heuristic in the exchange (Kramer, 1999). A social decision heuristic refers to the behavioral rule of thumb that is used when making decisions on how to respond to predicament situations (Squire, Cousins, and Brown, 2009). For example, trust can change attitudes to potential opportunistic situations, acting to oblige choice and forcing firms to behave with loyalty and conformity to expectations (Gulati 1995; Macaulay, 1963).

Trustworthy exchange supplier will tend to assume the best when predicting and interpreting another's motives and actions (Dirks and Ferrin, 2001; Uzzi, 1997). Integrated IT facilitates communication and interaction, but unless firms believe they are safe from opportunistic behavior, transfer activities are likely to be limited. On the basis of the foregoing considerations, we propose the following hypothesis:

> *H4B1. Trust moderates the relationship between integrated IT and supplier integration, so that the higher the trust, the greater the integrated IT - supplier integration relationship.*

2.2.4.2 Moderating role of relationship commitments on the relationship between integrated information technology and customer integration

Customer integration includes information sharing, planning, coordinating and controlling materials, parts and finished goods at the operational and tactical levels (Stevens, 1989). Synchronization of processes is a critical activity in customer integration (Zhao et al., 2008). Stank, Keller, and Closs (2001) found that customer integration is the most important dimension of supply chain integration that influences competitive performance.

Relationship commitment refers to the level of readiness of a firm to invest its resources physically and financially in a long-term relationship (Morgan and Hunt, 1994). Relationship commitment includes a strong sense of identification, loyalty, affiliation, and obligation. People

develop and maintain personal relationships that contribute and reinforce their formal roles (Lawler and Yoon 1998; Ring and Ven 1994). As such, relationship commitment also shapes a motivational impact that favors integrated information level with customer. In the context of supply chain, relationship commitment is an attitude of supply chain partners to establish, maintain and develop a stable, long-term reciprocal relationship (Anderson and Weitz, 1992; Moore 1998; Zhao et al., 2008).

Relationship commitment can play a significant and vital role in supply chain relationships (Zhao et al., 2008). For example, the rapid advance in information technology has presented firms with new, integrated technology-based solutions, such as customer relationship management (CRM) technology, to manage customer relationships. CRM technology is a suite of integrated information technology-based solutions, designed to improve the customer relationship management process (Rigby, Reichheld, and Schefter, 2002). Sustained relationship commitment with customers is expected to better customer integration, lower costs, increase customer satisfaction, and retention and improve revenues (Sheth and Parvatlyar, 1995).

Several scholars have investigated factors that influence inter-firm relationships from the relationship commitment perspective (Brown, Lusch, and Nicholson, 1995). For example, research conducted by Morgan and Hunt (1994) showed a positive and significant association between relationship commitment and integrative cooperation. However, the impact of relationship commitments on customer integration is still little known in a supply chain integration context. In effect, few researches have studied the impact of relationship commitment on customer integration from a supply chain management perspective (Zhao et al., 2008).

When there is relationship commitment between firms, supply chain members could integrate and coordinate business processes and goals with their key customers (Chen and Paulraj, 2004). Normalization of the values and norms of the customer, allows firms to maintain a long-term relationship with them. This committed, long-term relationship is primarily based on the similarity of values, with customers to confirm the obligations of each party. Therefore, firms with greater relationship commitment are more likely to integrate and coordinate with their customers.

On the basis of the foregoing considerations, we propose the following hypothesis:

H4A2. Relationship commitment is positively related to customer integration

In addition to direct relationship with customer integration, relationship commitment can play a significant role in moderating the relationship between integrated IT of a firm from one side and customer integration from the other side.

Trust and commitment between the parties is critical and decisive considering the necessity for exchanging information of a proprietary nature. For example, vital and sensitive information concerning stock levels, production plan, product quality, prices, and strategies is frequently involved. Furthermore, increased commitment tends to make firms resist attractive short-term alternatives in favor of expected long-term benefits (Morgan and Hunt 1994). The assurance is on maintaining and promoting the ongoing relationship with customers.

Given the high value of information and the costs associated with integrated information systems development, a high degree of relationship commitment between supply chain partners is necessary to ensure both the security of the information exchange and the recovery of systems costs over the length of the relationship. For this reason, relationship commitment is considered as a key moderator between integrated IT constructs and their influence on the customer integration. A high commitment may make that the integrated IT increase customer integration. Just as high trust can encourage integrated IT to increase supplier integration, high commitment should also support customer integration.

Therefore, the effect of integrated IT on customer integration, will be enhanced when it exits a relationship commitment between partners. Relationship commitment increases the integrated IT - customer integration relationship by providing stable long-term relationships with customers and by reducing opportunistic behaviors that contradict the interests of the other party (Williamson, 1985). On the basis of the foregoing considerations, we propose the following hypothesis:

H4B2. Relationship commitment moderates the relationship between integrated IT and customer integration, so that the higher the relationship commitment, the greater the integrated IT - consumer integration relationship.

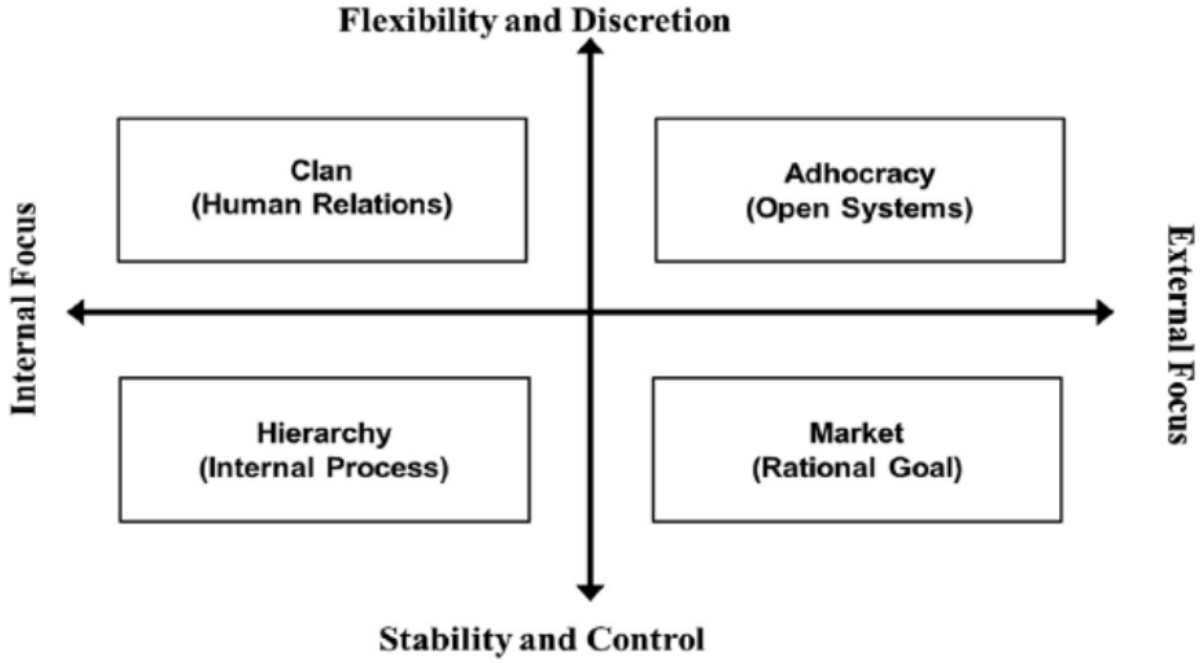
2.2.4.3 Moderating role of hierarchical organizational culture on the relationship between integrated IT and internal integration

Organizational culture is one of the most important factors that might affect the level of supply chain integration within a firm. Organizational culture could either enhance or restrain the supply chains internal integration process. Examining this possibility will improve our understanding of the nature of internal integration dimensions specifically and supply chain integration in general, as a main construct.

Organizational culture is defined as, "a pattern of shared basic assumptions that were learned by a group as it solved its problem of external adaptation and internal integration (II), that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those problems" (Schein 2004, 17). Therefore, the organizational culture of a firm is defined as the values or beliefs shared by members of an organization (Cameron and Quinn, 2005; Schein, 2010; Zu, Robbins, and Fredendall, 2010;).

Several researchers (Cameron and Quinn, 2005; Lee, Shiue, and Chen, 2016) have proposed a theoretical typology of organizational culture that they called the Competing Value Framework (CVF). This typology includes four controlling organizational culture types: clan, adhocracy, hierarchy and market. These organizational culture types are introduced along with two major pivots: (1) internal versus external organizational focus and (2) flexibility and discretion versus stability and control, as shown in next figure.

Figure 17: Competing Value Framework (CVF) of organizational culture



Source: (Lee, Shiue, and Chen, 2016)

To emphasize developing people and improving internal processes and systems within the organization, cultural preference for an internal focus has to be established by organizations (McDermott and Stock, 1999; Quinn and Rohrbaugh, 1983;).

Clan culture concentrates on organization stability by focusing on shared values such as cooperation, teamwork, common goals, commitment, loyalty and participation by the organization's members and thus heartens employees to collaborate and integrate with internal partners (Cameron and Quinn 2005; Naor et al., 2008). Clan culture plays an important role in situations of competition, by enabling supply chain members to cooperate and integrate internally (Eng, 2006). Common language could be created between internal departments by establishing teamwork activities such as brainstorming (Naor et al., 2008). This internal integrated common language created by clan culture, is fundamental for sharing information and knowledge (Nonaka, 1994) and for superior integrated communication across functions within organizations (Cao and Huo 2015).

Hierarchical culture refers to the level of formalized or structured construction that has been established inside an organization to assert procedures, stability, order and the expectably

of regulations, therefore increasing efficiency, productivity and the reliability of products (Lee, Shiue, and Chen, 2016). It is the organizational culture that controls the top-down decision-making to enhance employees' motivation to take risks and adapt to changes, which facilitate the internal integration process (Braunscheidel, Suresh, and Boisnier, 2010). Zu, Robbins, and Fredendall (2010) described hierarchical culture as specified procedures and routines that manage and formalize the decision-making structures whereas; decisions are reported to supervisors for approval.

Organizational culture impact on the implementation of technology has been investigated from an operations management perspective (McDermott and Stock, 1999; Zammuto and O'Connor, 1992); however, the analysis of the influence of organizational culture on supply chain integration has been very limited (McDermott and Stock, 1999). However, the behavior of employees in terms of internal integration, information sharing, teamwork and risk taking could be influenced by convenient organizational culture. Organizational cultures are substantial for internal integration and supply chain integration success (Fawcett, Magnan, and McCarter, 2008; McAfee, Glassman, and Honeycutt ,2002; McCarter, Fawcett, and Magnan, 2005; Whitfield and Landeros, 2006;). Several researchers (Braunscheidel, Suresh, and Boisnier, 2010; Naor et al., 2008;; Zu, Robbins, and Fredendall, 2010) have examined the relationship between organizational culture and supply chain integration and builds up links between the various dimensions of organizational culture and the different dimensions of supply chain integration. In this study, we only examine the effect of one type of hierarchical culture because Egyptian firms are more characterized by this type of culture.

Hierarchical organizational culture presents shared values that guide employees' behavior regarding internal operations (Adler, Goldoftas, and Levine, 1999). This culture, characterized by specialization -specified procedures and routines that manage and formalize the decision-making structures-, and centralization -decisions are reported to supervisors for approval- can facilitate internal integration (Cao and Huo 2015; Hult, Ketchen Jr., and Nichols Jr. 2003; Hult, Ketchen, and Slater 2004; Zhao et al. 2011). On the basis of the foregoing consideration, we propose the following hypothesis:

H4A3. Hierarchical organizational culture is positively related to internal integration.

Exploring the moderating role of hierarchical organizational culture may help resolve the conflict and collision in previous studies (Hewett, Money, and Sharma, 2002). We argue that the relationship between integrated IT and internal integration adoption may be conditioned by the collection of assumptions, values and beliefs that organizational members have in common. That is, we propose that internal organizational cultural elements related to hierarchy are contextual factors that could moderate the relationship between integrated IT and internal integration because effective implementation of integrated IT is influenced by employees' mindsets and orientation derived from what the hierarchical organizational culture implies and emphasizes. An internal organizational culture where people in the organization are concerned about specialization, formalization, and centralization in decision-making will increase the relationship between integrated IT and internal integration because it influences the implementation of shaping the behavior of employees that serve integrated IT enhancing the internal integration. In an organizational context organization act according to norms and procedures and are concerned with effectiveness and efficiency, where there is a high level of formalized or structured construction established to assert procedures, stability, order, and the expectably of regulations, integrated IT will generate higher levels of internal integration.

On the basis of the foregoing considerations, we propose the following hypothesis:

H4B3. Hierarchical organizational culture moderates the relationship between integrated IT and internal integration, so that the stronger the hierarchical organizational culture, the greater the integrated IT - internal integration relationship.

2.2.5 Department size and integrated information technology

IT as an infrastructure has been recognized as a critical factor in the improvement of supply chain management, due to the vital role to support both inside the organization itself and within its upstream (Gupta and Capen, 1996; Koh and Saad, 2006). IT has led to better performance of both the focal firm and the partners in the supply chain, because of its power to provide timely, accurate, and reliable information (Jin, 2006).

IT departments are an asset for companies and have become the main driver for all the activities inside and outside the organization, by managing and improving the integration processes, including communication, inventory management, data management, management information systems and customer relationship management.

IT departments help to implement and maintain links between different resources owned by different supply chain partners (Dong, Xu, and Zhu, 2009) and improving a firm's ability to address business uncertainties (Bensaou and Venkatraman, 1995). Therefore, a sufficient IT department size with qualified staff is highly needed to facilitate and enhance the integrated information technology processes. Businesses are paying more attention to the IT department's size and giving consideration to the importance of keeping a strong, qualified, professional workforce of a sufficient size.

As a higher number of employers can lead to better integrated information within a firm, we propose the following hypothesis:

H5. IT department size is positively related to integrated information technology.

2.2.6 Top management support and integrated information technology

Influencing the setting of organizational values and developing suitable management styles to improve the firm's performance, has been considered as one of the major functions of top management executives (Chen and Paulraj, 2004). Top management support is very important in providing and conducting convenient climates, suitable work environments and appropriate management styles, to achieve benefits from integrated IT and supply chain integration (Lee, Shiue, and Chen, 2016). In this study, top management support is described as time and resources dedicated by the top management to integrated IT and supply chain integration development.

Previous studies have analyzed and utilized top management support as a key factor in the software process improvement context (El-Emam et al., 2001; Goldenson and Herbsleb, 1995; Montoni and Rocha, 2007; Niazi, Wilson, and Zowghi, 2006; Rainer and Hall, 2002; Sulayman et al., 2012). For example, Dyba (2005) showed that improving software processes requires highly commitment participation from top management and Lee, Shiue, and Chen (2016) found that top management support had a positively significant influence on knowledge sharing in software process improvement, but the findings did not indicate a direct significant relationship with the success of software process improvement. Knowledge sharing played the mediation role in the relationship between top management support and software process improvement.

Although top management support has been inclusively and globally studied, the role of top management support in integrated IT and the supply chain integration process is still unknown (Swink, Narasimhan, and Wang, 2007). Following the case study methodology (Akkermans and van Helden, 2002) showed that top management support was ranked as one of the most critical success factors in enterprise resource planning (ERP) implementation. Ke and Wei (2008) argued that top management role designing, is able to reinforce a learning atmosphere that is established by successful integrated IT and ERP systems. A survey of chief information officers conducted by Nah, Zuckweiler, and Lau (2003) considered top management support as the most critical success factor influencing IT infrastructures and ERP implementation success. Top management support is also considered as a key success factor relating to customer relationship management (CRM) implementation (Chen and Popovich, 2003) and the internal and external propagation of electronic data interchange (EDI) (Lee and Lim, 2005).

We argue that top management support has a positive effect on integrated ITand can lead to better integrated information within a firm. In other words, a firm with a high level of top management support will have a high integrated IT amongst supply chain partners into its operating activities. Contrariwise, a firm with a low level of top management support, will be unable to integrate the IT from supply chain partners into its operating activities. On the basis of the foregoing considerations, we propose the following hypothesis:

H6. Top management support is positively related to integrated information technology.

CHAPTER (3): RESEARCH METHODOLOGY, DATA ANALYSIS, AND RESULTS

3.1 Methodology

In this section, we present research methodology performed to test our theoretical hypotheses with data collected in empirical study. First, data collection procedure and measurement of construct are described, ending this section with statistical description of data collected. Second, conceptual models are tested with Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) analysis, ending this section with results of analysis for each conceptual sub-model. All the analysis was performed using IBM SPSS Statistics v.20 and IBM SPSS Amos v.21.

3.1.1 Sample and data collection procedure

The study was conducted in 2016 using a sample of manufacturing, retailing, wholesaling and shipping services firms headquartered in Egypt. Following Morgan, Kaleka, and Katsikeas (2004), a multi-industry sample was used, in order to increase observed variance and to reinforce the generalization of the results. To collect the data, a structured questionnaire was developed starting from a comprehensive review of the literature in the area (sources of scales from the literature are presented in the next section). The content validity of the items was assessed by five academic experts familiar with this topic, and the questionnaire was also pre-tested by ten supply chain and general managers.

The sampling frame for the study was based on a government agency database (Egypt Business Directory, 2013). We considered those companies belonging to sub-sectors related with manufacturing, retailing, wholesaling and shipping service in Egypt with supply chain management. Considering these criteria, initial population of our study was compounded by 1,264 companies. Next tables show the selected companies of our database, first distributed by sub-sector and second distributed by location.

Table 9: Database: companies by sector

SECTOR	N	%
Industry	485	38.37
Service	231	18.28
Construction	200	15.82
Chemicals	163	12.90
Food	100	7.91
Automotive	85	6.72
TOTAL	**1,264**	**100**

Table 10: Database: companies by region

REGION	N	%
Cairo	392	31.01
Alexandria and Delta	304	24.05
Giza and 6th of October	265	20.97
10th of Ramadan	201	15.90
South Egypt	102	8.07
TOTAL	**1,264**	**100**

Our data base analysis shows that the most selected companies in our sample were from industry sector (38.37%) followed by service sector (18.28%). Construction and chemicals companies were presented in our study with lower share (15.82%) and (12.90%) respectively. Food companies share was lower (7.91%) and finally, companies from automotive sector scored the lowest share in our sample (6.72%).

On the other hand, our data base analysis indicated that the most selected companies were from Cairo region (31.01%) then Alexandria and Delta region (24.05%). Followed to that were Giza and 6th of October region (20.97%). Not far away from that comes 10th of Ramadan region (15.90%) and finally, south Egypt region scored the lowest rate in our selected sample with (8.07%).

Therefore, questionnaires were distributed to 1,264 senior managers with responsibilities in the field of supply chain, logistics, purchasing, marketing and operations. Respondents were contacted through different ways, including e-mailing, phone, and personal interviewing. After eliminating non-valid questionnaires, we retained 205 usable questionnaires, representing a response rate of 16.22%. This constitutes a fairly good response rate, considering that the average top management survey response rates are between 15 and 20% (Menon, Bharadwaj, and Howell 1996). To encourage respondents to participate, a report with the results of the research was promised. Thus, data collection procedure was performed as following:

Table 11: Sample description

Population	Manufacturing, retailing, wholesaling and shipping services firms
Location	Egypt
Data collection procedure	E-mailing, phone, and personal interview
Database source	Egypt Business Directory - http://www.egypt-business.com/ ("Egypt Business Directory" 2013)
Respondent	Managers with responsibilities in supply chain, logistics, purchasing, marketing and operations
Population size	1,264 firms
Sampling procedure	Convenience sample (non-probabilistic)
Field work	February – April 2016
Sample size	205 valid questionnaires
Response rate	16.22%

A single-key informant was selected in each firm to fulfil the questionnaire. The use of such an informant allowed us also to reduce the potential for systematic and random sources of error (Huber and Power 1985). In this context, it is important to select managers that are involved in a particular decision domain (Dutton, Fahey, and Narayanan 1983; Hambrick 2007). Thus, the focus of this research are the decision makers with responsibilities in supply chain, logistics, purchasing, marketing and operations, since they are who influence supply chain management through planning, organizing, leading, and controlling resources in this area. To ensure reliability of the data source, the respondents were required to be senior managers with responsibilities for supply chain, logistics, purchasing, marketing and operations. A specific section of the questionnaire was used to establish the respondent's title, and responsibilities in the company.

Finally, following the guidelines of Armstrong and Overton (1977) and Weiss and Heide (1993) we tested for significant differences between early respondents (first 75% returned questionnaires) and late respondents (late 25%), thus analyzing the possibility of nonresponse bias. For that purpose, we performed t-test in this subsamples on several firm characteristics (such as total number of employees, and total number of IT employees), and the results showed no significant differences (at the $p<.05$ level), so nonresponse bias was not a problem.

3.1.2 Measurement of constructs: questionnaire development and scales

We developed a structured questionnaire for data collection. For that purpose, an extensive literature review in the field was developed, several academic experts in the field assessed content validity of the items, and, finally, ten supervisors, and supply chain people pretested the questionnaire. The survey used in this study was originally written and submitted

in English. All the measurement items were pre-tested in two steps. First, several experts were asked to look at the questionnaire to identify any questions that may have been confusing or difficult to answer; second, a pre-test was carried out applying the questionnaire to ten pairs of supervisors and supply chain people belonging to ten companies. These tests gave rise to certain formal adjustments aimed at improving the wording and understanding of the various items included in the questionnaire. To operationalize the variables, this study relies on previously-validated scales, measured on five-point scales (1=totally disagree; 5=totally agree). First, Integrated Information Technology was measured using 6 items adapted from Chen and Paulraj (2004). Second, Customer Integration was based on the approach of Flynn, Huo, and Zhao (2010) using 11 items. Third, Supplier Integration was based on Narasimhan and Kim (2002) using 8 items. Fourth, Internal Integration was based on the approach of Narasimhan and Kim (2002) using 6 items. Fifth, Top Management Support was based on the approach of Zhao, Feng, and Wang (2015) using 6 items. Sixth, Hierarchical Organizational Culture was based on the approach of Lee, Shiue, and Chen (2016) using 4 items. Seventh, Relationship Commitment was based on the approach of Zhao et al. (2008) using 6 items. Eighth, Trust was based on the approach of Doney and Cannon (1997) using 8 items. Ninth, Supply Chain Performance was based on the approach of Qrunfleh and Tarafdar (2014) using 10 items. Finally, Financial Performance was based on the approach of Lee, Shiue, and Chen (2016) using 7 items. Finally, IT Department Size was measured by the number of employees belonging to IT Department. In addition to the variables specified in our theoretical model, we included one control variable, Firm Size, measured by the total number of employees.

Next table shows the different dimensions considered, literature sources for each scale and, finally, items considered in each dimension.

Table 12: Measurement of constructs: dimensions, sources of scales, and items

DIMENSION	SOURCE	ITEM
INTEGRATED INFORMATION TECHNOLOGY	Chen and Paulraj 2004	B.1 There are direct computer-to-computer links with key suppliers.
		B.2 Inter-organizational coordination is achieved using electronic links.
		B.3 We use information technology-enabled transaction processing.
		B.4 We have electronic mailing capabilities with our key suppliers.
		B.5 We use electronic transfer of purchase orders, invoices and/or funds.
		B.6 We use advanced information systems to track and/or expedite shipments.
CUSTOMER INTEGRATION	Flynn, Huo, and Zhao 2010	C.1 The level of linkage with our major customer through information networks.
		C.2 The level of computerization for our major customer's ordering.
		C.3 The level of sharing of market information from our major customer.
		C.4 The level of communication with our major customer.

DIMENSION	SOURCE	ITEM
		C.5 The establishment of quick ordering systems with our major customer.
		C.6 Follow-up with our major customer for feedback.
		C.7 The frequency of period contacts with our major customer.
		C.8 Our major customer shares Point of Sales (POS) information with us.
		C.9 Our major customer shares demand forecast with us.
		C.10 We share our available inventory with our major customer.
		C.11 We share our production plan with our major customer.
SUPPLIER INTEGRATION	Narasimhan and Kim 2002	D.1 The participation level of our major supplier in the process of Procurement and production
		D.2 The participation level of our major supplier in the design stage
		D.3 Our major supplier shares their production schedule with us
		D.4 Our major supplier shares their production capacity with us
		D.5 Our major supplier shares available inventory with us
		D.6 We share our production plan with our major supplier
		D.7 We share our demand forecast with our major supplier
		D.8 We share our inventory level with our major supplier
INTERNAL INTEGRATION	Narasimhan and Kim 2002	E.1 Integrative inventory management
		E.2 Real-time searching of level of inventory
		E.3 The utilization of periodic inter departmental meetings among internal functions
		E.4 The use of cross-functional teams in process improvement
		E.5 The use of cross-functional teams in new product development
		E.6 Real-time integration and connection among all internal functions from raw material management through production, shipping, and sales
TOP MANAGEMENT SUPPORT TO SCM	Zhao, Feng, and Wang 2015	F.1 Top management is supportive of our efforts to improve the supply chain management
		F.2 Top management considers supply chain management to be a vital part of our corporate strategy
		F.3 Supply chain management department's views are important to most top managers
		F.4 The chief supply chain management officer has high visibility within top management
		F.5 Top management emphasizes the supply chain management function's strategic role
		F.6 Requests for increased resources are mostly satisfied by top management
HIERARCHICAL ORGANIZATIONAL CULTURE	Lee, Shiue, and Chen 2016	G.1 The organization is a very controlled and structured place. Formal procedures generally govern what people do.
		G.2 The management style of the organization is characterized by security of employment, conformity, predictability and stability in relationships.
		G.3 The organization emphasizes permanence and stability. Efficiency, control and smooth operations are important.
		G.4 The organization defines success on the basis of efficiency. Dependable delivery, smooth scheduling and low cost production are critical.
RELATIONSHIP COMMITMENT	Zhao et al. 2008	H.1 We feel that our major customer views us as being an important ''team members,'' rather than our being just another supplier.
		H.2 We are proud to tell others that we are a supplier for this customer.
		H.3 Our attachment to this customer is primarily based on the similarity of our values and those of this customer.
		H.4 The reason we prefer this customer to others is because of what it stands for, its values.
		H.5 During the past year, our company's values and those of the major customer have become more similar.
		H.6 What this customer stands for is important to our company.

DIMENSION	SOURCE	ITEM
TRUST	Doney and Cannon 1997	I.1 Our supplier keeps promises it makes to our firm
		I.2 Our supplier is not always honest with us
		I.3 We believe the information that our supplier provides us
		I.4 Our supplier is genuinely concerned that our business succeeds
		I.5 When making important decisions, our supplier considers our welfare as well as its own
		I.6 We trust our supplier keeps our best interests in mind
		I.7 Our supplier is trustworthy
		I.8 We find it necessary to be cautious with our supplier
SUPPLY CHAIN PERFORMANCE	Qrunfleh and Tarafdar 2014	J.1 Our supply chain Is able to handle non standard orders
		J.2 Our supply chain Is able to meet special customer specification requirements
		J.3 Our supply chain Is able to produce products characterized by numerous features options, sizes and colours
		J.4 Our supply chain Is able to rapidly adjust capacity so as to accelerate or decelerate production in response to changes in customer demand
		J.5 Our supply chain Is able to rapidly introduce large numbers of product improvements / variation
		J.6 Our supply chain Is able to handle rapid introduction of new products
		J.7 Our supply chain Has fast customer response time
		J.8 Our supply chain Is characterized by a great amount of cross-over of the activities of our firm and our trading partners
		J.9 Our supply chain Is characterized by a high level of integration of information systems in our firm
		J.10 Our supply chain Has short order-to-delivery cycle time
FINANCIAL PERFORMANCE	Lee, Shiue, and Chen 2016	K.1 Growth in sales.
		K.2 Return on sales.
		K.3 Growth in return on sales.
		K.4 Growth in profit.
		K.5 Growth in market share.
		K.6 Return on investment (ROI).
		K.7 Growth in ROI.

3.2 Analysis and results

3.2.1 Descriptive analysis

3.2.1.1 Sample Description: Company and Respondent Profile

In this section, sample description is presented. First, univariate analysis is performed to summarize variables of company profile. Second, univariate analysis is performed to show those variables related to respondent profile. Before going in-depth through the main constructs of the survey, some filter questions were directed to identify company and respondent profile. Consequently, participants were asked to indicate their industry, ownership, employees total and IT, annual sales volume and respondent position (see next tables).

Table 13: Company profile: industry

SECTOR	N	%
Manufacturing	119	58.0
Service	86	42.0
Total	**205**	**100,0**

The results revealed that 58 % perceived themselves under manufacturing firms. On the other hand, 42 % of respondents said they are representing service firms.

Table 14: Company profile: ownership

SECTOR	N	%
State-owned	23	11.2
Privately-owned	132	64.4
Foreign-controlled	50	24.4
Total	**205**	**100.0**

Also, the analysis revealed that most (64.4%) of companies were privately-owned, continued (24.4) were foreign-controlled companies. Finally, stated-owned companies were the lowest place with 11.2%. The result shows that the privately-owned companies have a huge share in our study.

Table 15: Company profile: employees (total and IT)

	N	Min	Max	Mean	Stand.Dev.
Total number of employees working at this time in your company	205	13	4000	606.98	505.421
Total number of IT employees working at this time in your company	205	1	30	6.68	5.780

In addition, the analysis shows that the maximum number of employees working now in a company was 4000 and minimum number was 13 with 606.98 mean and 505.421 standard deviation. In the same time, it shows that the maximum number of IT employees working at this time in a company was 30 and minimum number was 1 with 6.68 mean and 5.780 standard deviation.

Table 16: Company profile: annual sales volume (in millions)

SECTOR	N	%
EGP 1–EGP 49	16	7.8
EGP 50–EGP 99	36	17.6
EGP 100–EGP 499	62	30.2
Over EGP 500	91	44.4
Total	**205**	**100.0**

Furthermore, our analysis shows various levels of companies' annual sales volume, most of them (44.4%) had over EGP 500 million, 30.2% of them had EGP 100–EGP 499 million, 17.6 % of them had EGP 50–EGP 99 million and finally the remaining 7.8% had EGP

1–EGP 49 million. This result indicates that the major category of companies that participated in the study were with the higher annual sales volume.

Table 17: Respondent profile: position

SECTOR	N	%
CEO/Managing Director	24	11.7
General Manager	26	12.7
Supply chain Manager	48	23.4
Purchasing/logistics Manager	50	24.4
Production Manager	21	10.2
Marketing Manager	36	17.6
Total	**205**	**100.0**

Finally, In the case of respondent position, most (24.4%) of respondents were purchasing/logistics managers, second and very close (23.4%) were supply chain managers. The result shows that (47.8%) almost half of respondent were related directly to supply chain area. In third place, (17.6%) of respondents were marketing managers. Finally, the remaining (12.7%), (11.7%) and (10.2%) of them worked as general managers, CEO/managing directors and production managers, respectively.

3.2.1.2 Theoretical Constructs: Univariate Analysis

In this section, theoretical constructs are described performing univariate analysis. Next tables show analysis for each dimension.

Table 18: Univariate Analysis: Integrated Information Technology

ITEM	N	Min	Max	Mean	St.Dev.
B.1 There are direct computer-to-computer links with key suppliers.	205	1	5	**3.08**	*1.258*
B.2 Inter-organizational coordination is achieved using electronic links.	205	1	5	**3.15**	*1.168*
B.3 We use information technology-enabled transaction processing.	205	1	5	**3.18**	*1.133*
B.4 We have electronic mailing capabilities with our key suppliers.	205	1	5	**3.50**	*.993*
B.5 We use electronic transfer of purchase orders, invoices and/or funds.	205	1	5	**3.22**	*1.088*
B.6 We use advanced information systems to track and/or expedite shipments.	205	1	5	**2.85**	*1.103*

Regarding integrated information technology, this group includes six items (B1, B2, B3, B4, B5 and B6). All items show a higher mean than the average value (3.00) except B6 has a lower mean value. On the top of category is; 'B4': 'We have electronic mailing capabilities with our key suppliers (3.50)' and 'B5': 'We use electronic transfer of purchase orders, invoices and/or funds (3.22).' and on the lowest of category is 'B6': 'We use advanced information systems to track and/or expedite shipments (2.85)' and 'B1': 'There are direct computer-to-computer links with key suppliers (3.08).

Table 19: Univariate Analysis: Customer Integration

ITEM	N	Min	Max	Mean	St.Dev.
C.1 The level of linkage with our major customer through information networks.	205	1	5	**3.17**	*1.076*
C.2 The level of computerization for our major customer's ordering.	205	1	5	**3.02**	*1.066*
C.3 The level of sharing of market information from our major customer.	205	1	5	**3.38**	*1.025*
C.4 The level of communication with our major customer.	205	1	5	**3.57**	*.945*
C.5 The establishment of quick ordering systems with our major customer.	205	1	5	**3.02**	*1.071*
C.6 Follow-up with our major customer for feedback.	205	1	5	**3.28**	*.851*
C.7 The frequency of period contacts with our major customer.	205	1	5	**3.26**	*.826*
C.8 Our major customer shares Point of Sales (POS) information with us.	205	1	5	**2.91**	*.968*
C.9 Our major customer shares demand forecast with us.	205	1	5	**2.99**	*.921*
C.10 We share our available inventory with our major customer.	205	1	5	**3.18**	*.887*
C.11 We share our production plan with our major customer.	205	1	5	**3.26**	*.923*

Regarding to customer integration which includes eleven items, all items show a higher mean than the average value (3.00) except C8 and C9 which have lower mean value. On the top of this category is; 'C4': 'The level of communication with our major customer (3.57)' and 'C3': 'The level of sharing of market information from our major customer (3.38).' Followed closely, 'C6': 'Follow-up with our major customer for feedback (3.28)'. And on the lowest of category is 'C8': 'Our major customer shares Point of Sales (POS) information with us (2.91)' and 'C91': 'Our major customer shares demand forecast with us (2.99)'.

Table 20: Univariate Analysis: Supplier Integration

ITEM	N	Min	Max	Mean	St.Dev.
D.1 The participation level of our major supplier in the process of Procurement and production	205	1	5	**2.89**	*1.143*
D.2 The participation level of our major supplier in the design stage	205	1	5	**2.64**	*1.140*
D.3 Our major supplier shares their production schedule with us	205	1	5	**2.89**	*.928*
D.4 Our major supplier shares their production capacity with us	205	1	5	**2.88**	*.905*
D.5 Our major supplier shares available inventory with us	205	1	5	**2.93**	*.910*
D.6 We share our production plan with our major supplier	205	1	5	**2.99**	*.980*
D.7 We share our demand forecast with our major supplier	205	1	5	**3.06**	*.932*
D.8 We share our inventory level with our major supplier	205	1	5	**3.08**	*.912*

Regarding to supplier integration which includes eight items, all items show a lower mean than the average value (3.00) except D7 and D8 which have higher mean value. On the top of this category is; 'D8': 'We share our inventory level with our major supplier (3.08)' and 'D7': 'We share our demand forecast with our major supplier (3.06).' Followed closely, 'D6': 'We share our production plan with our major supplier (2.99)'. And on the lowest of category is 'D2': 'The participation level of our major supplier in the design stage (2.64)' and 'D4': 'Our major supplier shares their production capacity with us (2.88)'.

Table 21: Univariate Analysis: Internal Integration

ITEM	N	Min	Max	Mean	St.Dev.
E.1 Integrative inventory management	205	1	5	**3.26**	*1.115*
E.2 Real-time searching of level of inventory	205	1	5	**3.19**	*1.111*
E.3 The utilization of periodic inter departmental meetings among internal functions	205	1	5	**3.23**	*.987*
E.4 The use of cross-functional teams in process improvement	205	1	5	**3.22**	*.942*
E.5 The use of cross-functional teams in new product development	205	1	5	**3.29**	*.908*
E.6 Real-time integration and connection among all internal functions from raw material management through production, shipping, and sales	205	1	5	**3.49**	*.832*

With respect to internal integration which includes six items, all items show a higher mean than the average value (3.00). Respondents indicated that on the top of this category is; 'E6': 'Real-time integration and connection among all internal functions from raw material management through production, shipping, and sales (3.49)' and 'E5': 'The use of cross-functional teams in new product development (3.29).' Followed closely, 'E1': 'Integrative inventory management (3.26)'. And on the lowest of category is 'E2': 'Real-time searching of level of inventory (3.19)' and 'E4': 'The use of cross-functional teams in process improvement (2.22)'.

Table 22: Univariate Analysis: Top Management Support to SCM

ITEM	N	Min	Max	Mean	St.Dev.
F.1 Top management is supportive of our efforts to improve the supply chain management	205	1	5	**3.66**	*1.102*
F.2 Top management considers supply chain management to be a vital part of our corporate strategy	205	1	5	**3.58**	*1.052*
F.3 Supply chain management department's views are important to most top managers	205	1	5	**3.49**	*1.087*
F.4 The chief supply chain management officer has high visibility within top management	205	1	5	**3.46**	*1.007*
F.5 Top management emphasizes the supply chain management function's strategic role	205	1	5	**3.50**	*.953*
F.6 Requests for increased resources are mostly satisfied by top management	205	1	5	**2.38**	*1.099*

Regarding to top management support to SCM which includes six items, all items show a higher mean than the average value (3.00) except F6 has a lower mean value. Our results show that on the top of this category is; 'F1': 'Top management is supportive of our efforts to improve the supply chain management (3.66)' and 'F2': 'Top management considers supply chain management to be a vital part of our corporate strategy (3.58).' Not far followed by, 'F5': 'Top management emphasizes the supply chain management function's strategic role (3.50)'. And on the lowest of category is 'F6': 'Requests for increased resources are mostly satisfied by top management (2.38)' and 'F4': 'The chief supply chain management officer has high visibility within top management (3.46)'.

Table 23: Univariate Analysis: Hierarchical Organizational Culture

ITEM	N	Min	Max	Mean	St.Dev.
G.1 The organization is a very controlled and structured place. Formal procedures generally govern what people do.	205	1	5	**3.54**	*1.031*
G.2 The management style of the organization is characterized by security of employment, conformity, predictability and stability in relationships.	205	1	5	**3.56**	*.882*
G.3 The organization emphasizes permanence and stability. Efficiency, control and smooth operations are important.	205	1	5	**3.60**	*.821*
G.4 The organization defines success on the basis of efficiency. Dependable delivery, smooth scheduling and low cost production are critical.	205	1	5	**3.80**	*.864*

With respect to hierarchical organizational culture which includes four items, all items show a higher mean than the average value (3.00). Respondents confirmed that on the top of this category is; 'G4': 'The organization defines success based on efficiency". Followed closely, 'G3': 'The organization emphasizes permanence and stability. Efficiency, control and smooth operations are important (3.60)'. And on the lowest of category is 'G1': 'The organization is a very controlled and structured place. Formal procedures generally govern what people do." (3.54), and 'G2': "The management style of the organization is characterized by security of employment, conformity, predictability and stability in relationships", (3.56).

Regarding to relationship commitment which includes six items, all items show a higher mean than the average value (3.00). On the top of this category is; 'H6': 'What this customer stands for is important to our company (3.89)' and 'H2': 'We are proud to tell others that we are a supplier for this customer (3.82).' Followed closely, 'H1': 'We feel that our major customer views us as being an important ''team members,'' rather than our being just another

supplier (3.67)'. And on the lowest of category is 'H4': 'The reason we prefer this customer to others is because of what it stands for, its values (3.52)' and 'H3': 'Our attachment to this customer is primarily based on the similarity of our values and those of this customer (3.57)'.

Table 24: Univariate Analysis: Relationship Commitment

ITEM	N	Min	Max	Mean	St.Dev.
H.1 We feel that our major customer views us as being an important ''team members,'' rather than our being just another supplier.	205	1	5	**3.67**	*.921*
H.2 We are proud to tell others that we are a supplier for this customer.	205	1	5	**3.82**	*.903*
H.3 Our attachment to this customer is primarily based on the similarity of our values and those of this customer.	205	1	5	**3.57**	*.870*
H.4 The reason we prefer this customer to others is because of what it stands for, its values.	205	1	5	**3.52**	*.844*
H.5 During the past year, our company's values and those of the major customer have become more similar.	205	1	5	**3.49**	*.878*
H.6 What this customer stands for is important to our company.	205	1	5	**3.89**	*.827*

Table 25: Univariate Analysis: Trust

ITEM	N	Min	Max	Mean	St.Dev.
I.1 Our supplier keeps promises it makes to our firm	205	1	5	**3.49**	*.943*
I.2 Our supplier is not always honest with us (reverse coded)	205	1	5	**3.58**	*.945*
I.3 We believe the information that our supplier provides us	205	1	5	**3.41**	*.845*
I.4 Our supplier is genuinely concerned that our business succeeds	205	1	5	**3.37**	*.845*
I.5 When making important decisions, our supplier considers our welfare as well as its own	205	1	5	**3.23**	*.829*
I.6 We trust our supplier keeps our best interests in mind	205	1	5	**3.55**	*.769*
I.7 Our supplier is trustworthy	205	1	5	**3.53**	*.832*
I.8 We find it necessary to be cautious with our supplier (reverse coded)	205	1	5	**3.16**	*.825*

Regarding trust, which includes eight items, all items show a higher mean than the average value (3.00). On the top of this category is; 'I2': 'Our supplier is not always honest with us (reverse coded) which means supplier is always honest (3.58)' and 'I6': 'We trust our supplier keeps our best interests in mind (3.55).' Followed closely, 'I7': 'Our supplier is trustworthy (3.53)'. And on the lowest of category is 'I8': 'We find it necessary to be cautious with our supplier (reverse coded) (3.16)' and 'I5': 'When making important decisions, our supplier considers our welfare as well as its own (3.23)'.

Table 26: Univariate Analysis: Supply Chain Performance

ITEM	N	Min	Max	Mean	St.Dev.
J.1 Our supply chain Is able to handle non-standard orders	205	1	5	**3.15**	*1.081*
J.2 Our supply chain Is able to meet special customer specification requirements	205	1	5	**3.28**	*.979*
J.3 Our supply chain Is able to produce products characterized by numerous features options, sizes and colours	205	1	5	**3.32**	*1.095*
J.4 Our supply chain Is able to rapidly adjust capacity so as to accelerate or decelerate production in response to changes in customer demand	205	1	5	**3.10**	*.985*
J.5 Our supply chain Is able to rapidly introduce large numbers of product improvements / variation	205	1	5	**3.09**	*.887*
J.6 Our supply chain Is able to handle rapid introduction of new products	205	1	5	**3.27**	*.914*
J.7 Our supply chain Has fast customer response time	205	1	5	**3.75**	*.795*
J.8 Our supply chain Is characterized by a great amount of cross-over of the activities of our firm and our trading partners	205	1	5	**3.77**	*.831*
J.9 Our supply chain Is characterized by a high level of integration of information systems in our firm	205	1	5	**3.84**	*.825*
J.10 Our supply chain Has short order-to-delivery cycle time	205	1	5	**3.94**	*.841*

With respect to supply chain performance which includes ten items, all items show a higher mean than the average value (3.00). Respondents confirmed that on the top of this category is; 'J10': 'Our supply chain has short order-to-delivery cycle time (3.94)' and 'J9': 'Our supply chain is characterized by a high level of integration of information systems in our firm (3.84).' Followed closely, 'J8': 'Our supply chain is characterized by a great amount of cross-over of the activities of our firm and our trading partners (3.77)'. And on the lowest of category is 'J4': 'Our supply chain is able to rapidly adjust capacity so as to accelerate or decelerate production in response to changes in customer demand (3.10)' and 'J1': 'Our supply chain is able to handle non-standard orders (3.15)'.

Table 27: Univariate Analysis: Financial Performance

ITEM	N	Min	Max	Mean	St.Dev.
K.1 Growth in sales.	205	1	5	**3.48**	*.983*
K.2 Return on sales.	205	1	5	**3.43**	*.981*
K.3 Growth in return on sales.	205	1	5	**3.37**	*.917*
K.4 Growth in profit.	205	1	5	**3.38**	*.875*
K.5 Growth in market share.	205	1	5	**3.35**	*.952*
K.6 Return on investment (ROI).	205	1	5	**3.30**	*.844*
K.7 Growth in ROI.	205	1	5	**3.25**	*.843*

Finally, regarding to financial performance which includes seven items, all items show a higher mean than the average value (3.00). Our results show that on the top of this category is; ‘K1’: ‘Growth in sales (3.48)’ and ‘K2’: ‘Return on sales (3.43).’ Not far followed by, ‘K4’: ‘Growth in profit (3.38)’. And on the lowest of category is ‘K7’: ‘Growth in ROI (3.25)’ and ‘K6’: ‘Return on investment (ROI) (3.30)’.

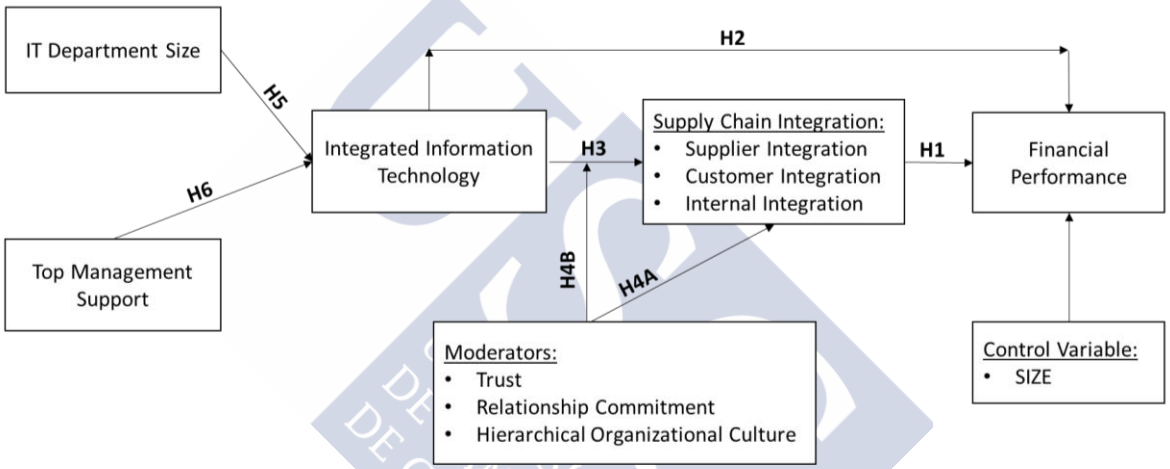
3.2.2 Hypotheses testing: CFA and SEM analysis

In this section, conceptual models are tested with the obtained sample of Egyptian companies. For that purpose, Confirmatory Factor Analysis (CFA) and Structural Equation Modelling (SEM) are performed with collected data. Beforehand, graphical description of general conceptual model and sub-models are presented.

3.2.2.1 Conceptual Model: Summary

Next figure presents our general conceptual model in a graphical way, summarizing our research hypotheses.

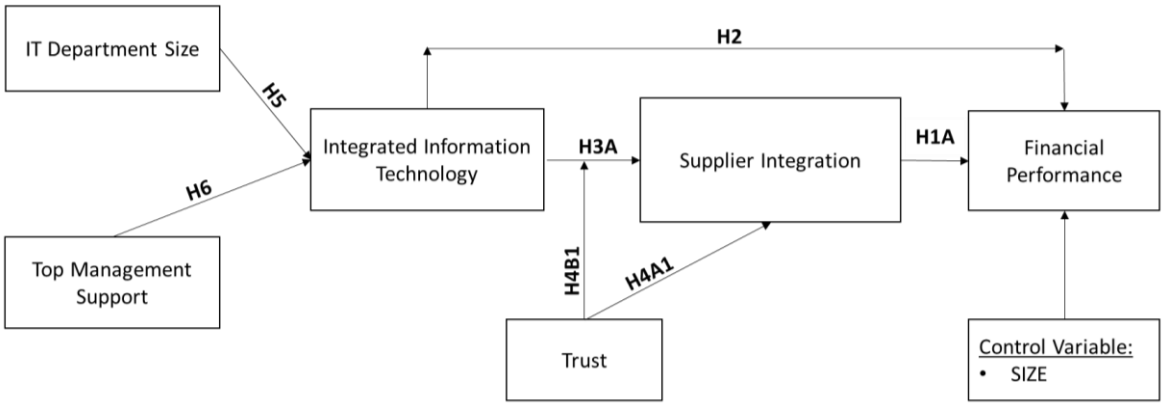
Figure 18: Conceptual Model Summary: graphical description



3.2.2.2 Model 1: CFA and SEM

Next figure presents our conceptual model 1, summarizing our research hypotheses.

Figure 19: Conceptual sub-model 1: graphical description



3.2.2.2.1 Model 1: Scales, Reliability and Validity

Firstly, we tested the existence of common method bias following two different tests to determine the extent of variance. On the one hand, based on the Harman one-factor test (Podsakoff and Organ 1986) the results showed that a single general factor did not account for most variance in an exploratory factor analytic (only 30.33%), indicating that the presence of common method variance was unlikely to be significant. On the other hand, based on the approach of Podsakoff et al. (2003) a new model with all the observed variables loading on one factor was re-estimated, and the results were unacceptable (Chi-square=630,254.77; df=277; RMSEA=3.339). Altogether, these results suggested that common method bias was not a problem in this study.

To operationalize the variables, this study relies on previously-validated scales, measured on seven-point scales (1=totally disagree; 5=totally agree). First, top management support was based on the approach of Zhao, Feng, and Wang (2015) using 6 items. Second, integrated information technology was measured using 6 items adapted from Chen and Paulraj (2004). Third, supplier integration was based on Narasimhan and Kim (2002) using 8 items. Fourth, financial performance was based on the approach of Flynn, Huo, and Zhao (2010) using 7 items. Finally, trust was based on the approach of Doney and Cannon (1997) using 8 items. Finally, IT Department Size was measured by the number of employees belonging to IT Department. In addition to the variables specified in our theoretical model, we included one control variable, Firm Size, measured by the total number of employees.

Content validity was established through a comprehensive literature review and by consulting experienced researchers and managers, ensuring that the measures satisfied the requirements for content validity. Discriminant validity, convergent validity, and scale reliability was assessed with confirmatory factor analysis, following Gerbing and Anderson (1988) guidelines. The results from the estimation of CFA (next table) show that the overall chi-square for this model was 388.839 with 247 degrees of freedom. We examined four measures of fit, comparative fit index (CFI=0.964), incremental fit index (IFI=0.965), Tucker-Lewis index (TLI=0.956), and root mean square error of approximation (RMSEA=0.053), which are inside conventional cut-off values (Vandenberg and Lance 2000), so we deemed the model acceptable.

Table 28: Confirmatory Factor Analysis (model 1): summary measurement results, validity and reliability

	Standardized Loadings
TOP MANAGEMENT SUPPORT (CR=0.920; AVE=0.698; CA=0.926)	
F.1 Top management is supportive of our efforts to improve the supply chain management	0.801
F.2 Top management considers supply chain management to be a vital part of our corporate strategy	0.862
F.3 Supply chain management department's views are important to most top managers	0.908
F.4 The chief supply chain management officer has high visibility within top management	0.829
F.5 Top management emphasizes the supply chain management function's strategic role	0.772
INTEGRATED INFORMATION TECHNOLOGY (CR=0.904; AVE=0.654; CA=0.903)	
B.1 There are direct computer-to-computer links with key suppliers.	0.816
B.2 Inter-organizational coordination is achieved using electronic links.	0.837
B.3 We use information technology-enabled transaction processing.	0.900
B.4 We have electronic mailing capabilities with our key suppliers.	0.758
B.6 We use advanced information systems to track and/or expedite shipments.	0.719
SUPPLIER INTEGRATION (CR=0.880; AVE=0.709; CA=0.881)	
D.6 We share our production plan with our major supplier	0.806
D.7 We share our demand forecast with our major supplier	0.836
D.8 We share our inventory level with our major supplier	0.883
FINANCIAL PERFORMANCE (CR=0.925; AVE=0.639; CA=0.933)	
K.1 Growth in sales.	0.874
K.2 Return on sales.	0.856
K.3 Growth in return on sales.	0.858
K.4 Growth in profit.	0.763
K.5 Growth in market share.	0.761
K.6 Return on investment (ROI).	0.740
K.7 Growth in ROI.	0.730
TRUST (CR=0.838; AVE=0.634; CA=0.840)	
I.3 We believe the information that our supplier provides us	0.767
I.4 Our supplier is genuinely concerned that our business succeeds	0.881
I.5 When making important decisions, our supplier considers our welfare as well as its own	0.734
MODEL FIT SUMMARY	
Chi-square=388.839, df=247, p=0.000	
CFI=0.964; IFI=0.965; TLI=0.956	
RMSEA=0.053	

***Notation**:*
CR: Composite Reliability; AVE: Average Variance Extracted; CA: Cronbach Alpha

To assess convergent validity we observed individual loadings, and the results show that all items load on their specified latent variables and that each loading is large and significant, thus indicating convergent validity (Anderson and Gerbing 1988). To assess discriminant validity we observed construct intercorrelations, and the results show that they were significantly different from 1, and that the shared variance between any two constructs (square of their intercorrelations) was less than the average variance explained in the items by the

construct (Fornell and Larcker 1981). Next table shows that intercorrelations are greater than square root of AVE, indicating that discriminant validity is adequate for all latent variables. Finally, regarding reliability all constructs presented acceptable levels of composite reliability (CR), considerably exceeding the level of .60 recommended by Bagozzi and Yi (1988): top management support (CR=0.920), integrated information technology (CR=0.904), supplier integration (CR=0.880), financial performance (CR=0.925), and trust (CR=0.838). In terms of variance extracted, all latent variables exceeded the recommended level of the average variance extracted (0.50). Therefore, results show that the indicators were sufficient and adequate in terms of how the measurement model was specified for all latent variables.

Table 29: Confirmatory Factor Analysis (model 1): Correlations between constructs and AVE

CONSTRUCT	1	2	3	4	5	6	7	AVE
1. TOP MANAGEMENT SUPPORT	**0.836**							0.698
2. INTEGRATED INFORMATION TECHNOLOGY	0.287	**0.808**						0.654
3. SUPPLIER INTEGRATION	0.273	0.352	**0.842**					0.709
4. FINANCIAL PERFORMANCE	0.482	0.666	0.447	**0.800**				0.639
5. TRUST	0.183	0.130	0.190	0.222	**0.796**			0.634
6. IT SIZE	0.196	0.506	0.250	0.493	0.177	**1.000**		1.000
7. SIZE	0.275	0.412	0.267	0.469	0.100	0.733	**1.000**	1.000

***Note**: Diagonal is the square root of the AVE*

3.2.2.2.2 Model 1: Testing of Hypotheses and Results

Based on the complexity of the model and the need to test the relationships between the different constructs at the same time, we used structural equation modeling by using the maximum likelihood method. First, the base model 1, without moderating effects, was estimated having the results that are shown in next table.

Table 30: Structural Equation Modeling (model 1): model fit summary and parameters estimates (base model)

HYP.	RELATIONSHIPS	STAND. PAR. ESTIMATE	TEST
H1A	*SI → FP*	0.208 ***	*Supported*
H2	*IIT → FP*	0.520 ***	*Supported*
H3A	*IIT → SI*	0.346 ***	*Supported*
H4A1	*TRUST → SI*	0.155 *	*Supported*
H5	*ITSIZE → IIT*	0.467 ***	*Supported*
H6	*TMS → IIT*	0.223 ***	*Supported*
	CONTROL EFFECTS		
	SIZE	0.203 ***	
	MODEL FIT SUMMARY		
	Chi-square=411.176, df=254		
	CFI=0.960; IFI=0.961; TLI=0.953; NFI=0.903		
	RMSEA=0.055		
	Note: * p <0.05; ** p<0.01; *** p<0.001; *ns*=not significant		

Notation:
ITSIZE: IT Department Size; TMS: Top Management Support; IIT: Integrated Information Technology; SI: Supplier Integration; FP: Financial Performance.

To estimate interaction effects using structural equations we followed a method based on the guidelines of Kline and Dunn (2000) and Marsh, Wen, and Hau (2004). First, Kline and Dunn (2000) proposed the use of a deviation-score or centring approach to the problem of interaction terms in structural equation models, where the original variables must be uncentred while the interaction terms have to be created from the centred original variables. In addition, Marsh, Wen, and Hau (2004) shows a specific strategy to build the multiple indicators of the latent interaction factor, a so-called "matched-pair strategy", where all indicators of each first-order factor are used in the construction of multiple product indicators, and none is used more than once, in such a way that indicators were paired from the highest factor loading each for first interaction term to the lowest factor loading each for last interaction term. This way, the interaction latent variable and its measures were then directly included in the model.

Following this procedure, the hypothesized model 1, including all the direct, mediating and moderating effects, was estimated having the results that are shown in next table.

Table 31: Structural Equation Modeling (model 1): model fit summary and parameters estimates (model with moderating effects)

HYP.	RELATIONSHIPS	STAND. PAR. ESTIMATE	TEST
H1A	*SI → FP*	0.210 ***	*Supported*
H2	*IIT → FP*	0.519 ***	*Supported*
H3A	*IIT → SI*	0.334 ***	*Supported*
H4A1	*TRUST → SI*	0.162 *	*Supported*
H5	*ITSIZE → IIT*	0.469 ***	*Supported*
H6	*TMS → IIT*	0.220 ***	*Supported*
	MODERATING EFFECTS		
H4B1	*IIT x TRUST → SI*	0.170 *	*Supported*
	CONTROL EFFECTS		
	SIZE	0.203 ***	
	MODEL FIT SUMMARY		
	Chi-square=503.597, df=325		
	CFI=0.956; IFI=0.957; TLI=0.949		
	RMSEA=0.052		
	Note: * p <0.05; ** p<0.01; *** p<0.001; *ns*=not significant		

Notation:
ITSIZE: IT Department Size; TMS: Top Management Support; IIT: Integrated Information Technology; SI: Supplier Integration; FP: Financial Performance.

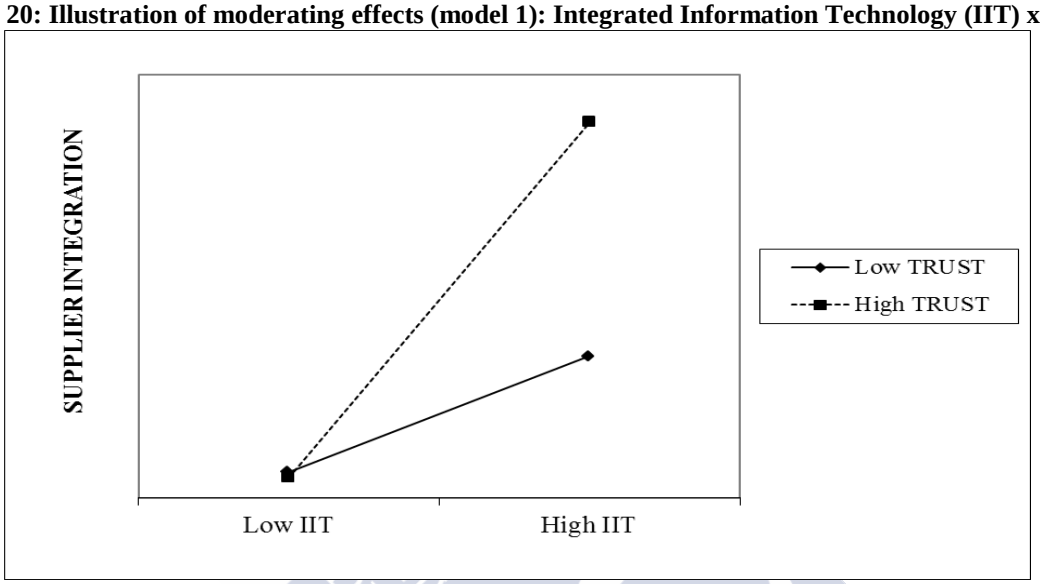
The fit indexes were inside the conventional cut-off values, thus the model was deemed acceptable (Vandenberg and Lance 2000): chi-square=503.597, d.f.= 325; CFI=0.956; IFI=0.957; TLI=0.949; RMSEA=0.052. Next, we examine the test of hypotheses proposed in our model.

On the one hand, we found support for the positive influence of supplier integration on financial performance (H1A) which returned estimated coefficients of 0.210 (p<.001), and for the positive influence of integrated information technology on financial performance (H2), which returned estimated coefficients of 0.519 (p<.001). We also found support for H3A, indicating that integrated information technology positively influence supplier integration, with an estimated coefficient of 0.334 (p<.001), and for H4A1, indicating that trust has a positive effect on supplier integration, with an estimated coefficient of 0.162 (p<.05).

On the other hand, IT department size also showed a positive and significant effect on integrated information technology, with an estimated coefficient of 0.469 (p<.001), thus supporting H5. Lastly, H6 was also supported, demonstrating that top management support has a positive and significant effect on integrated information technology (0.220, p<.001).

Lastly, regarding moderating effect which predicted that trust strengthens the positive relationship between integrated information technology and supplier integration, the results support this prediction, as the coefficient for this interaction is positive and significant (0.170; $p<0.05$) supporting H4B1. To facilitate interpretation of the moderating effect of trust on the integrated information technology - supplier integration relationship, these constructs are depicted graphically using the procedure suggested by Aiken and West (1991) (see next figure).

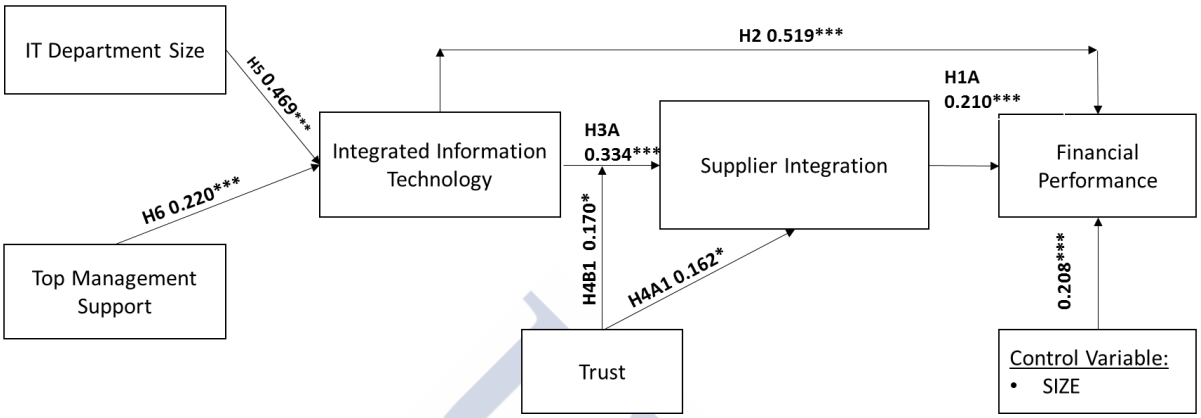
Figure 20: Illustration of moderating effects (model 1): Integrated Information Technology (IIT) x Trust



A "pure moderator" modifies the form of the relationship between the criterion and predictor variables. A pure moderator enters into the interaction with predictor variables without being a significant predictor variable and having a negligible correlation with the criterion variable (Cohen and Cohen 1975; Sharma, Durand, and Gur-Arie 1981). A "quasi moderator" also modifies the form of the relationship between the criterion and predictor variables. The quasi moderator not only interacts with the predictor variable but it is also a predictor variable (Sharma, Durand, and Gur-Arie 1981). Thus, in this case, our results indicate that trust is not a pure moderator but a quasi-moderator. This is because, as the coefficients show, the main effect as well as the interaction effect of trust is significant.

To sum up the result regarding the hypothesized model 1, next figure show the conceptual relationships and the estimated parameters.

Figure 21: Conceptual sub-model 1: graphical description with estimated parameters

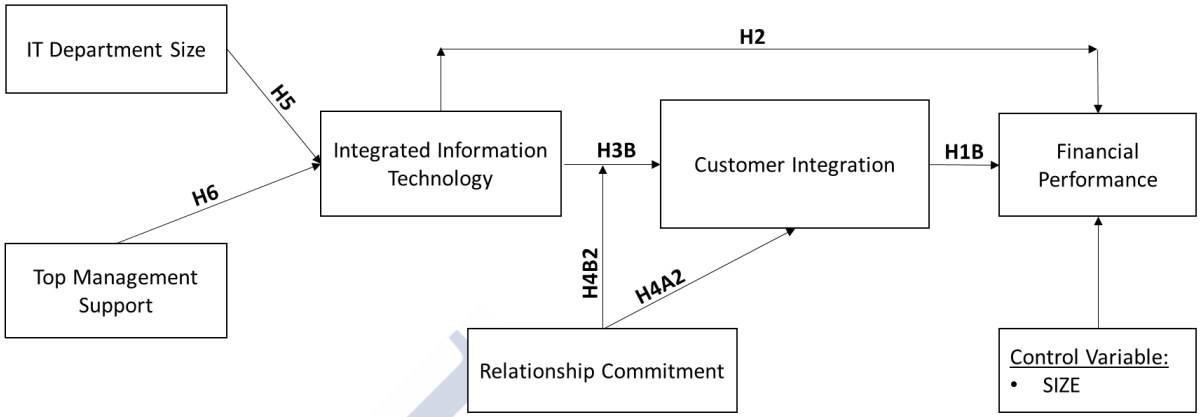


Note: * p <0.05; ** p<0.01; *** p<0.001; *ns*=not significant

3.2.2.3 Model 2: CFA and SEM

Next figure presents our conceptual model 2, summarizing our research hypotheses.

Figure 22: Conceptual sub-model 2: graphical description



3.2.2.3.1 Model 2: Scales, Reliability and Validity

Firstly, we tested the existence of common method bias following two different tests to determine the extent of variance. On the one hand, based on the Harman one-factor test (Podsakoff and Organ 1986) the results showed that a single general factor did not account for most variance in an exploratory factor analytic (only 35.34%), indicating that the presence of common method variance was unlikely to be significant. On the other hand, based on the approach of Podsakoff et al. (2003) a new model with all the observed variables loading on one factor was re-estimated, and the results were unacceptable (Chi-square=630,212.145; df=301; RMSEA=3.203). Altogether, these results suggested that common method bias was not a problem in this study.

To operationalize the variables, this study relies on previously-validated scales, measured on seven-point scales (1=totally disagree; 5=totally agree). First, top management support was based on the approach of Zhao, Feng, and Wang (2015) using 6 items. Second, integrated information technology was measured using 6 items adapted from Chen and Paulraj (2004). Third, customer integration was based on Flynn, Huo, and Zhao (2010) using 11 items. Fourth, financial performance was based on the approach of Flynn, Huo, and Zhao (2010) using 7 items. Finally, relationship commitment was based on the approach of Zhao et al. (2008) using 6 items. Finally, IT Department Size was measured by the number of employees belonging to IT Department. In addition to the variables specified in our theoretical model, we included one control variable, Firm Size, measured by the total number of employees.

Table 32: Confirmatory Factor Analysis (model 2): summary measurement results, validity and reliability

	Standardized Loadings
TOP MANAGEMENT SUPPORT (CR=0.922; AVE=0.666; CA=0.919)	
F.1 Top management is supportive of our efforts to improve the supply chain management	0.827
F.2 Top management considers supply chain management to be a vital part of our corporate strategy	0.888
F.3 Supply chain management department's views are important to most top managers	0.889
F.4 The chief supply chain management officer has high visibility within top management	0.835
F.5 Top management emphasizes the supply chain management function's strategic role	0.785
F.6 Requests for increased resources are mostly satisfied by top management	
INTEGRATED INFORMATION TECHNOLOGY (CR=0.838; AVE=0.634; CA=0.838)	
B.3 We use information technology-enabled transaction processing.	0.874
B.4 We have electronic mailing capabilities with our key suppliers.	0.781
B.6 We use advanced information systems to track and/or expedite shipments.	0.727
CUSTOMER INTEGRATION (CR=0.796; AVE=0.566; CA=0.795)	
C.2 The level of computerization for our major customer's ordering.	0.799
C.5 The establishment of quick ordering systems with our major customer.	0.758
C.8 Our major customer shares Point of Sales (POS) information with us.	0.696
FINANCIAL PERFORMANCE (CR=0.928; AVE=0.651; CA=0.933)	
K.1 Growth in sales.	0.876
K.2 Return on sales.	0.921
K.3 Growth in return on sales.	0.881
K.4 Growth in profit.	0.767
K.5 Growth in market share.	0.75
K.6 Return on investment (ROI).	0.711
K.7 Growth in ROI.	0.712
RELATIONSHIP COMMITMENT (CR=0.845; AVE=0.529; CA=0.858)	
H.1 We feel that our major customer views us as being an important ''team members,'' rather than our being just another supplier.	0.651
H.2 We are proud to tell others that we are a supplier for this customer.	0.581
H.3 Our attachment to this customer is primarily based on the similarity of our values and those of this customer.	0.939
H.4 The reason we prefer this customer to others is because of what it stands for, its values.	0.768
H.5 During the past year, our company's values and those of the major customer have become more similar.	0.642
MODEL FIT SUMMARY	
Chi-square=453.832, df=272. p=0.000	
CFI=0.953; IFI=0.954; TLI=0.944	
RMSEA=0.057	

***Notation**:*
CR: Composite Reliability; AVE: Average Variance Extracted; CA: Cronbach Alpha

Content validity was established through a comprehensive literature review and by consulting experienced researchers and managers, ensuring that the measures satisfied the requirements for content validity. Discriminant validity, convergent validity, and scale reliability was assessed with confirmatory factor analysis, following Gerbing and Anderson (1988) guidelines. The results from the estimation of CFA (previous table) show that the overall

chi-square for this model was 453.832 with 272 degrees of freedom. We examined four measures of fit, comparative fit index (CFI=0.953), incremental fit index (IFI=0.954), Tucker-Lewis index (TLI=0.944), and root mean square error of approximation (RMSEA=0.057), which are inside conventional cut-off values (Vandenberg and Lance 2000), so we deemed the model acceptable.

Table 33: Confirmatory Factor Analysis (model 2): Correlations between constructs and AVE

CONSTRUCT	1	2	3	4	5	6	7	AVE
1. TOP MANAGEMENT SUPPORT	**0.816**							0.666
2. INTEGRATED INFORMATION TECHNOLOGY	0.27	**0.796**						0.634
3. CUSTOMER INTEGRATION	0.305	0.741	**0.752**					0.566
4. FINANCIAL PERFORMANCE	0.461	0.632	0.661	**0.807**				0.651
5. RELATIONSHIP COMMITMENT	0.364	0.181	0.406	0.27	**0.727**			0.529
6. IT SIZE	0.196	0.49	0.492	0.495	0.138	**1.000**		1.000
7. SIZE	0.271	0.386	0.458	0.481	0.188	0.733	**1.000**	1.000

***Note**: Diagonal is the square root of the AVE*

To assess convergent validity we observed individual loadings, and the results show that all items load on their specified latent variables and that each loading is large and significant, thus indicating convergent validity (Anderson and Gerbing 1988). To assess discriminant validity we observed construct intercorrelations, and the results show that they were significantly different from 1, and that the shared variance between any two constructs (square of their intercorrelations) was less than the average variance explained in the items by the construct (Fornell and Larcker 1981). Previous table shows that intercorrelations are greater than square root of AVE, indicating that discriminant validity is adequate for all latent variables. Finally, regarding reliability all constructs presented acceptable levels of composite reliability (CR), considerably exceeding the level of .60 recommended by (Bagozzi and Yi 1988): top management support (CR=0.922), integrated information technology (CR=0.838), customer integration (CR=0.796), financial performance (CR=0.928), and relationship commitment (CR=0.845). In terms of variance extracted, all latent variables exceeded the recommended level of the average variance extracted (0.50). Therefore, results show that the indicators were

sufficient and adequate in terms of how the measurement model was specified for all latent variables.

3.2.2.3.2 Model 2: Testing of Hypotheses and Results

Based on the complexity of the model and the need to test the relationships between the different constructs at the same time, we used structural equation modeling by using the maximum likelihood method. First, the base model 2, without moderating effects, was estimated having the results that are shown in next table.

Table 34: Structural Equation Modeling (model 2): model fit summary and parameters estimates (base model)

HYP.	RELATIONSHIPS	STAND. PAR. ESTIMATE	TEST
H1B	*CI → FP*	0.335 **	*Supported*
H2	*IIT → FP*	0.310 **	*Supported*
H3B	*IIT → CI*	0.709 ***	*Supported*
H4A2	*RC → CI*	0.291 ***	*Supported*
H5	*ITSIZE → IIT*	0.477 ***	*Supported*
H6	*TMS → IIT*	0.205 **	*Supported*
	CONTROL EFFECTS		
	SIZE	0.219 ***	
	MODEL FIT SUMMARY		
	Chi-square=481.176, df=280		
	CFI=0.948; IFI=0.949; TLI=0.940		
	RMSEA=0.059		
	Note: * p <0.05; ** p<0.01; *** p<0.001; *ns*=not significant		

Notation:
ITSIZE: IT Department Size; TMS: Top Management Support; IIT: Integrated Information Technology; CI: Customer Integration; FP: Financial Performance; RC: Relationship Commitment.

To estimate interaction effects using structural equations we followed a method based on the guidelines of Kline and Dunn (2000) and Marsh, Wen, and Hau (2004). First, Kline and Dunn (2000) proposed the use of a deviation-score or centring approach to the problem of interaction terms in structural equation models, where the original variables have to be uncentred while the interaction terms have to be created from the centred original variables. In addition, Marsh, Wen, and Hau (2004) shows a specific strategy to build the multiple indicators of the latent interaction factor, a so-called "matched-pair strategy", where all indicators of each first-order factor are used in the construction of multiple product indicators, and none is used more than once, in such a way that indicators were paired from the highest factor loading each

for first interaction term to the lowest factor loading each for last interaction term. This way, the interaction latent variable and its measures were then directly included in the model.

Following this procedure, the hypothesized model 2, including all the direct, mediating and moderating effects, was estimated having the results that are shown in next table.

Table 35: Structural Equation Modeling (model 2): model fit summary and parameters estimates (model with moderating effects)

HYP.	RELATIONSHIPS	STAND. PAR. ESTIMATE	TEST
H1B	*CI → FP*	0.309 **	*Supported*
H2	*IIT → FP*	0.329 **	*Supported*
H3B	*IIT → CI*	0.741 ***	*Supported*
H4A2	*RC → CI*	0.274 ***	*Supported*
H5	*ITSIZE → IIT*	0.485 ***	*Supported*
H6	*TMS → IIT*	0.212 **	*Supported*
	MODERATING EFFECTS		
H4B2	*IIT x RC → CI*	0.144 *	*Supported*
	CONTROL EFFECTS		
	SIZE	0.211 ***	
	MODEL FIT SUMMARY		
	Chi-square=477.616, df=343		
	CFI=0.966; IFI=0.967; TLI=0.960		
	RMSEA=0.044		
	Note: * p <0.05; ** p<0.01; *** p<0.001; *ns*=not significant		

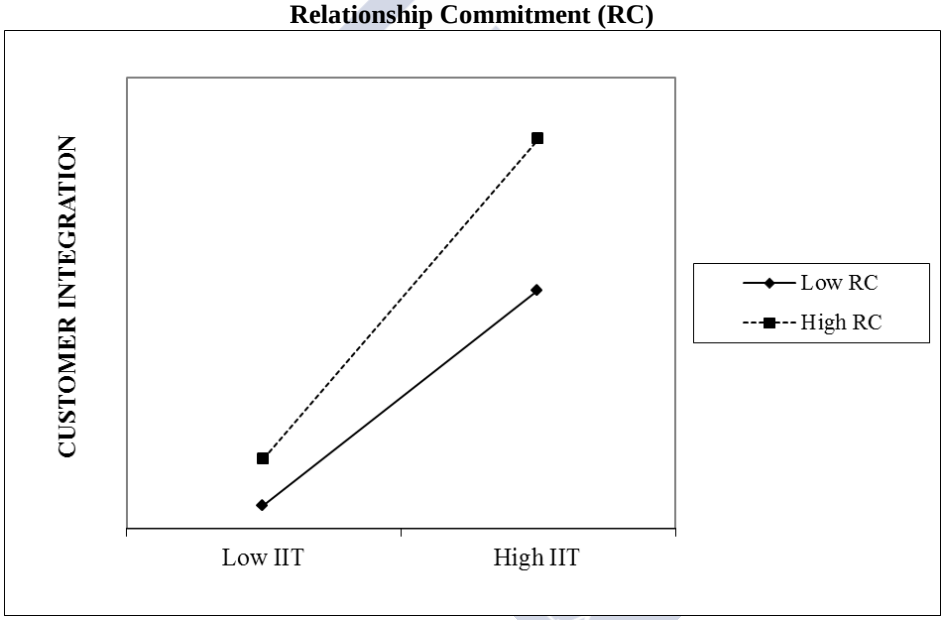
Notation:
ITSIZE: IT Department Size; TMS: Top Management Support; IIT: Integrated Information Technology; CI: Customer Integration; FP: Financial Performance; RC: Relationship Commitment.

The fit indexes were inside the conventional cut-off values, thus the model was deemed acceptable (Vandenberg and Lance 2000): chi-square=477.616, d.f.= 343; CFI=0.966; IFI=0.967; TLI=0.960; RMSEA=0.044. Next, we examine the test of hypotheses proposed in our model. On the one hand, we found support for the positive influence of supplier integration on financial performance (H1B) which returned estimated coefficients of 0.309 (p<.01), and for the positive influence of integrated information technology on financial performance (H2), which returned estimated coefficients of 0.329 (p<.01). We also found support for H3B, indicating that integrated information technology positively influence customer integration, with an estimated coefficient of 0.741 (p<.001), and for H4A2, indicating that relationship commitment has a positive effect on customer integration, with an estimated coefficient of 0.274 (p<.001). On the other hand, IT department size also showed a positive and significant effect on integrated information technology, with an estimated coefficient of 0.485 (p<.001),

thus supporting H5. Lastly, H6 was also supported, demonstrating that top management support has a positive and significant effect on integrated information technology (0.212, p<.01).

Lastly, regarding moderating effect which predicted that relationship commitment strengthens the positive relationship between integrated information technology and customer integration, the results support this prediction, as the coefficient for this interaction is positive and significant (0.144; p<0.05) supporting H4B2. To facilitate interpretation of the moderating effect of relationship commitment on the integrated information technology - customer integration relationship, these constructs are depicted graphically using the procedure suggested by Aiken and West (1991) (see next figure).

Figure 23: Illustration of moderating effects (model 2): Integrated Information Technology (IIT) x Relationship Commitment (RC)

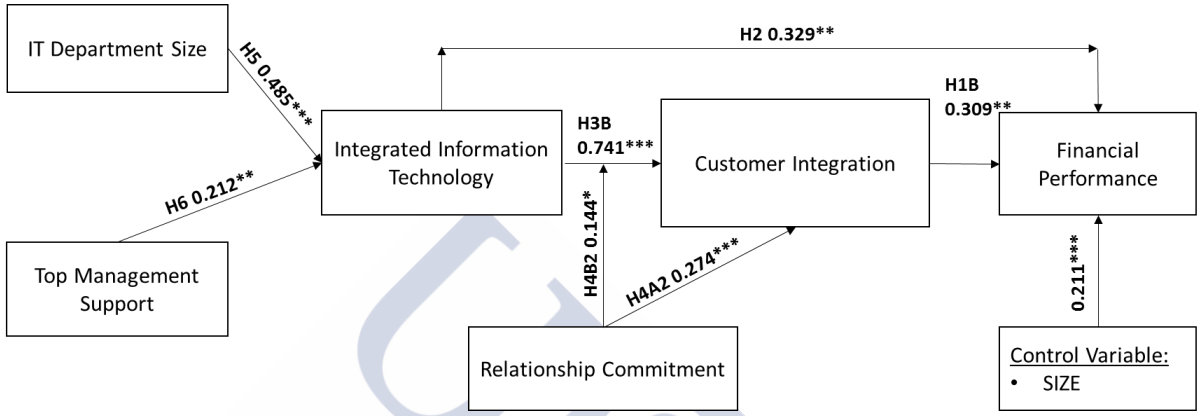


A "pure moderator" modifies the form of the relationship between the criterion and predictor variables. A pure moderator enters into the interaction with predictor variables without being a significant predictor variable and having a negligible correlation with the criterion variable (Cohen and Cohen 1975; Sharma, Durand, and Gur-Arie 1981). A "quasi moderator" also modifies the form of the relationship between the criterion and predictor variables. The quasi moderator not only interacts with the predictor variable but it is also a predictor variable (Sharma, Durand, and Gur-Arie 1981). Thus, in this case, our results indicate that relationship commitment is not a pure moderator but a quasi-moderator. This is because,

as the coefficients show, the main effect as well as the interaction effect of relationship commitment is significant.

To sum up the result regarding the hypothesized model 2, next figure show the conceptual relationships and the estimated parameters.

Figure 24: Conceptual sub-model 2: graphical description with estimated parameters

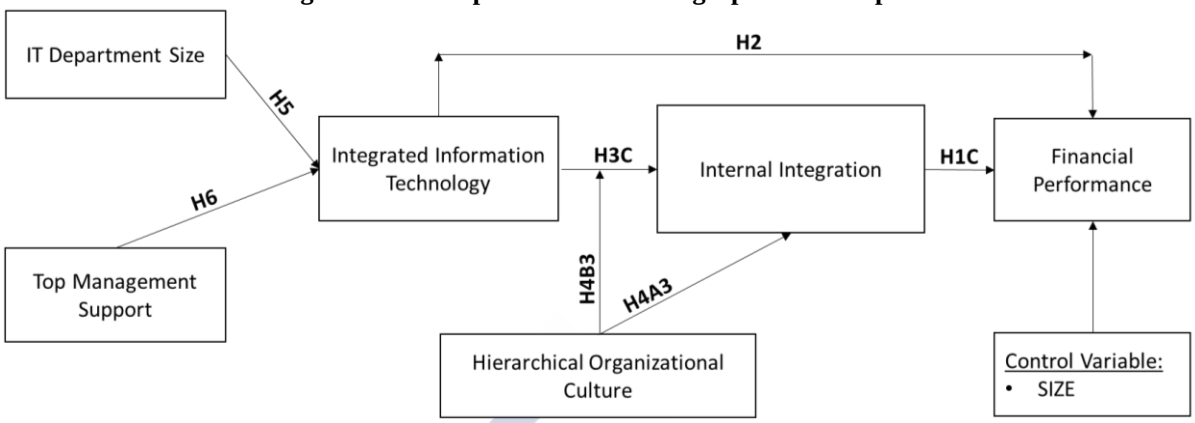


Note: * p <0.05; ** p<0.01; *** p<0.001; *ns*=not significant

3.2.2.4 Model 3: CFA and SEM

Next figure presents our conceptual model 3, summarizing our research hypotheses.

Figure 25: Conceptual sub-model 3: graphical description



3.2.2.4.1 Model 3: Scales, Reliability and Validity

Firstly, we tested the existence of common method bias following two different tests to determine the extent of variance. On the other hand, based on the Harman one-factor test (Podsakoff and Organ, 1986) the results showed that a single general factor did not account for most variance in an exploratory factor analytic (only 33.69%), indicating that the presence of common method variance was unlikely to be significant. On the other hand, based on the approach of Podsakoff et al. (2003) a new model with all the observed variables loading on one factor was re-estimated, and the results were unacceptable (Chi-square=630,541.487; df=301; RMSEA=3.204).

Altogether, these results suggested that common method bias was not a problem in this study. To operationalize the variables, this study relies on previously-validated scales, measured on seven-point scales (1=totally disagree; 5=totally agree). First, top management support was based on the approach of Zhao, Feng, and Wang (2015) using 6 items. Second, integrated information technology was measured using 6 items adapted from Chen and Paulraj (2004). Third, internal integration was based on Narasimhan and Kim (2002) using 6 items. Fourth, financial performance was based on the approach of Flynn, Huo, and Zhao (2010) using 7 items. Finally, hierarchical organizational culture was based on the approach of Lee, Shiue, and Chen (2016) using 4 items. Finally, IT Department Size was measured by the number of employees belonging to IT Department. In addition to the variables specified in our theoretical model, we included one control variable, Firm Size, measured by the total number of employees.

Table 36: Confirmatory Factor Analysis (model 3): summary measurement results, validity and reliability

	Standardized Loadings
TOP MANAGEMENT SUPPORT (CR=0.919; AVE=0.696; CA=0.926)	
F.1 Top management is supportive of our efforts to improve the supply chain management	0.798
F.2 Top management considers supply chain management to be a vital part of our corporate strategy	0.861
F.3 Supply chain management department's views are important to most top managers	0.914
F.4 The chief supply chain management officer has high visibility within top management	0.824
F.5 Top management emphasizes the supply chain management function's strategic role	0.767
INTEGRATED INFORMATION TECHNOLOGY (CR=0.911; AVE=0.631; CA=0.911)	
B.1 There are direct computer-to-computer links with key suppliers.	0.821
B.2 Inter-organizational coordination is achieved using electronic links.	0.831
B.3 We use information technology-enabled transaction processing.	0.894
B.4 We have electronic mailing capabilities with our key suppliers.	0.754
B.5 We use electronic transfer of purchase orders, invoices and/or funds.	0.743
B.6 We use advanced information systems to track and/or expedite shipments.	0.709
INTERNAL INTEGRATION (CR=0.895; AVE=0.745; CA=0.895)	
E.1 Integrative inventory management	0.954
E.2 Real-time searching of level of inventory	0.949
E.3 The utilization of periodic inter departmental meetings among internal functions	0.652
FINANCIAL PERFORMANCE (CR=0.928; AVE=0.650; CA=0.928)	
K.1 Growth in sales.	0.882
K.2 Return on sales.	0.926
K.3 Growth in return on sales.	0.881
K.4 Growth in profit.	0.762
K.5 Growth in market share.	0.746
K.6 Return on investment (ROI).	0.707
K.7 Growth in ROI.	0.709
HIERARCHICAL ORGANIZATIONAL CULTURE (CR=0.823; AVE=0.610; CA=0.817)	
G.2 The management style of the organization is characterized by security of employment, conformity, predictability and stability in relationships.	0.712
G.3 The organization emphasizes permanence and stability. Efficiency, control and smooth operations are important.	0.875
G.4 The organization defines success on the basis of efficiency. Dependable delivery, smooth scheduling and low cost production are critical.	0.747
MODEL FIT SUMMARY	
Chi-square=381.202, df=269. p=0.000	
CFI=0.974; IFI=0.974; TLI=0.968	
RMSEA=0.045	

***Notation**:*
CR: Composite Reliability; AVE: Average Variance Extracted; CA: Cronbach Alpha

Content validity was established through a comprehensive literature review and by consulting experienced researchers and managers, ensuring that the measures satisfied the requirements for content validity. Discriminant validity, convergent validity, and scale reliability was assessed with confirmatory factor analysis, following Gerbing and Anderson (1988) guidelines. The results from the estimation of CFA (previous table) show that the overall chi-square for this model was 381.202 with 269 degrees of freedom. We examined four

measures of fit, comparative fit index (CFI=0.974), incremental fit index (IFI=0.974), Tucker-Lewis index (TLI=0.968), and root mean square error of approximation (RMSEA=0.045), which are inside conventional cut-off values (Vandenberg and Lance 2000), so we deemed the model acceptable.

Table 37: Confirmatory Factor Analysis (model 3): Correlations between constructs and AVE

CONSTRUCT	1	2	3	4	5	6	7	AVE
1. TOP MANAGEMENT SUPPORT	**0.834**							0.696
2. INTEGRATED INFORMATION TECHNOLOGY	0.297	**0.795**						0.631
3. INTERNAL INTEGRATION	0.221	0.38	**0.863**					0.745
4. FINANCIAL PERFORMANCE	0.466	0.658	0.466	**0.806**				0.650
5. HIERARCHICAL ORGANIZATIONAL CULTURE	0.445	0.254	0.254	0.369	**0.781**			0.610
6. IT SIZE	0.195	0.513	0.251	0.495	0.218	**1.000**		1.000
7. SIZE	0.274	0.414	0.222	0.481	0.244	0.733	**1.000**	1.000

***Note**: Diagonal is the square root of the AVE*

To assess convergent validity we observed individual loadings, and the results show that all items load on their specified latent variables and that each loading is large and significant, thus indicating convergent validity (Anderson and Gerbing 1988). To assess discriminant validity we observed construct intercorrelations, and the results show that they were significantly different from 1, and that the shared variance between any two constructs (square of their intercorrelations) was less than the average variance explained in the items by the construct (Fornell and Larcker 1981). Previous table shows that intercorrelations are greater than square root of AVE, indicating that discriminant validity is adequate for all latent variables. Finally, regarding reliability all constructs presented acceptable levels of composite reliability (CR), considerably exceeding the level of .60 recommended by Bagozzi and Yi (1988): top management support (CR=0.919), integrated information technology (CR=0.911), internal integration (CR=0.895), financial performance (CR=0.928), and hierarchical organizational culture (CR=0.823). In terms of variance extracted, all latent variables exceeded the recommended level of the average variance extracted (0.50). Therefore, results show that the

indicators were sufficient and adequate in terms of how the measurement model was specified for all latent variables.

3.2.2.4.2 Model 3: Testing of Hypotheses and Results

Based on the complexity of the model and the need to test the relationships between the different constructs at the same time, we used structural equation modeling by using the maximum likelihood method. First, the base model 3, without moderating effects, was estimated having the results that are shown in next table.

Table 38: Structural Equation Modeling (model 3): model fit summary and parameters estimates (base model)

HYP.	RELATIONSHIPS	STAND. PAR. ESTIMATE	TEST
H1C	*II → FP*	0.231 ***	*Supported*
H2	*IIT → FP*	0.484 ***	*Supported*
H3C	*IIT → II*	0.342 ***	*Supported*
H4A3	*HOC → II*	0.174 **	*Supported*
H5	*ITSIZE → IIT*	0.474 ***	*Supported*
H6	*TMS → IIT*	0.227 ***	*Supported*
	CONTROL EFFECTS		
	SIZE	0.231 ***	
	MODEL FIT SUMMARY		
	Chi-square=407.737, df=277		
	CFI=0.970; IFI=0.970; TLI=0.965		
	RMSEA=0.047		

Note: * p <0.05; ** p<0.01; *** p<0.001; *ns*=not significant

Notation:
ITSIZE: IT Department Size; TMS: Top Management Support; IIT: Integrated Information Technology; II: Internal Integration; FP: Financial Performance; HOC: Hierarchical Organizational Culture.

To estimate interaction effects using structural equations we followed a method based on the guidelines of Kline and Dunn (2000) and Marsh, Wen, and Hau (2004). First, Kline and Dunn (2000) proposed the use of a deviation-score or centring approach to the problem of interaction terms in structural equation models, where the original variables have to be uncentred while the interaction terms have to be created from the centred original variables. In addition, Marsh, Wen, and Hau (2004) shows a specific strategy to build the multiple indicators of the latent interaction factor, a so-called "matched-pair strategy", where all indicators of each first-order factor are used in the construction of multiple product indicators, and none is used more than once, in such a way that indicators were paired from the highest factor loading each

for first interaction term to the lowest factor loading each for last interaction term. This way, the interaction latent variable and its measures were then directly included in the model.

Following this procedure, the hypothesized model 3, including all the direct, mediating and moderating effects, was estimated having the results that are shown in next table.

Table 39: Structural Equation Modeling (model 3): model fit summary and parameters estimates (model with moderating effects)

HYP.	RELATIONSHIPS	STAND. PAR. ESTIMATE	TEST
H1C	*II → FP*	0.231 ***	*Supported*
H2	*IIT → FP*	0.483 ***	*Supported*
H3C	*IIT → II*	0.351 ***	*Supported*
H4A3	*HOC → II*	0.177 **	*Supported*
H5	*ITSIZE → IIT*	0.474 ***	*Supported*
H6	*TMS → IIT*	0.226 ***	*Supported*
	MODERATING EFFECTS		
H4B3	*IIT x RC → SI*	-0.122 ns	*Not supported*
	CONTROL EFFECTS		
	SIZE	0.231 ***	
	MODEL FIT SUMMARY		
	Chi-square=471.882, df=353		
	CFI=0.973; IFI=0.973; TLI=0.969		
	RMSEA=0.041		
	Note: * p <0.05; ** p<0.01; *** p<0.001; *ns*=not significant		

Notation:
ITSIZE: IT Department Size; TMS: Top Management Support; IIT: Integrated Information Technology; II: Internal Integration; FP: Financial Performance; HOC: Hierarchical Organizational Culture.

The fit indexes were inside the conventional cut-off values, thus the model was deemed acceptable (Vandenberg and Lance 2000): chi-square=471.882, d.f.=353; CFI=0.973; IFI=0.973; TLI=0.969; RMSEA=0.041. Next, we examine the test of hypotheses proposed in our model.

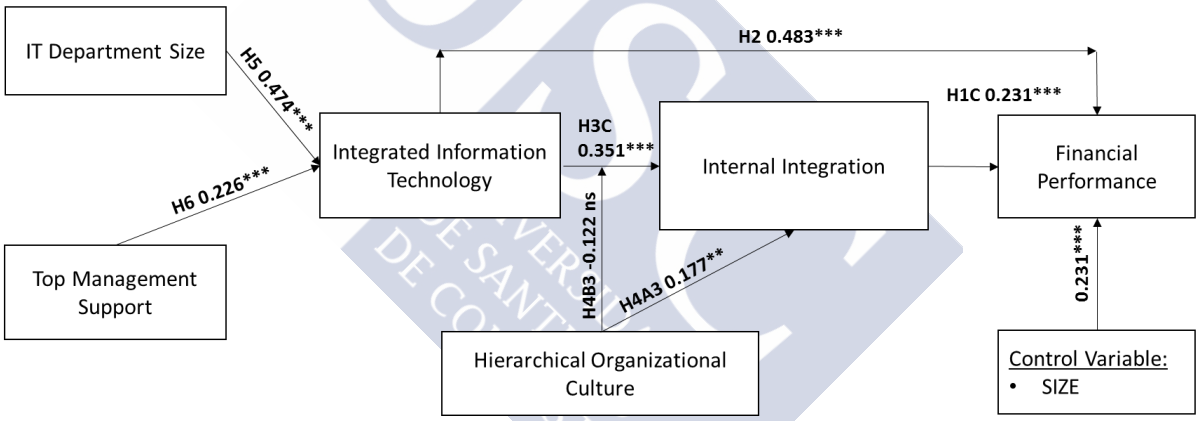
On the one hand, we found support for the positive influence of supplier integration on financial performance (H1C) which returned estimated coefficients of 0.231 (p<.001), and for the positive influence of integrated information technology on financial performance (H2), which returned estimated coefficients of 0.483 (p<.001). We also found support for H3C, indicating that integrated information technology positively influence internal integration, with an estimated coefficient of 0.351 (p<.001), and for H4A3, indicating that hierarchical organizational culture has a positive effect on internal integration, with an estimated coefficient of 0.177 (p<.01).

On the other hand, IT department size also showed a positive and significant effect on integrated information technology, with an estimated coefficient of 0.474 (p<.001), thus supporting H5. Lastly, H6 was also supported, demonstrating that top management support has a positive and significant effect on integrated information technology 0.226 (p<.001).

Lastly, regarding moderating effect which predicted that hierarchical organizational culture strengthens the positive relationship between integrated information technology and internal integration, the results does not support this prediction, as the coefficient for this interaction is negative (-0.122; *ns*) not supporting H4B3.

To sum up the result regarding the hypothesized model 3, next figure show the conceptual relationships and the estimated parameters.

Figure 26: Conceptual sub-model 3: graphical description with estimated parameters



Note: * p <0.05; ** p<0.01; *** p<0.001; *ns*=not significant

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CHAPTER (4): DISCUSSION, CONTRIBUTIONS, IMPLICATIONS, CONCLUSIONS, LIMITATIONS, AND FUTURE LINES OF RESEARCH

4.1 Discussion

The SCI has received increasing attention in both the literature and practice. The reported benefits include improvements in operational performance as well as financial performance. Considering the importance of SCI, there has been a wave in academic studies in recent years. A basic research question is SCI is beneficial to financial performance or not. Another question is integrated information technology is beneficial to supply chain integration and financial performance or not. Combing insights from the Resource Based View, Information Processing Theory, Organizational Learning Theory, and Commitment-Trust Theory, our study advances SCI literature by considering its positive effects on financial performance. We investigate the relationships between three dimensions of SCI (supplier, customer and internal integration) and financial performance, and suggest that SCI depends on its level of integrated information technology. This study using data collected from Egyptian manufacturers and service firms provides significant contributions to both SCI literature and practices.

Overall, our results endorse the position that though SCI benefits from supplier integration, customer integration, and internal integration are related to firm's financial performance. We further find that trust plays a complementary role to supplier integration, as well as relationship commitment to customer integration and hierarchical organizational culture to internal integration. Also, our finding supports that integrated information technology system is a basic asset to firms that help and facilitate the integration process with suppliers, customers and internally within the firm. Therefore, integrated information technology is positively related to all of supply chain integration's dimensions as well as to financial performance. Finally, top management support and IT department size were beneficially related to integrated information technology.

These findings offer a more refined understanding of the reasons and situations under how SCI enable firms to gain superior financial performance in Egypt.

4.1.1 SCI and financial performance

Our findings regarding the relationship between SCI and financial performance are in some ways consistent and in some ways in contrast with previous studies. The results of this study support earlier assumptions of a positive relationship between supply chain integration and financial performance. Our findings are supporting the previous empirical and theoretical studies such as Stevens (1989), Metters (1997), Lee, Padmanabhan, and Whang (1997), Anderson and Katz (1998), Johnson (1999), and Frohlich and Westbrook (2001), confirming that supply chain integration can improve the financial performance. Meanwhile, our results are in contrast with Vickery et al. (2003) who found that the relationship between SCI and financial performance is not supported. Like prior studies, our findings found that all three dimensions of SCI (supplier, customer, and internal integration) can contribute to performance increase through facilitating intra- and inter-organizational information exchange.

This study evidences the importance for firms to integrate internally and to cooperate closely with their external customers and suppliers. Internal integration can be embraced by internal functions in order to establish cooperative plans among departments. Building collaborative relationships with suppliers helps organizations reduce mistakes and wastage in activities across partner firms through information sharing and joint planning.

External integration with suppliers allows the manufacturer to be rapidly updated on the progress of its orders at the supplier's plant and to decide jointly with the supplier the most appropriate plan modifications in order to conform and fit final customer requests (Danese and Romano, 2011). A firm can integrate its suppliers to facilitate mutual understanding, reduce purchasing and production costs, and achieve benefits. Therefore, our finding is consistent with a recent empirical work indicating that, building and maintaining a long term strategic integrated partnership with suppliers has a significant positive effect on financial performance because supplier can better meet the focal firm’s changing requirements with better understanding through supplier integration (Swink, Narasimhan, and Wang, 2007; Yu et al., 2013). This result is matching with IPT and RBV theoretical suggestion of, the level of customer

services can be improved by suppliers by maintaining integrated process with focal firms which help firms improving their financial performance.

Also, customer integration lead to better financial performance. A better understanding of customer requirements and a better forecasting of customer demands, allow the firm to provide better quality and more innovative products at lower cost.

Our findings also provide empirical support for some studies that suggested a positive relationship between customer integration and financial performance. We find that integration practice can help firms to improve financial performance because they show clearly that customer integration increases financial performance in the Egyptian market. Although the value of customer integration has been recognized, existing literature lacks a theory which can explain why in some instances, customer integration has no significant effect on financial performance (Flynn, Huo, and Zhao, 2010; Yu et al., 2013). However, our results are in contrast with Hertz (2001) and Enkel, Kausch, and Gassmann (2005) who mentioned the potential risks and costs resulting from a high level of customer integration, and with Chan, Yim, and Lam (2010) who found that increased customer involvement would shift more power from a firm to its customers and thereby increase the workload of the firm.

The analysis reveals that customer integration has a significant impact on financial performance. Because customer integration generates opportunities for exchanging, building, and leveraging the knowledge embedded in collaborative processes, firms can reduce costs, create greater value, and detect demand changes more quickly. These, in turn, will strengthen financial performance. Within integrated supply chains, building strong strategic partnerships with customers will facilitate understanding and anticipation of the customer's needs by the firms so as to better meet changing requirements. A close relationship between trading partners provides opportunities for enhancing the accuracy of demand forecasts. This leads to greater responsiveness to customers through better product design, production planning, and reduced inventory obsolescence (Flynn, Huo, and Zhao, 2010). Our findings suggest that customer integration is important for better financial performance, which indicates that an exceptionally high level of customer service, obtained through a strategic partnership with the customer, is likely to offer opportunities for firms to success.

After testing the relationship between internal integration and financial performance we found that there is a positive significant relationship, supporting the previous research suggests (Flynn, Huo, and Zhao, 2010; Huo, 2012).

As a concluded result, firms may financially benefit from supplier, customer and internal integration practice where necessary.

4.1.2 Integrated information technology, supply chain integration and financial performance

Also, the results suggest that conceptual arguments linking integrated information technology, supply chain integration (internal integration external integration, customer integration), and financial performance are valid. We found that not only integrated information technology significantly influences the three dimensions of SCI (external, customer and supplier integration) but also significantly and positively related to financial performance. Hence, supply chain integration partially mediates the effect of integrated information technology on financial performance whereas the impact of integrated information technology is direct.

The direct effect of integrated information technology on financial performance seems to suggest that firms that use advanced information systems, information technology-enabled transaction processing and direct computer-to-computer links with supply chain partners will have a better chance for superior financial performance.

Our understanding of the integrated information technology– financial performance relationship can be significantly expanded by taking into consideration the mediating effect of supply chain integration (supplier, customer, and internal integration). In particular this research reveals there are direct benefits to financial performance from integrated information technology activities as well as indirect benefit through the mediating effect of supply chain integration.

Our findings show that integrated information technology can help firms exchange and share information internally among departments and externally with suppliers and customers which facilitate and help to beat the work barriers. This suggests that firms should work closely internally and externally with suppliers and customers to better learn about supply chain partner

and fully understand their needs and requirements so that financial performance can be improved.

Our results show clearly that information technology system increases firm's financial performance in the Egyptian market. However, our results are in contrast with Liang, You, and Liu (2010) who indicated that information technology resources and technological resources are not positively associated with financial performance. Also our finding is not matching Davis-Sramek, Germain, and Iyer (2010) who found that supply chain analytic information technology is not associated with financial performance.

4.1.3 The complementary roles of TMS

The more top management supports information systems, the more it will understand the complexity of the systems and the more it will be concerned about their success. In this study, we posit that integrated information technology will be low in the absence of top management support. Our findings endorse this position by examining the complementary role of top management support. As the level of top management support to integrated information technology and system increases, the financial performance gains derived from internal integration, supplier integration and customer integration endure much longer, and become beneficial to the firm.

The result of this study supports earlier assumptions of a positive relationship between top management support and integrated information technology. For example Hartono et al (2010) indicated that top management support leads to the improved quality of shared information in inter-organizational systems usage, Ngwenyama and Nørbjerg (2010) confirmed that top management support leads to successful software process improvement. Also our results reinforce Lin (2010) finding of top management support influences both perceived ERP system usefulness and usage.

Moreover, our findings offer some new insights on how top management support helps firms improve supply chain integration and financial performance through integrated information technology. We find that top management support can help firms establish and build an integrated information technology system that facilitate the information flow process inside the organization, upstream and downstream with customers and suppliers which facilitate exchanging information on perfect timing and help to beat the work barriers.

Our results show clearly that top management support to information technology system increases firm's supply chain integration and financial performance in the Egyptian market.

4.1.4 Trust and supplier integration

Our results confirm that trust has a positive effect on supplier integration. Overall, our result shows that suppliers are trustworthy and must be involved in making important decisions. Such trustable relationship with suppliers facilitates the integration process and lead to better results for both organizations. Trust of the supplier firm increases the likelihood that buyers anticipate doing business with the supplier firm in the future. Also, these findings indicate the extent to which trust influences long-term relationships.

Trusting supplier is expensive, time-consuming, and complex, its outcome in terms of forging strong buyer-seller bonds and enhanced loyalty could be critically important to firms. Supplier firms must make significant investments to establish, develop and maintain customer trust on him (Doney and Cannon, 1997). High levels of buyer trust on supplier lead to more favorable purchasing outcomes for the supplier.

In addition, our results indicate that trust of the supplier firm is subjected to future interaction by sharing important and critical information regarding production schedule, production capacity and available inventory. These findings confirms on the importance of trust in future intentions indicates that trust is a criterion buyers use to evaluate suppliers. Also, developing trusting relationships represents an investment with a long-term payoff.

Moreover, our findings offer some new insights on how trust plays not only a direct significant role in supplier integration but also a moderator role between integrated information technology and supplier integration. We find that trust can help firms establish and build a long term relationship that allow higher participation level of suppliers in the process of procurement, production and the design stage for new products. The higher participation level of suppliers leads for superior integration and coordination among firms.

Our result shows clearly that trust has a positive moderating effect on the relationship between integrated IT and supplier integration in the Egyptian market. Finally, our result recommends that firms need to share important information regarding production plan, demand forecast and inventory level with its suppliers to gain the maximum support from them.

4.1.5 Relationship commitment and customer integration

This study also investigated the link between relationship commitment and customer integration in Egyptian supply chains. The result indicates that relationship commitment has a strong positive impact on customer integration. This is consistent with Zhao et al. (2008) finding that relationship commitment had a very positive effect on customer integration. Integration requires transaction-specific asset investment. Therefore, partners should fight and militate for a longer-term orientation, as well as harmony and conformity in their values, norms of behavior and managerial approaches. Our finding confirms that customer integration can be achieved more easily when partners have a fundamental wish and willingness to continue a relationship due to conformity in values and norms. Accordingly, organizations should establish and maintain standard relationship commitment with their customers, in order to improve integration.

In addition, our results indicate that commitment to customer and considering him as a team member is related to future cooperation between both parties by sharing important and critical information and integrating inter-organizational processes. Sharing of market information from customer and enhancing the level of communication can be achieved easily through relationship commitment and the similarity of values. These findings confirms on the importance of relationship commitment in developing a stable long term relationships.

Moreover, our findings indicate that relationship commitment plays not only a direct significant role in customer integration but also a moderator role between integrated information technology and customer integration. We find that relationship commitment has a positive moderating effect on the relationship between integrated IT and customer integration. Therefore, our results suggest that establishing a communication channel or integrated information system with customers is beneficially for both parties. Firms can communicate and share critical information such as available inventory and production plan with customer; also customer can communicate and share demand forecast and point of sales information with firms.

4.1.6 Hierarchical organizational culture and internal integration

We argue that hierarchical organizational culture influences internal integration because it represents the shared values and beliefs of a company (Barney, 1986; Nahm, Vonderembse,

and Koufteros, 2004; Schein, 2004) . These values and beliefs represent the direction a firm conducts business (Barney, 1986). Shared values support employees in their conduct of internal operations (Adler, Goldoftas, and Levine 1999; Schilke and Cook, 2015). Therefore, organizational culture serves as a basis for management and operations practices (Braunscheidel, Suresh, and Boisnier, 2010). Thus, we suggest that internal integration as a dimension of SCI will be significantly influenced by hierarchical organizational culture.

We find that hierarchical organizational culture has a direct positive and significant effect on internal integration. However, the result shows that the expected positive moderating effect of hierarchical organizational culture on the relationship between integrated information technology and internal integration does not exist.

Our findings are in contrast with the results of Cao and Huo (2015) because these researchers found that hierarchical organizational culture is negatively related to internal integration; however we found it positively related to internal integration.

In addition, we considered IT department size, measured by the number of employees belonging to IT Department. Our results show a positive and significant relationship between IT department size and integrated information technology.

Finally, in addition to the variables specified in our theoretical model, we included one control variable, firm size, measured by the total number of employees. Regarding this control variable, our results show a positive and significant relationship between firm size and financial performance.

Result for all hypotheses is summarized in the following table:

Table 40: Hypotheses Testing: Summary

HYPOTHESES	PATH	RESULT
H1A.	Supplier integration has a positive effect on financial performance.	Supported
H1B.	Customer integration has a positive effect on financial performance.	Supported
H1C.	Internal integration has a positive effect on financial performance.	Supported
H2.	Integrated information technology has a positive effect on financial performance.	Supported
H3A.	Integrated information technology has a positive effect on supplier integration	Supported
H3B.	Integrated information technology has a positive effect on customer integration	Supported
H3C.	Integrated information technology has a positive effect on internal integration	Supported
H4A1.	Trust has a positive effect on supplier integration	Supported
H4B1.	Trust moderates the relationship between integrated IT and supplier integration, so that the higher the trust, the greater the integrated IT - supplier integration relationship.	Supported
H4A2.	Relationship commitment has a positive effect on customer integration	Supported
H4B2.	Relationship commitment moderates the relationship between integrated IT and customer integration, so that the higher the relationship commitment, the greater the integrated IT - consumer integration relationship.	Supported
H4A3.	Hierarchical organizational culture has a positive effect on internal integration	Supported
H4B3.	Hierarchical organizational culture moderates the relationship between integrated IT and internal integration, so that the stronger the hierarchical organizational culture, the greater the integrated IT - internal integration relationship.	Not Supported
H5.	Information technology department size has a positive effect on integrated information technology	Supported
H6.	Top management support has a positive effect on integrated information technology	Supported

4.2 Contributions

This research makes several contributions. Firstly, this study has contributed to filling the gap that exists in the relationships (direct and mediated) among integrated information technology, supply chain integration (considering its dimensions) and financial performance.

The final models show new evidence to the literature, analyzing complex models that relate a set of variables that to date had not been studied jointly or in such detail. Integrated information technology has not been greatly addressed in supply chain research and there are no studies have analyzed SCI acting as a mediator between integrated information technology and financial performance. In general terms, the Doctoral Thesis attempts to clarify the mediating effects of SCI between integrated information technology and financial performance in definitive models that nuance the direct relationships initially found.

Secondly, the study analyses SCI not as a single construct, but distinguishing between its various dimensions. This research reinforces the key role of integrated information technology in achieving supply chain integration and financial performance. It also demonstrates the important role of supplier integration, customer integration, and internal integration in improving financial performance.

Thirdly, this study contributes to the literature by providing a detailed study of the direct effects of each SCI dimension on financial performance. Different models were created for this that enabled the way that the relationships became nuanced to be observed as mediating constructs and antecedents were added. With this we provide empirical evidence that can explain the heterogeneous results in the prior research that analyses the relationship between SCI and performance.

Fourthly, it contributes to the literature by providing a detailed analysis of the moderating role of trust on the relationship between integrated information technology and supplier integration. Also, the moderating role of relationship commitment on the relationship between integrated information technology and customer integration. Moreover, the moderating role of hierarchical organizational culture on the relationship between integrated information technology and internal integration. Different models were created for this that enabled the way that the relationships became nuanced to be observed as moderator.

Finally, our study is the first to study these relationships using data collected from manufacturers, retailers, wholesalers and freight forwarders in Egypt. Because of Egypt's rapidly growing economic base and unique national culture, our findings provide fruitful managerial implications for both supply chain practitioners and researchers.

Overall, the results show that integrated information technology can significantly enhance financial performance directly and through mediating role of SCI.

4.3 Theoretical Implications

In initiating this study, we encountered an expansive literature base that appeared to use an array of perspectives and different theories in investigating integrated IT and SCI. Four theories have served to support the development of our study: Information Processing Theory, Resource Based View, Organizational Learning Theory, and Commitment-Trust Theory of Relationship Marketing.

We examine integrated IT and SCI under the lens of the IPT and RBV of the firm. Our primary objective for this research was to investigate whether integrated IT and SCI as firm resources with effective information processing system are related to better financial performance. This can help determine whether integrated IT and SCI should be viewed as a source of competitive advantage. In this study, we have presented a theoretical framework to aid in providing parsimony and to distinguish between three dimensions of SCI (supplier, customer, and internal integration).

Our study not only provides insight to a missing variable (integrated information technology) that may help to explain inconsistencies in the findings of prior studies, but also explains the role of learning in establishing the importance of this variable. By testing the relationships among internal integration, customer integration, supplier integration, and financial performance we highlight the critical role of SCI in linking integrated information technology to financial performance. As such this study adds greater comprehensiveness and richness to the SCI literature.

The overall positive and significant relationship between integrated IT and SCI, integrated IT and financial performance, and SCI and financial performance fit with the theoretical bases that we highlighted in this research. Closer supply chain integration and integrated information technology are significantly correlated with better financial performance.

Also, our study ties benefits and rationales for integrating with trading partners to organizational learning theory and commitment-trust theory. In particular this study positions the benefits of integration as accruing from learning. It suggests that supply chain integration is a function of how well the supplier understands the customer since information flow is

correlated with integration and integration is significantly related to financial performance. This study suggests that integration is the mechanism where by information is transmitted and subsequently synthesized. The contextualization and organization afforded through integrated information technology facilitates determining what information to bring in from suppliers and customers and knowing what to do with the information when it arrives. Hence, this research demonstrates the usefulness of organizational learning as a theoretical frame work for understanding integration and more broadly, supply chains.

In addition, the findings suggest several important avenues for the role of trust in theories of industrial buying and buyer-seller relationships. The theoretical development and results suggest that trust of the supplier firm directly influences supplier integration. As well as, our results suggest that maintaining a high level of relationship commitment with customer directly influences customer integration.

Thus, this study establishes a link between commitment-trust theory and SCI by examining the direct relation between trust and supplier integration from one side and relationship commitment and customer integration from other side. Our result submits better understanding for commitment-trust theory by examining the moderating effect of trust on the relationship between integrated information technology and supplier integration. In addition, we examined the moderating effect of relationship commitment on the relationship between integrated information technology and customer integration.

Our findings also contribute to the literatures on SCI and organizational culture. Although the extant studies have used similar definitions and conceptualizations in discussing organizational culture, they have not reached agreement on how the various dimensions of organizational culture influence SCI (Braunscheidel, Suresh, and Boisnier 2010; Naor et al. 2008; Zu, Robbins, and Fredendall 2010). Specifically, previous studies (Braunscheidel, Suresh, and Boisnier 2010; Cao and Huo 2015) show that hierarchical culture is negatively related to internal integration. Our study, however, finds that hierarchical dimension of organizational culture is positively related to internal integration.

4.4 Managerial Implications

Today's supply chain managers should have a good understanding of how supply chain integration helps their firms improve financial performance (Huo 2012; Wong, Boon-itt, and Wong 2011). From a practical stand point, our research offers to managers some evidences of the benefits of integrated information technology as an antecedent of supply chain integration. To profit more from SCI, top managers need to support the integrated information technology and the software system that facilitate SCI and provide resources required for developing such strong and stable integrated information technology system.

Firms could achieve a greater competitive advantage by improving their integrated IT and SCI. In this regard, senior management should pay special attention to integrated IT to achieve all the performance potentials that SCI is capable of in order to improve financial performance. The results show that if a firm achieves integrated IT and SCI this will impact on the financial performance.

Also, the findings of this study have a number of managerial implications that could provide valuable insights for manufacturing firms and organizations, retailers, wholesalers and freight forwarders. Our findings provide managerial guidelines for focusing limited resources to achieve not only better internal integration among departments but also external integration with customers and suppliers. Supply chain integration may be improved by investing first in information technology since it should facilitate a greater level of information exchange which could in turn lead to greater levels of knowledge creation and learning. Since the study found that internal integration, supplier integration and customer integration led to improved financial performance, it tends to support the proposition that competitive advantage accrues through learning and knowledge creation.

Companies should extensively integrate their organizations with trading partners by pursuing a strategy with abroad arc of integration. From both the downstream and upstream perspectives of the supply chain, firms should try to create situations where by all participants work together toward recognizing business synergy to compete effectively with other supply chains. Such collaborative advantages appear to increase financial performance for each supply chain partner. In addition, findings of this study suggest that integrated information technology

is crucial for a better financial performance and that better exchanging critical information among parties is likely to offer opportunities for revenue and profit growth.

In today's competitive business environment, to remain competitive and deliver satisfactory financial returns to the owners and shareholders, managers depend heavily on effectively coping with continuous and unexpected changes. The ability to establish and maintain a long term relationship full of trust and commitment has become a defining characteristic of competitiveness and of firm success.

Firms operating in an increasingly dynamic and competitive market place should place greater emphasis on the development and maintenance of supply chain integration in order to gain superior financial performance. Because supply chain integration fully mediates integrated information technology – financial performance connection, it is necessary for companies to understand the important role of supplier, customer and internal integration. Also, managers need to give attention to relationship commitment and trust and its roles in moderating the relationship between integrated information technology and financial performance.

One of the key findings of this research is that trust of a supplier firm is positively related to supplier integration as well as it positively moderate the relationship between integrated information technology and supplier integration. Therefore, we suggest that managers need to give more confidence to their suppliers through trust. Apparently, buying firms that trusted suppliers and consider trust an important prerequisite for building long-term relationships have future business opportunity with such suppliers, so suppliers should engage in trust enhancing activities. Companies should teach its salespeople how to develop trust with suppliers. Salespeople should contact customers often, because frequent contact plays a central role in developing trust. Finally, salespeople should be rewarded for such trust-building behaviors, because they strengthen the link between the buying firm and the supplier.

High levels of trust reduce the need for buyers and suppliers to spend long periods of time and effort during meetings to negotiate and write complex contracts in order to secure their investments in the relationship. By reducing the time and effort required to negotiate and monitor the relationship, buyers and suppliers can focus on one activity that mostly contributes to new product development: information exchange between parties. Information exchange can help the buyer obtain information about innovation occurring on the supplier side. In this case,

new components and product parts can contribute to incremental and even radical product development.

Also, an important finding of this research that provide guidelines for managers in developing relationship commitment in supply chain relationships. Our model demonstrates that relationship commitment is strongly related to customer integration. We find that the implementation of customer integration requires the support of an appropriate relationship commitment to customer. Therefore, company managers who are facing difficulties with customer integration need to give more attention to relationship commitment. Managers should teach their staff how to develop relationship commitment with customers.

Finally, our findings provide clues for managers on how to accelerate internal integration from the perspective of hierarchical organizational culture. We find that the internal integration requires the support of an appropriate hierarchical organizational culture. Therefore, company managers who are facing difficulties with internal integration or who want to accelerate internal integration need to take hierarchical organizational culture into consideration.

4.5 Conclusions

Our research contributes to the literature in many ways. First, it is one of the pioneering studies that examine effects of integrated IT and SCI through combining four theories: Information Processing Theory, Resource Based View, Organizational Learning Theory, and Commitment-Trust Theory of Relationship Marketing. We bring to the fore the theoretical importance of considering integrated IT and SCI to improve financial performance. Our analysis extends previous literature, which focuses on positive effects of SCI on financial performance. We found that positive significant effect for each SCI dimension (supplier, customer, and internal integration) on financial performance clearly exists.

Second, this study advances SCI research by developing theories and providing empirical evidence to explain the effects of integrated IT on financial performance and the mediating effect of SCI on the relationship between integrated IT and financial performance. Using combined theories, this study develops an approach to explain the complex relationships among integrated IT, internal integration, supplier integration, customer integration and financial performance.

Third, our study explores the complementary roles of trust, relationship commitment and hierarchical organizational culture. Our result indicates that trust is positively related to supplier integration. Also, investigating of the moderating role of trust shows that the relationships between integrated IT and supplier integration become stronger when the level of trust increases. Our analysis also suggests that relationship commitment is positively related to customer integration and analyzing the moderating role of relationship commitment shows that the relationships between integrated IT and customer integration become stronger when the level of relationship commitment increases. Regarding hierarchical organizational culture, our finding shows that hierarchical organizational culture has a positive direct effect on internal integration; however, the moderating role of hierarchical organizational culture on the relationships between integrated IT and internal integration does not exist.

Finally, our findings also provide some guidelines for managers to direct their management actions for improving financial performance through integrated IT and SCI. Our study give clear evidence that top management support is essential for integrated IT. The result

shows that IT department size and top management support have positive effect on integrated IT.

4.6 Limitations and future lines of research

Although this study makes significant contributions towards the understanding of integrated IT and SCI, there are some limitations and more opportunities for future research. Perhaps an important limitation of this study is that the data analyzed is based on (single respondent) managers' self-perceptive answers. Although most respondents were senior executives (of the level of Managers and Vice-Presidents) in supply chain functions such as purchasing and logistics, and the questions were well designed and clear, bias arising from respondent subjectivity and misunderstanding is a possibility since it is rare for one person in an organization to supervise the entire supply chain.

Additionally not all respondents were at the same level or held the same role within the firm. While this potentially introduces extraneous variance in the data, it may also strengthen the data by incorporating multiple perspectives. Having multiple respondents for each company could improve the study's reliability.

Also, our findings cannot resolve all of the inconsistencies concerning the relationships between SCI and financial performance. Some of our findings present additional contradictions to the previous findings. To make the findings on these relationships more robust, future research should examine the effects of integrated IT and SCI on financial performance in greater depth. We investigate the direct effects of three dimensions of SCI on financial performance without paying great attention to the intervening mechanisms of how SCI can impact financial performance. Future research should consider the mediating variables in the SCI–financial performance relationship.

In addition, factors that may influence the degree of supplier, customer and internal integration (such as business environment and power) are not examined in our study. Future studies should investigate the impact of these factors on SCI. Our result included only one dimension of internal organizational culture, future studies should include the other dimension (clan), also should investigate the external part of organizational culture. According to our finding, the moderating effect of hierarchical organizational culture on the relationship between integrated information technology and internal integration is not supported. Future studies should investigate this relationship in different countries and under different circumstances.

Moreover, the data used in this study are cross-sectional, and therefore cannot provide causal explanations for the observed effects of integrated IT and SCI on financial performance. Future research should use longitudinal data to test these relationships. Since the business environment is constantly changing, longitudinal follow-up studies could be designed to identify these changes and re-examine whether and how these relationships are changing. Also, in any model in which causality is suggested, longitudinal studies will provide for stronger inferences. Therefore, the model developed in this study could benefit from being tested in a longitudinal design.

Finally, the survey data was only collected from Egyptian organizations. Future studies can broaden their scope and globalize our finding by collecting data from other countries.

REFERENCES

Adler, Paul S., Barbara Goldoftas, and David I. Levine. 1999. "Flexibility Versus Efficiency? A Case Study of Model Changeovers in the Toyota Production System." SSRN Scholarly Paper ID 979102. Rochester, NY: Social Science Research Network. http://papers.ssrn.com/abstract=979102.

Aiken, Leona S., and Stephen G. West. 1991. *Multiple Regression: Testing and Interpreting Interactions*. Vol. xi. Thousand Oaks, CA, US: Sage Publications, Inc.

Akkermans, H., and K. van Helden. 2002. "Vicious and Virtuous Cycles in ERP Implementation: A Case Study of Interrelations between Critical Success Factors." *European Journal of Information Systems* 11 (1): 35–46. doi:10.1057/palgrave.ejis.3000418.

Alfalla-Luque, Rafaela, Juan A. Marin-Garcia, and Carmen Medina-Lopez. 2015. "An Analysis of the Direct and Mediated Effects of Employee Commitment and Supply Chain Integration on Organisational Performance." *International Journal of Production Economics* 162 (April): 242–57. doi:10.1016/j.ijpe.2014.07.004.

Alhashmi, S., J. Siddiqi, and B. Akhgar. 2006. "Staying Competitive by Managing Organisational Knowledge." *Engineering Management Journal* 16 (2): 43–45. doi:10.1049/em:20060211.

Altman, Irwin, and Dalmas A. Taylor. 1973. *Social Penetration: The Development of Interpersonal Relationships*. Vol. viii. Oxford, England: Holt, Rinehart & Winston.

Anderson. 1968. "Organizations in Action. By James D. Thompson. (New York: McGraw-Hill, 1967. Pp. X, 192. $7.95.)." *The Journal of Politics* 30 (02): 579–580. doi:10.2307/2128474.

Anderson, Erin, and Barton Weitz. 1989. "Determinants of Continuity in Conventional Industrial Channel Dyads." *Marketing Science* 8 (4): 310–23. doi:10.1287/mksc.8.4.310.

———. 1992. "The Use of Pledges to Build and Sustain Commitment in Distribution Channels." *Journal of Marketing Research* 29 (1): 18–34. doi:10.2307/3172490.

Anderson, James C., and David W. Gerbing. 1988. "Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach." *Psychological Bulletin* 103 (3): 411–23. doi:10.1037/0033-2909.103.3.411.

Anderson, James C., and James A. Narus. 1990. "A Model of Distributor Firm and Manufacturer Firm Working Partnerships." *Journal of Marketing* 54 (1): 42–58. doi:10.2307/1252172.

Anderson, and Katz. 1998. "Strategic Sourcing." *The International Journal of Logistics Management* 9 (1): 1–13. doi:10.1108/09574099810805708.

Antonio K.W. Lau, Richard C.M. Yam, and Esther P.Y. Tang. 2010. "Supply Chain Integration and Product Modularity: An Empirical Study of Product Performance for Selected Hong Kong Manufacturing Industries." *International Journal of Operations & Production Management* 30 (1): 20–56. doi:10.1108/01443571011012361.

Anu Bask, Jari Juga. 2001. "Semi-Integrated Supply Chains: Towards the New Era of Supply Chain Management." *International Journal of Logistics: Research and Applications* 4 (2): 137–52. doi:10.1080/13675560110059434.

Appleyard, Melissa M. 2003. “The Influence of Knowledge Accumulation on Buyer-Supplier Codevelopment Projects.” *Journal of Product Innovation Management* 20 (5): 356–73. doi:10.1111/1540-5885.00034.

Argyris, Chris. 1990. *Overcoming Organizational Defenses: Facilitating Organizational Learning*. 1 edition. Boston: Pearson.

Argyris, Chris, and Donald A. Schön. 1978. *Organizational Learning: A Theory of Action Perspective*. Vol. 173. Addison-Wesley Reading, MA. http://ih-vm-cisreis.c.mad.interhost.com/REIS/PDF/REIS_077_078_19.pdf.

Armistead, and Mapes. 1993. “The Impact of Supply Chain Integration on Operating Performance.” *Logistics Information Management* 6 (4): 9–14. doi:10.1108/09576059310045907.

Armstrong, J. Scott, and Terry S. Overton. 1977. “Estimating Nonresponse Bias in Mail Surveys.” *Journal of Marketing Research* 14 (3): 396–402. doi:10.2307/3150783.

Arshinder, Arun Kanda, and S. G. Deshmukh. 2008. “Supply Chain Coordination: Perspectives, Empirical Studies and Research Directions.” *International Journal of Production Economics*, Institutional Perspectives on Supply Chain Management, 115 (2): 316–35. doi:10.1016/j.ijpe.2008.05.011.

Bagozzi, Richard P., and Youjae Yi. 1988. “On the Evaluation of Structural Equation Models.” *Journal of the Academy of Marketing Science* 16 (1): 74–94. doi:10.1007/BF02723327.

Barney. 1986. “Strategic Factor Markets: Expectations, Luck, and Business Strategy.” *Management Science* 32 (10): 1231–1241.

———. 1991. “Firm Resources and Sustained Competitive Advantage.” *Journal of Management* 17 (1): 99–120.

———. 2012. “Purchasing, Supply Chain Management and Sustained Competitive Advantage: The Relevance of Resource-Based Theory.” *Journal of Supply Chain Management* 48 (2): 3–6.

Barratt, Mark, and Ruth Barratt. 2011. “Exploring Internal and External Supply Chain Linkages: Evidence from the Field.” *Journal of Operations Management*, Special Issue on Field Research in Operations and Supply Chain Management, 29 (5): 514–28. doi:10.1016/j.jom.2010.11.006.

Barrett, Stephanie, and Benn Konsynski. 1982. “Inter-Organization Information Sharing Systems.” *MIS Quarterly* 6 (December): 93–105. doi:10.2307/248993.

Beecham, M. A, and M Cordey-Hayes. 1998. “Partnering and Knowledge Transfer in the U.K. Motor Industry.” *Technovation* 18 (3): 191–205. doi:10.1016/S0166-4972(97)00113-2.

Ben Naylor, J, Mohamed M Naim, and Danny Berry. 1999. “Leagility: Integrating the Lean and Agile Manufacturing Paradigms in the Total Supply Chain.” *International Journal of Production Economics* 62 (1–2): 107–18. doi:10.1016/S0925-5273(98)00223-0.

Bendoly, and Schoenherr. 2005. “ERP System and Implementation-process Benefits: Implications for B2B E-procurement.” *International Journal of Operations & Production Management* 25 (4): 304–19. doi:10.1108/01443570510585516.

Bensaou, M., and N. Venkatraman. 1995. “Configurations of Interorganizational Relationships: A Comparison between U.S. and Japanese Automakers.” *Management Science* 41 (9): 1471–92.

Bergen, Mark, Shantanu Dutta, and Orville C. Walker. 1992. “Agency Relationships in Marketing: A Review of the Implications and Applications of Agency and Related Theories.” *Journal of Marketing* 56 (3): 1–24. doi:10.2307/1252293.

Berry, Leonard L., Jeffrey S. Conant, and A. Parasuraman. 1991. "A Framework for Conducting a Services Marketing Audit." *Journal of the Academy of Marketing Science* 19 (3): 255–68. doi:10.1007/BF02726500.

Bharadwaj, Anandhi S. 2000. "A Resource-Based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation." *MIS Quarterly* 24 (1): 169–96. doi:10.2307/3250983.

Birou, Fawcett, and Magnan. 1998. "The Product Life Cycle: A Tool for Functional Strategic Alignment." *International Journal of Purchasing and Materials Management* 34 (1): 37–52. doi:10.1111/j.1745-493X.1998.tb00047.x.

Bonaccorsi, Andrea, and Andrea Lipparini. 1994. "Strategic Partnerships in New Product Development: An Italian Case Study." *Journal of Product Innovation Management* 11 (2): 134–45. doi:10.1016/0737-6782(94)90061-2.

Bontis, Nick, Mary M. Crossan, and John Hulland. 2002. "Managing An Organizational Learning System By Aligning Stocks and Flows." *Journal of Management Studies* 39 (4): 437–69. doi:10.1111/1467-6486.t01-1-00299.

Bowersox, Closs, and Cooper. 2002. *Supply Chain Logistics Management*. 1 edition. Boston: McGraw-Hill/Irwin.

Bowersox, Donald J., David J. Closs, and Theodore P. Stank. 1999. *21ST CENTURY LOGISTICS: MAKING SUPPLY CHAIN INTEGRATION A REALITY*. http://trid.trb.org/view.aspx?id=672144.

Bowersox, Donald J., David J. Closs, Theodore P. Stank, and Scott B. Keller. 2000. "How Supply Chain Competency Leads to Business Success." *Supply Chain Management Review*, September. http://www.highbeam.com/doc/1G1-64972566.html.

Bozarth, and Handfield. 2008. "Bozarth & Handfield, Introduction to Operations and Supply Chain Management." https://www.pearsonhighered.com/product/Bozarth-Introduction-to-Operations-and-Supply-Chain-Management-2nd-Edition/9780131791039.html.

Braunscheidel, Michael J., and Nallan C. Suresh. 2009. "The Organizational Antecedents of a Firm's Supply Chain Agility for Risk Mitigation and Response." *Journal of Operations Management*, Special Issue: Perspectives on Risk Management in Supply Chains, 27 (2): 119–40. doi:10.1016/j.jom.2008.09.006.

Braunscheidel, Michael J., Nallan C. Suresh, and Alicia D. Boisnier. 2010. "Investigating the Impact of Organizational Culture on Supply Chain Integration." *Human Resource Management* 49 (5): 883–911. doi:10.1002/hrm.20381.

Brown, James R., Robert F. Lusch, and Carolyn Y. Nicholson. 1995. "Power and Relationship Commitment: Their Impact on Marketing Channel Member Performance." *Journal of Retailing* 71 (4): 363–92. doi:10.1016/0022-4359(95)90019-5.

Buttermann, Garry, Richard Germain, and Karthik N. S. Iyer. 2008. "Contingency Theory 'fit' as Gestalt: An Application to Supply Chain Management." *Transportation Research Part E: Logistics and Transportation Review* 44 (6): 955–69. doi:10.1016/j.tre.2007.05.012.

Byoungho Jin. 2006. "Performance Implications of Information Technology Implementation in an Apparel Supply Chain." *Supply Chain Management: An International Journal* 11 (4): 309–16. doi:10.1108/13598540610671752.

Cagliano, Caniato, and Spina. 2006. "The Linkage between Supply Chain Integration and Manufacturing Improvement Programmes." *International Journal of Operations & Production Management* 26 (3): 282–99. doi:10.1108/01443570610646201.

Cameron, Kim S., and Robert E. Quinn. 2005. *Diagnosing and Changing Organizational Culture: Based on the Competing Values Framework*. John Wiley & Sons.

Cangelosi, Vincent E., and William R. Dill. 1965. "Organizational Learning: Observations Toward a Theory." *Administrative Science Quarterly* 10 (2): 175–203. doi:10.2307/2391412.

Cannon, Joseph P., and William D. Perreault. 1999. "Buyer-Seller Relationships in Business Markets." *Journal of Marketing Research* 36 (4): 439–60. doi:10.2307/3151999.

Cao, and Huo. 2015. "The Impact of Organizational Culture on Supply Chain Integration: A Contingency and Configuration Approach." *Supply Chain Management: An International Journal* 20 (1): 24–41. doi:10.1108/SCM-11-2013-0426.

Cao, Mei, and Qingyu Zhang. 2011. "Supply Chain Collaboration: Impact on Collaborative Advantage and Firm Performance." *Journal of Operations Management* 29 (3): 163–80. doi:10.1016/j.jom.2010.12.008.

Carr, Amelia S, and John N Pearson. 1999. "Strategically Managed Buyer–supplier Relationships and Performance Outcomes." *Journal of Operations Management* 17 (5): 497–519. doi:10.1016/S0272-6963(99)00007-8.

"Central Bank of Egypt." 2015. http://www.cbe.org.eg/en/Pages/default.aspx.

Cespedes, Frank V. 1996. "Beyond Teamwork: How the Wise Can Synchronize," April. http://www.hbs.edu/faculty/Pages/item.aspx?num=22982.

Chan, Kimmy Wa, Chi Kin (Bennett) Yim, and Simon S.K Lam. 2010. "Is Customer Participation in Value Creation a Double-Edged Sword? Evidence from Professional Financial Services Across Cultures." *Journal of Marketing* 74 (3): 48–64. doi:10.1509/jmkg.74.3.48.

Charu Chandra, Jānis Grabis. 2007. "Problem Taxonomy: A Step towards Effective Information Sharing in Supply Chain Management." *International Journal of Production Research - INT J PROD RES* 45 (11): 2507–44. doi:10.1080/00207540601020486.

Chen, Haozhe, Patricia J. Daugherty, and Anthony S. Roath. 2009. "DEFINING AND OPERATIONALIZING SUPPLY CHAIN PROCESS INTEGRATION." *Journal of Business Logistics* 30 (1): 63–84. doi:10.1002/j.2158-1592.2009.tb00099.x.

Chen, and Lee. 2009. "Information Sharing and Order Variability Control Under a Generalized Demand Model." *Management Science* 55 (5): 781–97. doi:10.1287/mnsc.1080.0983.

Chen, and Paulraj. 2004. "Towards a Theory of Supply Chain Management: The Constructs and Measurements." *Journal of Operations Management* 22 (2): 119–50. doi:10.1016/j.jom.2003.12.007.

Chen, Paulraj, and Lado. 2004. "Strategic Purchasing, Supply Management, and Firm Performance." *Journal of Operations Management* 22 (5): 505–23. doi:10.1016/j.jom.2004.06.002.

Cheng, Jao-Hong. 2011. "Inter-Organizational Relationships and Information Sharing in Supply Chains." *International Journal of Information Management* 31 (4): 374–84. doi:10.1016/j.ijinfomgt.2010.09.004.

Christopher. 1996. "From Brand Values to Customer Value." *Journal of Marketing Practice: Applied Marketing Science* 2 (1): 55–66. doi:10.1108/EUM0000000000007.

Christopher, Martin. 1992. *Logistics: The Strategic Issues*. Chapman & Hall.

———. 2016. *Logistics & Supply Chain Management*. Pearson UK.

Christopher, Martin, and Uta Juttner. 2000. "Supply Chain Relationships: Making the Transition to Closer Integration." *International Journal of Logistics Research and Applications* 3 (1): 5–23. doi:10.1080/13675560050006646.

Clark, Theodore H., and Ho Guen Lee. 2000. “Performance, Interdependence and Coordination in Business-to-business Electronic Commerce and Supply Chain Management.” *Information Technology and Management* 1 (1–2): 85–105. doi:10.1023/A:1019108621684.

Clemons, Eric K., Sashidhar P. Reddi, and Michael C. Row. 1993. “The Impact of Information Technology on the Organization of Economic Activity: The ‘Move to the Middle’ Hypothesis.” *J. Manage. Inf. Syst.* 10 (2): 9–35. doi:10.1080/07421222.1993.11517998.

Clemons, ERIC K., and MICHAEL C. Row. 1992. “Information Technology and Industrial Cooperation: The Changing Economics of Coordination and Ownership.” *Journal of Management Information Systems* 9 (2): 9–28.

Cohen, Jacob, and Patricia Cohen. 1975. *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences*. Lawrence Erlbaum Associates.

Cohen, Wesley M., and Daniel A. Levinthal. 1990. “Absorptive Capacity: A New Perspective on Learning and Innovation.” *Administrative Science Quarterly* 35 (1): 128–52. doi:10.2307/2393553.

Cooper, and Ellram. 1993. “Characteristics of Supply Chain Management and the Implications for Purchasing and Logistics Strategy.” *The International Journal of Logistics Management* 4 (2): 13–24. doi:10.1108/09574099310804957.

Cooper, Martha C., Douglas M. Lambert, and Janus D. Pagh. 1997. “Supply Chain Management: More than a New Name for Logistics.” *The International Journal of Logistics Management* 8 (1): 1–14.

Cousins, Paul D., and Bulent Menguc. 2006. “The Implications of Socialization and Integration in Supply Chain Management.” *Journal of Operations Management* 24 (5): 604–20. doi:10.1016/j.jom.2005.09.001.

Craighead, Christopher W., G. Tomas M. Hult, and David J. Ketchen Jr. 2009. “The Effects of Innovation–cost Strategy, Knowledge, and Action in the Supply Chain on Firm Performance.” *Journal of Operations Management* 27 (5): 405–21. doi:10.1016/j.jom.2009.01.002.

Crespo Marquez, Adolfo, Carmine Bianchi, and Jatinder N. D. Gupta. 2004. “Operational and Financial Effectiveness of E-Collaboration Tools in Supply Chain Integration.” *European Journal of Operational Research*, Supply Chain Management: Theory and Applications, 159 (2): 348–63. doi:10.1016/j.ejor.2003.08.020.

Cristina Gimenez, and Eva Ventura. 2005. “Logistics-production, Logistics-marketing and External Integration: Their Impact on Performance.” *International Journal of Operations & Production Management* 25 (1): 20–38. doi:10.1108/01443570510572222.

Crossan, Mary M., and Iris Berdrow. 2003. “Organizational Learning and Strategic Renewal.” *Strategic Management Journal* 24 (11): 1087–1105. doi:10.1002/smj.342.

Crossan, Mary M., Henry W. Lane, and Roderick E. White. 1999. “An Organizational Learning Framework: From Intuition to Institution.” *Academy of Management Review* 24 (3): 522–37. doi:10.5465/AMR.1999.2202135.

Cuijpers, Maarten, Hannes Guenter, and Katrin Hussinger. 2011. “Costs and Benefits of Inter-Departmental Innovation Collaboration.” *Research Policy* 40 (4): 565–75. doi:10.1016/j.respol.2010.12.004.

Cyert, Richard M., and James G. March. 1963. *Behavioral Theory of the Firm*. 1 edition. Cambridge, Mass., USA: Wiley-Blackwell.

Daft, Richard L., and Robert H. Lengel. 1986. “Organizational Information Requirements, Media Richness and Structural Design.” *Management Science* 32 (5): 554–71. doi:10.1287/mnsc.32.5.554.

Daft, Richard L., and Karl E. Weick. 1984. “Toward a Model of Organizations as Interpretation Systems.” *The Academy of Management Review* 9 (2): 284. doi:10.2307/258441.

Dale S. Rogers, Patricia J. Daugherty, and Theodore P. Stank. 1993. “Enhancing Service Responsiveness: The Strategic Potential of EDI.” *Logistics Information Management* 6 (3): 27–32. doi:10.1108/EUM0000000002905.

Danese, Pamela, and Pietro Romano. 2011. “Supply Chain Integration and Efficiency Performance: A Study on the Interactions between Customer and Supplier Integration.” *Supply Chain Management: An International Journal* 16 (4): 220–30. doi:10.1108/13598541111139044.

Dangayach, and Deshmukh. 2001. “Manufacturing Strategy: Literature Review and Some Issues.” *International Journal of Operations & Production Management* 21 (7): 884–932. doi:10.1108/01443570110393414.

Das, Ajay, Ram Narasimhan, and Srinivas Talluri. 2006. “Supplier integration—Finding an Optimal Configuration.” *Journal of Operations Management* 24 (5): 563–82. doi:10.1016/j.jom.2005.09.003.

Davis, Donna F., and Susan L. Golicic. 2010. “Gaining Comparative Advantage in Supply Chain Relationships: The Mediating Role of Market-Oriented IT Competence.” *Journal of the Academy of Marketing Science* 38 (1): 56–70. doi:10.1007/s11747-008-0127-8.

Davis-Sramek, Beth, Richard Germain, and Karthik Iyer. 2010. “Supply Chain Technology: The Role of Environment in Predicting Performance.” *Journal of the Academy of Marketing Science* 38 (1): 42–55. doi:10.1007/s11747-009-0137-1.

Day, George S. 1994. “The Capabilities of Market-Driven Organizations.” *Journal of Marketing* 58 (4): 37–52. doi:10.2307/1251915.

Demirbag, Koh, Tatoglu, and Zaim. 2006. “TQM and Market Orientation’s Impact on SMEs’ Performance.” *Industrial Management & Data Systems* 106 (8): 1206–28. doi:10.1108/02635570610710836.

Denison, Daniel R., Stuart L. Hart, and Joel A. Kahn. 1996. “From Chimneys to Cross-Functional Teams: Developing and Validating a Diagnostic Model.” *The Academy of Management Journal* 39 (4): 1005–23. doi:10.2307/256721.

Dertouzos, Michael L., Robert M. Solow, and Richard K. Lester. 1989. *Made in America: Regaining the Productive Edge*. 1st edition. Cambridge, Mass: The MIT Press.

Devaraj, Sarv, and Rajiv Kohli. 2003. “Performance Impacts of Information Technology: Is Actual Usage the Missing Link?” *Management Science* 49 (3): 273–89. doi:10.1287/mnsc.49.3.273.12736.

Devaraj, Sarv, Lee Krajewski, and Jerry C. Wei. 2007. “Impact of eBusiness Technologies on Operational Performance: The Role of Production Information Integration in the Supply Chain.” *Journal of Operations Management*, Supply Chain Management in a Sustainable Environment Special Issue on Frontiers of Empirical Supply Chain Research, 25 (6): 1199–1216. doi:10.1016/j.jom.2007.01.002.

Dierickx, Ingemar, and Karel Cool. 1989. “Asset Stock Accumulation and Sustainability of Competitive Advantage.” *Management Science* 35 (12): 1504–11. doi:10.1287/mnsc.35.12.1504.

Dierkes, Meinolf, Ariane Berthoin Antal, John Child, and Ikujiro Nonaka. 2003. *Handbook of Organizational Learning and Knowledge*. Oxford University Press.

Ding, Huiping, Baochun Guo, and Zhishuo Liu. 2011. "Information Sharing and Profit Allotment Based on Supply Chain Cooperation." *International Journal of Production Economics*, Leading Edge of Inventory Research, 133 (1): 70–79. doi:10.1016/j.ijpe.2010.06.015.

Dirks, Kurt T., and Donald L. Ferrin. 2001. "The Role of Trust in Organizational Settings." *Organization Science* 12 (4): 450–67. doi:10.1287/orsc.12.4.450.10640.

Donald J. Bowersox, and Edward A. Morash. 1989. "The Integration of Marketing Flows in Channels of Distribution." *European Journal of Marketing* 23 (2): 58–67. doi:10.1108/EUM0000000000546.

Doney, Patricia M., and Joseph P. Cannon. 1997. "An Examination of the Nature of Trust in Buyer-Seller Relationships." *Journal of Marketing* 61 (2): 35–51. doi:10.2307/1251829.

Dong, Shutao, Sean Xin Xu, and Kevin Xiaoguo Zhu. 2009. "Research Note—Information Technology in Supply Chains: The Value of IT-Enabled Resources Under Competition." *Information Systems Research* 20 (1): 18–32. doi:10.1287/isre.1080.0195.

Dos Santos, Brian L., Ken Peffers, and David C. Mauer. 1993. "The Impact of Information Technology Investment Announcements on the Market Value of the Firm." *Information Systems Research* 4 (1): 1–23. doi:10.1287/isre.4.1.1.

Douglas M. Lambert. 2008. *By Douglas M. Lambert Supply Chain Management: Processes, Partnerships, Performance, 3rd Edition*. Supply Chain Management Institute.

Droge, Cornelia, Jayanth Jayaram, and Shawnee K. Vickery. 2004. "The Effects of Internal versus External Integration Practices on Time-Based Performance and Overall Firm Performance." *Journal of Operations Management* 22 (6): 557–73. doi:10.1016/j.jom.2004.08.001.

Droge, Cornelia, Shawnee K. Vickery, and Mark A. Jacobs. 2012. "Does Supply Chain Integration Mediate the Relationships between Product/Process Strategy and Service Performance? An Empirical Study." *International Journal of Production Economics* 137 (2): 250–62. doi:10.1016/j.ijpe.2012.02.005.

Duncan, Robert B. 1972. "Characteristics of Organizational Environments and Perceived Environmental Uncertainty." *Administrative Science Quarterly* 17 (3): 313–27. doi:10.2307/2392145.

Dutton, Jane E., Liam Fahey, and V. K. Narayanan. 1983. "Toward Understanding Strategic Issue Diagnosis." *Strategic Management Journal* 4 (4): 307–23. doi:10.1002/smj.4250040403.

Dwyer, F. Robert, Paul H. Schurr, and Sejo Oh. 1987. "Developing Buyer-Seller Relationships." *Journal of Marketing* 51 (2): 11–27. doi:10.2307/1251126.

Dyba, Tore. 2005. "An Empirical Investigation of the Key Factors for Success in Software Process Improvement." *IEEE Transactions on Software Engineering* 31 (5): 410–24. doi:10.1109/TSE.2005.53.

Dyer, Jeffrey H., and Harbir Singh. 1998. "The Relational View: Cooperative Strategy and Sources of Interorganizational Competitive Advantage." *Academy of Management Review* 23 (4): 660–79. doi:10.5465/AMR.1998.1255632.

Earl, Michael J. 1993. "Experiences in Strategic Information Systems Planning." *MIS Q.* 17 (1): 1–24. doi:10.2307/249507.

"Egypt Business Directory." 2013. http://www.egypt-business.com/.

"Egypt GDP | 1960-2016 | Data | Chart | Calendar | Forecast | News." 2016. http://www.tradingeconomics.com/egypt/gdp.

El-Emam, Khaled, Dennis Goldenson, James McCurley, and James Herbsleb. 2001. "Modelling the Likelihood of Software Process Improvement: An Exploratory Study." *Empirical Software Engineering* 6 (3): 207–29. doi:10.1023/A:1011487332587.

Ellram, Lisa M. 2007. "Services Supply Management : The next Frontier for Improved Organizational Performance."

Ellram, Lisa M., and Amelia Carr. 1994. "Strategic Purchasing: A History and Review of the Literature." *International Journal of Purchasing and Materials Management* 30 (1): 9–19. doi:10.1111/j.1745-493X.1994.tb00185.x.

Eng, Teck-Yong. 2006. "An Investigation into the Mediating Role of Cross-Functional Coordination on the Linkage between Organizational Norms and SCM Performance." *Industrial Marketing Management* 35 (6): 762–73. doi:10.1016/j.indmarman.2005.05.014.

Enkel, Ellen, Christoph Kausch, and Oliver Gassmann. 2005. "Managing the Risk of Customer Integration." *European Management Journal* 23 (2): 203–13. doi:10.1016/j.emj.2005.02.005.

Erik Brynjolfsson. 1993. "The Productivity Paradox of Information Technology." http://dl.acm.org/citation.cfm?id=163309.

Eve D Rosenzweig, Aleda V. Roth. 2003. "The Influence of an Integration Strategy on Competitive Capabilities and Business Performance: An Exploratory Study of Consumer Products Manufacturers." *Journal of Operations Management - J OPER MANAG* 21 (4): 437–56. doi:10.1016/S0272-6963(03)00037-8.

Fabbe-Costes, Nathalie, and Marianne Jahre. 2008. "Supply Chain Integration and Performance: A Review of the Evidence." Edited by Matthew Waller - one of the usual editors. *The International Journal of Logistics Management* 19 (2): 130–54. doi:10.1108/09574090810895933.

Farmer, David. 1997. "Purchasing Myopia — Revisited." *European Journal of Purchasing & Supply Management* 3 (1): 1–8. doi:10.1016/S0969-7012(96)00006-8.

Fawcett, Stanley E., and Gregory M. Magnan. 2004. "Ten Guiding Principles for High-Impact SCM." *Business Horizons* 47 (5): 67–74.

Fawcett, Stanley E., Cynthia Wallin, Chad Allred, Amydee M. Fawcett, and Gregory M. Magnan. 2011. "Information Technology as an Enabler of Supply Chain Collaboration: A Dynamic-Capabilities Perspective." *Journal of Supply Chain Management* 47 (1): 38–59. doi:10.1111/j.1745-493X.2010.03213.x.

Ferdows, Kasra, Michael A. Lewis, and Jose A. D. Machuca. 2004. "Rapid-Fire Fulfillment." *Harvard Business Review*. November 1. https://hbr.org/2004/11/rapid-fire-fulfillment.

Fiol, C. Marlene, and Marjorie A. Lyles. 1985. "Organizational Learning." *Academy of Management Review* 10 (4): 803–13. doi:10.5465/AMR.1985.4279103.

Fisher. 1997. "What Is the Right Supply Chain for Your Product?" *Harvard Business Review*. https://hbr.org/1997/03/what-is-the-right-supply-chain-for-your-product.

Fleury, Afonso C. C., and Maria Tereza Leme Fleury. 2003. "Competitive Strategies and Core Competencies: Perspectives for the Internationalization of Industry in Brazil." *Gestão & Produção* 10 (2): 129–44. doi:10.1590/S0104-530X2003000200002.

Floyd, Steven W., and Peter J. Lane. 2000. "Strategizing Throughout the Organization: Managing Role Conflict in Strategic Renewal." *Academy of Management Review* 25 (1): 154–77. doi:10.5465/AMR.2000.2791608.

Flynn, Barbara B., Baofeng Huo, and Xiande Zhao. 2010. "The Impact of Supply Chain Integration on Performance: A Contingency and Configuration Approach." *Journal of Operations Management* 28 (1): 58–71. doi:10.1016/j.jom.2009.06.001.

Flynn, Barbara B., Xenophon Koufteros, and Guanyi Lu. 2016. "On Theory in Supply Chain Uncertainty and Its Implications for Supply Chain Integration." *Journal of Supply Chain Management*, May, n/a-n/a. doi:10.1111/jscm.12106.

Ford, David. 2002. *Understanding Business Marketing and Purchasing: An Interaction Approach*. Cengage Learning EMEA.

Fornell, Claes, and David F. Larcker. 1981. "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error." *Journal of Marketing Research* 18 (1): 39–50. doi:10.2307/3151312.

Fosso Wamba, Samuel, Louis A. Lefebvre, Ygal Bendavid, and Élisabeth Lefebvre. 2008. "Exploring the Impact of RFID Technology and the EPC Network on Mobile B2B eCommerce: A Case Study in the Retail Industry." *International Journal of Production Economics*, Special Section on RFID: Technology, Applications, and Impact on Business Operations, 112 (2): 614–29. doi:10.1016/j.ijpe.2007.05.010.

Freeman, Virginia T., and Joseph L. Cavinato. 1990. "Fitting Purchasing to the Strategic Firm: Frameworks, Processes, and Values." *Journal of Purchasing & Materials Management* 26 (1): 6.

Frohlich, Markham T. 2002. "E-Integration in the Supply Chain: Barriers and Performance*." *Decision Sciences* 33 (4): 537–56. doi:10.1111/j.1540-5915.2002.tb01655.x.

Frohlich, Markham T., and Roy Westbrook. 2001. "Arcs of Integration: An International Study of Supply Chain Strategies." *Journal of Operations Management* 19 (2): 185–200. doi:10.1016/S0272-6963(00)00055-3.

Frohlich, Markham T, and Roy Westbrook. 2002. "Demand Chain Management in Manufacturing and Services: Web-Based Integration, Drivers and Performance." *Journal of Operations Management* 20 (6): 729–45. doi:10.1016/S0272-6963(02)00037-2.

Fuente, M. Victoria de la, Lorenzo Ros, and Manuel Cardós. 2008. "Integrating Forward and Reverse Supply Chains: Application to a Metal-Mechanic Company." *International Journal of Production Economics*, Special Section on Sustainable Supply Chain, 111 (2): 782–92. doi:10.1016/j.ijpe.2007.03.019.

Fugate, Brian S., John T. Mentzer, and Theodore P. Stank. 2010. "Logistics Performance: Efficiency, Effectiveness, and Differentiation." *Journal of Business Logistics* 31 (1): 43–62. doi:10.1002/j.2158-1592.2010.tb00127.x.

Füller, Johann, Rita Faullant, and Kurt Matzler. 2010. "Triggers for Virtual Customer Integration in the Development of Medical Equipment — From a Manufacturer and a User's Perspective." *Industrial Marketing Management*, Building, Implementing, and Managing Brand Equity in Business Markets, 39 (8): 1376–83. doi:10.1016/j.indmarman.2010.04.003.

Gadde, Lars-Erik, and Håkan Håkansson. 1994. "The Changing Role of Purchasing: Reconsidering Three Strategic Issues." *European Journal of Purchasing & Supply Management* 1 (1): 27–35. doi:10.1016/0969-7012(94)90040-X.

Galbraith. 1974. "Organization Design: An Information Processing View." *Interfaces* 4 (3): 28–36. doi:10.1287/inte.4.3.28.

Galbraith, Jay R. 1973. *Designing Complex Organizations*. 1st ed. Boston, MA, USA: Addison-Wesley Longman Publishing Co., Inc.

Ganesan, Shankar. 1994. "Determinants of Long-Term Orientation in Buyer-Seller Relationships." *Journal of Marketing* 58 (2): 1–19. doi:10.2307/1252265.

Gattiker, Thomas F., and Dale L. Goodhue. 2004. "Understanding the Local-Level Costs and Benefits of ERP through Organizational Information Processing Theory." *Information & Management* 41 (4): 431–43. doi:10.1016/S0378-7206(03)00082-X.

Gattorna, John. 1998. *Strategic Supply Chain Alignment: Best Practice in Supply Chain Management*. Gower Publishing, Ltd.

George Q. Huang, Jason S. K. Lau, and K. L. Mak. 2003. "Impacts of Sharing Production Information on Supply Chain Dynamics:" http://www.imse.hku.hk/gqhuang/Publications/Info%20Sharing%20Literature_Survey.htm.

Gerbing, David W., and James C. Anderson. 1988. "An Updated Paradigm for Scale Development Incorporating Unidimensionality and Its Assessment." *Journal of Marketing Research* 25 (2): 186–92. doi:10.2307/3172650.

Germain, Richard, and Karthik N. S. Iyer. 2006. "The Interaction of Internal and Downstream Integration and Its Association with Performance." *Journal of Business Logistics* 27 (2): 29–52. doi:10.1002/j.2158-1592.2006.tb00216.x.

Gioia, Dennis A., and James B. Thomas. 1996. "Identity, Image, and Issue Interpretation: Sensemaking during Strategic Change in Academia." *Administrative Science Quarterly* 41 (3): 370–403.

Giovani J.C. da Silveira, and Rebecca Arkader. 2007. "The Direct and Mediated Relationships between Supply Chain Coordination Investments and Delivery Performance." *International Journal of Operations & Production Management* 27 (2): 140–58. doi:10.1108/01443570710720595.

Goldenson, Dennis R., and James D. Herbsleb. 1995. "After the Appraisal: A Systematic Survey of Process Improvement, Its Benefits, and Factors That Influence Success."

Gounaris, Spiros P. 2005. "Trust and Commitment Influences on Customer Retention: Insights from Business-to-Business Services." *Journal of Business Research*, Business-to-business relationship architecture and networks among Australia, NZ, and Asian firms, 58 (2): 126–40. doi:10.1016/S0148-2963(03)00122-X.

Grant, Robert M. 1991. "The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulation." *California Management Review* 33 (3): 114–35. doi:10.2307/41166664.

Grean, Michael, and Michael J. Shaw. 2002. "Supply-Chain Partnership between P&G and Wal-Mart." In *E-Business Management*, edited by Michael J. Shaw, 155–71. Integrated Series in Information Systems 1. Springer US. doi:10.1007/0-306-47548-0_8.

Gregory N. Stock, Noel P. Greis, and John D. Kasarda. 1998. "Logistics, Strategy and Structure." *International Journal of Operations & Production Management* 18 (1): 37–52. doi:10.1108/01443579810192772.

Gulati, Ranjay. 1995. "Does Familiarity Breed Trust? The Implications of Repeated Ties for Contractual Choice in Alliances." *Academy of Management Journal* 38 (1): 85–112. doi:10.2307/256729.

———. 2007. "Silo Busting: How to Execute on the Promise of Customer Focus." *Harvard Business Review* 85 (5): 98–108, 145.

Gunasekaran, A, and E. W. T Ngai. 2004. "Information Systems in Supply Chain Integration and Management." *European Journal of Operational Research*, Supply Chain Management: Theory and Applications, 159 (2): 269–95. doi:10.1016/j.ejor.2003.08.016.

Gunasekaran, Lai, and Edwin Cheng. 2008. “Responsive Supply Chain: A Competitive Strategy in a Networked Economy.” *Omega*, Special Issue on Logistics: New Perspectives and Challenges, 36 (4): 549–64. doi:10.1016/j.omega.2006.12.002.

Gundlach, Gregory T., Ravi S. Achrol, and John T. Mentzer. 1995. “The Structure of Commitment in Exchange.” *Journal of Marketing* 59 (1): 78–92. doi:10.2307/1252016.

Guo, Zhiling, Fang Fang, and Andrew B. Whinston. 2006. “Supply Chain Information Sharing in a Macro Prediction Market.” *Decision Support Systems* 42 (3): 1944–58. doi:10.1016/j.dss.2006.05.003.

Gupta, Uma G., and Margaret Capen. 1996. “An Empirical Investigation of the Contribution of IS to Manufacturing Productivity.” *Information & Management* 31 (4): 227–33. doi:10.1016/S0378-7206(96)01081-6.

H. L. Lee, S. Whang. 2001. “Winning the Last Mile of E-Commerce.” *MIT Sloan Management Review* 42 (4).

Håkansson, Håkan. 1982. *International Marketing and Purchasing of Industrial Goods: An Interaction Approach*. 1 edition. Chichester ; New York: Wiley.

Hakansson, Hakan, and Ivan Snehota, eds. 1995. *Developing Relationships in Business Networks*. S.l.: Van Nostrand Reinhold.

Hambrick, Donald C. 2007. “Upper Echelons Theory: An Update.” *The Academy of Management Review* 32 (2): 334–43. doi:10.2307/20159303.

Hammer, Michael. 1990. “Reengineer Work: Don't Automate, Obliterate.” *Harvard Business Review* 68: 104–12.

Handfield, Robert B., and Christian Bechtel. 2002. “The Role of Trust and Relationship Structure in Improving Supply Chain Responsiveness.” *Industrial Marketing Management*, Cycle Time and Industrial Marketing, 31 (4): 367–82. doi:10.1016/S0019-8501(01)00169-9.

Handfield, Robert B., Gary L. Ragatz, Kenneth J. Petersen, and Robert M. Monczka. 1999. “Involving Suppliers in New Product Development.” *California Management Review* 42 (1): 59–82.

Hansen, Gary S., and Birger Wernerfelt. 1989. “Determinants of Firm Performance: The Relative Importance of Economic and Organizational Factors.” *Strategic Management Journal* 10 (5): 399–411. doi:10.1002/smj.4250100502.

Harland, C. M. 1996. “Supply Chain Management: Relationships, Chains and Networks.” *British Journal of Management* 7 (December): S63–80. doi:10.1111/j.1467-8551.1996.tb00148.x.

Harland, Lamming, and Cousins. 1999. “Developing the Concept of Supply Strategy.” *International Journal of Operations & Production Management* 19 (7): 650–74. doi:10.1108/01443579910278910.

Hartono, Edward, Xiaotong Li, Kwan-Sik Na, and James T. Simpson. 2010. “The Role of the Quality of Shared Information in Interorganizational Systems Use.” *International Journal of Information Management* 30 (5): 399–407. doi:10.1016/j.ijinfomgt.2010.02.007.

He, Yuanqiong, Kin Keung Lai, Hongyi Sun, and Yun Chen. 2014. “The Impact of Supplier Integration on Customer Integration and New Product Performance: The Mediating Role of Manufacturing Flexibility under Trust Theory.” *International Journal of Production Economics*, Building Supply Chain System Capabilities in the Age of Global Complexity: Emerging Theories and Practices, 147, Part B (January): 260–70. doi:10.1016/j.ijpe.2013.04.044.

Heide, Jan B., and George John. 1992. "Do Norms Matter in Marketing Relationships?" *Journal of Marketing* 56 (2): 32–44. doi:10.2307/1252040.

Helper, S. 1991. *How Much Has Really Changed between U.S. Automakers and Their Suppliers?*

Hertz, Susanne. 2001. "Dynamics of Alliances in Highly Integrated Supply Chain Networks." *International Journal of Logistics Research and Applications* 4 (2): 237–56. doi:10.1080/13675560110060009.

Hewett, Kelly, R. Bruce Money, and Subhash Sharma. 2002. "An Exploration of the Moderating Role of Buyer Corporate Culture in Industrial Buyer-Seller Relationships." *Journal of the Academy of Marketing Science* 30 (3): 229–39. doi:10.1177/0092070302303004.

Hillebrand, B. & Biemans, W. G. 2003. "The Relationship between Internal and External Cooperation - Research Database - University of Groningen." http://www.rug.nl/research/portal/publications/the-relationship-between-internal-and-external-cooperation(dcb2d2be-a7f9-454b-b433-3f8c04b39af4).html.

Hines, Peter. 1994. *Creating World Class Suppliers: Unlocking Mutual Competitive Advantage*. Financial Times Management.

Hitt, Lorin M., and Erik Brynjolfsson. 1996. "Productivity, Business Profitability, and Consumer Surplus: Three Different Measures of Information Technology Value." *MIS Quarterly* 20 (2): 121–42. doi:10.2307/249475.

Homburg, Christian, and Ruth M. Stock. 2004. "The Link between Salespeople's Job Satisfaction and Customer Satisfaction in a Business-to-Business Context: A Dyadic Analysis." *Journal of the Academy of Marketing Science* 32 (2): 144–58. doi:10.1177/0092070303261415.

Houlihan. 1988. "International Supply Chains: A New Approach." *Management Decision* 26 (3): 13–19. doi:10.1108/eb001493.

Hrebiniak, Lawrence G. 1974. "Effects of Job Level and Participation on Employee Attitudes and Perceptions of Influence." *Academy of Management Journal* 17 (4): 649–62. doi:10.2307/255644.

Hsiu-Fen Lin. 2007. "Knowledge Sharing and Firm Innovation Capability: An Empirical Study." *International Journal of Manpower* 28 (3/4): 315–32. doi:10.1108/01437720710755272.

Huber, George P. 1991. "Organizational Learning: The Contributing Processes and the Literatures." *Organization Science* 2 (1): 88–115. doi:10.1287/orsc.2.1.88.

Huber, George P., and Danial J. Power. 1985. "Retrospective Reports of Strategic-Level Managers: Guidelines for Increasing Their Accuracy." *Strategic Management Journal* 6 (2): 171–80. doi:10.1002/smj.4250060206.

Hult, G. Tomas M. 2011. "Toward a Theory of the Boundary-Spanning Marketing Organization and Insights from 31 Organization Theories." *Journal of the Academy of Marketing Science* 39 (4): 509–36. doi:10.1007/s11747-011-0253-6.

Hult, G. Tomas M, David J Ketchen Jr., and Ernest L Nichols Jr. 2003. "Organizational Learning as a Strategic Resource in Supply Management." *Journal of Operations Management* 21 (5): 541–56. doi:10.1016/j.jom.2003.02.001.

Hult, Ketchen, and Arrfelt. 2007. "Strategic Supply Chain Management: Improving Performance through a Culture of Competitiveness and Knowledge Development." *Strategic Management Journal* 28 (10): 1035–52. doi:10.1002/smj.627.

Hult, Ketchen, and Slater. 2004. “Information Processing, Knowledge Development, and Strategic Supply Chain Performance.” *Academy of Management Journal* 47 (2): 241–53. doi:10.2307/20159575.

Humphreys, P. K., W. L. Li, and L. Y. Chan. 2004. “The Impact of Supplier Development on Buyer–supplier Performance.” *Omega* 32 (2): 131–43. doi:10.1016/j.omega.2003.09.016.

Huo. 2012. “The Impact of Supply Chain Integration on Company Performance: An Organizational Capability Perspective.” *Supply Chain Management: An International Journal* 17 (6): 596–610. doi:10.1108/13598541211269210.

Injazz J. Chen, and Karen Popovich. 2003. “Understanding Customer Relationship Management (CRM): People, Process and Technology.” *Business Process Management Journal* 9 (5): 672–88. doi:10.1108/14637150310496758.

Inkpen, Andrew C. 2000. “Learning Through Joint Ventures: A Framework Of Knowledge Acquisition.” *Journal of Management Studies* 37 (7): 1019–44. doi:10.1111/1467-6486.00215.

Ireland, R. Duane, and Justin W. Webb. 2007. “A Multi-Theoretic Perspective on Trust and Power in Strategic Supply Chains.” *Journal of Operations Management*, Special Issue Evolution of the Field of Operations Management SI/ Special Issue Organisation Theory and Supply Chain Management, 25 (2): 482–97. doi:10.1016/j.jom.2006.05.004.

Isobe, Takehiko, Shige Makino, and David B. Montgomery. 2008. “Technological Capabilities and Firm Performance: The Case of Small Manufacturing Firms in Japan.” *Asia Pacific Journal of Management* 25 (3): 413–28. doi:10.1007/s10490-008-9098-z.

J. Campbell, J. Sankaran. 2005. “An Inductive Framework for Enhancing Supply Chain Integration.” *International Journal of Production Research - INT J PROD RES* 43 (16): 3321–51. doi:10.1080/00207540500095852.

Jane Kingman-Brundage, William R. George, and David E. Bowen. 1995. “‘Service Logic’: Achieving Service System Integration.” *International Journal of Service Industry Management* 6 (4): 20–39. doi:10.1108/09564239510096885.

Jayachandran, Satish, Subhash Sharma, Peter Kaufman, and Pushkala Raman. 2005. “The Role of Relational Information Processes and Technology Use in Customer Relationship Management.” *Journal of Marketing* 69 (4): 177–92. doi:10.1509/jmkg.2005.69.4.177.

Jayaram, Jayanth, and Keah-Choon Tan. 2010. “Supply Chain Integration with Third-Party Logistics Providers.” *International Journal of Production Economics* 125 (2): 262–71. doi:10.1016/j.ijpe.2010.02.014.

Jayaram, Jayanth, Keah-Choon Tan, and S.P. Nachiappan. 2010. “Examining the Interrelationships between Supply Chain Integration Scope and Supply Chain Management Efforts.” *International Journal of Production Research* 48 (22): 6837–57. doi:10.1080/00207540903358329.

Johnson, Jean L. 1999. “Strategic Integration in Industrial Distribution Channels: Managing the Interfirm Relationship as a Strategic Asset.” *Journal of the Academy of Marketing Science* 27 (1): 4–18. doi:10.1177/0092070399271001.

Johnston, David A, David M McCutcheon, F. Ian Stuart, and Hazel Kerwood. 2004. “Effects of Supplier Trust on Performance of Cooperative Supplier Relationships.” *Journal of Operations Management* 22 (1): 23–38. doi:10.1016/j.jom.2003.12.001.

Johnston, and Kristal. 2008. “The Climate for Co-operation: Buyer-supplier Beliefs and Behavior.” *International Journal of Operations & Production Management* 28 (9): 875–98. doi:10.1108/01443570810895294.

Joshi, Ashwin W., and Alexandra J. Campbell. 2003. "Effect of Environmental Dynamism on Relational Governance in Manufacturer-Supplier Relationships: A Contingency Framework and an Empirical Test." *Journal of the Academy of Marketing Science* 31 (2): 176–88. doi:10.1177/0092070302250901.

Kale, Prashant, Harbir Singh, and Howard Perlmutter. 2000. "Learning and Protection of Proprietary Assets in Strategic Alliances: Building Relational Capital." *Strategic Management Journal* 21 (3): 217–37. doi:10.1002/(SICI)1097-0266(200003)21:3<217::AID-SMJ95>3.0.CO;2-Y.

Karoway, C. 1997. "Karoway, C., 1997. Superior Supply Chains Pack Plenty of Byte. Purchasing Technology 8 (11), 32-35." http://www.sciepub.com/reference/44415.

Kathuria, Ravi, Murugan Anandarajan, and Magid Igbaria. 1999. "Linking IT Applications with Manufacturing Strategy: An Intelligent Decision Support System Approach." *Decision Sciences* 30 (4): 959–91. doi:10.1111/j.1540-5915.1999.tb00915.x.

Ke, Weiling, and Kwok Kee Wei. 2008. "Organizational Culture and Leadership in ERP Implementation." *Decision Support Systems,* I.T. and Value Creation, 45 (2): 208–18. doi:10.1016/j.dss.2007.02.002.

Kearns, Grover S., and Albert L. Lederer. 2003. "A Resource-Based View of Strategic IT Alignment: How Knowledge Sharing Creates Competitive Advantage." *Decision Sciences* 34 (1): 1–29. doi:10.1111/1540-5915.02289.

Kekre, Sunder, B. P. S. Murthi, and Kannan Srinivasan. 1995. "Operating Decisions, Supplier Availability and Quality: An Empirical Study." *Journal of Operations Management* 12 (3): 387–96. doi:10.1016/0272-6963(95)00002-A.

Kelle, Peter, and Asli Akbulut. 2005. "The Role of ERP Tools in Supply Chain Information Sharing, Cooperation, and Cost Optimization." *International Journal of Production Economics,* Proceedings of the Twelfth International Symposium on Inventories, 93–94 (January): 41–52. doi:10.1016/j.ijpe.2004.06.004.

Keller, Robert T. 2001. "Cross-Functional Project Groups in Research and New Product Development: Diversity, Communications, Job Stress, and Outcomes." *Academy of Management Journal* 44 (3): 547–55. doi:10.2307/3069369.

Kelly and Schine. 1992. "How Did Sears Blow This Gasket?" *BloombergView*. http://www.bloomberg.com/bw/stories/1992-06-28/how-did-sears-blow-this-gasket.

Kenneth B. Kahn, and John T. Mentzer. 1996. "Logistics and Interdepartmental Integration." *International Journal of Physical Distribution & Logistics Management* 26 (8): 6–14. doi:10.1108/09600039610182753.

Ketikidis, P, S Koh, N Dimitriadis, A Gunasekaran, and M Kehajova. 2008. "The Use of Information Systems for Logistics and Supply Chain Management in South East Europe: Current Status and Future Direction ☆ ." *Omega* 36 (4): 592–99. doi:10.1016/j.omega.2006.11.010.

Kettinger, William J., Varun Grover, Subashish Guha, and Albert H. Segars. 1994. "Strategic Information Systems Revisited: A Study in Sustainability and Performance." *MIS Quarterly* 18 (1): 31–58. doi:10.2307/249609.

Khanna, Tarun, Ranjay Gulati, and Nitin Nohria. 1998. "The Dynamics of Learning Alliances: Competition, Cooperation, and Relative Scope." *Strategic Management Journal* 19 (3): 193–210.

Kim. 2009. "An Investigation on the Direct and Indirect Effect of Supply Chain Integration on Firm Performance." *International Journal of Production Economics* 119 (2): 328–46. doi:10.1016/j.ijpe.2009.03.007.

Kim, Daekwan, S. Tamer Cavusgil, and Roger J. Calantone. 2006. “Information System Innovations and Supply Chain Management: Channel Relationships and Firm Performance.” *Journal of the Academy of Marketing Science* 34 (1): 40–54. doi:10.1177/0092070305281619.

Kim, Daekwan, S. Tamer Cavusgil, and Erin Cavusgil. 2013. “Does IT Alignment between Supply Chain Partners Enhance Customer Value Creation? An Empirical Investigation.” *Industrial Marketing Management*, Maximizing Buyer-Supplier Relationships in the Digital Era, 42 (6): 880–89. doi:10.1016/j.indmarman.2013.05.021.

Kline, and Bruce Dunn. 2000. “Analysis of Interaction Terms in Structural Equation Models: A Non-Technical Demonstration Using the Deviation Score Approach.” *Canadian Journal of Behavioural Science / Revue Canadienne Des Sciences Du Comportement* 32 (2): 127–32. doi:10.1037/h0087107.

Koçoğlu, İpek, Salih Zeki İmamoğlu, Hüseyin İnce, and Halit Keskin. 2011. “The Effect of Supply Chain Integration on Information sharing:Enhancing the Supply Chain Performance.” *Procedia - Social and Behavioral Sciences*, The Proceedings of 7th International Strategic Management Conference, 24: 1630–49. doi:10.1016/j.sbspro.2011.09.016.

Koh, Demirbag, Bayraktar, Tatoglu, and Zaim. 2007. “The Impact of Supply Chain Management Practices on Performance of SMEs.” *Industrial Management & Data Systems* 107 (1): 103–24. doi:10.1108/02635570710719089.

Koh, S. C. L., and S. M. Saad. 2006. “Managing Uncertainty in ERP-Controlled Manufacturing Environments in SMEs.” In , 101:109–27. Virginia Polytech Inst & State Univ. http://shura.shu.ac.uk/1727/.

Kohli, Ajay K., and Bernard J. Jaworski. 1990. “Market Orientation: The Construct, Research Propositions, and Managerial Implications.” *Journal of Marketing* 54 (2): 1–18. doi:10.2307/1251866.

Kor, Yasemin Y., and Joseph T. Mahoney. 2004. “Edith Penrose’s (1959) Contributions to the Resource-Based View of Strategic Management.” *Journal of Management Studies* 41 (1): 183–91. doi:10.1111/j.1467-6486.2004.00427.x.

Koufteros, Peng, Lu, and Richard Peters. 2014. “The Impact of Organizational Structure on Internal and External Integration: An Empirical, Cross-Regional Assessment.” *Journal of Organization Design* 3 (2). doi:10.7146/jod.7386.

Koufteros, Xenophon A., T. C. Edwin Cheng, and Kee-Hung Lai. 2007. “‘Black-Box’ and ‘gray-Box’ Supplier Integration in Product Development: Antecedents, Consequences and the Moderating Role of Firm Size.” *Journal of Operations Management* 25 (4): 847–70. doi:10.1016/j.jom.2006.10.009.

Koufteros, Xenophon A., Greg E. Rawski, and Rauniar Rupak. 2010. “Organizational Integration for Product Development: The Effects on Glitches, On-Time Execution of Engineering Change Orders, and Market Success.” *Decision Sciences* 41 (1): 49–80. doi:10.1111/j.1540-5915.2009.00259.x.

Koufteros, Xenophon, Mark Vonderembse, and Jayanth Jayaram. 2005. “Internal and External Integration for Product Development: The Contingency Effects of Uncertainty, Equivocality, and Platform Strategy.” *Decision Sciences* 36 (1): 97–133. doi:10.1111/j.1540-5915.2005.00067.x.

Krajewski, Lee J., Larry P. Ritzman, and Manoj K. Malhotra. 2006. *Operations Management: Processes and Value Chains, 8th Edition*. 8 edition. Upper Saddle River, N.J: Prentice Hall.

Kramer. 1999. “TRUST AND DISTRUST IN ORGANIZATIONS: Emerging Perspectives, Enduring Questions.” *Annual Review of Psychology* 50 (1): 569–98. doi:10.1146/annurev.psych.50.1.569.

Kulp, Susan Cohen, Hau L. Lee, and Elie Ofek. 2004. “Manufacturer Benefits from Information Integration with Retail Customers.” *Management Science* 50 (4): 431–44. doi:10.1287/mnsc.1030.0182.

Kulp, Susan Cohen, Elie Ofek, and Jonathan Whitaker. 2004. “Supply-Chain Coordination: How Companies Leverage Information Flows to Generate Value.” In *The Practice of Supply Chain Management: Where Theory and Application Converge*, 91–107. International Series in Operations Research & Management Science 62. Springer US. http://link.springer.com/chapter/10.1007/0-387-27275-5_6.

La Londe, and Masters. 1994. “Emerging Logistics Strategies: Blueprints for the Next Century.” *International Journal of Physical Distribution & Logistics Management* 24 (7): 35–47. doi:10.1108/09600039410070975.

Lado, Augustine A., Nancy G. Boyd, and Peter Wright. 1992. “A Competency-Based Model of Sustainable Competitive Advantage: Toward a Conceptual Integration.” *Journal of Management* 18 (1): 77–91. doi:10.1177/014920639201800106.

Lado, Paulraj, and Chen. 2011. “Customer Focus, Supply-chain Relational Capabilities and Performance.” *The International Journal of Logistics Management* 22 (2): 202–21. doi:10.1108/09574091111156550.

Lambert, Douglas M, and Martha C Cooper. 2000. “Issues in Supply Chain Management.” *Industrial Marketing Management* 29 (1): 65–83. doi:10.1016/S0019-8501(99)00113-3.

Lambert, Douglas M., Martha C. Cooper, and Janus D. Pagh. 1998. “Supply Chain Management: Implementation Issues and Research Opportunities.” *The International Journal of Logistics Management* 9 (2): 1–20. doi:10.1108/09574099810805807.

Lambert, Ellram , Stock. 1998. *Fundamentals of Logistics*. International edition edition. McGraw-Hill Publishing Co.

Lambert, Robeson, and Stock. 1978. “An Appraisal of the Integrated Physical Distribution Management Concept.” *International Journal of Physical Distribution & Materials Management* 9 (1): 74–88. doi:10.1108/eb014439.

Landeros, Robert, and Robert M. Monczka. 1989. “Cooperative Buyer/Seller Relationships and a Firm’s Competitive Posture.” *Journal of Purchasing & Materials Management* 25 (3): 9.

Larsson, Rikard, Lars Bengtsson, Kristina Henriksson, and Judith Sparks. 1998. “The Interorganizational Learning Dilemma: Collective Knowledge Development in Strategic Alliances.” *Organization Science* 9 (3): 285–305. doi:10.1287/orsc.9.3.285.

Larzelere, Robert E., and Ted L. Huston. 1980. “The Dyadic Trust Scale: Toward Understanding Interpersonal Trust in Close Relationships.” *Journal of Marriage and Family* 42 (3): 595–604. doi:10.2307/351903.

Lau, Antonio K. W., Esther Tang, and Richard C. M. Yam. 2010. “Effects of Supplier and Customer Integration on Product Innovation and Performance: Empirical Evidence in Hong Kong Manufacturers.” *Journal of Product Innovation Management* 27 (5): 761–77. doi:10.1111/j.1540-5885.2010.00749.x.

Lavie, Dovev. 2006. “The Competitive Advantage of Interconnected Firms: An Extension of the Resource-Based View.” *Academy of Management Review* 31 (3): 638–58. doi:10.5465/AMR.2006.21318922.

Lawler, Edward J., and Jeongkoo Yoon. 1998. “Network Structure and Emotion in Exchange Relations.” *American Sociological Review* 63 (6): 871–94. doi:10.2307/2657506.

Lee. 2000. “Creating Value through Supply Chain Integration.” *Supply Chain Management Review*, September. http://www.highbeam.com/doc/1G1-64972562.html.

———. 2002. “Aligning Supply Chain Strategies with Product Uncertainties.” *California Management Review* 44 (3): 105–19. doi:10.2307/41166135.

———. 2004. “The Triple-A Supply Chain.” *Harvard Business Review*. October 1. https://hbr.org/2004/10/the-triple-a-supply-chain.

Lee, Byungtae, and Anitesh Barua. 1999. “An Integrated Assessment of Productivity and Efficiency Impacts of Information Technology Investments: Old Data, New Analysis and Evidence.” *Journal of Productivity Analysis* 12 (1): 21–43. doi:10.1023/A:1007898906629.

Lee, Jung-Chieh, Yih-Chearng Shiue, and Chung-Yang Chen. 2016. “Examining the Impacts of Organizational Culture and Top Management Support of Knowledge Sharing on the Success of Software Process Improvement.” *Computers in Human Behavior* 54 (January): 462–74. doi:10.1016/j.chb.2015.08.030.

Lee, Lee, and Schniederjans. 2011. “Supply Chain Innovation and Organizational Performance in the Healthcare Industry.” *International Journal of Operations & Production Management* 31 (11): 1193–1214. doi:10.1108/01443571111178493.

Lee, Padmanabhan, and Whang. 1997. “Information Distortion in a Supply Chain: The Bullwhip Effect.” *Management Science* 43 (4): 546–58.

Lee, Sangjae, and Gyoo Gun Lim. 2005. “The Impact of Partnership Attributes on EDI Implementation Success.” *Information & Management* 42 (4): 503–16. doi:10.1016/j.im.2003.03.001.

Lee, So, and Tang. 2000. “The Value of Information Sharing in a Two-Level Supply Chain.” *Management Science* 46 (5): 626–43. doi:10.1287/mnsc.46.5.626.12047.

Lee, and Whang. 2004. “E-Business and Supply Chain Integration.” In *The Practice of Supply Chain Management: Where Theory and Application Converge*, 123–38. International Series in Operations Research & Management Science 62. Springer US. http://link.springer.com/chapter/10.1007/0-387-27275-5_8.

Lengnick-Hall, Cynthia A. 1996. “Customer Contributions to Quality: A Different View of the Customer-Oriented Firm.” *Academy of Management Review* 21 (3): 791–824. doi:10.5465/AMR.1996.9702100315.

Leuschner, Rudolf, François Charvet, and Dale S. Rogers. 2013. “A Meta-Analysis of Logistics Customer Service.” *Journal of Supply Chain Management* 49 (1): 47–63. doi:10.1111/jscm.12000.

Leuschner, Dale S. Rogers, and François F. Charvet. 2013. “A Meta-Analysis of Supply Chain Integration and Firm Performance.” *Journal of Supply Chain Management* 49 (2): 34–57. doi:10.1111/jscm.12013.

Levitt, Barbara, and James G. March. 1988. “Organizational Learning.” *Annual Review of Sociology* 14: 319–40.

Li, Gang, Hongjiao Yang, Linyan Sun, and Amrik S. Sohal. 2009. “The Impact of IT Implementation on Supply Chain Integration and Performance.” *International Journal of Production Economics*, Special Issue on Operations Strategy and Supply Chains Management, 120 (1): 125–38. doi:10.1016/j.ijpe.2008.07.017.

Li, Jingquan, Riyaz Sikora, Michael J. Shaw, and Gek Woo Tan. 2006. “A Strategic Analysis of Inter Organizational Information Sharing.” *Decision Support Systems* 42 (1): 251–66. doi:10.1016/j.dss.2004.12.003.

Li, and Lin. 2006. "Accessing Information Sharing and Information Quality in Supply Chain Management." *Decision Support Systems* 42 (3): 1641–56. doi:10.1016/j.dss.2006.02.011.

Li, Ragu-Nathan, Ragu-Nathan, and Subba Rao. 2006. "The Impact of Supply Chain Management Practices on Competitive Advantage and Organizational Performance." *Omega* 34 (2): 107–24. doi:10.1016/j.omega.2004.08.002.

Liang, You, and Liu. 2010. "A Resource-based Perspective on Information Technology and Firm Performance: A Meta Analysis." *Industrial Management & Data Systems* 110 (8): 1138–58. doi:10.1108/02635571011077807.

Lim, JeeHae, V.J. Richardson, and T.L. Roberts. 2004. "Information Technology Investment and Firm Performance: A Meta-Analysis." In *Proceedings of the 37th Annual Hawaii International Conference on System Sciences, 2004*, 10 pp.-. doi:10.1109/HICSS.2004.1265512.

Lin, Ching-Torng, Hero Chiu, and Po-Young Chu. 2006. "Agility Index in the Supply Chain." *International Journal of Production Economics* 100 (2): 285–99. doi:10.1016/j.ijpe.2004.11.013.

Lin, Hsiu-Fen. 2010. "An Investigation into the Effects of IS Quality and Top Management Support on ERP System Usage." *Total Quality Management & Business Excellence* 21 (3): 335–49. doi:10.1080/14783360903561761.

Lippman, S. A., and R. P. Rumelt. 1982. "Uncertain Imitability: An Analysis of Interfirm Differences in Efficiency under Competition." *The Bell Journal of Economics* 13 (2): 418–38. doi:10.2307/3003464.

Liqun Du. 2007. "Acquiring Competitive Advantage in Industry through Supply Chain Integration: A Case Study of Yue Yuen Industrial Holdings Ltd." *Journal of Enterprise Information Management* 20 (5): 527–43. doi:10.1108/17410390710823680.

Liu, Ke, Wei, and Hua. 2013. "Effects of Supply Chain Integration and Market Orientation on Firm Performance." *International Journal of Operations & Production Management* 33 (3): 322–46. doi:10.1108/01443571311300809.

Lucas, Jr Henry C. 1993. *The Business Value of Information Technology: A Historical Perspective and Thoughts for Future Research*. https://www.researchgate.net/publication/234818154_The_business_value_of_information_technology_a_historical_perspective_and_thoughts_for_future_research.

Lummus, and Vokurka. 1999. "Defining Supply Chain Management: A Historical Perspective and Practical Guidelines." *Industrial Management & Data Systems* 99 (1): 11–17. doi:10.1108/02635579910243851.

Lummus, Vokurka, and Alber. 1998. "Strategic Supply Chain Planning." http://search.proquest.com/openview/1a30563da507737ddf1c8ee27977adc0/1?pq-origsite=gscholar.

Macaulay, Stewart. 1963. "Non-Contractual Relations in Business: A Preliminary Study." *American Sociological Review* 28 (1): 55–67. doi:10.2307/2090458.

Madhok, Anoop, and Stephen B. Tallman. 1998. "Resources, Transactions and Rents: Managing Value Through Interfirm Collaborative Relationships." *Organization Science* 9 (3): 326–39. doi:10.1287/orsc.9.3.326.

Mahoney, Joseph T. 1995. "Sustainable Competitive AdvantageThe Management of Resources and the Resource of Management." *Journal of Business Research* 33 (2): 91–101. doi:10.1016/0148-2963(94)00060-R.

Mahoney, Joseph T., and J. Rajendran Pandian. 1992. "The Resource-Based View within the Conversation of Strategic Management." *Strategic Management Journal* 13 (5): 363–80. doi:10.1002/smj.4250130505.

March, James G. 1991. "Exploration and Exploitation in Organizational Learning." *Organization Science* 2 (1): 71–87. doi:10.1287/orsc.2.1.71.

March, James G., and Johan P. Olsen. 1975. "The Uncertainty of the Past: Organizational Learning Under Ambiguity*." *European Journal of Political Research* 3 (2): 147–71. doi:10.1111/j.1475-6765.1975.tb00521.x.

Mark Jacobs, Shawnee K. Vickery, and Cornelia Droge. 2007. "The Effects of Product Modularity on Competitive Performance." *International Journal of Operations & Production Management* 27 (10): 1046–68. doi:10.1108/01443570710820620.

Marsh, Herbert W., Zhonglin Wen, and Kit-Tai Hau. 2004. "Structural Equation Models of Latent Interactions: Evaluation of Alternative Estimation Strategies and Indicator Construction." *Psychological Methods* 9 (3): 275–300. doi:10.1037/1082-989X.9.3.275.

Mayer, Roger C., James H. Davis, and F. David Schoorman. 1995. "An Integrative Model Of Organizational Trust." *Academy of Management Review* 20 (3): 709–34. doi:10.5465/AMR.1995.9508080335.

McAfee, R. Bruce, Myron Glassman, and Earl D. Honeycutt. 2002. "The Effects of Culture and Human Resource Management Policies on Supply Chain Management Strategy." *Journal of Business Logistics* 23 (1): 1–18. doi:10.1002/j.2158-1592.2002.tb00013.x.

McCarter, Matthew W., Stanley E. Fawcett, and Gregory M. Magnan. 2005. "The Effect of People on the Supply Chain World: Some Overlooked Issues." *Human Systems Management* 24 (3): 197–208.

McDermott, Christopher M, and Gregory N Stock. 1999. "Organizational Culture and Advanced Manufacturing Technology Implementation." *Journal of Operations Management* 17 (5): 521–33. doi:10.1016/S0272-6963(99)00008-X.

McEvily, Bill, Vincenzo Perrone, and Akbar Zaheer. 2003. "Trust as an Organizing Principle." *Organization Science* 14 (1): 91–103. doi:10.1287/orsc.14.1.91.12814.

Menon, Anil, Sundar G. Bharadwaj, and Roy Howell. 1996. "The Quality and Effectiveness of Marketing Strategy: Effects of Functional and Dysfunctional Conflict in Intraorganizational Relationships." *Journal of the Academy of Marketing Science* 24 (4): 299. doi:10.1177/0092070396244002.

Menor, Larry J., Aleda V. Roth, and Charlotte H. Mason. 2001. "Agility in Retail Banking: A Numerical Taxonomy of Strategic Service Groups." *Manufacturing & Service Operations Management* 3 (4): 273–92. doi:10.1287/msom.3.4.273.9969.

Mentzer, John T., William DeWitt, James S. Keebler, Soonhong Min, Nancy W. Nix, Carlo D. Smith, and Zach G. Zacharia. 2001. "Defining Supply Chain Management." *Journal of Business Logistics* 22 (2): 1–25. doi:10.1002/j.2158-1592.2001.tb00001.x.

Merrill Warkentin, Ravi Bapna, and Vijayan Sugumaran. 2001. "E-knowledge Networks for Inter-organizational Collaborative E-business." *Logistics Information Management* 14 (1/2): 149–63. doi:10.1108/09576050110363040.

Metters, Richard. 1997. "Quantifying the Bullwhip Effect in Supply Chains." *Journal of Operations Management* 15 (2): 89–100.

Michel Paquin. 1990. *Information Technology Management: An Integrated Approach : Summary*. Canadian Workplace Automation Research Centre.

Mishra, and Shah. 2009. “In Union Lies Strength: Collaborative Competence in New Product Development and Its Performance Effects.” *Journal of Operations Management* 27 (4): 324–38. doi:10.1016/j.jom.2008.10.001.

Monczka, and Morgan. 1996. “Supplier integration a new level of supply chain management.” *PURCHASING*, no. 1: 120.

Monczka, Robert M., Robert J. Trent, and Robert B. Handfield. 1998. *Purchasing and Supply Chain Management*. South-Western College Pub.

Montoni, Mariano, and Ana Regina Rocha. 2007. “A Methodology for Identifying Critical Success Factors That Influence Software Process Improvement Initiatives: An Application in the Brazilian Software Industry.” In *Software Process Improvement*, edited by Pekka Abrahamsson, Nathan Baddoo, Tiziana Margaria, and Richard Messnarz, 175–86. Lecture Notes in Computer Science 4764. Springer Berlin Heidelberg. doi:10.1007/978-3-540-75381-0_16.

Mooney, John G., Vijay Gurbaxani, and Kenneth L. Kraemer. 1996. “A Process Oriented Framework for Assessing the Business Value of Information Technology.” *SIGMIS Database* 27 (2): 68–81. doi:10.1145/243350.243363.

Moore, Kevin R. 1998. “Trust and Relationship Commitment in Logistics Alliances: A Buyer Perspective.” *International Journal of Purchasing and Materials Management* 34 (4): 24–37. doi:10.1111/j.1745-493X.1998.tb00039.x.

Moorman, Christine. 1995. “Organizational Market Information Processes: Cultural Antecedents and New Product Outcomes.” *Journal of Marketing Research* 32 (3): 318–35. doi:10.2307/3151984.

Moorman, Christine, Rohit Deshpandé, and Gerald Zaltman. 1993. “Factors Affecting Trust in Market Research Relationships.” *Journal of Marketing* 57 (1): 81–101. doi:10.2307/1252059.

Moorman, Christine, and Anne S. Miner. 1997. “The Impact of Organizational Memory on New Product Performance and Creativity.” *Journal of Marketing Research* 34 (1): 91–106. doi:10.2307/3152067.

Moorman, Zaltman, and Deshpande. 1992. “Relationships Between Providers and Users of Market Research: The Dynamics of Trust Within and Between Organizations - ProQuest.” http://search.proquest.com/openview/fb71c8a829086bd820ff3b6afb8b69d7/1?pq-origsite=gscholar&cbl=1819740.

Morash, Edward A. 2001. “Supply Chain Strategies, Capabilities, and Performance.” *Transportation Journal* 41 (1): 37–54.

Morash, Edward A., and Steven R. Clinton. 1997. “The Role of Transportation Capabilities in International Supply Chain Management.” *Transportation Journal* 36 (3): 5–17.

———. 1998. “Supply Chain Integration: Customer Value through Collaborative Closeness versus Operational Excellence.” *Journal of Marketing Theory and Practice* 6 (4): 104–20.

Morgan, Neil A., Anna Kaleka, and Constantine S. Katsikeas. 2004. “Antecedents of Export Venture Performance: A Theoretical Model and Empirical Assessment.” *Journal of Marketing* 68 (1): 90–108. doi:10.1509/jmkg.68.1.90.24028.

Morgan, Robert M., and Shelby D. Hunt. 1994. “The Commitment-Trust Theory of Relationship Marketing.” *Journal of Marketing* 58 (3): 20–38. doi:10.2307/1252308.

Morris, D. S., Bradley R. Barnes, and James E. Lynch. 2009. “Relationship Marketing Needs Total Quality Management.” *ResearchGate* 10 (4): 659–65. doi:10.1080/0954412997659.

Mowery, David C., Joanne E. Oxley, and Brian S. Silverman. 1996. "Strategic Alliances and Interfirm Knowledge Transfer." *Strategic Management Journal* 17 (S2): 77–91. doi:10.1002/smj.4250171108.

Mukhopadhyay, Tridas, Surendra Rajiv, and Kannan Srinivasan. 1997. "Information Technology Impact on Process Output and Quality." *Management Science* 43 (12): 1645–59. doi:10.1287/mnsc.43.12.1645.

Nah, Fiona Fui-Hoon, Kathryn M. Zuckweiler, and Janet Lee-Shang Lau. 2003. "ERP Implementation: Chief Information Officers' Perceptions of Critical Success Factors." *International Journal of Human-Computer Interaction* 16 (1): 5–22. doi:10.1207/S15327590IJHC1601_2.

Nahapiet, Janine, and Sumantra Ghoshal. 1998. "Social Capital, Intellectual Capital, and the Organizational Advantage." *Academy of Management Review* 23 (2): 242–66. doi:10.5465/AMR.1998.533225.

Nahm, Abraham Y., Mark A. Vonderembse, and Xenophon A. Koufteros. 2004. "The Impact of Organizational Culture on Time-Based Manufacturing and Performance." *Decision Sciences* 35 (4): 579–607. doi:10.1111/j.1540-5915.2004.02660.x.

Naor, Michael, Susan M. Goldstein, Kevin W. Linderman, and Roger G. Schroeder. 2008. "The Role of Culture as Driver of Quality Management and Performance: Infrastructure Versus Core Quality Practices*." *Decision Sciences* 39 (4): 671–702. doi:10.1111/j.1540-5915.2008.00208.x.

Narasimhan, Ram. 1998. "Linking Business Unit and Material Sourcing Strategies - Material Sourcing Is an Aspect of Logistics That Encompasses Purchasing, Inbound Logistics, and Links with Other Functional Areas within the Firms. Increasingly, Material Sourcing Strategies Are Being Used to Help Attain a Firm's Objectives. This Empirical Study Is Aimed at Discovering Those Strategies and Their Linkages to the Competitive ..."

Narasimhan, Ram, and Jayanth Jayaram. 1998. "Causal Linkages in Supply Chain Management: An Exploratory Study of North American Manufacturing Firms." *Decision Sciences* 29 (3): 579–605. doi:10.1111/j.1540-5915.1998.tb01355.x.

Narasimhan, Ram, and Soo Wook Kim. 2002. "Effect of Supply Chain Integration on the Relationship between Diversification and Performance: Evidence from Japanese and Korean Firms." *Journal of Operations Management,* Managing the Interface between Marketing and Operations, 20 (3): 303–23. doi:10.1016/S0272-6963(02)00008-6.

Narasimhan, Ram, Morgan Swink, and Sridhar Viswanathan. 2010. "On Decisions for Integration Implementation: An Examination of Complementarities Between Product-Process Technology Integration and Supply Chain Integration." *Decision Sciences* 41 (2): 355–72. doi:10.1111/j.1540-5915.2010.00267.x.

Narasimhan, Ram, Srinivas Talluri, and Ajay Das. 2004. "Exploring Flexibility and Execution Competencies of Manufacturing Firms." *Journal of Operations Management* 22 (1): 91–106. doi:10.1016/j.jom.2003.12.003.

Narus, James A., and James C. Anderson. 1995. "Using Teams to Manage Collaborative Relationships in Business Markets." *Journal of Business-to-Business Marketing* 2 (3): 17–46. doi:10.1300/J033v02n03_02.

Ngwenyama, Ojelanki, and Jacob Nørbjerg. 2010. "Software Process Improvement with Weak Management Support: An Analysis of the Dynamics of Intra-Organizational Alliances in IS Change Initiatives." *European Journal of Information Systems* 19 (3): 303–19. doi:10.1057/ejis.2010.18.

Niazi, Mahmood, David Wilson, and Didar Zowghi. 2006. "Critical Success Factors for Software Process Improvement Implementation: An Empirical Study." *Software Process: Improvement and Practice* 11 (2): 193–211. doi:10.1002/spip.261.

Nonaka, Ikujiro. 1994. "A Dynamic Theory of Organizational Knowledge Creation." *Organization Science* 5 (1): 14–37.

Noordewier, Thomas G., George John, and John R. Nevin. 1990. "Performance Outcomes of Purchasing Arrangements in Industrial Buyer-Vendor Relationships." *Journal of Marketing* 54 (4): 80–93. doi:10.2307/1251761.

Norman, Patricia M. 2002. "Protecting Knowledge in Strategic Alliances: Resource and Relational Characteristics." *The Journal of High Technology Management Research* 13 (2): 177–202. doi:10.1016/S1047-8310(02)00050-0.

Ogden, and Carter. 2008. "The Supply Base Reduction Process: An Empirical Investigation." *The International Journal of Logistics Management* 19 (1): 5–28. doi:10.1108/09574090810872578.

Oh, Lih-Bin, Hock-Hai Teo, and Vallabh Sambamurthy. 2012. "The Effects of Retail Channel Integration through the Use of Information Technologies on Firm Performance." *Journal of Operations Management* 30 (5): 368–81. doi:10.1016/j.jom.2012.03.001.

Olavarrieta, and Ellinger. 1997. "Resource-based Theory and Strategic Logistics Research." *International Journal of Physical Distribution & Logistics Management* 27 (9/10): 559–87. doi:10.1108/09600039710188594.

O'Leary-Kelly, Scott W., and Benito E. Flores. 2002. "The Integration of Manufacturing and Marketing/Sales Decisions: Impact on Organizational Performance." *Journal of Operations Management*, Managing the Interface between Marketing and Operations, 20 (3): 221–40. doi:10.1016/S0272-6963(02)00005-0.

Oliver, and Webber. 1992. "Supply-Chain Management: Logistics Catches up with Strategy." *Logistics: The Strategic Issues*.

Otto, Andreas, and Herbert Kotzab. 2003. "Does Supply Chain Management Really Pay? Six Perspectives to Measure the Performance of Managing a Supply Chain." *European Journal of Operational Research* 144 (2): 306–20. doi:10.1016/S0377-2217(02)00396-X.

Pagell, Mark. 2004. "Understanding the Factors That Enable and Inhibit the Integration of Operations, Purchasing and Logistics." *Journal of Operations Management* 22 (5): 459–87. doi:10.1016/j.jom.2004.05.008.

Pagh, Janus Dóre, Martha Cooper, Janus Dóre Pagh, and Martha Cooper. 1998. "Supply Chain Postponement and Speculation Strategies: How to Choose the Right Strategy." *Journal of Business Logistics* 19 (2): 13.

Palmer, Jonathan W., and David A. Griffith. 1998. "Information Intensity: A Paradigm for Understanding Web Site Design." *Journal of Marketing Theory and Practice* 6 (3): 38–42.

Pamela Danese, and Pietro Romano. 2013. "The Moderating Role of Supply Network Structure on the Customer Integration-efficiency Relationship." *International Journal of Operations & Production Management* 33 (4): 372–93. doi:10.1108/01443571311307226.

Park, Namgyoo K., John M. Mezias, and Jaeyong Song. 2004. "A Resource-Based View of Strategic Alliances and Firm Value in the Electronic Marketplace." *Journal of Management* 30 (1): 7–27. doi:10.1016/j.jm.2002.11.001.

Paulraj, Antony, Injazz J. Chen, and James Flynn. 2006. "Levels of Strategic Purchasing: Impact on Supply Integration and Performance." *Journal of Purchasing and Supply Management* 12 (3): 107–22. doi:10.1016/j.pursup.2006.08.002.

Paulraj, Antony, Injazz J. Chen, and Augustine A. Lado. 2012. "An Empirical Taxonomy of Supply Chain Management Practices." *Journal of Business Logistics* 33 (3): 227–44. doi:10.1111/j.0000-0000.2012.01046.x.

Paulraj, Antony, Augustine A. Lado, and Injazz J. Chen. 2008. "Inter-Organizational Communication as a Relational Competency: Antecedents and Performance Outcomes in Collaborative Buyer–supplier Relationships." *Journal of Operations Management* 26 (1): 45–64. doi:10.1016/j.jom.2007.04.001.

Penrose. 1959. "The Theory of the Growth of the Firm." http://www.slideshare.net/pavan7soni/the-theory-of-the-growth-of-the-firm-penrose-1959.

Peteraf, Margaret A. 1993. "The Cornerstones of Competitive Advantage: A Resource-Based View." *Strategic Management Journal* 14 (3): 179–91. doi:10.1002/smj.4250140303.

Petersen, Kenneth J., Robert B. Handfield, and Gary L. Ragatz. 2005. "Supplier Integration into New Product Development: Coordinating Product, Process and Supply Chain Design." *Journal of Operations Management*, Coordinating Product Design, Process Design and Supply Chain Design Decisions, 23 (3–4): 371–88. doi:10.1016/j.jom.2004.07.009.

Petrovic-Lazarevic, Sonja, Amrik Sohal, and Imam Baihaqi. 2007. *Supply Chain Management Practices and Supply Chain Performance in the Australian Manufacturing Industry*. Monash University Faculty of Business and Economics. http://www.buseco.monash.edu.au/mgt/research/working-papers/2007/wp21-07.pdf.

Piller, Frank T., and Dominik Walcher. 2006. "Toolkits for Idea Competitions: A Novel Method to Integrate Users in New Product Development." *R&D Management* 36 (3): 307–18. doi:10.1111/j.1467-9310.2006.00432.x.

Podsakoff, Philip M., Scott B. MacKenzie, Jeong-Yeon Lee, and Nathan P. Podsakoff. 2003. "Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies." *Journal of Applied Psychology* 88 (5): 879–903. doi:10.1037/0021-9010.88.5.879.

Podsakoff, Philip M., and Dennis W. Organ. 1986. "Self-Reports in Organizational Research: Problems and Prospects." *Journal of Management* 12 (4): 531–44. doi:10.1177/014920638601200408.

Popper, Micha, and Raanan Lipshitz. 2000. "Organizational Learning Mechanisms Culture and Feasibility." *The Learning Organization* 7 (3): 135–45. doi:10.1108/09696470010335854.

Powell, Thomas C., and Anne Dent-Micallef. 1997. "Information Technology as Competitive Advantage: The Role of Human, Business, and Technology Resources." *Strategic Management Journal* 18 (5): 375–405. doi:10.1002/(SICI)1097-0266(199705)18:5<375::AID-SMJ876>3.0.CO;2-7.

Power, Damien. 2005. "Supply Chain Management Integration and Implementation: A Literature Review." *Supply Chain Management: An International Journal* 10 (4): 252–63. doi:10.1108/13598540510612721.

Prahalad, C. K., and Gary Hamel. 1990. "The Core Competence of the Corporation." SSRN Scholarly Paper ID 1505251. Rochester, NY: Social Science Research Network. http://papers.ssrn.com/abstract=1505251.

Premkumar, G., K. Ramamurthy, and Carol Stoak Saunders. 2005. "Information Processing View of Organizations: An Exploratory Examination of Fit in the Context of

Interorganizational Relationships." *Journal of Management Information Systems* 22 (1): 257–94.

Puckridge, and Woolsey. 2003. *Information Systems Strategy for Supply Chains. In: Gattorna,J.(Ed.), Gower Hand Book of Supply Chain Management. Gower Aldershot, England,pp.406–425.* Gower Publishing, Ltd.

Qi, Yinan, Kenneth K. Boyer, and Xiande Zhao. 2009. "Supply Chain Strategy, Product Characteristics, and Performance Impact: Evidence from Chinese Manufacturers*." *Decision Sciences* 40 (4): 667–95. doi:10.1111/j.1540-5915.2009.00246.x.

Qrunfleh, Sufian, and Monideepa Tarafdar. 2014. "Supply Chain Information Systems Strategy: Impacts on Supply Chain Performance and Firm Performance." *International Journal of Production Economics*, Building Supply Chain System Capabilities in the Age of Global Complexity: Emerging Theories and Practices, 147, Part B (January): 340–50. doi:10.1016/j.ijpe.2012.09.018.

Radstaak, Ben G, Mark H Ketelaar, Phillip Hastings, and Holland International Distribution Council. 1998. *Worldwide Logistics: The Future of Supply Chain Services*. Hague, the Netherlands: Holland International Distribution Council.

Ragatz, Gary L, Robert B Handfield, and Kenneth J Petersen. 2002. "Benefits Associated with Supplier Integration into New Product Development under Conditions of Technology Uncertainty." *Journal of Business Research*, Marketing Productivity, 55 (5): 389–400. doi:10.1016/S0148-2963(00)00158-2.

Rai, Arun, Ravi Patnayakuni, and Nainika Seth. 2006. "Firm Performance Impacts of Digitally Enabled Supply Chain Integration Capabilities." *MIS Quarterly* 30 (2): 225–46.

Rainer, Austen, and Tracy Hall. 2002. "Key Success Factors for Implementing Software Process Improvement: A Maturity-Based Analysis." *Journal of Systems and Software* 62 (2): 71–84. doi:10.1016/S0164-1212(01)00122-4.

Ramsay, John, and S. Croom. 2008. "The Impact of Evolutionary and Developmental Metaphors on Purchasing and Supply Management: A Critique." *Journal of Purchasing and Supply Management* 14 (3): 192–204. doi:10.1016/j.pursup.2008.04.001.

Ray, Gautam, Jay B. Barney, and Waleed A. Muhanna. 2004. "Capabilities, Business Processes, and Competitive Advantage: Choosing the Dependent Variable in Empirical Tests of the Resource-Based View." *Strategic Management Journal* 25 (1): 23–37. doi:10.1002/smj.366.

Richey, R. Glenn, Patricia J. Daugherty, and Anthony S. Roath. 2007. "Firm Technological Readiness and Complementarity: Capabilities Impacting Logistics Service Competency and Performance." *Journal of Business Logistics* 28 (1): 195–228. doi:10.1002/j.2158-1592.2007.tb00237.x.

Rigby, Darrell K., Frederick F. Reichheld, and Phil Schefter. 2002. "Avoid the Four Perils of CRM." *Harvard Business Review* 80 (2): 101–6, 108–9, 130.

Ring, Peter Smith, and Andrew H. Van De Ven. 1994. "Developmental Processes of Cooperative Interorganizational Relationships." *Academy of Management Review* 19 (1): 90–118. doi:10.5465/AMR.1994.9410122009.

Robert E. Quinn, and John Rohrbaugh. 1983. "A Spatial Model of Effectiveness Criteria: Towards a Competing Values Approach to Organizational Analysis." *Management Science* 29 (3): 363–77. doi:10.1287/mnsc.29.3.363.

Robert Handfield, Kenneth Petersen, Paul Cousins, and Benn Lawson. 2009. "An Organizational Entrepreneurship Model of Supply Management Integration and Performance Outcomes." *International Journal of Operations & Production Management* 29 (2): 100–126. doi:10.1108/01443570910932011.

Roberts, Bob, and Mike Mackay. 1998. “IT Supporting Supplier Relationships: The Role of Electronic Commerce.” *European Journal of Purchasing & Supply Management* 4 (2–3): 175–84. doi:10.1016/S0969-7012(97)00030-0.

Roh, James Jungbae, Anand Kunnathur, and Monideepa Tarafdar. 2009. “Classification of RFID Adoption: An Expected Benefits Approach.” *Information & Management* 46 (6): 357–63. doi:10.1016/j.im.2009.07.001.

Romano, Pietro. 2003. “Co-Ordination and Integration Mechanisms to Manage Logistics Processes across Supply Networks.” *Journal of Purchasing and Supply Management* 9 (3): 119–34. doi:10.1016/S1478-4092(03)00008-6.

Rosell, David, Nicolette Lakemond, and S. Nazli Wasti. 2014. “Integrating Knowledge with Suppliers at the R&D-Manufacturing Interface.” *Journal of Manufacturing Technology Management* 25 (2): 240–57. doi:10.1108/JMTM-12-2013-0171.

Rosenzweig, Eve D. 2009. “A Contingent View of E-Collaboration and Performance in Manufacturing.” *Journal of Operations Management* 27 (6): 462–78. doi:10.1016/j.jom.2009.03.001.

Roth, Aleda V., and Larry J. Menor. 2003. “Insights into Service Operations Management: A Research Agenda.” *Production and Operations Management* 12 (2): 145–64. doi:10.1111/j.1937-5956.2003.tb00498.x.

Rotter, Julian B. 1967. “A New Scale for the Measurement of Interpersonal trust1.” *Journal of Personality* 35 (4): 651–65. doi:10.1111/j.1467-6494.1967.tb01454.x.

———. 1971. “Generalized Expectancies for Interpersonal Trust.” *American Psychologist* 26 (5): 443–52. doi:10.1037/h0031464.

Rousseau, Denise M., Sim B. Sitkin, Ronald S. Burt, and Colin Camerer. 1998. “Not So Different After All: A Cross-Discipline View Of Trust.” *Academy of Management Review* 23 (3): 393–404. doi:10.5465/AMR.1998.926617.

Ruyter, Ko de, Luci Moorman, and Jos Lemmink. 2001. “Antecedents of Commitment and Trust in Customer–Supplier Relationships in High Technology Markets.” *Industrial Marketing Management* 30 (3): 271–86. doi:10.1016/S0019-8501(99)00091-7.

S. Alhashmi, J. Siddiqi. 2006. “Staying Competitive by Managing Organisational Knowledge.” *Engineering Management Journal*, no. 2: 43–45. doi:10.1049/em:20060211.

Saeed, Khawaja A., Manoj K. Malhotra, and Varun Grover. 2005. “Examining the Impact of Interorganizational Systems on Process Efficiency and Sourcing Leverage in Buyer–Supplier Dyads.” *Decision Sciences* 36 (3): 365–96. doi:10.1111/j.1540-5414.2005.00077.x.

Sahin, Funda, and E. Powell Robinson. 2002. “Flow Coordination and Information Sharing in Supply Chains: Review, Implications, and Directions for Future Research.” *Decision Sciences* 33 (4): 505–36. doi:10.1111/j.1540-5915.2002.tb01654.x.

Sahin, Funda, and E. Powell Robinson Jr. 2005. “Information Sharing and Coordination in Make-to-Order Supply Chains.” *Journal of Operations Management* 23 (6): 579–98. doi:10.1016/j.jom.2004.08.007.

Sako, Mari, and Susan R. Helper. 1995. *Supplier Relations and Performance in the Auto Industry: European-Japanese-US Comparisons of the Voice/Exit Choice*.

Sanders, N. 2008. “Pattern of Information Technology Use: The Impact on Buyer–suppler Coordination and Performance.” *Journal of Operations Management* 26 (3): 349–67. doi:10.1016/j.jom.2007.07.003.

Sanders, Nada R., and Robert Premus. 2002. “It Applications in Supply Chain Organizations: A Link Between Competitive Priorities and Organizational Benefits.” *Journal of Business Logistics* 23 (1): 65–83. doi:10.1002/j.2158-1592.2002.tb00016.x.

Schein, Edgar H. 2004. *Organizational Culture and Leadership*. John Wiley & Sons.
———. 2010. *Organizational Culture and Leadership*. John Wiley & Sons.
Schilke, Oliver, and Karen S. Cook. 2015. "Sources of Alliance Partner Trustworthiness: Integrating Calculative and Relational Perspectives." *Strategic Management Journal* 36 (2): 276–97. doi:10.1002/smj.2208.
Schiller. 1992. "Goodyear Is Gunning Its Marketing Engine." *BloombergView*. http://www.bloomberg.com/bw/stories/1992-03-15/goodyear-is-gunning-its-marketing-engine.
Schilling, Jan, and Annette Kluge. 2009. "Barriers to Organizational Learning: An Integration of Theory and Research." *International Journal of Management Reviews* 11 (3): 337–60. doi:10.1111/j.1468-2370.2008.00242.x.
Schurr, Paul H., and Julie L. Ozanne. 1985. "Influence on Exchange Processes: Buyers' Preconceptions of a Seller's Trustworthiness and Bargaining Toughness." *Journal of Consumer Research* 11 (4): 939–53.
Shah, R., S. M. Goldstein, and P. T. Ward. 2002. "Aligning Supply Chain Management Characteristics and Interorganizational Information System Types: An Exploratory Study." *IEEE Transactions on Engineering Management* 49 (3): 282–92. doi:10.1109/TEM.2002.803382.
Sharma, Subhash, Richard M. Durand, and Oded Gur-Arie. 1981. "Identification and Analysis of Moderator Variables." *Journal of Marketing Research* 18 (3): 291–300. doi:10.2307/3150970.
Sheth, Jagdish N., and Atul Parvatlyar. 1995. "Relationship Marketing in Consumer Markets: Antecedents and Consequences." *Journal of the Academy of Marketing Science* 23 (4): 255–71. doi:10.1177/009207039502300405.
Shi, Xinping, and Ziqi Liao. 2015. "Inter-Firm Dependence, Inter-Firm Trust, and Operational Performance: The Mediating Effect of E-Business Integration." *Information & Management* 52 (8): 943–50. doi:10.1016/j.im.2015.06.010.
Shin, Hojung, David A Collier, and Darryl D Wilson. 2000. "Supply Management Orientation and Supplier/Buyer Performance." *Journal of Operations Management* 18 (3): 317–33. doi:10.1016/S0272-6963(99)00031-5.
Sila, and Ebrahimpour. 2005. "Critical Linkages among TQM Factors and Business Results." *International Journal of Operations & Production Management* 25 (11): 1123–55. doi:10.1108/01443570510626925.
Simchi-Levi, Kaminsky, and Simchi-Levi. 2007. *Designing and Managing the Supply Chain 3e with Student CD*. 3 edition. Boston: McGraw-Hill Education.
Sinkovics, Rudolf R., and Anthony S. Roath. 2004. "Strategic Orientation, Capabilities, and Performance in Manufacturer — 3pl Relationships." *Journal of Business Logistics* 25 (2): 43–64. doi:10.1002/j.2158-1592.2004.tb00181.x.
Sinkula, James M. 1994. "Market Information Processing and Organizational Learning." *Journal of Marketing* 58 (1): 35–45. doi:10.2307/1252249.
Sinkula, James M., William E. Baker, and Thomas Noordewier. 1997. "A Framework for Market-Based Organizational Learning: Linking Values, Knowledge, and Behavior." *Journal of the Academy of Marketing Science* 25 (4): 305. doi:10.1177/0092070397254003.
Slater, Stanley F., and John C. Narver. 1995. "Market Orientation and the Learning Organization." *Journal of Marketing* 59 (3): 63–74. doi:10.2307/1252120.

Smith, Ken G., Stephen J. Carroll, and Susan J. Ashford. 1995. “Intra- and Interorganizational Cooperation: Toward a Research Agenda.” *The Academy of Management Journal* 38 (1): 7–23. doi:10.2307/256726.

Soo Wook Kim. 2006. “The Effect of Supply Chain Integration on the Alignment between Corporate Competitive Capability and Supply Chain Operational Capability.” *International Journal of Operations & Production Management* 26 (10): 1084–1107. doi:10.1108/01443570610691085.

Squire, Brian, Paul D. Cousins, and Steve Brown. 2009. “Cooperation and Knowledge Transfer within Buyer–Supplier Relationships: The Moderating Properties of Trust, Relationship Duration and Supplier Performance*.” *British Journal of Management* 20 (4): 461–77. doi:10.1111/j.1467-8551.2008.00595.x.

Stank, Theodore P., Michael R. Crum, and Miren Arango. 1999. “BENEFITS OF INTERFIRM COORDINATION IN FOOD INDUSTRY SUPPLY CHAINS.” *Journal of Business Logistics*. http://trid.trb.org/view.aspx?id=615319.

STANK, THEODORE P., SCOTT B. KELLER, and DAVID J. CLOSS. 2001. “Performance Benefits of Supply Chain Logistical Integration.” *Transportation Journal* 41 (2/3): 32–46.

Stank, Theodore P., Scott B. Keller, and Patricia J. Daugherty. 2001. “Supply Chain Collaboration and Logistical Service Performance.” *Journal of Business Logistics* 22 (1): 29–48. doi:10.1002/j.2158-1592.2001.tb00158.x.

Stanley E. Fawcett, Gregory M. Magnan, and Matthew W. McCarter. 2008. “Benefits, Barriers, and Bridges to Effective Supply Chain Management.” *Supply Chain Management: An International Journal* 13 (1): 35–48. doi:10.1108/13598540810850300.

Stanley, L. L., and J. D. Wisner. 2001. “Service Quality along the Supply Chain: Implications for Purchasing.” *Journal of Operations Management* 19 (3): 287–306. doi:10.1016/S0272-6963(00)00052-8.

Stevens. 1989. “Integrating the Supply Chain.” *International Journal of Physical Distribution & Materials Management* 19 (8): 3–8. doi:10.1108/EUM0000000000329.

Stock, Gregory N, Noel P Greis, and John D Kasarda. 2000. “Enterprise Logistics and Supply Chain Structure: The Role of Fit.” *Journal of Operations Management* 18 (5): 531–47. doi:10.1016/S0272-6963(00)00035-8.

Strassmann, Paul A. 1997. *The Squandered Computer: Evaluating the Business Alignment of Information Technologies*. Strassmann, Inc.

Stuart, F. Ian. 1993. “Supplier Partnerships: Influencing Factors and Strategic Benefits.” *International Journal of Purchasing and Materials Management* 29 (3): 21–29. doi:10.1111/j.1745-493X.1993.tb00015.x.

Sulayman, Muhammad, Cathy Urquhart, Emilia Mendes, and Stefan Seidel. 2012. “Software Process Improvement Success Factors for Small and Medium Web Companies: A Qualitative Study.” *Information and Software Technology* 54 (5): 479–500. doi:10.1016/j.infsof.2011.12.007.

Swafford, Patricia M., Soumen Ghosh, and Nagesh Murthy. 2008. “Achieving Supply Chain Agility through IT Integration and Flexibility.” *International Journal of Production Economics* 116 (2): 288–97. doi:10.1016/j.ijpe.2008.09.002.

Sweeney, Edward. 2007. “Introduction to Perspectives on Supply Chain Management and Logistics - Creating Competitive Organisations in the 21st Century.” *Books/Book Chapters*, January. http://arrow.dit.ie/nitlbk/8.

Swink, Golecha, and Richardson. 2010. “Does Supply Chain Excellence Really Pay off?” *Supply Chain Management Review* 14 (2). http://trid.trb.org/view.aspx?id=917116.

Swink, Morgan, Ram Narasimhan, and Cynthia Wang. 2007. "Managing beyond the Factory Walls: Effects of Four Types of Strategic Integration on Manufacturing Plant Performance." *Journal of Operations Management* 25 (1): 148–64. doi:10.1016/j.jom.2006.02.006.

Takeishi, Akira. 2001. "Bridging Inter- and Intra-Firm Boundaries: Management of Supplier Involvement in Automobile Product Development." *Strategic Management Journal* 22 (5): 403–33. doi:10.1002/smj.164.

Tan, Kannan, and Handfield. 1998. "Supply Chain Management: Supplier Performance and Firm Performance - ProQuest." http://search.proquest.com/openview/3192714c0de16646af86c4225b193050/1?pq-origsite=gscholar.

Teece, David J., Gary Pisano, and Amy Shuen. 1997. "Dynamic Capabilities and Strategic Management." *Strategic Management Journal* 18 (7): 509–33. doi:10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z.

The Report: Egypt. 2016. "The Report: Egypt 2016." *Oxford Business Group*. January 26. https://www.oxfordbusinessgroup.com/egypt-2016.

Thomas, and Griffin. 1996. "Coordinated Supply Chain Management." *European Journal of Operational Research* 94 (1): 1–15. doi:10.1016/0377-2217(96)00098-7.

Thomas, James B., Shawn M. Clark, and Dennis A. Gioia. 1993. "Strategic Sensemaking and Organizational Performance: Linkages Among Scanning, Interpretation, Action, and Outcomes." *Academy of Management Journal* 36 (2): 239–70. doi:10.2307/256522.

Thorelli, Hans B. 1986. "Networks: Between Markets and Hierarchies." *Strategic Management Journal* 7 (1): 37–51. doi:10.1002/smj.4250070105.

Thun, Jörn-Henrik. 2010. "Angles of Integration: An Empirical Analysis of the Alignment of Internet-Based Information Technology and Global Supply Chain Integration." *Journal of Supply Chain Management* 46 (2): 30–44. doi:10.1111/j.1745-493X.2010.03188.x.

Tobias Schoenherr, Morgan Swink. 2012. "Revisiting the Arcs of Integration: Cross-Validations and Extensions." *Journal of Operations Management - J OPER MANAG*. doi:10.1016/j.jom.2011.09.001.

Tollin, Karin. 2002. "Customization as a Business Strategy–a Barrier to Customer Integration in Product Development?" *Total Quality Management* 13 (4): 427–39. doi:10.1080/09544120220149250.

Toni, A. De. 1999. "Buyer-Supplier Operational Practices, Sourcing Policies and Plant Performances: Results of an Empirical Research." *International Journal of Production Research* 37 (3): 597–619. doi:10.1080/002075499191698.

Turban, Efraim, Ephraim McLean, and James Wetherbe. 1999. *Information Technology for Management (2Nd Ed.): Making Connections for Strategic Advantage*. New York, NY, USA: John Wiley & Sons, Inc.

Tushman, Michael L., and David A. Nadler. 1978. "Information Processing as an Integrating Concept in Organizational Design." *The Academy of Management Review* 3 (3): 613–24. doi:10.2307/257550.

"UNdata | Country Profile | Egypt." 2016. http://data.un.org/CountryProfile.aspx?crName=egypt#Economic.

Uzzi, Brian. 1997. "Social Structure and Competition in Interfirm Networks: The Paradox of Embeddedness." *Administrative Science Quarterly* 42 (1): 35–67. doi:10.2307/2393808.

Vaart, Taco van der, and Dirk Pieter van Donk. 2008. "A Critical Review of Survey-Based Research in Supply Chain Integration." *International Journal of Production Economics*, Managing Supply Chain Network, 111 (1): 42–55. doi:10.1016/j.ijpe.2006.10.011.

Vandenberg, Robert J., and Charles E. Lance. 2000. "A Review and Synthesis of the Measurement Invariance Literature: Suggestions, Practices, and Recommendations for Organizational Research." *Organizational Research Methods* 3 (1): 4–70. doi:10.1177/109442810031002.

Vickery, Calantone, and Dröge. 1999. "Supply Chain Flexibility: An Empirical Study." *Journal of Supply Chain Management* 35 (2): 16–24. doi:10.1111/j.1745-493X.1999.tb00058.x.

Vickery, Shawnee K, Jayanth Jayaram, Cornelia Droge, and Roger Calantone. 2003. "The Effects of an Integrative Supply Chain Strategy on Customer Service and Financial Performance: An Analysis of Direct versus Indirect Relationships." *Journal of Operations Management* 21 (5): 523–39. doi:10.1016/j.jom.2003.02.002.

Vonderembse, Mark A., Mohit Uppal, Samuel H. Huang, and John P. Dismukes. 2006. "Designing Supply Chains: Towards Theory Development." *International Journal of Production Economics* 100 (2): 223–38. doi:10.1016/j.ijpe.2004.11.014.

Wagner, Stephan M. 2003. "Intensity and Managerial Scope of Supplier Integration." *Journal of Supply Chain Management* 39 (3): 4–15. doi:10.1111/j.1745-493X.2003.tb00160.x.

Wallenburg, Carl Marcus, David L. Cahill, A. Michael Knemeyer, and Thomas J. Goldsby. 2011. "Commitment and Trust as Drivers of Loyalty in Logistics Outsourcing Relationships: Cultural Differences Between the United States and Germany." *Journal of Business Logistics* 32 (1): 83–98. doi:10.1111/j.2158-1592.2011.01008.x.

Waller, Derek L. 2003. *Operations Management: A Supply Chain Approach*. 2 edition. London: Cengage Learning EMEA.

Wang, Eric T. G., Jeffrey C. F. Tai, and Hsiao-Lan Wei. 2006. "A Virtual Integration Theory of Improved Supply-Chain Performance." *Journal of Management Information Systems* 23 (2): 41–64.

Wang, Eric T. G., and Hsiao-Lan Wei. 2007. "Interorganizational Governance Value Creation: Coordinating for Information Visibility and Flexibility in Supply Chains*." *Decision Sciences* 38 (4): 647–74. doi:10.1111/j.1540-5915.2007.00173.x.

Wang, Huang, and Dismukes. 2004. "Product-Driven Supply Chain Selection Using Integrated Multi-Criteria Decision-Making Methodology." *International Journal of Production Economics* 91 (1): 1–15. doi:10.1016/S0925-5273(03)00221-4.

Wathne, Kenneth H., and Jan B. Heide. 2004. "Relationship Governance in a Supply Chain Network." *Journal of Marketing* 68 (1): 73–89. doi:10.1509/jmkg.68.1.73.24037.

Weill, Peter. 1992. "The Relationship Between Investment in Information Technology and Firm Performance: A Study of the Valve Manufacturing Sector." *Information Systems Research* 3 (4): 307–33. doi:10.1287/isre.3.4.307.

Weiss, Allen M., and Jan B. Heide. 1993. "The Nature of Organizational Search in High Technology Markets." *Journal of Marketing Research* 30 (2): 220–33. doi:10.2307/3172829.

Wernerfelt. 1984. "A Resource-Based View of the Firm." *Strategic Management Journal* 5 (2): 171–80. doi:10.1002/smj.4250050207.

Wernerfelt, Birger. 1995. "The Resource-Based View of the Firm: Ten Years after." *Strategic Management Journal* 16 (3): 171–74. doi:10.1002/smj.4250160303.

Whitfield, Gwendolyn, and Robert Landeros. 2006. "Supplier Diversity Effectiveness: Does Organizational Culture Really Matter?" *Journal of Supply Chain Management* 42 (4): 16–28. doi:10.1111/j.1745-493X.2006.00019.x.

Wikipedia. 2016. “Effects of Hurricane Katrina in New Orleans.” *Wikipedia, the Free Encyclopedia*. https://en.wikipedia.org/w/index.php?title=Effects_of_Hurricane_Katrina_in_New_Orleans&oldid=738358693.

Williamson, Oliver E. 1985. “The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting.” SSRN Scholarly Paper ID 1496720. Rochester, NY: Social Science Research Network. http://papers.ssrn.com/abstract=1496720.

———. 2008. “Outsourcing: Transaction Cost Economics and Supply Chain Management*.” *Journal of Supply Chain Management* 44 (2): 5–16. doi:10.1111/j.1745-493X.2008.00051.x.

Wilson, David T. 1995. “An Integrated Model of Buyer-Seller Relationships.” *Journal of the Academy of Marketing Science* 23 (4): 335. doi:10.1177/009207039502300414.

Wisner, Joel, Keah-Choon Tan, and G. Leong. 2008. *Principles of Supply Chain Management*. Cengage Learning.

Wisner, and Tan. 2000. “Supply Chain M Anagement and Its Impact on Purchasing.” *Journal of Supply Chain Management* 36 (3): 33–42. doi:10.1111/j.1745-493X.2000.tb00084.x.

Wisner, Tan, and Leong. 2014. *Principles of Supply Chain Management: A Balanced Approach*. Cengage Learning.

Wolf, Julia. 2011. “Sustainable Supply Chain Management Integration: A Qualitative Analysis of the German Manufacturing Industry.” *Journal of Business Ethics* 102 (2): 221–35. doi:10.1007/s10551-011-0806-0.

Wong, Boon-itt, and Wong. 2011. “The Contingency Effects of Environmental Uncertainty on the Relationship between Supply Chain Integration and Operational Performance.” *Journal of Operations Management* 29 (6): 604–15. doi:10.1016/j.jom.2011.01.003.

Wong, Lai, and Bernroider. 2015. “The Performance of Contingencies of Supply Chain Information Integration: The Roles of Product and Market Complexity.” *International Journal of Production Economics* 165 (July): 1–11. doi:10.1016/j.ijpe.2015.03.005.

Wong, Lai, and Cheng. 2011. “Value of Information Integration to Supply Chain Management: Roles of Internal and External Contingencies.” *J. Manage. Inf. Syst.* 28 (3): 161–200. doi:10.2753/MIS0742-1222280305.

Wowak, Kaitlin D., Christopher W. Craighead, David J. Ketchen, and G. Tomas M. Hult. 2013. “Supply Chain Knowledge and Performance: A Meta-Analysis.” *Decision Sciences* 44 (5): 843–75. doi:10.1111/deci.12039.

Wu, and Barnes. 2012. “A Dynamic Feedback Model for Partner Selection in Agile Supply Chains.” *International Journal of Operations & Production Management* 32 (1): 79–103. doi:10.1108/01443571211195745.

Wu, Chan, Ooi, and Sim. 2011. “Can Malaysian Firms Improve Organizational/Innovation Performance via SCM?” *Industrial Management & Data Systems* 111 (3): 410–31. doi:10.1108/02635571111118288.

Wu, Fang, Sengun Yeniyurt, Daekwan Kim, and S. Tamer Cavusgil. 2006. “The Impact of Information Technology on Supply Chain Capabilities and Firm Performance: A Resource-Based View.” *Industrial Marketing Management* 35 (4): 493–504. doi:10.1016/j.indmarman.2005.05.003.

Wuyts, Stefan, and Inge Geyskens. 2005. “The Formation of Buyer—Supplier Relationships: Detailed Contract Drafting and Close Partner Selection.” *Journal of Marketing* 69 (4): 103–17. doi:10.1509/jmkg.2005.69.4.103.

Wynstra, Finn, and Eric ten Pierick. 2000. “Managing Supplier Involvement in New Product Development: A Portfolio Approach.” *European Journal of Purchasing & Supply Management* 6 (1): 49–57. doi:10.1016/S0969-7012(99)00035-0.

Xue, Ling, Gautam Ray, and Vallabh Sambamurthy. 2013. “The Impact of Supply-Side Electronic Integration on Customer Service Performance.” *Journal of Operations Management*, IT, Supply Chain, and Services, 31 (6): 363–75. doi:10.1016/j.jom.2013.07.010.

Yang, Ching-Chiao, Peter B. Marlow, and Chin-Shan Lu. 2009. “Assessing Resources, Logistics Service Capabilities, Innovation Capabilities and the Performance of Container Shipping Services in Taiwan.” *International Journal of Production Economics*, Transport Logistics and Physical Distribution Interlocking of Information Systems for International Supply and Demand Chains Management ICPR19, 122 (1): 4–20. doi:10.1016/j.ijpe.2009.03.016.

Yeung, Jeff Hoi Yan, Willem Selen, Min Zhang, and Baofeng Huo. 2009. “The Effects of Trust and Coercive Power on Supplier Integration.” *International Journal of Production Economics*, Special Issue on Operations Strategy and Supply Chains Management, 120 (1): 66–78. doi:10.1016/j.ijpe.2008.07.014.

Yu, Jacobs, Salisbury, and Enns. 2013. “The Effects of Supply Chain Integration on Customer Satisfaction and Financial Performance: An Organizational Learning Perspective.” *International Journal of Production Economics* 146 (1): 346–58. doi:10.1016/j.ijpe.2013.07.023.

Yu, Ming-Min, Shih-Chan Ting, and Mu-Chen Chen. 2010. “Evaluating the Cross-Efficiency of Information Sharing in Supply Chains.” *Expert Systems with Applications* 37 (4): 2891–97. doi:10.1016/j.eswa.2009.09.048.

Zacharia, Nix, and Lusch. 2009. “An Analysis of Supply Chain Collaborations and Their Effect on Performance Outcomes.” *Journal of Business Logistics* 30 (2): 101–23. doi:10.1002/j.2158-1592.2009.tb00114.x.

Zaheer, Akbar, and N. Venkatraman. 1995. “Relational Governance as an Interorganizational Strategy: An Empirical Test of the Role of Trust in Economic Exchange.” *Strategic Management Journal* 16 (5): 373–92. doi:10.1002/smj.4250160504.

Zammuto, Raymond F., and Edward J. O’Connor. 1992. “Gaining Advanced Manufacturing Technologies’ Benefits: The Roles of Organization Design and Culture.” *The Academy of Management Review* 17 (4): 701–28. doi:10.2307/258805.

Zhao, Feng, and Dan Wang. 2015. “Is More Supply Chain Integration Always Beneficial to Financial Performance?” *Industrial Marketing Management* 45 (February): 162–72. doi:10.1016/j.indmarman.2015.02.015.

Zhao, Huo, Selen, and Yeung. 2011. “The Impact of Internal Integration and Relationship Commitment on External Integration.” *Journal of Operations Management*, Special Issue Operations management, entrepreneurship, and value creation:Emerging opportunities in a cross-disciplinary context, 29 (1–2): 17–32. doi:10.1016/j.jom.2010.04.004.

Zhao, Xiande, Baofeng Huo, Barbara B. Flynn, and Jeff Hoi Yan Yeung. 2008. “The Impact of Power and Relationship Commitment on the Integration between Manufacturers and Customers in a Supply Chain.” *Journal of Operations Management* 26 (3): 368–88. doi:10.1016/j.jom.2007.08.002.

Zhou, Honggeng, and W. C. Benton Jr. 2007. “Supply Chain Practice and Information Sharing.” *Journal of Operations Management*, Supply Chain Management in a Sustainable

EnvironmentSpecial Issue on Frontiers of Empirical Supply Chain Research, 25 (6): 1348–65. doi:10.1016/j.jom.2007.01.009.

Zu, Xingxing, Tina L. Robbins, and Lawrence D. Fredendall. 2010. “Mapping the Critical Links between Organizational Culture and TQM/Six Sigma Practices.” *International Journal of Production Economics* 123 (1): 86–106. doi:10.1016/j.ijpe.2009.07.009.

APPENDIX. QUESTIONNAIRE SURVEY

DOCTORAL PROGRAM IN ECONOMICS AND BUSINESS
UNIVERSITY OF SANTIAGO DE COMPOSTELA

RESEARCH ON INTEGRATED INFORMATION TECHNOLOGY AND FIRM PERFORMANCE: MEDIATING AND MODERATING EFFECTS IN SUPPLY CHAIN MANAGEMENT CONTEXT.

Note: The information provided is confidential and exclusive use by the research group. The data will be used only for analysis and the results are presented in aggregate.

How to complete the questionnaire:

The issues raised are of two types:

1. Filling in the blanks: a blank line like the following ____, it should be completed by the word or the appropriate number.
2. Rating Scales: in this case, select ✓ the option that best represents your suggestion or opinion.

SECTION A - CHARACTERIZATION OF YOUR COMPANY

The questions in this section are used to obtain general information about your company.

A.1 Position of Respondents:

☐ CEO/Managing Director
☐ General Manager
☐ Supply chain Manager
☐ Purchasing/logistics Manager
☐ Production Manager
☐ Marketing Manager

A.2 Industry:

☐ Manufacturing
☐ Service

A.3 Ownership

☐ State-owned
☐ Privately-owned
☐ Foreign-controlled

A.4 Total number of employees working at this time in your company: _____

A.5 Total number of IT employees working at this time in your company: _____

A.6 Annual sales volume (in millions):

☐ Less than EGP 1
☐ EGP 1–EGP 49
☐ EGP 50–EGP 99
☐ EGP 100–EGP 499
☐ Over EGP 500

SECTION B - FACTORS RELATED TO INTEGRATED INFORMATION TECHNOLOGY

Please indicate the extent of **integrated information technology** in your organization in the following areas (1 = not at all; 5 = extensive).

	1	2	3	4	5
B.1 There are direct computer-to-computer links with key suppliers.	❑	❑	❑	❑	❑
B.2 Inter-organizational coordination is achieved using electronic links.	❑	❑	❑	❑	❑
B.3 We use information technology-enabled transaction processing.	❑	❑	❑	❑	❑
B.4 We have electronic mailing capabilities with our key suppliers.	❑	❑	❑	❑	❑
B.5 We use electronic transfer of purchase orders, invoices and/or funds.	❑	❑	❑	❑	❑
B.6 We use advanced information systems to track and/or expedite shipments.	❑	❑	❑	❑	❑

SECTION C - FACTORS RELATED TO CUSTOMER INTEGRATION

Please indicate the extent of integration or information sharing between your organization and your **major customer** in the following areas (1 = not at all; 5 = extensive).

	1	2	3	4	5
C.1 The level of linkage with our major customer through information networks.	❑	❑	❑	❑	❑
C.2 The level of computerization for our major customer's ordering.	❑	❑	❑	❑	❑
C.3 The level of sharing of market information from our major customer.	❑	❑	❑	❑	❑
C.4 The level of communication with our major customer.	❑	❑	❑	❑	❑
C.5 The establishment of quick ordering systems with our major customer.	❑	❑	❑	❑	❑
C.6 Follow-up with our major customer for feedback.	❑	❑	❑	❑	❑
C.7 The frequency of period contacts with our major customer.	❑	❑	❑	❑	❑
C.8 Our major customer shares Point of Sales (POS) information with us.	❑	❑	❑	❑	❑
C.9 Our major customer shares demand forecast with us.	❑	❑	❑	❑	❑
C.10 We share our available inventory with our major customer.	❑	❑	❑	❑	❑
C.11 We share our production plan with our major customer.	❑	❑	❑	❑	❑

SECTION D - FACTORS RELATED TO SUPPLIER INTEGRATION

Please indicate the extent of integration or information sharing between your organization and your **major supplier** in the following areas (1 = not at all; 5 = extensive).

	1	2	3	4	5
D.1 The participation level of our major supplier in the process of Procurement and production	❑	❑	❑	❑	❑
D.2 The participation level of our major supplier in the design stage	❑	❑	❑	❑	❑
D.3 Our major supplier shares their production schedule with us	❑	❑	❑	❑	❑
D.4 Our major supplier shares their production capacity with us	❑	❑	❑	❑	❑
D.5 Our major supplier shares available inventory with us	❑	❑	❑	❑	❑
D.6 We share our production plan with our major supplier	❑	❑	❑	❑	❑
D.7 We share our demand forecast with our major supplier	❑	❑	❑	❑	❑
D.8 We share our inventory level with our major supplier	❑	❑	❑	❑	❑

SECTION E - FACTORS RELATED TO INTERNAL INTEGRATION

Please indicate the extent of integration or information sharing **internally in your organization** in the following areas (1 = not at all; 5 = extensive).

	1	2	3	4	5
E.1 Integrative inventory management	❑	❑	❑	❑	❑
E.2 Real-time searching of level of inventory	❑	❑	❑	❑	❑
E.3 The utilization of periodic inter departmental meetings among internal functions	❑	❑	❑	❑	❑
E.4 The use of cross-functional teams in process improvement	❑	❑	❑	❑	❑

E.5 The use of cross-functional teams in new product development	❑	❑	❑	❑	❑
E.6 Real-time integration and connection among all internal functions from raw material management through production, shipping, and sales	❑	❑	❑	❑	❑

SECTION F – FACTORS RELATED TO TOP MANAGEMENT SUPPORT TO SUPPLY CHAIN MANAGEMENT

The following statements are about **top management support**. Please indicate the degree of agreement that you have with each statement. (1 = strongly disagree; 5 = strongly agree)

	1	2	3	4	5
F.1 Top management is supportive of our efforts to improve the supply chain management	❑	❑	❑	❑	❑
F.2 Top management considers supply chain management to be a vital part of our corporate strategy	❑	❑	❑	❑	❑
F.3 Supply chain management department's views are important to most top managers	❑	❑	❑	❑	❑
F.4 The chief supply chain management officer has high visibility within top management	❑	❑	❑	❑	❑
F.5 Top management emphasizes the supply chain management function's strategic role	❑	❑	❑	❑	❑
F.6 Requests for increased resources are mostly satisfied by top management	❑	❑	❑	❑	❑

SECTION G – FACTORS RELATED TO HIERARCHICAL ORGANIZATIONAL CULTURE

The following statements are about **hierarchical organizational culture**. Please indicate the degree of agreement that you have with each statement. (1 = strongly disagree; 5 = strongly agree).

	1	2	3	4	5
G.1 The organization is a very controlled and structured place. Formal procedures generally govern what people do.	❑	❑	❑	❑	❑
G.2 The management style of the organization is characterized by security of employment, conformity, predictability and stability in relationships.	❑	❑	❑	❑	❑
G.3 The organization emphasizes permanence and stability. Efficiency, control and smooth operations are important.	❑	❑	❑	❑	❑
G.4 The organization defines success on the basis of efficiency. Dependable delivery, smooth scheduling and low cost production are critical.	❑	❑	❑	❑	❑

SECTION H – FACTORS RELATED TO RELATIONSHIP COMMITMENT

The following statements are about **you and your major customer concerning relationship**. Please indicate the degree of agreement that you have with each statement. (1 = strongly disagree; 5 = strongly agree).

	1	2	3	4	5
H.1 We feel that our major customer views us as being an important ''team members,'' rather than our being just another supplier.	❑	❑	❑	❑	❑
H.2 We are proud to tell others that we are a supplier for this customer.	❑	❑	❑	❑	❑
H.3 Our attachment to this customer is primarily based on the similarity of our values and those of this customer.	❑	❑	❑	❑	❑
H.4 The reason we prefer this customer to others is because of what it stands for, its values.	❑	❑	❑	❑	❑
H.5 During the past year, our company's values and those of the major customer have become more similar.	❑	❑	❑	❑	❑
H.6 What this customer stands for is important to our company.	❑	❑	❑	❑	❑

SECTION I - FACTORS RELATED TO TRUST

The following statements are about **you and your major supplier concerning trust**. Please indicate the degree of agreement that you have with each statement. (1 = strongly disagree; 5 = strongly agree).

	1	2	3	4	5
I.1 Our supplier keeps promises it makes to our firm	❑	❑	❑	❑	❑
I.2 Our supplier is not always honest with us	❑	❑	❑	❑	❑
I.3 We believe the information that our supplier provides us	❑	❑	❑	❑	❑
I.4 Our supplier is genuinely concerned that our business succeeds	❑	❑	❑	❑	❑
I.5 When making important decisions, our supplier considers our welfare as well as its own	❑	❑	❑	❑	❑
I.6 We trust our supplier keeps our best interests in mind	❑	❑	❑	❑	❑
I.7 Our supplier is trustworthy	❑	❑	❑	❑	❑
I.8 We find it necessary to be cautious with our supplier	❑	❑	❑	❑	❑

SECTION J - FACTORS SUPPLY CHAIN PERFORMANCE

The following statements are about your **supply chain performance**. Please indicate the degree of agreement that you have with each statement. (1 = strongly disagree; 5 = strongly agree)

Our supply chain:	1	2	3	4	5
J.1 Is able to handle non standard orders	❑	❑	❑	❑	❑
J.2 Is able to meet special customer specification requirements	❑	❑	❑	❑	❑
J.3 Is able to produce products characterized by numerous features options, sizes and colors	❑	❑	❑	❑	❑
J.4 Is able to rapidly adjust capacity so as to accelerate or decelerate production in response to changes in customer demand	❑	❑	❑	❑	❑
J.5 Is able to rapidly introduce large numbers of product improvements / variation	❑	❑	❑	❑	❑
J.6 Is able to handle rapid introduction of new products	❑	❑	❑	❑	❑
J.7 Has fast customer response time	❑	❑	❑	❑	❑
J.8 Is characterized by a great amount of cross-over of the activities of our firm and our trading partners	❑	❑	❑	❑	❑
J.9 Is characterized by a high level of integration of information systems in our firm	❑	❑	❑	❑	❑
J.10 Has short order-to-delivery cycle time	❑	❑	❑	❑	❑

SECTION K - FACTORS RELATED TO FINANCIAL PERFORMANCE

Please evaluate your company's performance in the following areas relative to your primary/ major competitors (1 = much worse; 5 = much better).

	1	2	3	4	5
K.1 Growth in sales.	❑	❑	❑	❑	❑
K.2 Return on sales.	❑	❑	❑	❑	❑
K.3 Growth in return on sales.	❑	❑	❑	❑	❑
K.4 Growth in profit.	❑	❑	❑	❑	❑
K.5 Growth in market share.	❑	❑	❑	❑	❑
K.6 Return on investment (ROI).	❑	❑	❑	❑	❑
K.7 Growth in ROI.	❑	❑	❑	❑	❑

RESUMEN AMPLIADO

1. Introducción

¿Por qué algunas empresas tienen un rendimiento financiero más elevado que otras? ¿La tecnología de información integrada (*integrated information technology*) y la cadena de suministro integrada (*integrated supply chain*) influyen en el rendimiento financiero?

El objetivo de este estudio es mostrar cómo mejorar el rendimiento financiero a través de la integración de la cadena de suministro y la tecnología de información integrada. Más concretamente, el estudio propone un modelo en el que la integración de la cadena de suministro se asocia directamente al rendimiento financiero de la empresa. Además, el estudio analiza la relación directa e indirecta de la tecnología de información integrada a través de la cadena de suministro integrada. Además, se examina el papel moderador de la confianza en la relación entre la tecnología de información integrada y la integración de la cadena de suministro. Por último, se analiza la relación entre el tamaño del departamento responsable de la tecnología de información y el apoyo de la alta dirección y la tecnología de información integrada.

Este trabajo responde a llamadas a la investigación y ayuda a aumentar el conocimiento sobre el fenómeno de la Gestión de la Cadena de Suministro (GCS) de varias maneras. En primer lugar, mientras que algunos estudios (Cuijpers, Guenter y Hussinger, 2011; Das, Narasimhan y Talluri 2006) sostienen que la cadena de suministro integrada (CSI) puede dificultar el desempeño financiero, otros estudios (Flynn, Huo, y Zhao 2010; Kim, 2009) sostienen que la CSI tiene un efecto positivo en el rendimiento financiero. En segundo lugar, los análisis anteriores (Devaraj y Kohli, 2003; Hitt y Brynjolfsson 1996; Kettinger et al., 1994; Lee y Barua 1999; Weill, 1992) sugieren que la inversión en tecnología de información no garantiza una SCI más elevada y un mayor rendimiento financiero. Nuestra investigación evalúa el impacto de la tecnología de información integrada en la CSI y en el rendimiento financiero. En tercer lugar, esta investigación se centra en la relación entre el tamaño del departamento de tecnología de la información y el apoyo de la alta dirección con la tecnología de información integrada. Cuarto, el papel moderador de la confianza, el compromiso relacional y la cultura organizacional jerárquica en la relación entre la tecnología de información integrada y la CSI es otra de las metas del análisis.

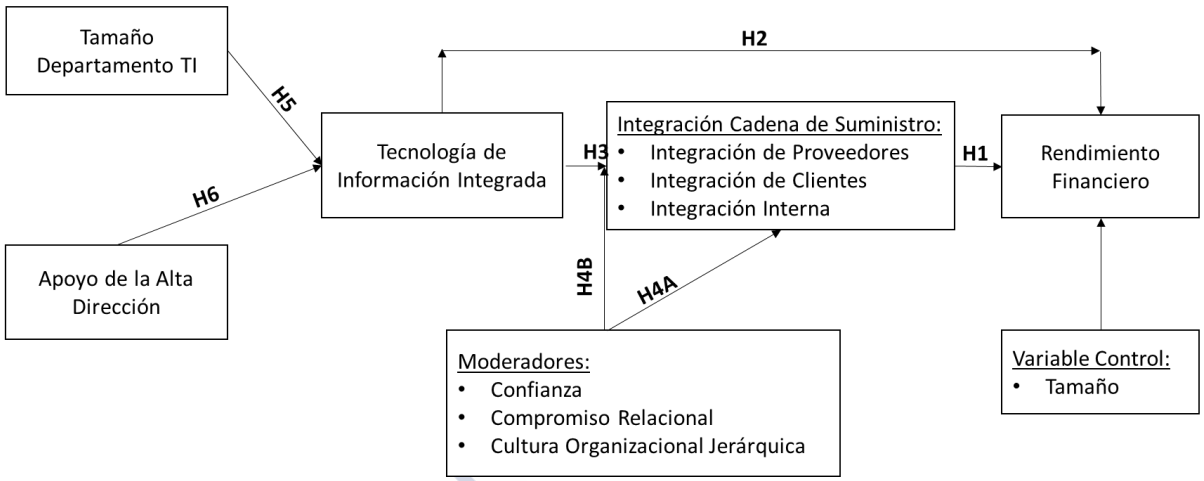
Esta investigación se centra en las empresas de fabricación y servicios de Egipto. Hemos seleccionado el mercado egipcio porque es un mercado virgen en el campo de la investigación en Gestión de la Cadena de Suministro y es un mercado industrial importante en el área, con un alto nivel de competencia y una elevada diferenciación y diversidad industrial y de productos.

2. Modelo de investigación y desarrollo de hipótesis

Partiendo de la perspectiva basada en los recursos, este estudio propone que la tecnología de información integrada (TII) es uno de los recursos que influyen en la integración de la cadena de suministro y el rendimiento financiero. Para ampliar el conocimiento de cómo la TII repercute en la integración de la cadena de suministro y el rendimiento financiero, se propone un conjunto de hipótesis basadas en la literatura para examinar empíricamente la relación directa de la TII en el rendimiento financiero y la relación indirecta de la TII en el rendimiento financiero a través de la cadena de suministro integrada.

El estudio también considera el análisis del tamaño del departamento de TI y el apoyo de la alta dirección en tanto antecedentes de la TII, esperando que ambos antecedentes tengan un impacto positivo en la tecnología de información integrada. Además, también se examinan los roles de la confianza, el compromiso relacional y cultura organizativa jerárquica como moderadores de la relación entre la TII y la integración de la cadena de suministro. Colectivamente, estas relaciones se muestran en la Figura 1.

Figura 1: Marco conceptual: descripción gráfica



Los investigadores y los profesionales de la gestión de la cadena de suministro están de acuerdo en que la cadena de suministro integrada es un nuevo campo de investigación, con grandes oportunidades para mejorar el rendimiento de la empresa (Frohlich 2002; Da Silveira y Arkader 2007; Lau, Tang y Yam 2010; Liu et al., 2013; Sahin y Robinson 2002). Las cadenas de suministro deben integrarse y colaborar por medio de relaciones mutuas de los socios para maximizar los beneficios y mejorar el rendimiento financiero (Ding, Guo y Liu, 2011). Mientras que algunos estudios analizaron la cadena de suministro integrada como un constructo unidimensional (Armistead y Mapes, 1993; Márquez, Bianchi y Gupta, 2004; Rosenzweig, 2003), la mayoría de los investigadores han considerado la cadena de suministro integrada como un constructo multidimensional, separando la integración interna de la externa (Morash y Clinton, 1998; O'Leary-Kelly y Flores, 2002; Pagell, 2004; Petersen, Handfield y Ragatz, 2005; Ragatz, Handfield y Petersen, 2002; Stank, Keller y Daugherty, 2001; Stanley y Wisner, 2001; Swink, Narasimhan y Wang, 2007; Vijayasarathy, 2010; Yu et al., 2013).

La integración interna y externa son las dos caras de una moneda llamada cadena de suministro integrada. Cada cara juega un papel diferente. La integración externa consiste en la integración de proveedores y clientes (Cousins y Menguc 2006; Droge, Vickery y Jacobs, 2012; Homburg y Stock, 2004; Koufteros, Cheng y Lai, 2007). La integración de clientes (proveedores) se considera como el grado en que una empresa colabora con sus principales clientes (proveedores) para convertir sus estrategias, prácticas, procedimientos y comportamientos inter-organizacionales en procesos colaborativos, coincidentes y manejables en orden a satisfacer las demandas de los clientes (Zhao Et al., 2011, Huo 2012).

En la actualidad se le presta una creciente atención a la integración entre proveedores, fabricantes y clientes. La integración de la cadena de suministro también incluye la integración interna, que se refiere al grado en que una empresa puede establecer sus estrategias, prácticas, procedimientos y comportamientos organizacionales de modo integrado entre los diversos departamentos que la forman.

Sobre la base de la revisión de la investigación conceptual y empírica en el dominio de la cadena de suministro integrada se proponen 3 hipótesis sobre la relación entre las dimensiones de CSI en el rendimiento financiero de la empresa:

H1A. La integración de proveedores está relacionada positivamente con el rendimiento financiero.

H1B. La integración de clientes está relacionada positivamente con el rendimiento financiero.

H1C. La integración interna está relacionada positivamente con el rendimiento financiero.

La tecnología de información integrada ha sido considerada como un factor crítico en la cadena de suministro, debido a su importante contribución para mejorar el rendimiento de la empresa. La TI podría mejorar el rendimiento de la cadena de suministro al proporcionar información oportuna, precisa y confiable. A pesar de que la implementación de TI integrada se está generalizando entre las organizaciones, su efecto positivo directo sobre el rendimiento financiero sigue siendo elusivo.

Las empresas exitosas utilizan su base tecnológica y capacidades relativas a la tecnología de la información para desarrollar un sistema de TI integrado completo que favorezca la integración interna de la organización y la integración externa (proveedor - cliente) para lograr un rendimiento superior. Bharadwaj (2000) indicó que las empresas pueden disfrutar de un rendimiento financiero superior, al disminuir sus costes e incrementar los ingresos, si logran crear una capacidad de TI integrada superior. Por otro lado, las empresas que soportan los costes de TI sin desarrollar una capacidad TI integrada se encontrarán en una posición de riesgo y con una desventaja competitiva.

Sobre la base de las consideraciones anteriores, se propone la siguiente hipótesis:

H2. La tecnología de la información integrada está relacionada positivamente con el rendimiento financiero.

La TI integrada favorece la integración de la cadena de suministro en varios aspectos, tales como la planificación de los recursos empresariales, gestión de relaciones con los clientes, planificación avanzada, gestión del transporte y sistemas de administración de almacenes (Kim, Cavusgil y Calantone, 2006). El intercambio electrónico de datos es uno de los elementos más importantes, que juega un papel vital en la integración de la cadena de suministro (Rogers, Daugherty y Stank, 1993).

La mayoría de los investigadores consideran que la TI integrada es un elemento clave para la integración de la cadena de suministro mediante el intercambio de información importante sobre los procesos de negocio dentro y fuera de las fronteras de la organización (Clemons, Reddi y Row, 1993; Kelle y Akbulut, 2005; Sanders y Premus, 2002; Vickery et al., 2003). Un elevado nivel de integración de la TI hace posible la compatibilidad de las tecnologías de comunicación entre ellas (Kim, Cavusgil, y Cavusgil, 2013), mejorando la eficiencia de las actividades de la cadena de suministro (Sanders y Premus, 2002; Rai, Patnayakuni y Seth, 2006). La aplicación de la TI integrada entre los socios de la cadena de suministro requiere tanto de una coordinación amplia entre empresas como de su voluntad de sacrificar sus intereses a corto plazo (Kim y Cavusgil, 1999). Para asegurar la TI integrada, cada socio debe tener una tecnología compatible y un fuerte compromiso de recursos (Froehlich, 2002).

Se espera que la TI integrada tenga una relación positiva con la integración interna de la cadena de suministro de una empresa focal y con la integración externa, entre una empresa focal y sus proveedores y clientes. Sobre la base de las consideraciones anteriores, se propone la siguiente hipótesis:

H3A. La tecnología de información integrada está relacionada positivamente con la integración de proveedores.

H3B. La tecnología informática integrada está relacionada positivamente con la integración de clientes.

H3C. La tecnología de la información integrada está relacionada positivamente con la integración interna.

Además, sobre la base de la literatura existente y las llamadas a llenar los vacíos de investigación, es posible plantear relaciones directas y moderaciones de la confianza, el compromiso relacional y la cultura organizacional jerárquica, respectivamente, en las relaciones anteriores.

H4A1. La confianza está relacionada positivamente con la integración de proveedores.

H4B1. La confianza modera la relación entre la TI integrada y la integración de proveedores, de modo que cuanto mayor sea la confianza, mayor será la relación entre la TI integrada y la integración de proveedores.

H4A2. El compromiso relacional está relacionado positivamente con la integración de clientes.

H4B2. El compromiso relacional modera la relación entre la TI integrada y la integración de clientes, de modo que cuanto mayor sea el compromiso relacional, mayor será la relación entre la TI integrada y la integración de clientes.

H4A3. La cultura organizacional jerárquica está relacionada positivamente con la integración interna.

H4B3. La cultura organizacional jerárquica modera la relación entre la TI integrada y la integración interna, de modo que cuanto mayor sea la cultura organizacional jerárquica, mayor será la relación entre la TI integrada y la integración interna.

Las empresas están invirtiendo cada vez más en TI, prestando más atención al tamaño del departamento de TI y teniendo en cuenta la importancia de mantener una fuerza laboral cualificada y profesional de un tamaño suficiente. Los departamentos de TI son un activo para las empresas y se han convertido en un importante impulsor de las actividades dentro y fuera de la organización, gestionando y mejorando los procesos de integración, incluyendo la comunicación, gestión de inventario, gestión de datos, sistemas de gestión de información y gestión de relaciones con los clientes.

Como un mayor número de empleadores puede mejorar la tecnología de información integrada, se propone la siguiente hipótesis:

H5. El tamaño del departamento de TI está relacionado positivamente con la tecnología de información integrada.

El apoyo de la alta dirección puede conducir a una mejora de la tecnología de información integrada. En otras palabras, una empresa con un alto nivel de apoyo de la alta dirección tendrá una mayor y mejor integración de TI en sus actividades operativas entre los socios de la cadena de suministro. Por el contrario, una empresa con un bajo nivel de apoyo de la alta dirección no podrá integrar la información de los socios de la cadena de suministro en sus actividades operativas. Sobre la base de las consideraciones anteriores, se propone la siguiente hipótesis:

H6. El apoyo de la alta dirección está relacionado positivamente con la tecnología de información integrada

3. Metodología de la investigación, análisis de datos y resultados

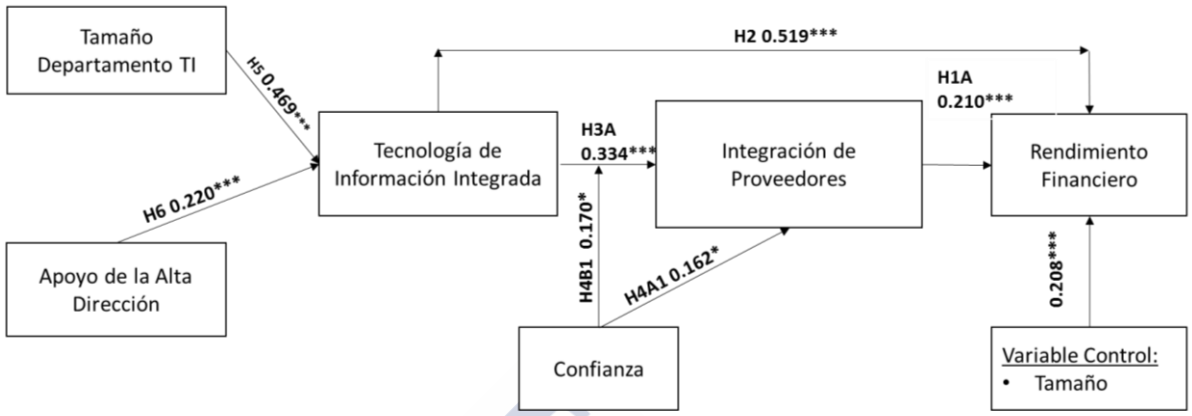
El estudio se llevó a cabo en 2016 utilizando una muestra de empresas de fabricación, venta al por menor, mayoristas y de servicios de transporte con sede en Egipto. Siguiendo a Morgan, Kaleka y Katsikeas (2004), se utilizó una muestra multisectorial para aumentar la varianza observada y reforzar la generalización de los resultados. Para recoger los datos, se desarrolló un cuestionario estructurado a partir de una revisión integral de la literatura.

Teniendo en cuenta estos criterios, la población inicial de empresas estaba compuesta por 1.264 empresas. Por lo tanto, se distribuyeron cuestionarios a altos directivos con responsabilidades en el dominio de la cadena de suministro, logística, compras, marketing y operaciones. Los entrevistados fueron contactados de diferentes maneras, incluyendo correo electrónico, teléfono y contactos personales. Después de eliminar los cuestionarios no válidos, se dispuso de 205 cuestionarios utilizables, lo que representa una tasa de respuesta del 16,22%.

Los modelos conceptuales se probaron con los datos obtenidos de la muestra de empresas egipcias. Para ello, se realizó un Análisis Factorial Confirmatorio (AFC) y un Modelo de Ecuaciones Estructurales (MEE). Después del análisis realizado, las siguientes figuras

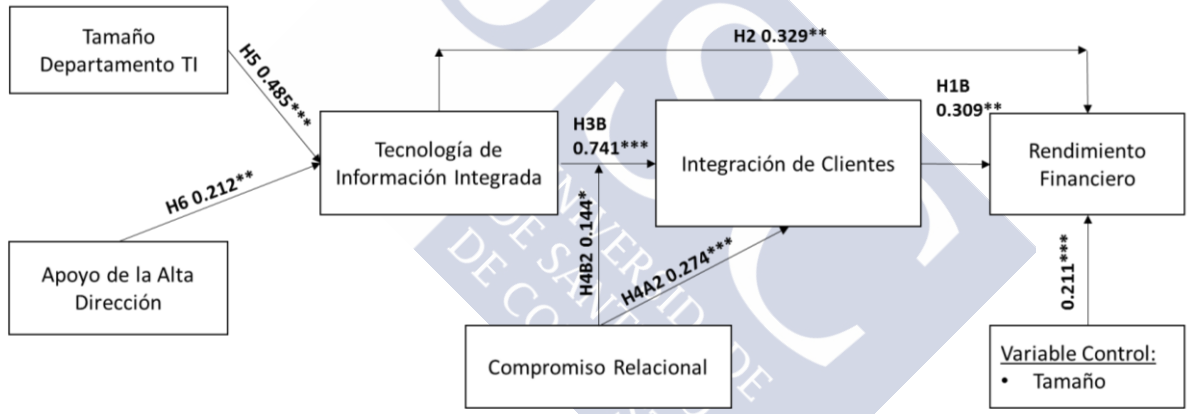
muestran las relaciones conceptuales y los parámetros estimados para cada uno de los tres sub-modelos estimados.

Figura 2: Sub-modelo teórico 1: descripción gráfica con los parámetros estimados



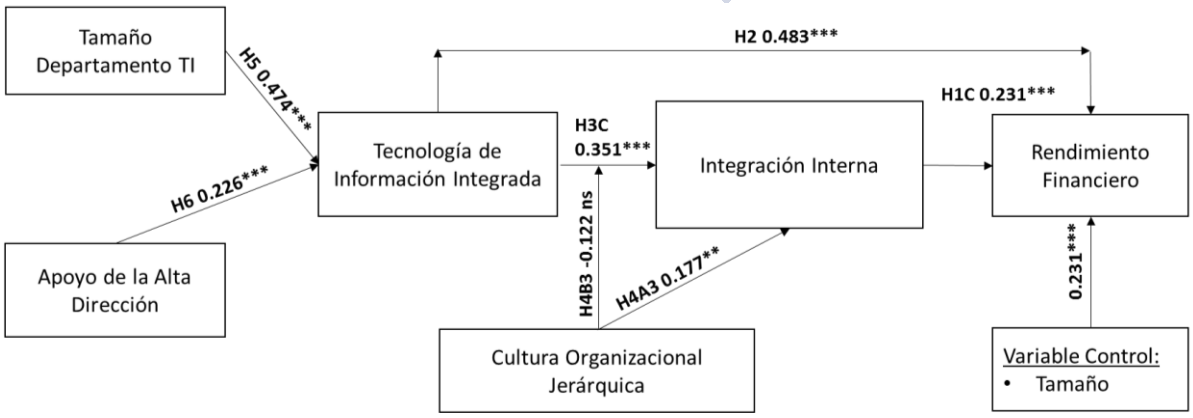
Nota: * p <0.05; ** p<0.01; *** p<0.001; *ns*=no significativo

Figura 3: Sub-modelo teórico 2: descripción gráfica con los parámetros estimados



Nota: * p <0.05; ** p<0.01; *** p<0.001; *ns*= no significativo

Figura 4: Sub-modelo teórico 3: descripción gráfica con los parámetros estimados



Nota: * p <0.05; ** p<0.01; *** p<0.001; *ns*= no significativo

4. Discusión, Limitaciones y Futuras Líneas de Investigación

La importancia de la cadena de suministro integrada ha recibido una atención creciente tanto en la literatura como en la práctica empresarial. Una pregunta de investigación básica es si la cadena de suministro integrada es beneficiosa para el rendimiento financiero, o no. Otra cuestión es si la integración de la tecnología de información es útil para la integración de la cadena de suministro y el rendimiento financiero, o no. Combinando las ideas de la Visión Basada en Recursos (RBV), la Teoría del Procesamiento de la Información (IPT), la Teoría del Aprendizaje Organizacional y la Teoría del Compromiso-Confianza, nuestro estudio contribuye a la literatura sobre integración de la cadena de suministro al examinar su relación con el rendimiento financiero. Se investigan las relaciones entre las tres dimensiones de la cadena de suministro integrada (proveedor, cliente e integración interna) y el rendimiento financiero, y se sugiere que la integración de la cadena de suministro de una empresa depende de su nivel de integración de la tecnología de información. Utilizando datos recogidos de empresas fabricantes y de servicios egipcias se realizan contribuciones significativas tanto a la literatura como a la práctica de la integración de la cadena de suministro.

En general, nuestros resultados avalan la posición de los beneficios de la cadena de suministro integrada ya que la integración de la cadena de suministro está relacionada positivamente con el rendimiento financiero de la empresa. Además, encontramos que la confianza desempeña una función complementaria en la integración de proveedores, del mismo modo que el compromiso relacional lo tiene en la integración de clientes.

Además, nuestros resultados apoyan que la tecnología de la información integrada es un activo básico para las empresas que les ayuda y facilita el proceso de integración con los proveedores, los clientes y de forma interna. La tecnología de información integrada está relacionada positivamente con la integración de la cadena de suministro, así como con el rendimiento financiero.

Por último, el apoyo de la alta dirección y el tamaño del departamento de TI se asocian positivamente a la integración de la tecnología de información. Estos resultados ofrecen una comprensión más refinada de los antecedentes de la integración de la cadena de suministro y del rendimiento financiero de las empresas de Egipto.

Esta investigación hace varias contribuciones. En primer lugar, el estudio contribuye a llenar el vacío existente en el análisis de las relaciones (directas y mediadas) entre la tecnología de la información integrada, la integración de la cadena de suministro y el rendimiento financiero. Al analizar modelos complejos que relacionan un conjunto de variables que hasta la fecha no habían sido estudiadas conjuntamente o con tal detalle, los resultados muestran nuevas evidencias a la literatura.

La tecnología de la información integrada apenas se ha considerado en la investigación de la cadena de suministro y no hay estudios que hayan analizado la integración de la cadena de suministro como mediador entre la tecnología de información integrada y el rendimiento financiero. En términos generales, el estudio intenta identificar el efecto mediador de la integración de proveedores, integración de clientes e integración interna en la relación entre la tecnología de información integrada y el rendimiento financiero.

En segundo lugar, este estudio contribuye a la literatura proporcionando un análisis detallado de los efectos directos de la integración de proveedores, la integración de clientes y la integración interna en el rendimiento financiero. Por lo tanto, proporcionamos evidencia empírica que puede explicar los resultados heterogéneos de la investigación previa que analiza la relación entre la integración de la cadena de suministro y el rendimiento.

En tercer lugar, el estudio contribuye a la literatura proporcionando un examen del efecto moderador de: (1) la confianza en la relación entre la integración de tecnologías de información y la integración de proveedores, (2) el compromiso relacional en la relación entre la integración de la tecnología de información y la integración de clientes, y (3) la cultura organizacional jerárquica en la relación entre la tecnología de información integrada y la integración interna.

Finalmente, nuestro estudio es el primero en estudiar estas relaciones usando datos recogidos de empresas fabricantes, minoristas, mayoristas y transportistas de Egipto. Debido a la creciente base industrial de este país, los resultados tienen implicaciones gerenciales útiles para los profesionales de la cadena de suministro.

Aunque el estudio hace contribuciones significativas a la comprensión de la integración de la tecnología de información y la cadena de suministro integrada, hay algunas limitaciones

y más oportunidades para la investigación futura. Quizás una limitación importante de este estudio es que los datos analizados se basan en las respuestas auto-perceptivas de los entrevistados. Aunque la mayoría de los encuestados eran altos ejecutivos (directivos y vicepresidentes) en departamentos vinculados a la cadena de suministro, tales como compras y logística, y las preguntas eran claras, puede existir un sesgo derivado de la subjetividad del entrevistado, al tiempo que existe la posibilidad de una incorrecta comprensión de las cuestiones, ya que era infrecuente que una única persona en las organizaciones supervisara toda la cadena de suministro.

Además, no todos los encuestados estaban al mismo nivel o desempeñaban el mismo papel dentro de la empresa. Aunque esto podría introduce varianza exógena en los datos, también puede fortalecer los datos al incorporar múltiples perspectivas. Tener varios encuestados en cada empresa podría mejorar la fiabilidad del estudio.

Por otra parte, los resultados no pueden resolver todas las inconsistencias relativas a las relaciones entre la integración de la cadena de suministro y el rendimiento financiero. Algunos de nuestros resultados no apoyan resultados previos. Para que los resultados relativos a las relaciones examinadas sean más sólidos, la investigación futura debería examinar la relación entre la integración de la tecnología de información, la integración de la cadena de suministro y el rendimiento financiero incorporando nuevas variables mediadoras y moderadoras. Por ejemplo, prestar atención a los mecanismos que intervienen en la relación entre la integración de la cadena de suministro y el rendimiento financiero. Además, nuestro estudio no examina otros factores que pueden influir en el grado de integración de la cadena de suministro, como por ejemplo el entorno empresarial y el poder. Estudios futuros deben investigar estos antecedentes.

Por otra parte, los datos utilizados en este estudio son transversales y, por lo tanto, no pueden proporcionar explicaciones causales de las relaciones observada entre la integración de la tecnología de información, la integración de la cadena de suministro y el rendimiento financiero. La investigación futura debería recurrir a diseños longitudinales para probar las relaciones entre las variables consideradas. Dado que el entorno empresarial está cambiando constantemente, los estudios de naturaleza longitudinal podrían diseñarse para identificar estos cambios, así como para examinar si y cómo las relaciones están cambiando.

Por último, los datos de la encuesta sólo se recogieron en empresas egipcias. Estudios futuros podrían ampliar su alcance recogiendo datos de otros países con un nivel de desarrollo similar.

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This thesis extends the developing body of literature on supply chain integration (SCI). We develop hypotheses proposing positive relationships between integrated IT, supplier integration, customer integration, internal integration, and financial performance. Also, we investigate the complementary roles of IT department size and top management support. CFA and SEM analysis of a survey of 205 firms in Egypt indicates that integrated IT, supplier integration, customer integration, and internal integration can improve financial performance. In addition, integrated IT has a direct positive effect on SCI dimensions. Also, it is confirmed that IT department size and top management support are significantly related to integrated IT. Finally, we found direct and moderating effects of trust, relationship commitment, and hierarchical organizational culture on SCI dimensions, and on the relationship between integrated IT and SCI dimensions. This finding suggests that firms should focus on the important roles of IT technology to improve financial performance through SCI.

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