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The Role of E-business Solution in Firm Performance: Impact of Supply Chain Collaboration in Manufacturing Sector in Jordan

دور حلول الاعمال الالكترونية في أداء الشركة: أثر تعاون سلسلة التوريد في قطاع التصنيع في الاردن

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Thesis Submitted in Partial Fulfillment of the Requirements for master's Degree in E-Business.

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Has been defined accepted and approved on …. /2018.

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Dedication

Every challenging work needs self-efforts as well as guidance of older especially those who were very close to our heart.

This study dedicated to my whole family and friends;

My Father, who always proud of me and supported me in every step of my life and encouraging me believed in myself, thank you for everything

My Mother, no words can describe what you have done for me, thank you for your endless love

My sweetest sisters: Nadine and Diala, who are one part of my life

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List of Abbreviations

AVE	Average Variance Extracted
ML	Maximum likelihood
KMO	Kaiser-Meyer-Olkin
SEM	Structural equation model
EFA	Exploratory factor analysis
CC	Collaboration with Customer
CFA	Confirmatory factor analysis
CCO	Collaboration with Competitors
FP	Firm Performance
SA	Sampling Adequacy
SCC	Supply Chain Collaboration
SC	Supply Chain
EB	E-Business
BTS	Bartlett's Test of Sphericity

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Abstract

This research seeks to present a theoretical model about the Role of E-business in Firm performance taking into consideration the impact of the mediators "Collaboration with Customer and Collaboration with Competitors". The study was conducted in manufacturing sectors in Jordan. The researcher used the Exploratory Factor Analysis in the first phase of the analysis. A total of 66 questionnaires were distributed and considered for pilot testing. In the second phase, Confirmatory Factor Analysis was conducted to validate the measurement scale. The researcher distributes 178 questionnaires and used to validate the measurement scale. Then the researcher used Structural Equation Modelling to investigate the relationship between the dimensions, and to measure the impact of E-Business on Firm Performance, impact of Supply Chain Collaboration on E-business and Firm Performance. The study presents suggestion and recommendation for managers in Jordanian's manufacturing sectors that may be helpful to use E-business effectively to improve the organizational performance by Collaboration with Customers and Competitors. Based on final results of this research, E-business doesn't have a significant impact on Firm Performance, the assumption of the mediating effect of Collaboration with Customers on E-business and Firm Performance was refused, in the other side it was accepted for Collaboration with Competitors mediate the relationship between E-business and Firm Performance. The researcher recommends that the future researches should include other types of Collaboration such as retailers, suppliers, etc., also should include other sectors such as services, other industries, telecommunications, etc.

Keywords: E-business, Supply Chain Collaboration, Firm Performance.

دور حلول الاعمال الالكترونية في أداء الشركة: أثر تعاون سلسلة التوريد في قطاع التصنيع في الاردن

الطالبة

ديما خليل الحن

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الملخص

تسعى هذه الدراسة إلى تقديم نموذج نظري حول دور أثر الأعمال الإلكترونية على أداء الشركة مع الأخذ بعين الاعتبار أثر الوسيط وهو التعاون مع العملاء والمنافسين في سلسلة التوريد على المتغير التابع "الأعمال الإلكترونية" والمتغير المستقل "أداء الشركة". أجريت الدراسة في قطاع الصناعات التحويلية في الأردن. استخدم الباحث التحليل العاملي الاستكشافي في المرحلة الأولى من التحليل، حيث تم فيه توزيع 66 استبيانا للاختبار التجريبي. في المرحلة الثانية، تم إجراء التحليل العاملي التوكيدي للتحقق من صدق وثبات أداة القياس، حيث قام الباحث فيه بتوزيع 178 استبيانا استخدم للتحقق من الصدق والثبات. ثم استخدم الباحث نموذج المعادلات البنائية SEM لتحليل العلاقة بين أبعاد الدراسة وقياس أثر الأعمال الالكترونية على أداء الشركة وأثر تعاون العملاء والمنافسين في سلسلة التوريد على الأعمال الالكترونية والأداء .قدمت الدراسة توصيات للمدراء في قطاع الصناعة التحويلية في الأردن باستخدام الأعمال الإلكترونية بشكل فعال لتحسين الأداء التنظيمي من خلال التعاون مع العملاء والمنافسين. استنادًا إلى

النتائج النهائية لهذا البحث، لم يكن للأعمال الالكترونية تأثير ذو دلالة احصائية على أداء الشركة، حيث تم رفض تأثير الوسيط التعاون مع العملاء على الأعمال الإلكترونية وأداء الشركة، وفي الجانب الآخر تم قبول التعاون مع المنافسين كوسيط بين الأعمال الإلكترونية وأداء الشركة. يوصي الباحث بأن تتضمن الأبحاث المستقبلية أنواعًا أخرى من التعاون مثل تجار التجزئة والموردين وما إلى ذلك، كما ينبغي أن تشمل قطاعات أخرى مثل الخدمات، والصناعات الأخرى، والاتصالات، إلخ.

الكلمات المفتاحية: العمال الإلكترونية، تعاون سلسلة التوريد، أداء الشركة.

Chapter One

General Framework

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Chapter One

General Framework

1.1 Introduction

Information technology nowadays affects the business environment. Whether it is external (outside the firm) or internal (inside the firm), among different firms with these information technologies especially internet firms are able to share these information with other firms or stockholders, which increase firm performance (FP) through which called Supply Chain that allowed firms to share not just information but also resources, services and money. E-business (EB) concerned with Internet use to connect organizations with its suppliers, customers and other trading partners, it is a transformation in which creativity is needed to completely use the capabilities of internet technology in a particular business setting (Sheung, 2014).while Petrtyl (2011) characterizes EB as a term applied to describe organizations keep running on the Internet, or the utilization of Internet technologies to enhance the efficiency of a business.

E-business Solutions can support business and government process that are integrated by using information and communication technologies (Lipitakis, 2015).

Organizational Performance might be defined as the transformation of inputs into outputs for accomplishing certain results, performance informs about the relation between minimal and effective cost, between effective cost and realized output which called efficiency and between output and achieved outcome which called effectiveness, Organizational performance is influenced by various factors, both internal which the organization can influence, and external which are beyond the organization's influence (Hurduzeu, 2015).

Supply chain (SC) includes raw material and component suppliers, manufacturers, distributors, and retailers until the point that the finished products reach end customers. It has been generally agreed that the performance of the entire SC could be enhanced through collaboration (Ramanathan et.al, 2011). SC is characterized as a demand chain, indicating the significance of customer focus, and the significance of end to end coordination between supply and demand, SC must be overseen as systems to boost the effectiveness (Bustinza et. al, 2013).

Collaboration is the procedure by which individuals accomplish work by consistent to a standardized method of working, developing and enhancing their work routine within both their abilities and unique customer needs, Collaboration (both internal and external) is progressively essential for customer-focused firms (Rodriguez and Honeycutt, 2011).While Kristensen and kijl (2010) suggested that the collaboration acquires consideration as a key driver of overall business performance, innovation capabilities and productivity. In any case, there is a discrepancy between the perceived significance of collaboration, and the degree to which a company's approach collaboration in an organized way.

Supply Chain Collaboration (SCC) is characterized as a long-term relationship where members generally cooperate, share information, and work together to plan and modify their business practices to enhance joint performance (Whipple et.al, 2010); (Ralston, 2014).

This research investigates the important role of EB in the FP and more specifically with customers and competitors who help the firm provide useful information to enhance FP.

1.2 Study Problem

E-business created new alternative ways in finding customers using different internet technologies (Kahonen, 2013). While (Sheung, 2014) concluded that E-business makes

a lot of benefits to a company such as increasing demand and productivity of the product. As Ramanathan et.al (2011) suggested that the performance of the entire supply chain could be improved through collaboration. On the other hand, Cao and Zhang (2011) proposed that the collaboration help the firm boost the productivity and Competitive advantages to deliver a satisfying relationship.

Many studies demonstrate the Impact of E-business on Firm Performance. As (Cerdan and Acosta, 2005) recommended that the Influences on Firm's performance were observed for two out of the three EB dimensions: e-communication, e-workflow, e-information. While Bremser and Chung (2006) mentioned that the Development of E-business results in higher Firm Performance as a result of lower search and straight on comparison cost, E-business prompts more intense competition, result in higher Firm Performance and productivity. On the other hand, (Rodriguez and Honeycutt, 2011) mentioned that the Performance with customers is the degree to which the sales professional develops deeper customer relationships by understanding the client's unique needs and providing a solution that meet those needs. While (Loecker and Biesebroeck, 2016) suggested that the potential impact of international competition on firm performance, highlight two points. First, it is important to consider effects on productive efficiency and market power in an integrated framework. Second, greater international competition enlarges the relevant market and can affect both the set and type of competitors a firm face, as well as the nature of competition. In addition, Devaraj et.al (2007) indicated that the effect of the E-business channel investment on firm performance can better be realized with the presence of strong off-line business infrastructure that permits the exploitation of E-business investments. According to Wu

and Liang (2009) indicated that the E-business must rely on elements of the customer website interaction, it might be hypothesized that the customers might reach some levels of satisfaction with the product or services, after doing that the customers could be obtained, hold or reach profitability. In other words, the customer satisfaction is related to the involvement, responsiveness, and disclosing behaviors of the interaction of the business's level.

According to the previous relationships studies, the researcher found that the solutions of e-business technologies contribute significantly to increase the performance of the organizations. The researcher also found that e-business solutions lead to collaboration across the supply chain, that motivate the researcher to build a general theoretical framework to examine all these relations in one conceptual model.

The main problem of this study was:

Does E-business solution impact Firm Performance, and does Supply Chain Collaboration, “Collaboration with Customers (CC) and Collaboration with Competitors (CCO)” have impact on Firm Performance in Manufacturing Sector in Jordan?

In the light of the previous discussion and the increased impact of E-business on Firm Performance in Jordan, especially in Manufacturing Sector, there is a need to investigate the impact of E-business on Supply Chain Collaboration (CC and CCO) and how Supply Chain Collaboration (CC and CCO) impact Firm Performance.

1.3 Study Objectives

This study investigated **The Role of E-business Solutions in Firm Performance: Impact of Supply Chain Collaboration on Firm Performance in Manufacturing Sector in Jordan**.

The main Objectives of this study as following:

- Provide a conceptual framework to examine the impact of E-business on Firm Performance, taking into consideration the mediating impact of Collaboration with Customers and Collaboration with Competitors.
- Building a measurement scale to explore the factors that underlie the study variable.
- Validate the measurement scale.
- Estimate the total impact (direct and indirect) relationship between the study variable model fit and the validation of the model.
- Providing the recommendation based on the study result for the decision makers in manufacturing sector in Jordan, to identify the most critical variable of (E-business, Collaboration with Customers, Collaboration with Competitors and Firm Performance).

1.4 Study Significance

There are few studies that have addressed all dimensions of the study (E-business, Collaboration with Customers, Collaboration with Competitors and Firm Performance) in a conceptual framework, in addition, there are few studies that dealt with this subject in the Arab world, as well as the manufacturing sector, especially in Jordan.

1.5 Study Questions and Hypothesis

Study Questions:

- What is the impact of E-business on Firm Performance?
- What is the impact of E-business on Collaboration with Customers?
- What is the impact of E-business on Collaboration with Competitors?
- What is the impact of Collaboration with Customers on Firm Performance?
- What is the impact of Collaboration with Competitors on Firm Performance?
- How does Collaboration with Customers mediate the impact of E-business on Firm Performance?
- How does Collaboration with Competitors mediate the impact of E-business on Firm Performance?

Study Hypothesis:

This study test seven main hypothesis according to the above questions and objectives, which show as following:

H_o1: There is a direct positive impact of E-business on Firm Performance at the level of significance ($\alpha \leq 0.05$).

H_o2: There is a direct positive impact of E-business on Collaboration with Customers at the level of significance ($\alpha \leq 0.05$).

Ho3: There is a direct positive impact of E-business on Collaboration with Competitors at the level of significance ($\alpha \leq 0.05$).

Ho4: There is a direct positive impact of Collaboration with Customers on Firm Performance at the level of significance ($\alpha \leq 0.05$).

Ho5: There is a direct positive impact of Collaboration with Competitors on Firm Performance at the level of significance ($\alpha \leq 0.05$).

Ho6: Collaboration with Customers mediates positively the impact of E-business on Firm Performance at the level of significance ($\alpha \leq 0.05$).

H_o7: Collaboration with Competitors mediates positively the impact of E-business on Firm Performance at the level of significance ($\alpha \leq 0.05$).

1.6 Study Model

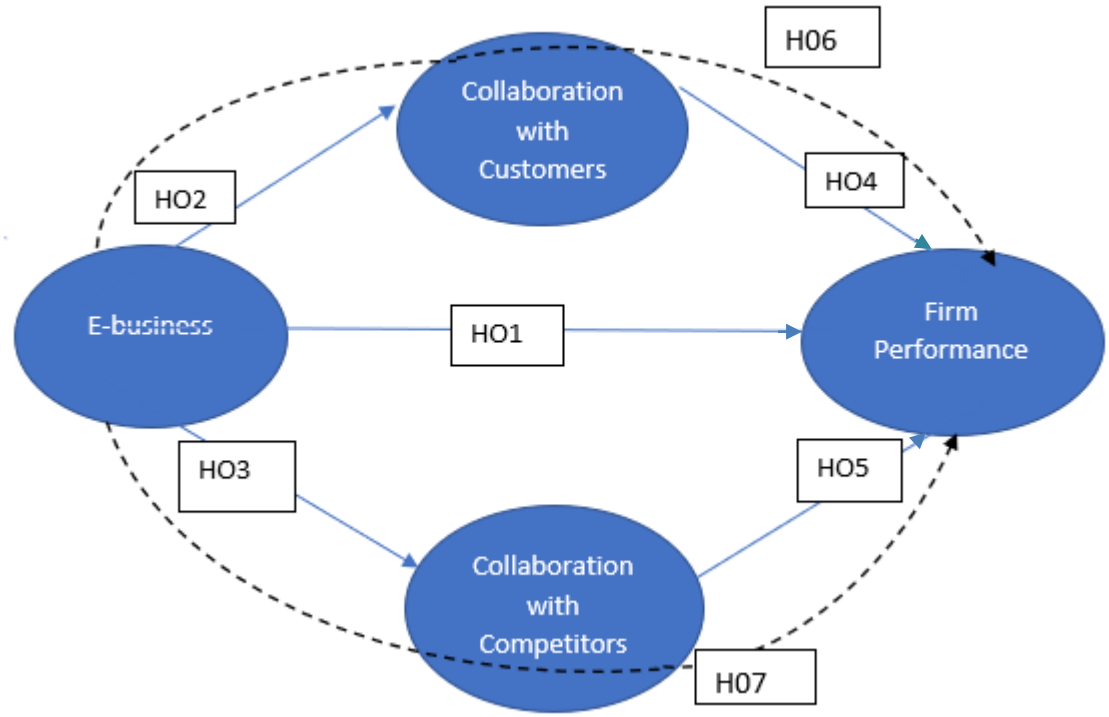

Figure (1): The proposed Conceptual model

Source: prepared by the researcher based upon:

- independent variable: E-Business (Troshani and Rao, 2007), (sanders, 2007), (Azeem,et.al, 2015).
- dependent variable: firm performance (Kim and Lee, 2010), (Ramanathan et.al, 2011), (Vieira et.al, 2015) .
- Mediator variable:
  - Collaboration with Customer: (Chae et.al, 2005), (Cao and Zhang, 2010), (Talevera, 2013).
  - Collaboration with Competitors: (Vachon and Klassen, 2008), (Saban and Mawhinney, 2010), (Iyer, 2013).

1.7 Study Limitations

This study is implemented at Manufacturing Sector which limited its generalizability to other companies.

- Study results restricted only at manufacturing sector (Top, Middle, and Operational).
- The amount of collect data depended on employee's response to the questionnaires.
- The employees' response reflects the psychological impression of the company at that point of time.

1.8 Study Delimitations

The researcher in this thesis face number of limitations as:

- **Human limitation:** This study carried with manufacturer employee in Jordan.
- **Place limitation:** This study conducted with manufacturing sector in Jordan.
- **Time limitation**: The academic year 2017-2018.
- **Scientific limitation:** This study focused on determining "The Role of EB Solution in Firm Performance: Impact of Supply Chain Collaboration at Manufacturing Sector" and adapt the prior's studies recommendations.

1.9 Study Conceptual and Operational Definitions

Conceptual Definitions:

E -business: is the transformation of an association's processes to deliver extra customer value through the utilization of technologies, philosophies and computing paradigm of the new economy (Petrtyl, 2011). EB as lipitakis (2015) is the conduct of business online including global communication media (web or other electronic systems). It is also the transformation of key business processes utilizing web technologies with the application of information and communication technologies in support of all business activities.

The organization's performance can be seen from the financial statement revealed by the organization. Thus, a great performing organization reinforced administration for quality exposure. Performance measurement alludes to the way of measuring the action's efficiency and effectiveness. Likewise, it is the transference of the complex reality of performance in

organized symbols that can be connected and handed-off under the similar conditions. In the current business administration, performance measurement is considered to be in a more critical role compared to quantification and accounting (Al-Matari et.al, 2014).

Supply Chain is group of independent organization associated together through the products and services that independently or mutually add value to deliver them to the end customer, collaboration means working together to achieve common goal from project to project and from business to business (Lu, 2011). Furthermore, Supply Chain Collaboration is defined as a long-term relationship where participants generally cooperate, share information, and cooperate to plan and modify their business practices to enhance joint performance (Ralston, 2014).

Customer Collaboration refers to the way an association utilizes customer feedback to benefit its business, products and services. Examples of commonly used customer collaboration methods, include social media, network-based recordings and analytics, video feedback and Web-based collaborations through Customer Relationship Management, Competitor Collaboration is included of a set of one or more agreements between competitors to connect as economic activity, and the economic activity resulting therefrom. Competitor collaborations usually involved one or more business activities, such as research and development, production, marketing, distribution, sales or purchasing. Information sharing, and different exchange association activities might also take place through competitor collaborations (Majava et.al, 2013)

New manufacturing giants with low wage economies tend to compete on costs, while established players want to move up the manufacturing value chain to compete on innovation and developing (Thornton, 2010).

Operational Definitions:

This study demonstrates that EB can provide more customer value by using internet technology in many organization's positively impact on FP which is a great way for measuring the effectiveness and efficiency of the manufacturing sectors and providing them a high quality with a lower cost supporting that by collaborating with customers to use the customer feedback to benefit it business, product and services also through collaborating with competitors to connect with competitors from one or more business activities such as research and development, distribution and production.

Chapter Two

Theoretical Framework and Previous Studies

2.1 Theoretical Framework.

2.1.1 E-business

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2.1.3 Organizational Performance

2.1.4 Supply Chain Collaboration

2.1.5 Customer collaboration and Competitor collaboration

2.2 Previous Studies.

2.2.1 Distinctive Features of this study.

Chapter 2

Theoretical Framework and Previous Studies

This chapter discuss in detail the related literature and previous studies that are related to E-business, Supply Chain Collaboration (Collaboration with Customers CC, and Collaboration with Customers CCO) and Firm Performance FP.

2.1 Theoretical Framework.

E-business can be viewed as (lipitakis, 2015) as an online business management, including global media (web or other electronic systems). It also reflects the transformation of major business processes using Web technologies, in relation to the application of ICTs to assist and support all business activities. E-business solutions no longer provide links with strategic differentiation. Many argue that interests in e-business are a competitive need and not a source of competitive advantage. Although large amounts of investments have been made in e-business technologies, there is evidence that many have not valued their business. (Troshani and Rao, 2007).

2.1.1 The importance of E-business

Helping electronic businesses create new alternatives in finding customers using diverse web technologies and expanding target market by finding new customers around the world without having to move from one place to another which saves time. Electronic business help increasing the number of alternative products, since it is easy to work globally, determining customer needs, ease to switch competitors, as well as search for feedback by using the web without

paying anything, enhancing the speed and flexibility of suppliers, high customer level and reduced inventory cost as it allocates their products.

According to Kahkonen, (2013), Sheung (2014), e-business brings many benefits to business such as increased product demand and productivity that automatically increase their business profitability, e-business development that leads the company to success (by working globally). The company finds more customers that increase sales and thus increase profitability and productivity). Similarly, e-business increases revenue from e-commerce but its main contribution comes from its ability to reduce costs, including fixed and variable costs (Cerdan and Acosta, 2005).

2.1.2 organizational performance

Organizational performance can be defined as the transformation of inputs into outputs to achieve certain outcomes. Performance measurement focuses on the relationship between the minimum and the effective cost, which can be referred to as economics, and between the effective cost and achieved outputs, which is called efficiency, and between the output and the achieved result, which is called effectiveness. Organizational performance is influenced by several factors that can be internal. Or might be external where they are outside the scope of the organization's influence. (Hurduzeu, 2015).

2.1.3 Supply Chain Collaboration

Supply Chain includes raw materials, component suppliers, manufacturers, distributors, and retailers until final products reach to the end customers. It has been generally agreed that the performance of the entire SC can be enhanced through collaboration. (Ramanathan et.al, 2011).

According to Bustinza et.al, (2013), SC is characterized as a demand chain, indicating the importance of customer focus and the importance of end-to-end coordination between supply and demand. This indicate supervise the SC as systems to enhance effectiveness.

Collaboration is the action by which individuals accomplish their business by aligning themselves with a standard way of working and developing their work routines using their unique customer capabilities and needs. Collaboration (internal and external) is increasingly necessary for customer-centric companies. (Rodriguez and Honeycutt, 2011). Whilst (Kristensen and Kijl, 2010) said that collaboration can be seen as a key engine for overall business performance, innovation and productivity. In any case, there is a difference between the perceived importance of collaboration. And the degree of collaboration of the company's collaboration with external parties in an orderly manner.

Collaboration in the supply chain is defined as a long-term relationship where members in the supply chain share information and work together to plan and modify their business practices to improve joint performance. (Whipple et.al, 2010; Ralston, (2014). According to Cao and Zhang (2011), SCC means two or more organizations are working together to plan and implement the supply chain process to achieve great potential, many practices are needed to strengthen collaboration. SCC is also located in two sets of concepts: focus on process, focus on relationship. Conceptual development of collaboration. SC partners can work as part of a single endeavor. Collaboration relationships help companies share risks to achieve common goals, access to resources, reduce costs, increase productivity, profit performance, competitive advantages over time to provide satisfactory relationship.

2.1.4 Customer and Competitor Collaboration

According to Majava et.al (2013), customer collaboration refers to the way organizations within the supply chain use customer feedback to take advantage of their business, products, and services. There are many examples of commonly used customer collaboration methods, including social media, web-based recordings, analytics, video notes, and web collaboration through CRM. There may be collaboration between competitors to connect as an economic activity and the resulting economic activity. Competing collaboration usually involves one or more business activities, such as research, development, production, marketing, distribution, sales or purchase. Information exchange and exchange activities can also be carried out through collaboration with competitors.

2.2 Previous Studies.

1- Chae et.al, (2005) mentioned in this study that information technology (IT) is a key driver for improved collaboration between SC partners. And that e-business is one of the forms of uses information technology, this study shows that the impact of information technology is not predetermined by its technological capabilities. Instead, its impact on inter-organizational collaboration which can be seen through the characteristics of the development of the exchange between information technology and existing relationships among partners. This study focused on four dimensions of the relationship between suppliers and retailers to investigate the impact of routing relationships based on the effectiveness of information technology. The study adopted a case study approach that included direct and systematic interviews with five pairs of suppliers and retailers and ascertained that the existing configuration contexts between partners enabled and limited the impact of information technology on inter-organizational collaboration.

Furthermore, information technology promotes and consolidates existing joint organizational structures and arrangements. In general, the results suggest that collaborative contexts among partners should precede efforts to link IT-based organizations.

2- Troshani and Rao (2007) suggested that the use of e-business and related innovations continue to have a significant impact on the way organizations operate. Under the current favorable conditions for collaborative behavior, organizations are discovering that it is difficult to gradually create a competitive advantage by implementing distributed EB solutions. This study focused on building a theoretical framework to assess the ability of organizations' activities to produce a competitive advantage in the context of the Australian financial services industry. The results show that EB applications can be seen as an enabling tool that promotes organizational competencies, thereby enabling organizations to transfer traditional and new services more effectively and efficiently. The way EB systems are used is also a source of advantage. It has also been discovered that in an industry that requires extensive interaction among organizations within the supply chain, consolidation of EB systems and collaboration with partners and competitors is a source of advantage. This study adds to the ongoing debate on the strategic value of e-business and how it can be improved and serves as a prelude to further research.

3- Sanders, (2007) suggested that the use of innovative solutions provided by the EB-SC was objective in modern literature. Organizational collaboration, the establishment of SC management has been enabled through the progress and utilization of EB innovations. Therefore, organizational collaboration and information exchange is used to enhance the organizational performance and overall performance of the supply chain. This study focused on

proposing and testing a model for the relationship between organizational use of EB innovations, organizational collaboration, and performance, using empirical data. The model proposed in this study differed from the models presented in previous studies, as this collaboration is seen as unique constructs, distinguishing between collaboration between organizations and between organizations. The study has shown that the use of EB innovations affects performance directly and indirectly by pushing two measures of collaboration. It was also found that inter-firm collaboration has a direct impact on the organizational performance and overall performance of the supply chain. In any event, the impact of collaboration between organizations on performance has been found to be indirect only through the impact of collaboration within the Organization. These findings reveal the complexity of organizational collaboration, emphasize the importance of organizations to enhance internal collaboration, and invest in information technologies that facilitate collaboration across the supply chain.

4- Yan (2008) indicated that with the rapid progress in e-commerce and the adoption of dual channels, manufacturers and retailers are gradually implementing cross-supply collaboration through profit-sharing techniques to improve channel coordination and standards performance, Yan's study (2008) focused on the strategic role played by the participation in profits in the supply chain - (collaboration between manufacturers and retails). The study compared the expected benefits received by each SC player in the traditional retail framework with the benefits that could be achieved in collaboration with other parties in the supply chain. The results show that both the manufacturer and the retailer are always benefiting from revenue sharing technology, given the additional benefits of collaboration and the utilization of dual channels. In addition, the bargaining model is used to implement profit sharing for the

manufacturer and retailer to accomplish the coordination of their channels. The results of the study showed how to derive optimal market techniques.

5- The Kristensen and Kijl (2010) study reported that collaboration was considered as the main driver of overall business performance, progress and efficiency. There is much controversy and wide discrepancy between the importance of collaboration and the degree to which organizations collaborate with organizations in an organized manner. The study discussed systematic development of areas of collaboration, as few organizations implemented management and leadership principles to systematically enhance collaborative performance. This study shows how organizations can reap the benefits of systematically investing in tools, methods and techniques that support cross-supply collaboration. The study also points to governance principles and a list of specific business points for companies that are concerned with enhancing their collaborative performance and achieving higher return on investment on private collaboration initiatives.

6- Saban and Mawhinney (2010) stated that performance in the supply chain is frequently compared to the constant introduction of innovations in processes. This study suggests that the current studies in the field of collaboration within the supply chain view that the performance of organizations also requires human collaboration in order to change patterns of thinking. This study proposed a comprehensive theoretical approach to SC management, focusing on the forces that encourage human collaboration in which organizations can take to create a more collaborative system.

7- Kim & Lee (2010) envisions frameworks for collaboration in the supply chain and strategic collaboration as key types of inter-firm collaboration. The study focused simultaneously on the multiple roles of collaboration as well as frameworks and strategic collaboration, and how they

directly and indirectly affect the company's response and market performance. The study tested hypotheses on the assumed model on survey data. The results suggest that the interrelationships between IT efficiency, inter-firm collaboration, and the response of the SC have important impact on market performance.

8- Cao and Zhang (2010) revealing the nature of collaboration in the supply chain, verifying its impact on the performance of organizations and the advantage of collaboration in the supply chain. In the proposed model for this study, reliable and valid tools were provided for these constructs through a pilot study in the United States. The data was collected through a web survey of US manufacturing organizations in many industries. Statistical methods used include analysis of the factor using (CFA) and structural equation modeling (SEM). The results show that collaboration in the supply chain leads to enhanced utilization of the collaborative advantage and has already a linear impact on the performance of organizations. Collaborative advantage has been used as an mediator variable that enables SC partners to achieve synergy and create superior performance. Another analysis of the moderation effect of the size of the company reveals that the collaborative advantage is fully moderate in the relationship between SCC and firm performance for small businesses while partially moderating the relationship with medium and extended organizations.

9- Ramanathan et.al, (2011) noted the collaboration between suppliers and retailers has become a common practice in many modern business industries. The study considered that the estimation of collaborative advantages is a major challenge. This study proposed a conceptual framework and a standard arrangement measures to evaluate performance based on supply chain literature and practices. The study reached a conclusion, most notably that the members of the supply chain are unable to imagine all the possible benefits of collaboration. This study

proposed a structure to study the performance of organizations working with the initial and advanced stages of collaboration in order to overcome this problem.

10- Petrtyl (2011) stated that the implementation of e-business can make organizations more effective. The researcher presented a general framework for e-business and the challenges associated with using it in the European countries and how to make full use of it. Completed through a number of E-business applications, study illustrated the current possibilities of using ICTs to become more competitive. In the final part of this study, the focus was on drawing future scenarios for the use of e-business in order to achieve higher levels of performance.

11- Chang and Graham (2012) explore the integration of electronic SC through the e-commerce application. In addition, the study aimed to explore the critical success factors of an e-business strategy in affecting SCC. The study used the analytical approach of six international organizations in Taiwan. The conclusion indicated that the critical success factors of the study are cross-sectional analysis that has been categorized and discussed in the context of key collaboration issues to influence the success of business implementation and e-commerce project. This study presented an academic and practical insights into the EB strategy and the SCC.

12- Talavera (2013) points out the relationship between SCC and trust across the supply chain, where they are critical builders of SC management. These factors were presented by reviewing the literature and meeting with industry experts. Factor analysis was performed to classify the basic dimensions of these structures. A total of 57 manufacturing and service companies contributed to this study. From factor analyzes, two SCC values emerged: (1) common order and decision making; and (ii) information sharing. Again, trust-building revealed two fundamental perspectives: (1) the organizational view, and (2) the risk perspective. The study

revealed that information exchange, a measure of SCC, is closely related to trust. The study contributes to SC management literature by providing complete and realistic SCC definitions and confidence. It also provides experts with a list of SC management strategies that they can employ to achieve better collaboration and performance.

13- Iyer (2013) shows that the use of advanced information technology in inter-firm collaboration has been studied in many current literatures. Although conventional wisdom is aware that IT frameworks encourage SCC, this study gives an alternative perspective. Based on the resource-based approach and the "fit" hypothesis, the study investigated the impact of ecological vulnerability factors on the nature of the organization of two core IT capabilities with collaboration. The results confirm that the positive organization of collaboration between organizations, e-commerce and the analytical capacity of information technology leads to increased performance, and the unpredictability of demand improves the relationship of analytical collaboration in information technology.

14- Vieira et.al (2015) focused on assessing the impact of collaboration between suppliers and vendors on performance and trade exchange costs in the supply sector of the large Brazilian retailer sector. The results indicate that collaboration contributes to enhancing logistics performance related to deliveries and urgent deliveries that occur when demand increases. Interpersonal collaboration and joint activities contribute to reducing the weaknesses between existing supply chain. These joint activities, together with major collaboration, contribute to the expansion of sources of access to interest. The study provides an examination of strategic performance and previously unexplored exchange cost components, including urgent deliveries and aimed at increasing demand, arranging contracts, renegotiating, waiting for understandings,

possible coordination, and various social and psychosocial aspects, geographical parts of the relationship between suppliers and brand.

15- Gumboh and Gichira (2015) focused on the collaboration in the supply chain in SMEs, which represents the highest proportion of companies in all global economies and focused on a range of difficulties from innovation to finance. These difficulties constrain collaboration and eventually affect the performance of SMEs. The study showed that SCC barriers are one of the areas that have not been thought of decisively. In this way, the survey cleared SCC barriers affecting small and medium enterprises in Kenya, where SCC plays a vital role in the progress and performance of SMEs.

16- Azeem et.al (2015) said that e-banking is one of the most important transformations in the banking sector in Pakistan. This study measures the impact of e-commerce (business to business, business to customers, customers to customers) on enterprise performance (business processes, performance, customer satisfaction). The results indicate a positive relationship between e-commerce and e-commerce performance; companies enhance their performance in terms of business processes, performance and customer satisfaction.

17- Shams and Moussawi, (2016) measured the impact of collaboration with customers in the process of innovation based on knowledge management practices with customers and marketing results in business and business activities in Fars Province. The results showed that innovation has had a direct positive impact on knowledge management Customers in product and process innovation and can illustrate changes in knowledge management. Also, customer collaboration in the innovation process has been directly positive to customer knowledge management and collaboration with customers in the innovation process has had a direct positive impact on performance. In this study, the dimensions of customer knowledge management have been

developed in innovation projects: customer knowledge, knowledge about customers and collaboration in the creation of knowledge can be predicted changes in performance or marketing results. On the other hand, this study provided a directional innovation, performance had a direct and positive effect, and organizational innovation and practical innovation could predict changes in marketing results (performance).

2.2.1 Distinctive Features of the Current Study

The significance of this study comes from the fact that this study is contained the first in the Arab world and in Jordan. There is no study that has taken the SSC as a mediator for the relationship between EB and FP. Several previous studies have dealt with collaboration from a conceptual perspective, and many previous and current studies have sought to measure the impact of collaboration on performance. Few previous studies have focused on the role of using e-business techniques in supporting collaboration between parties in the supply chain. There are many studies that have examined the positive impact of e-business on competitive advantage and performance in general.

There are also many studies that have examined the impact of supply chain collaboration on achieving competitive advantage and overall performance as well. But these studies have dealt with this effect individually (e-business, supply chain collaboration). What distinguishes this study is that it highlighted the key role that e-business technologies play in supporting collaboration activities across the supply chain. This study has focused on two important aspects of the supply chain namely customers, competitors. Based on previous studies, it can be assumed that e-business practices can support the organization in achieving the highest levels

of performance, and the collaboration in the supply chain can achieve real addition to increasing performance by optimizing the potential of e-business.

Many scholars have studied EB, SCC and Firm performance, but in this study, the researcher paid attention to the impact of EB on Firm Performance, impact of EB on Collaboration with Customers and Collaboration with Competitors, impact of Collaboration with Customers and Collaboration with Competitors on Firm Performance in same conceptual framework.

Chapter Three

Study Methodology (Method and Procedures)

3.1 Study Methodology

3.2. Study Population

3.3 Study Sample

3.4 Data Collection Tools

3.5 Scale Reliability

3.6 Scale Validity

3.7 Study Variables

3.8 Statistical Treatment

Chapter Three

Study Methodology (Method and Procedures)

This chapter described the methodology used by providing the population and sample, data collection tools, reliability and validity, the end explains the study variables and statistical tools.

3.1 Study Methodology

This study used descriptive approach used to describe the study sample and variables, and analytical approach. in order to recognize the impact of E-business Solution in Firm Performance taking in consideration the Supply Chain Collaboration (Collaboration with Customers and Collaboration with Competitors) in Manufacturing Sector in Jordan , and because this thesis is a field study following descriptive analytical method so analytical approaches deployed to investigate and examine the relationships between the variables.

3.2 Study Population

As the population of the study is unknown because the population of this study included managers in Manufacturing Sector in Jordan., a sample selected appropriately based on size of population, the survey unit of analysis composed of different managers in Manufacturing companies.

3.3 Study Sample

As mentioned above that the population of the study were managers in Manufacturing Sector in Jordan., sample was selected from different levels of all mangers in manufacturing sector to meet the study objectives and measurement, A random selection approach was applied, sampling process was conducted two times, one for pilot testing using Exploratory Factor Analysis, the other sample was used for confirming the results using Confirmatory Factor Analysis. A total of 66 Questionnaires were distributed and considered for pilot testing, the researcher distributes 178 Questionnaires in Confirmatory Factor Analysis and used to validate the measurement scale.

3.4 Data Collection Tools

This study depends on two sources to collect data:

Primary Source: The researcher developed a measurement scale based on previous studied to measure the (E-business, Firm Performance, Collaboration with customers and collaboration with Competitors) and answering the questions and hypothesis of the study.

Secondary Source: The secondary sources was based on **Books**, Journals, Theses, Articles, and Worldwide Web to write theoretical framework of this study.

3.5 Scale Reliability

Exploratory Factor Analysis used to develop initial measurement scale, the scale Reliability measured by using Cronbach's Alpha for the adopted scale items.

Then Confirmatory Factor Analysis was carried out, also Cronbach alpha coefficient, composite reliability, and Average Variance Extracted (AVE) calculated to measure reliability for each construct in the modified measurement scale.

3.6 Scale Validity

To validate the constructs of the scale the researcher deployed CFA. While CFA is appropriate to confirm validity and standardize the scale. Validity tests used to meet certain empirical properties and standardizing the measurement scale. Construct validity assured when the correlation of items in the same construct is relatively high. Also, according to (Hair et.al, 2010), factor loading, high regression weights and square multiplied correlations of the items are significantly correlated to specified construct would also contribute to construct validity. On the other hand, Convergent validity indicates the degree to which items measure construct and that each item loads onto one single component factor without any cross-loading onto other factor. Finally, discriminate validity ensure that the latent variables are different, in which each individual item measure one latent construct and not measure deferent latent construct at the same time.(Zikmund, 2003; DellaVigna, 2009).

3.7 Study Variables

- **Independent Variable:** e-business, collaboration with customers, collaboration with competitors.
- **Dependent Variable:** collaboration with customers, collaboration with competitors and Firm Performance.

3.8 Statistical Treatment

Demographic characteristics and study variables was analyzed using Descriptive statistics analysis. To ensure normality of the distribution of multivariate data, skewness and kurtosis coefficients were assessed. multivariate normality for data distribution can be achieved when kurtosis value not much larger than three or four. On the other hand, absolute value of skewness of all variables is less than three and the absolute value of the kurtosis is less than 10 (Bartolini, 2005)

- **Exploratory factor analyses (EFA):** During the initial development of the measurement scale, Exploratory factor analyses of all items included in the study are used, with a principal-components analysis method to evaluate the latent dimensionality the scale. Factor loading for each item of which exceed 0.4 with an Eigenvalue of 1.00 retained. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity (BTS) used to assess adequacy of data. When the value of KMO is larger than .8 and the KMO is significant, it considered appropriate according to (Kim et.al, 2001).

- **Confirmatory factor analysis (CFA):** According to Byrd and turner, (2001), CFA is used to validate the constructs of measurement scale. CFA have been identified from many researchers as a statistical test especially when several factors required to explain the inter-correlations between the variables (Phan and Deo, 2008). And, the observed variables (items of the scale) that are more likely to be reliable indicators of each factor

(Schreiber et.al, 2006). The measurement model was based on logic, previous empirical studies and theoretical findings. The proposed factors were confirmed using CFA. Certain empirical properties such as reliability and validity were confirmed, additionally standardizing of the measurement scale was also assured.

- **Structural Equation Modelling (SEM):** For further adoption of SEM, the approved measurement scale facilitated SEM in order to estimate direct and indirect effects of the structural model. SEM using AMOS was used to assess the structural relationships between the study constructs. Maximum likelihood (ML) estimation was deployed to examine the hypothetical models, also helping in estimation of the direct and indirect of effects. Model fit for the sample data was evaluated. According to Schumacker, (2012), several indices used: the chi-square to degrees of freedom ratio $((X^2))/DF$), goodness of fit index (GFI), comparative fit index (CFI), normal fit index (NFI), Tucker Lewis Index (TLI) and root mean square error of approximation (RMSEA) and other fit indices mentioned in many studies were used when necessary.

Chapter 4

Data Analysis and Hypothesis testing

4.1 Sample of Study and Data Collection.

4.2 Descriptive Statistics for the initial Sample.

4.3 The Instrument (Questionnaires).

4.4 Data Analysis and Exploratory Factor Analysis.

4.4.1 Exploratory Factor Analysis.

4.4.2 Exploratory Factor Analysis for Validity.

4.4.3 Analyze EFA for Reliability.

4.5 Comprehensive Survey and Confirmatory Factor Analysis.

4.5.1 Confirmatory Factor Analysis.

4.6 Data screening.

4.7 Model Specification.

4.8 Assessment of Validity, Reliability and Normality of Measurement Model.

4.9 Testing the Structural Model.

4.10 Testing the Hypothesized Model (Hypothesizes).

Chapter 4

The purpose of this chapter is to illustrate the results of the statistical analysis for several data collected based on the study framework and study hypotheses. The data analysis included a description of the means, standard Deviations for the questions of this study; using EFA, CFA and SEM.

4.1 Sample of study and Data Collection

The thesis was conducted initially in many manufacturing sectors in Jordan, from these sectors a total of 66 questionnaires were received in the first stage of data collection. Since the Data collection method used is face to face survey, the response rate was 100% and valid for EFA analysis. And because face to face communication is more effective, the researcher chooses this method. This approach of collection the data is principally useful in clarifying outcomes and analyzing what and why individuals believe as the researcher met the administrators and the business owners themselves. McKenna (1994) indicated that gathering information through this way increased validity as the sample size is small in this phase of investigation.

4.2 Statistical Analysis for the initial sample

The rate of responses was (100%) and it considered high as majority of the individuals were met directly. Data set are coded to SPSS and checked for missing, no cases deleted, and the sum of useful respondents were (66). Table (4.1) shows the mean, standard deviation, Min and Max for EB, CC, CCO and FP. It was found that CC has high importance criteria (M=3.8918), then EB (M=3.7091), then FP (M=3.4912), for CCO (M=2.5523). The finding uncovered that the variables is roughly normally distributed in regard to the level of skewness and kurtosis as both

were lower than 1.00 and the estimation of z-score of Skewness and Kurtosis coefficients in the scope of ±1.96, standard error ($p>0.05$). Descriptive analysis for demographical variables was not performed as it directed for the comprehensive survey.

Table (4.1): Descriptive Statistics

#	N	Mean Statistic	Std. Deviation	Skewness	Kurtosis
				Statistic	Statistic
E-Business	66	3.7091	.80760	-1.885	3.679
Collaboration with Customers	66	3.8918	.62399	-.831	1.808
Collaboration with Competitors	66	2.5523	1.02447	-.282	-1.384
Firm Performance	66	3.4912	.82108	-.908	1.254

4.3 Instrument of the Study (Questionnaires)

This study investigates the impact of E-business solution in Firm Performance, considering The Role Supply Chain Collaboration. The questionnaires are divided into four sections: E-Business, CC, CCO and FP. A total of 40 items were developed form the literature. Table (4.2) lists the initial paragraphs of the questionnaire and the sample selected were required to answer these paragraphs.

Table (4. 2): Initial Questionnaire

#	**E-business** Sanders 2007, Bakotic 2016, Ramanathan et al 2011
1-	The company uses EB technology according to the field that the company work with
2-	The company uses EB proportionally with the competition requirements
3-	The company uses EB technology according to the needs of its key customers
4-	The company relies on EB technology in operating business processes
5-	EB is considered very important for the industry
6-	The purposes of the EB technologies used in the company agree with the purposes of the company.
7-	EB facilitates the coordination between departments within the company
8-	EB facilitates the continuous organizational review of the company's performance
9-	EB is considered an integral part of the strategic planning operation
10-	The company does the planning and the scheduling for the operations performed through the internet
#	**CC** Cao and Zhang 2011, Vachon and Klassen 2008, Ryzhkova and Pesämaa 2015,
1-	We consider the customers of the company as an extension to it
2-	We consider the relationship with our customers as a long-term alliance
3-	We exchange basic information with our customers
4-	The Company has as inter-changeable communications with its partners within the SC
5-	We develop new products and new services in cooperation with our customers
6-	We respond quickly to our customers' needs

7-	We cooperate with other suppliers to specify the customers' needs
#	**Collaboration with competitors** Chen 2015, Plant et al 2003,
1-	The company cooperates with competitors in the development processes of the new product
2-	The Company receives information about the competitor's abilities within the SC
3-	The company joins forces with other specific competitors to develop new products or new technologies
4-	We conduct research and development with competitors for beneficial cooperation as long as there is no professional secrets
5-	We exchange information with competitors to achieve common standards, to be informed about whatever is new in the market and technology tendencies
6-	The company cooperates with suppliers to discover new markets to its competitors
7-	The company has face to face communication with its competitors
8-	The company exchanges information continuously and accurately with its competitors
9-	The company cooperates with competitors in the technology field
10-	We cooperate with our competitors to identify customer's needs
11-	The company has knowledge exchange with its competitors
#	**To what extent do you evaluate your company's performance concerning the following in comparison with competitors** Devaraj et al 2007, Troshani and Rao 2015
1-	Performance of the company in cost reduction

2-	The company's performance in improving product quality
3-	The performance of the company in the speed of entering new products to the market
4-	The company's performance in improving quick delivery
5-	The company's performance in the job satisfaction of the employees
6-	The performance of the company for the total cost of the product
7-	The performance of the company in the required time of the production
8-	The company's performance in sales growth
9-	The company's performance in the return on investment
10-	The performance of the company in the profit margin of sales
11-	The performance of the company in customer satisfaction
12-	The performance of the company in the precision process

4.4 Data Analysis and EFA

EFA was deployed to discover the structural factors of the scale. After that, a reliability analysis was performed to assess the reliability of measurement scale.

4.4.1 Exploratory Factor Analysis (EFA)

The assumption of factorability is the first step of EFA analysis process, for that correlation between scale items were determined. (Hair et al, 2009) mention that when significant correlation between items are more than 30% of the correlation matrix its mean that the researcher is able to proceed to EFA, so when the researcher used Correlation matrix, its shown that 105 of 234 (44%) are significant at level (0.01).

Osborne and Fitzpatrick (2012) mention that **EFA** is a technique to reduce items to a small set of primary factors. Also used to summarize the structure of items. KMO test and BTS were tested to confirm that the data is suitable for factor analysis. These tests were used to measure the sampling adequacy. if BTS is large and significant, and KMO measure is greater than 0.50. this mean that factorability in data set exist

To extract the factors, Maximum likelihood ML extraction technique with Varimax rotation was utilized. Consolidating these two techniques, the estimation of eigenvalues and Scree plot investigation were gotten and after that, the factors that exist in data can be acquired. The estimation of eigenvalues must surpass '1' to consider it as one factor. The Scree Plot method was likewise used to affirm the results acquired from the investigation of eigenvalues (Osborne and Fitzpatrick, 2012). To confirm whether all factors extracted from this examination are reliable or not as recommended by MacCallum, Widaman, Zhang, and Hong (1999). Another criterion that was utilized to explore factors that extracted is to check whether it was reliable or not is by evaluating and estimation of factor loading for each item. Factor loadings can be evaluated and assessed through pattern matrix. Field (2009) contended that the best factor loading value for item must be greater than 0.30.

Hair et.al (2010) demonstrated that the acknowledged factor loading for the sample of 100 respondents is 0.75. The researcher decided to remain all items that loaded more than 0.40, because the researcher trying to incorporate more items due to exploratory nature of the investigation, additionally, and because CFA conducted later in the second phase of estimation to confirm the results. Also, CFA increased the reliability and validity of the measurement scale and in result increasing fitting of the model for the selected data. The researcher tested the

reliability for all items. The analysis of Cronbach's Alpha-Coefficient was conducted to assess the reliability of the measurement scale. Haron (2010), indicated that alpha value should be .70 or higher for a set of items to be considered. Cronbach's Alpha values are quite sensitive to the number of items

4.4.2 Testing Validity using EFA

EFA was conducted on the 40 items with varimax rotation, four criteria namely (1) E-Business, (2) CC, (3) CCO (4) FP were tested. KMO measure demonstrated the sampling adequacy (SA) for the investigation, KMO=0.786, which is greater the acceptable limit 0.5. also, BTS, $\chi 2(780) = 2766.470$, $p<0.000$ demonstrate that the correlations between items were adequately high for EFA. Table (4.3) represents the results of estimating *SA and BTS.* Chi Square/Df was 3.54 which indicated fitting of the model structure for the sample data in light of Hair (2010).

Table (4.3): Kaiser-Meyer-Olkin of Sampling Adequacy and Bartlett's Test of Sphericity

Kaiser-Meyer-Olkin of Sampling Adequacy and Bartlett's Test of Sphericity		
Kaiser-Meyer-Olkin of Sampling Adequacy		0.786
Bartlett's Test of Sphericity	Approx. Chi Square	2766.470
	Df	780
	Sig	0.000

Three factors had eigenvalues more than 1.00, as the scree plot below which is illustrated in Figure (4.1).

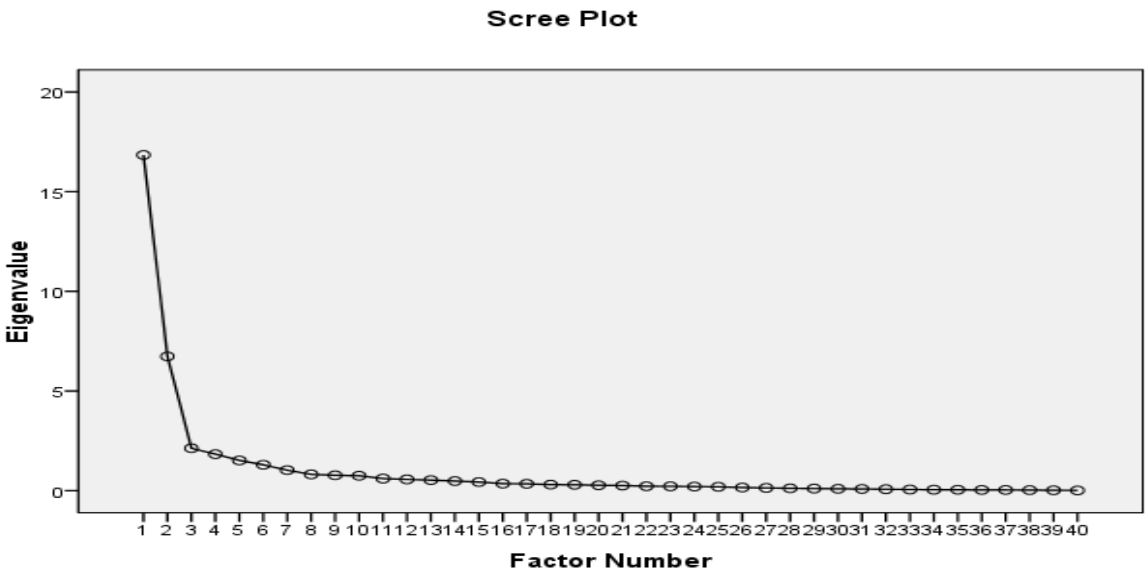

Figure (4.1): Scree Plot

Result of Extraction of Component Factors are listed in table **(4.4)**, four factors have eigenvalue greater than 1.0. The four factors retained explain 68.833% of variance, which indicate sufficiency of total variance explained.

Table (4.4): Result for the Extraction of Component Factors

Initial Eigenvalues			
Component	**Total**	**% of Variance**	**Cumulative%**
1	16.840	42.101	42.101
2	6.734	16.836	58.937
3	2.128	5.321	64.257
4	1.830	4.576	68.833

40 items structures were explored to explain 68.833% of variance in the data. The first factor explained 42.101% of the total variance with an eigenvalue of 16.840. the second factor accounted for 16.836% of the total variance with an eigenvalue of 6.734, the third accounted for 5.321% of the total variance with an eigenvalue of 2.128 and the fourth accounted for 4.576 percent of the total variance with an eigenvalue of 1.830.

The researcher performed EFA numerous time to investigate which variables (Items) are attributable to each factor. Variables that loaded less than 0.40 were eliminated; items which loaded on two factors or more, and items that have cross-loading were also removed. One item load on another factor which is CC4 that move to CCO, numerous amendment had been performed and moved the items to their appropriate factors. Examining the rotated pattern matrix of factor, the non- significant loading, cross loading variables were removed, and the structure of variables were devoted to re-specification.

The analysis revealed that there were items loaded on two or more factors, for example (CC4) loaded in factor 1 (collaborative with competitors). 21 items were deleted due to cross loading. After the elimination of non- significant loading, low item loading and the cross loading, EFA was conducted for the final structure and indicated that 19 items were retained as they loaded significantly on their factors. VARIMAX- rotated analysis was applied to obtain a clean set of factors loading and avoiding non-cross loading of items to other factors and to maximize the loading of each variable on one factor. According Hair et al, (2009), Factor loading indicate the degree of association of each item with each factor. Table (4.4) shows the rotated factor matrix after deletion of items that loaded in many factors.

Table (4. 5): VARIMAX- ROTATED Component Analysis Factor Matrix

#	Item				
	Collaboration with competitors	**Factor 1**	**Factor 2**	**Factor 3**	**Factor 4**
1-	The company has knowledge exchange with its competitors	.900			
2-	The company cooperates with competitors in the technology field	.890			
3-	The company has face to face communication with its competitors	.871			
4-	The company exchanges information continuously and accurately with its competitors	.862			
5-	The company joins forces with other specific competitors to develop new products or new technologies	.845			
6-	We conduct research and development with competitors for beneficial cooperation as long as there are no professional secrets	.832			
7-	We exchange information with competitors to achieve common standards, to be informed about whatever is new in the market and technology tendencies	.818			

8-	The company cooperates with competitors in the development processes of the new product	.750	
9-	The Company receives information about the competitor's abilities within the SC	.474	
	Firm Performance		
10-	The performance of the company in the total product cost	.876	
11-	The company's performance in the speed of entering new products to the market	.745	
12-	The company's performance in sales growth	.644	
13-	The company's performance in improving quick delivery	.615	
	E-Business		
14-	The company uses EB technology according to the field that the company works with		.872
15-	The company uses EB proportionally with the competition requirements		.822
16-	The company uses EB technology according to the needs of its key customers		.685

	Collaboration with customer	
17-	We consider the customers of the company as an extension to it	.630
18-	We consider the relationship with our customers as a long-term alliance	.613
19-	We respond quickly to our customer's need	.466

The new Eigenvalues, Total Variances Explained for modified scale is presented in **Table (4.6)**, the total of four eigenvalues is (14.499) which explain the total amount of variance extracted by factors which has increased to (69.596).

Table (4. 6): Result for the Extraction of Component Factors new items

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.883	41.491	41.491	7.582	39.903	39.903	6.250	32.893	32.893
2	4.248	22.357	63.848	3.822	20.116	60.019	2.751	14.479	47.372
3	1.219	6.414	70.261	1.004	5.286	65.305	2.496	13.136	60.508
4	1.149	6.046	76.307	.815	4.291	69.596	1.727	9.088	69.596

The measurement scale of 40 items was reduced to 19 items loaded on 4 factors. 21 items were removed. KMO Measure of SA and BTS were assessed. The results in table (4.7) indicated the KMO were (0.846) and is above the acceptable limit 0.5. BTS also significant (0.000). Significant Chi Square indicated that correlations among items were sufficiently high for EFA. BTS, $\chi 2=1034.476$, $p<0.000$ indicated that the correlations among items were adequately sufficient for conducting EFA, as the df value is (171). The goodness of fit test for overall EFA model revealed that chi-square = 147.458, and df= 101, chi-square/df= 1.46 which indicated a good model fit for sample data.

Table (4.7): Kaiser-Meyer-Olkin of Sampling Adequacy and Bartlett's Test of Sphericity

Kaiser-Meyer-Olkin of Sampling Adequacy and Bartlett's Test of Sphericity		
Kaiser-Meyer-Olkin of Sampling Adequacy		0.846
Bartlett's Test of Sphericity	Approx. Chi Square	1034.476
	Df	171
	Sig	0.000

4.4.3 Reliability Test

Reliability analysis was performed to estimate the degree of freeness of random or unstable error for the measurement scale (Curran et.al, 1996). The factors proposed and included in this study have an excellent internal consistency. Each factor has Cronbach's Alpha value more than

0.90. Table (4.8) lists the correlation matrix among factor which indicating high correlation between all factors.

Table (4.8): Factor Correlation Matrix

Factor	EB	CC	CCO	FP
EB	1			
CC	.458	1		
CCO	.303	0.036	1	
FP	.606	.469	.359	1

Cronbach's Alpha had been calculated for all items remained in the scale. Satisfactory internal consistency range between 0.7-0.9 according (Blunch, 2008). The factors in the scale have a high internal consistency and high rating of reliability. The higher rate of factors was (0.938) for CCO, and the lowest is CC (0.763).

Table (4. 9): Cronbach's Alpha for Elements of the Instrument

	Cronbach's Alpha	Number of Items
EB	.915	3
CC	.763	3
CCO	.938	9
FP	.883	4

The result of EFA revealed that the instrument (scale) has four factor structures. The four factors explained 69.596% of variance among the items, all factors had high reliabilities (Cronbach's Alpha is larger than 0.70). 19 items retained in the final scale structure after deleting 21 item which cross-loaded on multiple factors and due to factor loading is lower than 0.40.

The final factor structure of the measurement scale:

Collaboration with Competitors have 9 items:

1- The company has knowledge exchange with its competitors.
2- The company cooperates with competitors in the technology field.
3- The company has face to face communication with its competitors.
4- The company exchanges information continuously and accurately with its competitors.
5- The company joins forces with other specific competitors to develop new products or new technologies.
6- We conduct research and development with competitors for beneficial cooperation as long as there are no professional secrets.
7- We exchange information with competitors to achieve common standards, to be informed about whatever is new in the market and technology tendencies.
8- The company cooperates with competitors in the development processes of the new product.
9- The Company receives information about the competitor's abilities within the SC.

Firm Performance included four items:

1- The performance of the company in the total product cost.

2- The company's performance in the speed of entering new products to the market.

3- The company's performance in sales growth.

4- The company's performance in improving quick delivery.

E-business included 3 items:

1- The company uses EB technology according to the field that the company work with.

2- The company uses EB proportionally with the competition requirements.

3- The company uses EB technology according to the needs of its key customers.

Finally, collaboration with customers included 3 items:

1-We consider the customers of the company as an extension to it.

2- We consider the relationship with our customers as a long-term alliance.

3- We respond quickly to our customers' needs.

The data set which used was appropriate and serve good to perform EFA depending on the descriptive analysis, the sample is relatively enough for pilot testing as recommended by Hair, et al, ,2009). The new scale was deployed for comprehensive surveying of mangers in many manufacturing sectors in Jordan. As EFA is not sufficient tool to test the theoretical foundations of the instrument which means further analysis is necessary to estimate the relationships exist between the latent variables and their indicators (Items) by performing a CFA.

4.5 Comprehensive Survey and Confirmatory Factor Analysis

This research was based on the development and validating reliable constructs of EB, CC, CCO and FP which suggested and adapted from previous studies. The resulted measurement from EFA was used in (Table 4.5) for surveying the selected sample. A total of 19 items of full measurement scale, (Table 4.5) were utilized 3 items for E- Business, 3 items for CC, 9 items for CCO and 4 items for FP) to collect data. The researcher used survey to collect data from manufacturing sector from diver's geographic locations in Jordan. Online survey has been conducted along with a direct interview. The data set consisted of five categories of respondent managers. Data were used to validate the measurement model according to sample that has relevant experience in the field of EB and collaboration.

A sampling methodology followed a random sample procedure in which the sample was utilized to guarantee the representativeness and generalizability of the sample. Participants in the survey should meet several criteria. For example, they must be incorporated in EB practices and engaged for several years. They have access to use different resources of online processes and able to utilize distinctive online procedures. Secondly, the distribution of manufacturing sectors in Jordan was considered and multiple and diverse respondents can be gotten from the same manufacturing company.

Sample size should be adequate to get meaningful parameter estimates. testing and development of SEM theory using ML estimation method and the transition from exploratory to confirmatory analysis require large-sample (Hair et al, 2010). A sample size of 150 or more typically necessary to achieve meaningful parameter estimates. Number of latent constructs and items is also considered, when the model has five or less latent constructs and each latent construct has

more than three items, 100 sample would be enough as recommended by Hair (2010). Our sample exceed 150 respondents (178).

Total number of (350) questionnaires were sent to selected sample. The initial response rate was 54% (189) respondents indicating low response rate. The reason behind the low response rate (54%) since this study focused on a small group of employees of managers and owners of manufacturing sectors. Byrd and Turner, (2001) indicated that despite the low response rate, the responses from the managers and owners of manufacturing sectors can provide insight as previous studies indicated. The distribution of sample size in each manufacturing sector, is presented in table (4.10).

4.5.1 Confirmatory Factor Analysis (CFA)

The scale incorporates a set of factors to measure EB, CC, CCO and FP (FP) in manufacturing sectors in Jordan. In developing the overall measurement scale, the researcher considers how all individual constructs converged together. To affirm that, the Unidimensional measures according to (Hair et al, 2009) were considered in which variables can be explained by only one construct. Contrary from EFA, individual variable is hypothesized to relate to only one construct, and this imply that there aren't any cross- loading as in EFA (all cross-loading are assumed to be zero).

The researcher applied the standard rules and procedures to produce valid measurement scale. The same data sample that been used in CFA model was used to test the structural model for estimating the relationships between EB, CC, CCO and FP. Initial data analysis conducted to identify problems in data, assessment of normality, fitting the measurement model and before proceeding to testing the model. Normalization of data makes interpreting the coefficients and

response values easier as recommended by Hair et al, (2009), the normalization procedures should be conducted before estimation. In CFA, reliability and validity tests was conducted for construct discriminate validity, composite reliability, and AVE and fitting the hypothesized and revised CFA model have been also performed.

4.6 Data Screening

The final data set which coded into SPSS version 19 was composed of 189, the number of questionnaires were not fully answered (more than 11% of items have blank responses) are 9. Those were considered of low interest and have been eliminated. Other procedures were followed to treat the other missing data less than 20% in each item such as average imputation of value of responses from the other participant (Rubin, 1987).

To enhance normality of data, the assessment of the Mahalanobis distance for identifying the potential outliers in data sample was carried out. AMOS version 20 was employed to compute the distance for observations in dataset from the center of all data distribution. Outlier occurs when the distance of specific observation is too far compared to the majority of other observations in a dataset. Some of observations were deleted to improve the multivariate normality based on the observation number. The data set of 180 were checked and screening for outliers, 2 observations are deleted from data set due to Mahalanobis distance values more than the $\chi 2$ value ($\chi 2=102.44$; $n=38$, $p<0.001$), the final data set remain to be analyzed is (178) see in table (4.10). Since the sample is large (more than 150), the new sampling distribution would be closer to normal distribution.

Table (4.10): descriptive Statistics, Job Title, Firm size, and industry sub-sector: -

Job Title	frequency	percent
CEO-President	27	15.2
Vice President	29	16.3
Manager	56	31.5
Director	36	20.2
Other position	30	16.9
Firm Size	**frequency**	**percent**
1-50	22	12.4
51-100	54	30.3
101-250	62	34.8
251-500	36	20.2
501-1000	4	2.2
Industry Sub-Sector	**frequency**	**percent**
Miscellaneous manufacturing equipment	4	2.2
Electrical \ Electronic	7	3.9
Chemical	9	5.1
Fabricated metal	10	5.6
Rubber and plastic equipment manufacturing	13	7.3
Computer \ electronic	10	5.6
Machinery manufacturing	17	9.6
Transport equipment manufacturing	17	9.6
Apparel manufacturing	20	11.2
Food manufacturing	18	10.1
Furniture and related product manufacturing	14	7.9
Beverage manufacturing	14	7.9
Wood product manufacturing	13	7.3
Paper manufacturing	6	3.4
Others	6	3.4

An online survey has been conducted along with direct surveying, online surveying was performed using e-mails which obtained from the manufacturing sectors databases, also through WhatsApp groups after uploading the questionnaire on google document and disseminating the web link. Most of mangers were contacted directly due to small numbers of administrators in each manufacturing sector. The high number of employees were from 101-250 were (62 of total sample) and the approximate percentage was 34.8 of respondents. Results in table (4.10) showing that high number of the industry sub sector is Apparel manufacturing, which indicated that most of the sample selected (20) and an approximate percentage was (11.2) were informant and experienced. It also indicates that the surveys are usable, and respondents can have insight about the questionnaire paragraphs which required a full perception of EB, FP and SCC (CC and CCO).

4.7 Model Specification

The CFA model for EB, CC, CCO and FP hypothesizes that the responses to the items in the questionnaire can be explained by 4 factors as mentioned above. Each item has non-Zero loading on its factor and Zero loading on other factor. All four factors are correlated, and error terms associated with item measurements are uncorrelated. CFA was selected for assessing convergent and discriminate validity of the instrument. According to Williams and Vaske (2003), CFA is appropriate statistical test to identify number of factors required to explain the inter-correlation among the measurement variables, and to identify which the observed variables are more likely to be reliable indicators of a factor. Based on Tacq (1997), the researcher can decide priori whether the factors would correlate or not, also impose which factor pairs that are correlated, and which observed variables are affected by common factors. CFA considered as a

tool to confirm the proposed factors. To purify the measurement model, two step approaches was used to identify and determine whether items should be eliminated from the measurement model considering number of criteria such as weak loading, cross loading, multiple loading, communalities, error residuals and theoretical determination. (Anderson and Gerbing, 1988). For specifying the measurement model, the researcher specify free for estimation the indicators related to each construct and the correlation between them. And the researcher also didn't specify cross-loading as in EFA. In specifying the constructs, the researcher set a scale for latent construct because it not observed and has no metric scale (no range of values), therefore, the researcher fix one of the factor loading on each construct to specific value (the researcher used 1.00).

The researcher performed CFA for all four latent constructs and ensured Unidimensional before assessing Validity and Reliability. items with low factor loading don't fit the measurement model and should be removed from the model. According to Hair et.al (2005), factor loading for each item should exceed 0.6. The deletion process has started with regarding to lowest factor loading. After the deletion, the researcher run the new measurement model repeatedly until achieving unidimensional noting that unidimensionality require also positive factor loading. Evaluating the fitness of the model was conducted after each run of CFA model to reflect how the model fits the data, several Fitness Indecis used. There are a lot of argument about which fitness indecis to use, according to Hair et.al (1995, 2010) and Holmes-Smith (2006), the researcher should at least consider one fitness indecis from each category of model fit (Absolute Fit, Incremental Fit, and Parsimonious Fit). Based on their discussion, table (4.11) provides information relating to model fit category and their level of acceptance.

Table (4.11): Categories of Model Fit and their Level of Acceptance

Category		Index	Acceptance Level
Absolute fit	Discrepancy Chi Square	Chi-Square	P-value > 0.05
	Root Mean Square of Error Approximation	RMSEA	RMSEA < 0.08
	Goodness of Fit Index	GFI	GFI > 0.90
Incremental fit	Adjusted Goodness of Fit	AGFI	AGFI > 0.90
	Comparative Fit Index	CFI	CFI > 0.90
	Tucker-Lewis Index	TLI	TLI > 0.90
	Normed Fit Index	NFI	NFI > 0.90
Parsimonious fit	Chi Square/Degrees of Freedom	Chisq/df	Chi-Square/ df < 3.0

Most of literatures are frequently reported indexes (RMSEA, GFI, CFI and, Chisq/df) to be used, and their level of acceptance are also varied. Based on the above literatures, main absolute fit index is the $\chi 2$ (chi-square) that tests for the degree of misspecification. A non-significant $\chi 2$ is indication of a model that fits the data well. P-value attached to the $\chi 2$ to be non-significant to accept the null hypothesis that there is no significant difference between the model-specified and observed variances and covariance's. $\chi 2$ is too sensitive to sample size increases so probability level tends to be significant. Also $\chi 2$ also tends to be greater when the number of observed variables increases, so the researcher gave a little attention to P- value due to our large sample and the complexity of our model (many variables included in the model).According to (Hair et al., 1996; Joreskog, 1978), the researcher could ignore the absolute fit index of minimum discrepancy chi-square because it's value is sensitive to sample size increase. (GFI) assesses the relative amount of the observed variances and covariance's explained by the model. Root mean square error of approximation (RMSEA) corrects the tendency of the Chi-Square ($\chi 2$) to reject models with large same size or number of variables, Comparative Fit Index (CFI) indicates the relative lack of fit of a specified model versus the baseline model. It is formed and

varies from 0 to 1, with higher values representing better fit. The CFI is widely used because of its strengths, including its relative insensitivity to model complexity. Finally, providing three or four fit indices seems adequate to give evidence of model fit because most goodness of fit is often redundant (Hair et al, 2009). Figure (4.2) shows the specified measurement model for measuring EB, CC, CCO and FP.

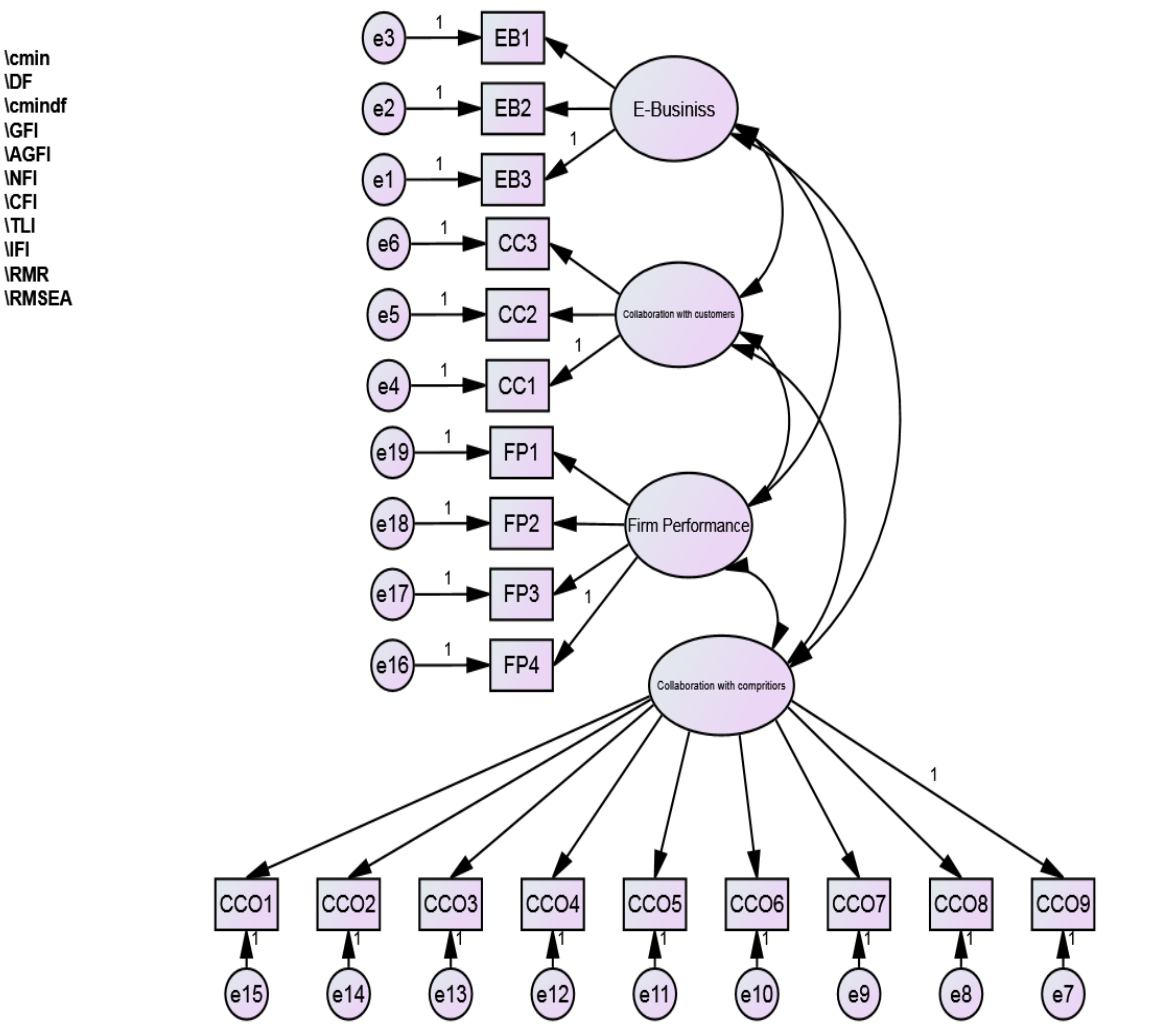

Figure 4.2. The Measurement Model combining all constructs involved in the study

The model consists of four constructs namely:

E-business scale measured using three indicators:

1- The company uses EB technology according to the field that the company work with.

2- The company uses EB proportionally with the competition requirements.

3- The company uses EB technology according to the needs of its key customers.

Collaboration with Customers scale measured using three indicators:

1-We consider the customers of the company as an extension to it.

2- We consider the relationship with our customers as a long-term alliance.

3- We respond quickly to our customers' needs.

Firm Performance scale measured using 4 indicators:

1- The performance of the company in the total product cost.

2- The company's performance in the speed of entering new products to the market.

3- The company's performance in sales growth.

4- The company's performance in improving quick delivery

Collaboration with Competitors scale measured using 9 indicators:

1- The company has knowledge exchange with its competitors.

2- The company cooperates with competitors in the technology field.

3- The company has face to face communication with its competitors.

4- The company exchanges information continuously and accurately with its competitors.

5- The company joins forces with other specific competitors to develop new products or new technologies.
6- We conduct research and development with competitors for beneficial cooperation as long as there are no professional secrets.
7- We exchange information with competitors to achieve common standards, to be informed about whatever is new in the market and technology tendencies.
8- The company cooperates with competitors in the development processes of the new product.
9- The Company receives information about the competitor's abilities within the SC.

The output of CFA in figure (4.3) shows the factor loading for each item, and the correlation between the constructs. The results indicated that fitness indices (RMSEA, GFI, AGFI, and Chisq/df) did achieve the required accepted level. But there are some items have low factor loading less than 0.6) such as (CC3, FP4 and CCO1), deletion of them would improve the fitness of model. Table (4.12) below shows fitness indices for the initial CFA model result.

270.792
146
1.855
.864
.822
.909
.956
.948
.956
.048
.069

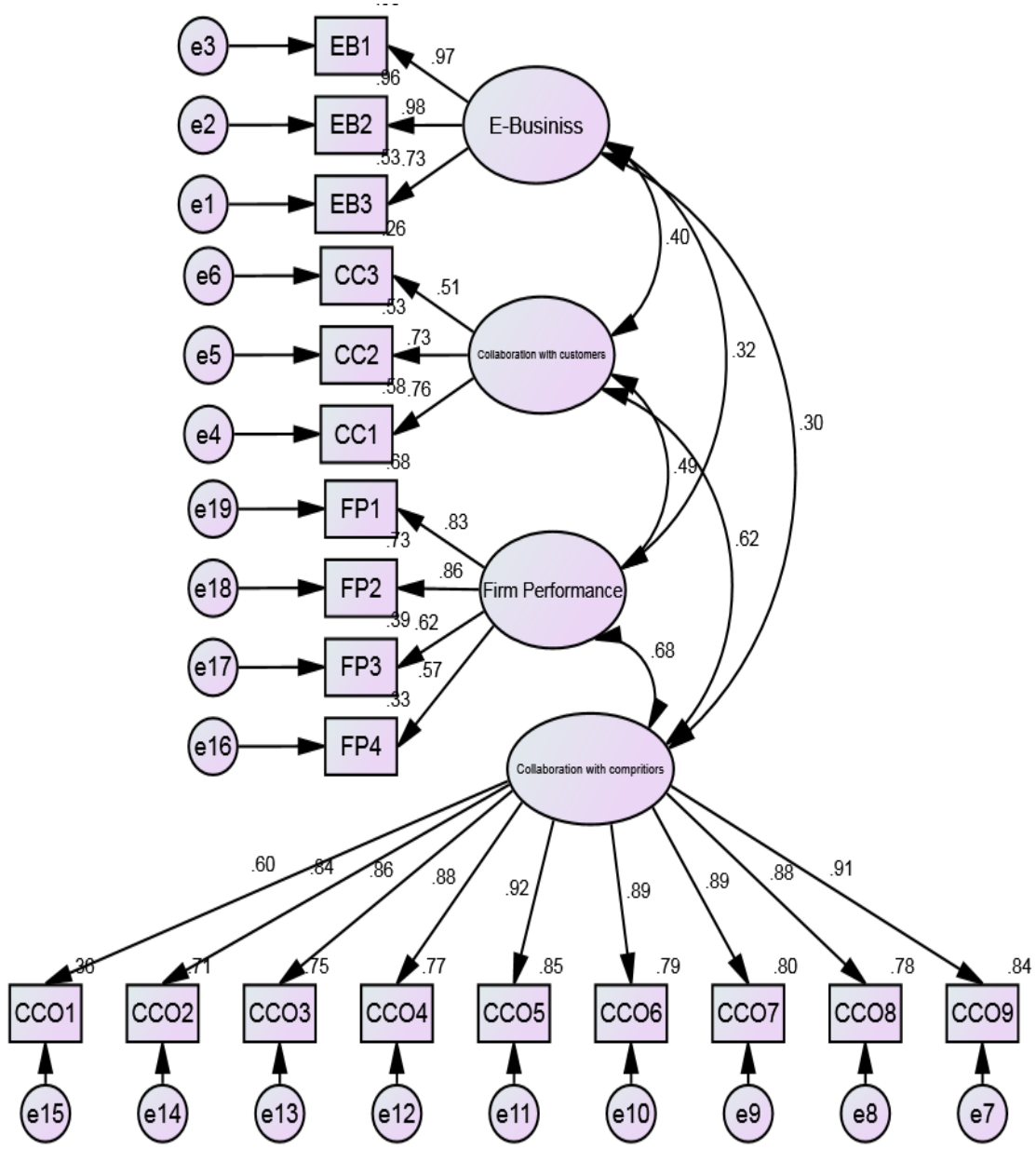

Figure 4.3 Factor loading for all items related to each construct

Table (4.12) Fitness Indices for Measurement Model

Fitness Indexes	Index	Index value	Acceptance
Absolute fit	**RMSEA**	0.069	Accepted
	GFI	0.864	Accepted
Incremental fit	**CFI**	0.956	Accepted
	TLI	0.948	Accepted
Parsimonious fit	**Chisq/df**	1.855	Accepted
P-Value= 0.000			

Each item that have a factor loading lower than 0.6 and an R^2 (R-Squared for the item) less than 0.4 were deleted from the measurement model. Low factor loading means that item is considered useless to measure that construct. Keeping these items affected the fitness indices of the model. There are many reasons for obtaining low factor loading, these reasons may include biased statement, double meaning statement, ambiguous statements, sensitive statement etc. Below is the listing of items deleted due low factor loading:

1- FP4 due to the lower factor loading (less than 0.60) = 0.57.

2- CCO1 due to the lower factor loading (less than 0.60) = 0.59.

CC3 was not deleted because the factor CC have only three items, the deletion of this item made CC include 2 items, so the factor was under-identified (Hair et al, 2009).

Additionally, after deletion of factors that loaded less than 0.60, the researcher ran the new measurement model to improve model fit and examined the model Fitness, fitness indices were achieved after low factor loading deletion and based on criteria mentioned in table (4.12). Figure (4.4) show the items loading for the modified model

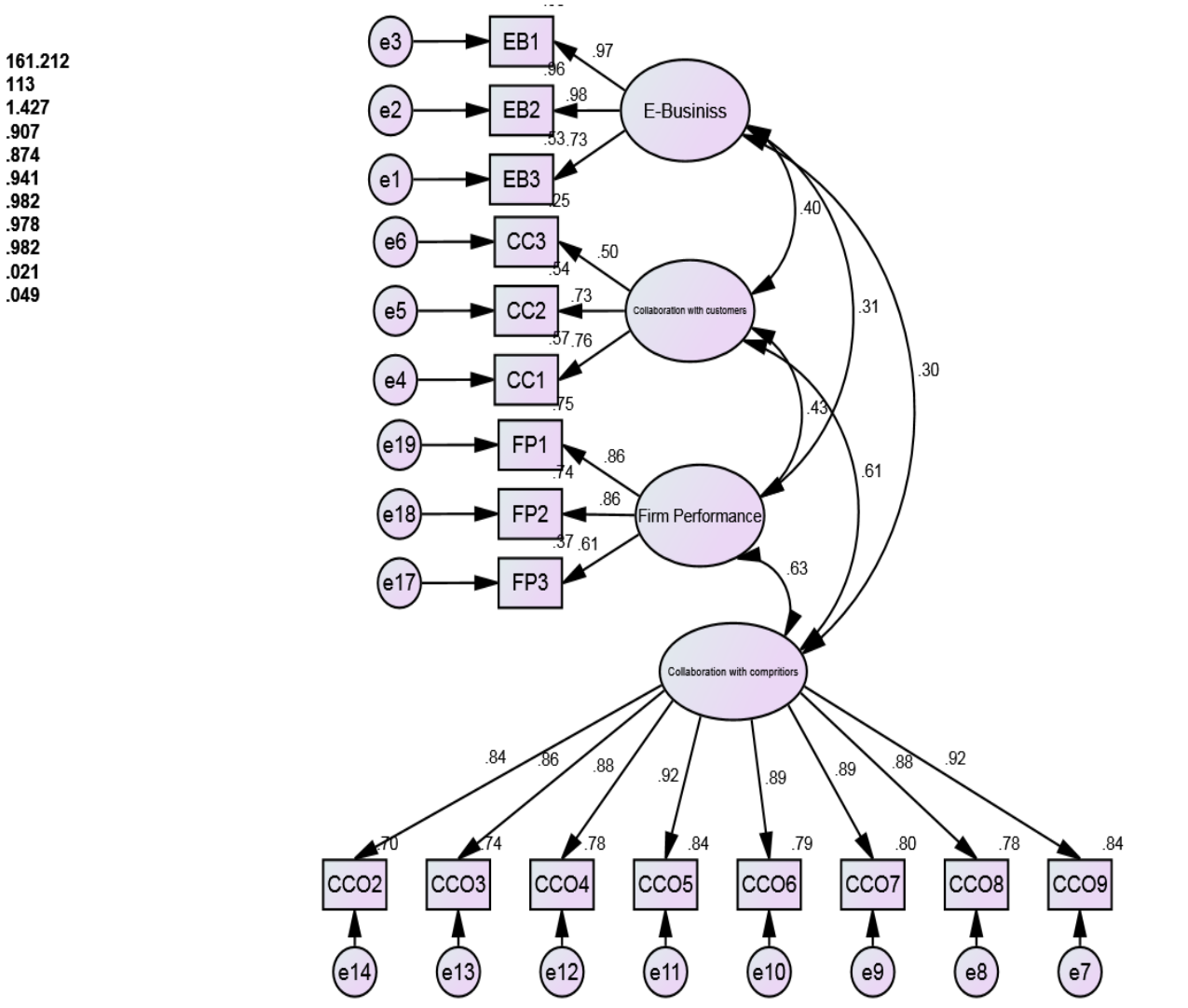

Figure 4.4: Factor Loading for each item, and the correlation between the constructs.

The researcher has modified the model, the resulted model is shown in figure (4.4), and the fitness indices are improved and shown in table (4.13). two Items were deleted in the second measurement estimation.

Table (4.13): Fitness Indices for the modified Measurement Model

Fitness Indexes	index	Index value	Acceptance
Absolute fit	**RMSEA**	0.049	Accepted
	GFI	0.907	Accepted
Incremental fit	**CFI**	0.982	Accepted
	TLI	0.978	Accepted
Parsimonious fit	**Chisq/df**	1.429	Accepted
P-Value= 0.000			

The results in table (4.13) indicate good fit as fit indices have improved after deletion of items with low factor loading. seventeen Items were resulted from the second measurement model estimation. Those items were confirmed and the requirement for Unidimensional was achieved through the item deletion process for low factor loading items. Results also indicated that the modified measurement scale for the sample selected from manufacturing sectors in Jordan have four constructs as Standardized path coefficient for the four constructs are greater than 0.60 and the significances level are ($P \leq 0.05$) see (Figure 4.4). The items related to the four constructs EB, CC, CCO, FP model are fit with the data selected which indicated that measurement model

can serve as a good measurement scale of EB, CC, CCO and FP in manufacturing sectors in Jordan.

After completion of CFA measurement model, the researcher must ensure that our model indicate validity and reliability of the construct. Assessment of model unidimensional, validity, and reliability is required before proceeding to modeling the structural model. Also examining the normality of the data to assess the distribution for each variable (items resulted in 2nd CFA Model) in a dataset after fitting the measurement model. Cronbach's Alpha was also calculated to ensure the internal consistency between variables.

4.8 Assessment of Validity, Reliability and Normality of Measurement Model

Hair et al (1995) indicated that validity is ability of instrument to measure what it supposed to measure for a latent construct. They categorized three types of validity, Convergent Validity which is achieved when all items in a measurement model are statistically significant. AVE is calculated for each construct. Value of AVE should be greater than 0.5 to achieve Convergent Validity. This means that keeping the low factor loading in the measurement model not enhanced Convergent Validity. Construct Validity on the other hand, can be achieved when Fitness Indices for construct be acceptable. Results from table (4.14) (Fitness Indices) indicated good model fit for the items in measuring their respective latent constructs. Finally, Discriminant Validity which indicates the extent to which the latent variables are different. Each item measures one latent construct and not measure deferent latent construct at the same time. It indicates that the measurement model of a construct is free from redundant items. Correlation between constructs should not exceed 0.85 to ensure discriminant validity. Correlation value

exceeding 0.85 indicates the two constructs are redundant or having serious multicollinearity problem.

To assess Reliability, Cronbach alpha coefficient, composite reliability, and AVE had been calculated to measure reliability. Internal Reliability which indicates how strong the measuring items are holding together in measuring the respective construct. Measurement reliability is achieved when the value of Cronbach's Alpha exceeds 0.7. On the other hand, Composite Reliability indicates the reliability and internal consistency of a latent construct (Hair et al, 2009). AVE indicates the average percentage of variation explained by the measuring items for a latent construct. According to Hair et al (1995), Holmes-Smith (2001), and Zikmund (2003) suggest that composite reliability should be greater than 0.7 and AVE is greater than 0.5. As can be shown in table (4.14), the composite reliability and AVE values exceeded the minimum acceptable values, indicating that measures were reliable and no errors and introducing consistent results. Results of descriptive statistics, multivariate normality assessment for remaining items of a construct in the study, Cronbach's Alpha, composite reliability, and AVE for every construct in the model, Report the normality. The researcher used the equation below to calculate AVE and Composite Reliability (Hair et al, 1995,2009). The AVE for CC was found to be less than accepted AVE value (0.46), this was happened because the item CC3 (item loading was 0.504 less than 0.60) was remained and it has impacted the value of AVE.

AVE= Σ Ƙ2 / n

CR = (**Σ**Ƙ)2 / [(**Σ**Ƙ)2 + (**Σ**1- Ƙ2)]

The researcher employed the Pooled-CFA for all constructs of measurement model, all constructs are combined as shown in Figure (4.2), and the CFA is performed at once. The

researcher run the CFA for the measurement model, the outputs are given in figure (4.2), and examine the Fitness indices resulted for the measurement model in table (4.14).

Table 4.14.: Results of multivariate normality and CFA Model

Item#	Cronbach alpha	Mean	SD	Skewness	Kurtosis	Standardized path coefficient	SE	CR	P	SMC	Composite Reliability	Average Variance Extracted (AVE)
E-Business	0.814										**0.927**	**0.811**
EB1		4.61	0.52	-0.824	-0.562	0.966	0.102	13.464	0.000	0.933		
EB2		4.62	0.52	-0.851	-0.51	0.982	0.103	13.524	0.000	0.964		
EB3		4.68	0.5	-1.176	0.248	0.731				0.534		
Collaboration with Customer	0.966										**0.709**	**0.46**
CC1		4.55	0.55	-0.71	-0.573	0.757				0.573		
CC2		4.58	0.52	-0.568	-1.121	0.734	0.12	7.555	0.000	0.539		
CC3		4.74	0.455	-1.261	0.084	0.504	0.095	5.74	0.000	0.254		
Firm Performance	0.7										**0.826**	**0.618**
CA1		4.37	0.64	-0.531	-0.652	0.864	0.162	8.283	0.000	0.746		
CA2		4.38	0.68	-0.759	-0.1	0.86	0.171	8.283	0.000	0.740		
CA3		4.48	0.68	-1.071	0.341	0.606			0.000	0.367		
Collaboration with Competitors	0.92										**0.967**	**0.784**
CCO2		3.74	0.95	0.274	-1.399	0.84	0.055	16.695	0.000	0.706		
CCO3		3.63	0.983	0.248	-1.209	0.862	0.054	17.78	0.000	0.743		
CCO4		3.37	1.143	0.302	-1.328	0.882	0.061	18.863	0.000	0.778		
CCO5		3.52	1.009	0.438	-1.119	0.919	0.05	21.214	0.000	0.845		
CCO6		3.54	1.014	0.32	-1.156	0.888	0.054	19.181	0.000	0.789		
CCO7		3.53	1.015	0.317	-1.139	0.892	0.053	19.458	0.000	0.796		
CCO8		3.46	1.069	0.301	-1.191	0.882	0.057	18.866	0.000	0.778		
CCO9		3.56	0.956	0.469	-1.061	0.916				0.839		

Note: SE= Standard Error, CR= Critical Ratio, SMC= Squared Multiple Correlation
SE and CR for First item in each factor are not shown because the regression weight of the first variable of each factor is fixed at 1.

The researcher examined the normality of the data to assess the distribution of each variable in a dataset after fitting the measurement model. Measuring of skewness for each item was conducted to assess normality, the absolute value of skewness 1.0 or lower reveals that the data is normally distributed. Most of resulted skewness is lower than 1.0. Also, by looking to multivariate kurtosis, the researcher found the Critical ratio of (CR) for the kurtosis does not exceed 3.0 according to (Harris, 1995). According to Hair et.al (2010), SEM using the ML Estimator is robust to skewness greater than 1.0 and robust to kurtosis violations of multivariate normality as long the sample size is large and the Critical ratio (CR) for the kurtosis does not exceed 3.0. Along with enough large sample and the values of skewness and kurtosis not exceeded 1.0 and 3.0 respectively, the researcher is able to proceed to further analysis to Structure Equation Analysis since the estimator used is MLE. Table (4.14) also represents the output resulted for the normality assessment for each item included in measurement model.

Discriminant Validity is also achieved which indicates the extent to which the latent variables are different (Zikmund, 2003), and each individual item measure one latent construct and not measure deferent latent construct at the same time. Discriminant Validity is achieved for the measurement model when all redundant items are either deleted or constrained (Paired). The researcher developed Discriminant Validity index as shown in table (4.15). Results indicated that the constructs in the model are discriminant of each other, the square root of AVE for each construct is calculated, other values are the correlation between the constructs. Discriminant validity for all constructs is achieved when the square root of AVE values is higher than the

values in its row and column (Hair et al, 1995). Thus, the researcher concludes that discriminant validity for all seventeen constructs is achieved.

Table (4.15): Discriminant Validity index

Construct	EB	CC	CCO	FP	AVE
EB	0.900				0.811
CC	0.44	0.678			0.460
CCO	0.56	0.45	0.885		0.784
FP	0.66	0.38	0.280	0.789	0.618

4.9 Testing the Structural Model

The main focus of this research is to estimate the impact of independent variables (Exogenous) and dependent (Endogenous) variables. SEM is integrating of regression analysis and EFA (Ali, 2017). SEM is a more powerful statistical technique running the CFA Analyzing multiple regression models simultaneously, analyzing regressions with multi-collinearity problem, Analyzing the path analysis with multiple dependents, Estimating the correlation and covariance in a model. And finally modeling the inter-relationships among variables in a model. The variables in SEM are exogenous construct which is the independent variable, Endogenous construct which is the dependent variable, finally, mediating variable which is variable in which has a double role. This variable acts as a dependent variable in the first equation, and acts as an independent

variable in the second equation (Hair, 2009). In this study, the mediator variables (CC, CCO) mediate the relationship between an independent variable (EB) and a dependent variable (FP).

Chin (1998) indicated that the power of mediator variable is relies on correlation of coefficient or square multiple correlation (R^2) in the model. (R^2) is exist once this variable has been exerted by other variables whereby independent or exogenous variables. Mediator variable comes upon the independent variable influences the variables. Lin and Hsieh (2010) indicated that (R^2) higher than 0.80 consider high total variation. There are three types concerning on testing mediated effect beginning by Chin (1995) followed of Bentler (1983) and has been improve by Baron and Kenny test (1986). All these types use the z-score or z-test to indicate the significant level for their theory.

As stated before, mediation effect (intervening effect) is a predictor link in the relationships between two other variables, it can become an External and internal variable at the same time. By testing for meditational effects, the researcher explores to examine the influences between (EB, CC, CCO, FP variables). Awang (2010) has indicated that mediation have three types which are full mediation, partial mediation, and non-mediation.

Mediation analysis effect allow for examination process (MacKinnon, 2000). The researcher hypothesized that there are structural effects in which CC, CCO are modeled as the mediator between the EB variable and the ultimate dependent variable FP. This mediating model was proposed based on literature as stated on theoretical review. According to Baron and Kenny (1986) Three required conditions are required for mediation effects. The first one is that the independent variable must affect the dependent variable. In this model, EB must have effect on FP then the mediator must have effect on the dependent variable. In this model CC, CCO

must affect on FP. These conditions were examined, it appeared that the three conditions were not met. Hair et al. (2000) indicated that testing mediation effect using SEM requires significant correlations between independent variable, mediating variable, and the dependent variable

The Researcher have proposed that CC, CCO is mediator, the researcher addressed several steps before testing the mediating effect using SEM, firstly the researcher Construct each variable with the number of items. For Example, EB factor have 3 items. Second, insignificant items (usually lower than 0.60 of items were dropped to obtain accurate results. Third, fit criteria were achieved. Fourth, the required level of reliability, validity and fitness of measurement model likely Cronbach Alpha, Composite reliability and AVE were also achieved. Finally, the researcher estimated the path of each variable regarding the theoretical framework. In this case, four variables are performed including two mediator's variables. The researcher executed the structural model. In this case, the researcher used ML estimation that has been recognizes as a best formal estimator as stated by (Hair, 2010). As results, standardized regression weight and the probability values which indicate the significant path have been achieved. Figure (4.5) show the results for standardized regression weights and factor loading for each construct. Table (4.16) shows the Standardized Regression Weights, Critical Ratio, and Probability Value.

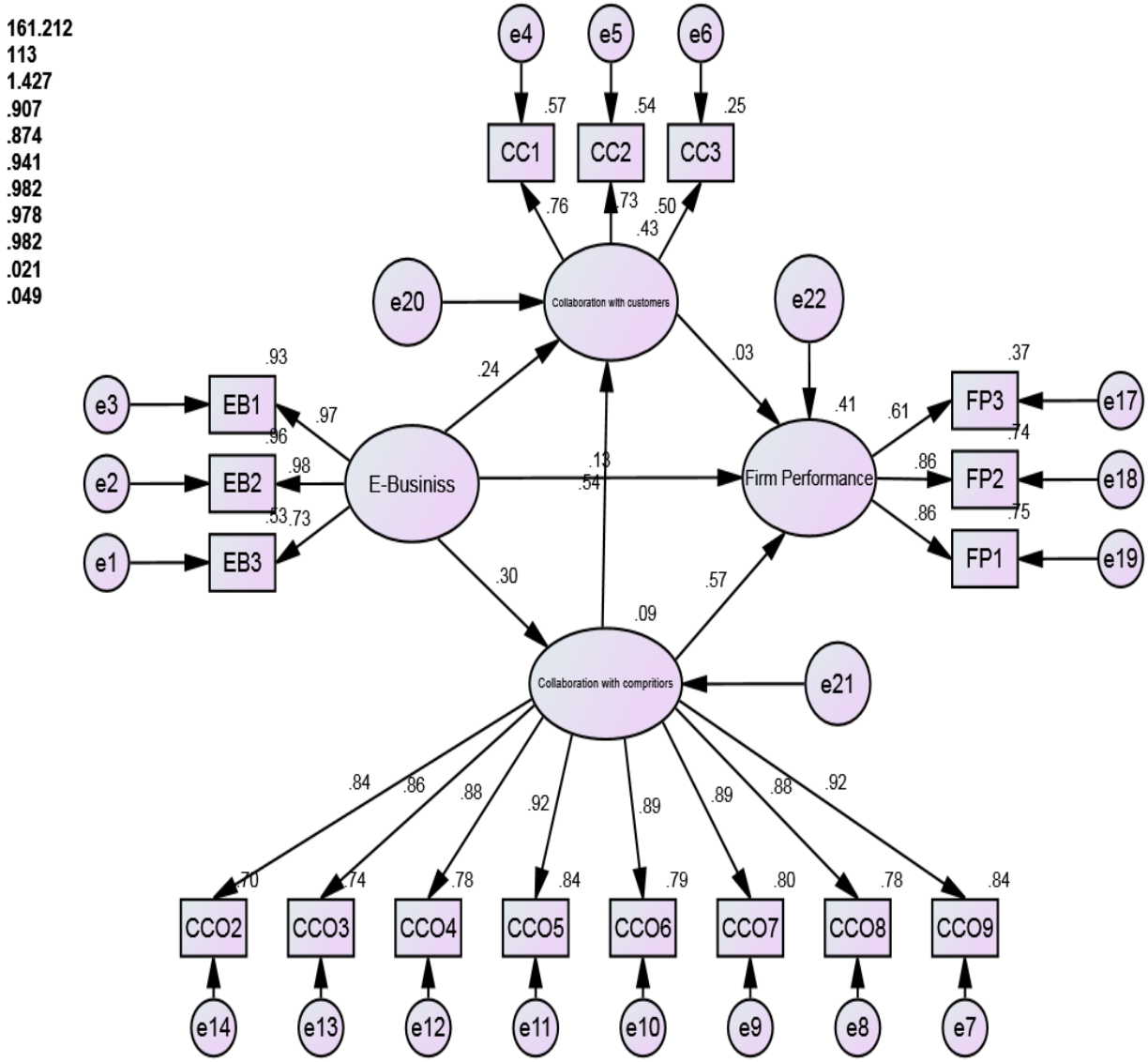

Figure (4.5): Standardized regression weights for EB, CC, CCO, and FP

Table (4.16): Direct Standardized Regression Weights, Critical Ratio, and Probability Value.

	Estimate	Critical ratio	Probability value	Result
EB → FP	**0.133**	**1.738**	**0.082**	**Not Significant**
EB→ CC	**0.238**	**2.96**	**0.003**	**Significant**
EB → CCO	**0.297**	**3.84**	*******	**Significant**
CC → FP	**0.029**	**0.263**	**0.793**	**Not Significant**
CCO → FP	**0.568**	**5.108**	*******	**Significant**
CCO → CC	**0.543**	**6.261**	*******	**Significant**

The Procedure for Testing Mediation

Figure (4.5) present the structural model with fitness indices, the fitness required in structural equation model has been reached, the findings is emphasized once achieve the required level for CFA using covariance-based SEM. The figure (4.5) demonstrates the path coefficient of standardized regression weight for causal effect of exogenous variables on endogenous variables. EB factor doesn't has significant impact on FP. On the other hands, the EB factor has significant impact on CC and competitors. CC don't have impact on FP, while CCO has a significant impact on FP. To improve the model, the researcher has proposed a new relationship between CCO and Collaboration with Customer, testing the modified model revealed that CCO has significant impact on CC (estimation 0.543 P<0.000), this relationship has increased the

power of mediators to explain the changes in FP. Many researchers supported this relationship such as (Ralston, 2014; Kim and Lee, 2010) who pointed to the impact of CCO on CC.

The researcher is seeking to certify whether the mediator variables are to be interested to apply for the subsequent analysis. CC, CCO factors is selected for testing the statistical power analysis using Sobel test technique.

The results of standardized regression weight and probability values (P-value) were implemented. The indirect effect should be considering of Independent variable→ Mediator variable→ Dependent variable of which value of standardized regression weight for both path should be multiplied (e.g.: value of Independent and Mediator * value of Mediator and Dependent). Baron & Kenny (1986) inherits that technique, indirect effect should be higher than direct effect to indicate the mediation effect is occurs in a structural modeling. Means that, value related on mediator variable should be higher than causal effect. Logically, the mediation variable is deemed has an influenced to increase or decrease the causal effect of independent on dependent variable. However, if some of the sort cases judges the presence of mediator variable (P-value > 0.05) does not give any shift to effect on the main factor can be defined as non-mediation occurs. Thus, this variable might be appropriate to perform as independent variable since does not give any contribution that can give a tremendous advantage in analysis. Of overwhelming techniques has been spread among researchers recently, the non-mediation effect supposed to preserve for the future research. Indeed, the researcher should be drawing the deduction based on our findings, but it does not mean the researcher should neglect the significant of this variable. In other words, the researcher should address the probability value as a first step followed on value of Independent and Mediator *

value of Mediator and Dependent calculated. To fulfill the requirement of the mediation effect occurs, probability value should be significant (P-value < 0.05) or confidence interval 95%. If either one or both path is insignificant presented stating that the mediation effect is not supposed to be occurs. Subsequently, the researcher presses on the calculation between indirect and direct effect as mentioned.

The calculation bellow explains deeper understanding about the mediation affect:

The indirect effect EB → CC → FP= 0.238 * 0.029 = 0.0069.

0.0069 is lower than 0.133, No mediation Accrue

The indirect effect EB →CCO→ FP = 0.297* 0.568= 0.169

0.169 is greater than 0.133, Mediation Accrued

The indirect effect EB →CCO →CC= 0.297*.543=0.161

0.161 is lower than 0.238, CCO does not mediate EB-CC

The indirect effect EB →CCO →CC → FP= 0.297*0.543*0.029=0.005

0.005 is lower than 0.133, No mediation accrues

The indirect effect CCO →CC →FP = 0.543*.029=0.015

0.015 is lower than 0.568, CC does not mediate CCO- FP.

4.10 Testing the hypothesized model (Hypothesizes)

Testing the mediation effect using SEM indicated that CC does not meet the condition to be mediator variable, while CCO play as a significant variable to mediate the relationship between EB and FP. The variable CC is fail at the beginning once the mediator variable having insignificant path on endogenous construct. Since the result of direct effect is unchanged once include a mediator variable, thus, the mediation effect is not occurring, while variable CCO have a significant impact. Also, the result of direct effect is suddenly increase once include a mediator variable when all path coefficient is significant, calculate the result of indirect effect. If value of direct effect is higher than indirect effect, the non-mediation effect is not occurred. Table (4.17) below presents the hypothesis testing.

Table (4.17): **Testing the direct hypothesis**

Hypothesis	**Estimate**	**p-value**	**Supported or not**
H_o1: There is a positive impact of EB on FP at the level ($\alpha \leq 0.05$)	0.133	0.082	Not Supported
H_o2: There is a positive impact of EB on CC at the level ($\alpha \leq 0.05$)	0.238	0.003	Supported
Ho3: There is a positive impact of EB on CCO at the level ($\alpha \leq 0.05$)	0.297	0.000	supported
Ho4: There is a positive impact of CCO on CC at the level ($\alpha \leq 0.05$)	0.543	0.000	Supported
Ho5: There is a positive impact of CC on FP at the level ($\alpha \leq 0.05$)	0.029	0.793	Not Supported
Ho6: There is a positive impact of CCO on FP at the level ($\alpha \leq 0.05$)	0.568	0.000	Supported

Results in table (4.17) which have shown no mediation effect have been accrued from CC cannot be presume as a fail findings or analysis but can be elaborate as no effect on endogenous construct. This might be happened due to less correlation with endogenous construct or view of respondent at the targeted population that deem this factor is unnecessary to be addressed.

Chapter 5

5.1 Introduction

5.2 Study discussion

5.3 Conclusion

5.4 Recommendations

Chapter 5

Discussion, Conclusion and Recommendations

5.1 Introduction

The main objective of this study is to investigate the role of EB in FP: impact of SCC in manufacturing sectors in Jordan. As a mediator variable, to achieve objectives of this study, the study has developed a model to measure impact of EB on FP, impact of EB on CC and CCO and the impact of CC and competitors on FP. An extensive literature review has been conducted to build the study model and measurement scale. The model has two types of variables: the independent variables EB, CC and CCO and the dependent variables: CC, CCO and FP. The model was applied and tested at manufacturing sectors in Jordan.

5.2 Study discussion

Discussion of Exploratory factor analysis (EFA)

The results of EFA, have indicated four factors (EB, CC, CCO and FP) explained 68.833of the variance in the pattern of relationships among the items. All the four factors had high reliabilities (all Cronbach's $\alpha > 0.70$), the first questioner was 40 items then the researcher performed EFA many time to investigate which variables (Items) are attributable to each factor. Variable which load less than 0.40 was eliminated, items which loaded on two or more factors and items which have cross-loading were also eliminated, for example (CC4) loaded in factor 1 CCO. Totally 21 items were deleted due to cross loading 19 items remained. After the deletion process the researcher applied a VARIMAX- rotated analysis to get a completely

clean set of factors loading and avoiding non-cross loading of items to other factors and maximizing the loading of each variable on one factor.

According to (Hair et.al, 2005) it was confirmed that the data included in this study was appropriate to conduct a valid EFA based on the descriptive statistics analysis. Based on the results of the exploratory factor analysis, this study has successfully achieved the simple solution with four factor structures by deleting the items which cross loaded on multiple factors and the items which load less than 0.4.

This research examined the reliability and validity, Based on the results of the EFA. Further analysis is necessary to examine the relationships which exist among the latent and observed variables by conducting a CFA (Schreiber et al, 2006).

At this stage the following questions were deleted due to factor loading less than 0.4 and due to cross loading,

EB4	The company relies on EB technology in operating business processes
EB5	EB is considered very important for the industry
EB6	The purposes of the EB technologies used in the company agree with the purposes of the company.
EB7	EB facilitates the coordination between departments within the company
EB8	EB facilitates the continuous organizational review of the company's performance
EB9	EB is considered an integral part of the strategic planning operation

EB10	The company does the planning and the scheduling for the operations performed through the internet
CC3	We exchange basic information with our customers
CC4	The Company has as inter-changeable communications with its partners within the SC
CC5	We develop new products and new services in cooperation with our customers
CC7	We cooperate with other suppliers to specify the customers' needs

CC010	We cooperate with our competitors to identify customer's needs
CCO6	The company cooperates with suppliers to discover new markets to its competitors

FP1	Performance of the company in cost reduction
FP2	The company's performance in improving product quality
FP5	The company's performance in the job satisfaction of the employees
FP7	The performance of the company in the required time of the production
FP9	The company's performance in the return on investment
FP10	The performance of the company in the profit margin of sales
FP11	The performance of the company in customer satisfaction
FP12	The performance of the company in the precision process

The remained items in the measurement scale are shown in appendix (3).

Discussion of Confirmatory Factor Analysis

The second step after EFA is performing CFA, based on data from 178 respondents. The researcher chooses ML estimation because the data were normally distributed. The data came from 19 questions are distributed in many manufacturing sectors in Jordan. A Results of multivariate normality and CFA Model with means and standard deviations is shown in Table 4.15; the theoretical model is presented in Figure (4.5). The researcher hypothesized a four-factor model to be confirmed in the measurement model. Then evaluated the assumptions of multivariate normality and linearity through SPSS 19.

Each item that have a factor loading lower than 0.6 and an R^2 (R-Squared for the item) less than 0.4 were deleted from the measurement model. Low factor loading means that item is considered useless to measure that construct. Keeping these items affected the fitness indices of the model. There are many reasons for obtaining low factor loading, these reasons may include biased statement, double meaning statement, ambiguous statements, sensitive statement etc. The items deleted due low factor loading are FP4 due to the lower factor loading (less than 0.60) = 0.57 and CCO1 due to the lower factor loading (less than 0.60) = 0.59.

CC3 was not deleted because the factor CC have only three items, the deletion of this item made CC include 2 items, so the factor was under identified as (Hair et al, 2009).

The items related to the four constructs EB, CC, CCO, FP model are fit with the data selected which indicated that measurement model can serve as a good measurement scale of EB, CC, CCO and FP in manufacturing sectors in Jordan.

After completion of CFA measurement model, the researcher must have ensured that model indicate validity and reliability of the construct. Assessment of model unidimensional, validity, and reliability is required before proceeding to modeling the structural model. Also examining the normality of the data to assess the distribution for each variable (items resulted in 2nd CFA Model) in a dataset after fitting the measurement model. Cronbach's Alpha was also calculated to ensure the internal consistency between variables.

Discussion of Structural model

Testing the structuring model indicated that:

The directs effects: EB has no significant impact on FP (path coefficient =0.133, P =0.082), this result was supported by (Azeem et.al, 2015). On the other hand, EB has significant impact on CC(CC) (path coefficient = 0.238, P=0.003), this result was supported by (shams and Moosavi, 2016). Also, EB has a significant impact on CCO (path coefficient = 0.297, P= 0.00), this result was supported by (Majava et.al, 2013). While Rodriguez And Honeycutt (2011) supported the result of CC has no significant impact on FP (path coefficient = 0.029, P=0.793), although CCO has a significant impact on FP (path coefficient = 0.568, P=0.00), this result was supported by (Cao and Zhang, 2010) and CCO has a significant impact on CC (path coefficient = 0.543, P=0.00), this result supported by (Talavera, 2013).

The results of the tests revealed that there is a need for collaboration relationships between competitors and customers, where the results indicated that the collaboration between competitors and customers was statistically significant (Estimate =.543). This finding

coincided with several studies such as (Shams and Moussawi, 2016), this relationship led to improve fitness indices of the model.

Collaboration with Customers has no significant mediation between EB and FP, this result supported by (Sanders, 2007) and that's because the customers have no awareness enough in enhancing the organizational performance and lack of customer interaction with the manufacturing sectors and the most things that the customers need is to get the product with high quality and good price. While CCO has a significant mediator between EB and FP, this result supported by (Vachon and Klassen, 2008). Based on final results of this research, the assumption of the mediating effect of CC on EB and FP was refused, in the other side it was accepted that CCO Mediate EB and FP. The researcher supported the model of the study by two mediator variables (CC and CCO) because there is no significant impact of EB on FP.

5.3 Conclusion

With the fast development of EB and the adoption of channels, manufacturers are executing benefits sharing procedures to improve channel of Collaboration and SC performance.

SC Management includes Collaboration Between Customers, Competitors, distributers and suppliers. Associations rely on SCC to develop the performance of SC. Additionally, Collaboration should enhance organizational performance by allowing SC members to define the significant objectives and share many techniques and information.

This study measures the impact of EB on FP in the manufacturing sectors. The study assumes that CC and competitors mediate the relationship between EB and FP. In the end, the researcher developed a measurement scale to measure the dimensions of the study. For

verifying the validity and reliability of the study scale, the researcher used the EFA, the CFA and verified that the scale is characterized by validity and reliability. The SEM method was used to examine the relationship between the dimensions of the study and to measure the impact of EB on FP and measure the mediating effect of CCO and CC. The study found that EB doesn't have a statistically significant impact on FP. The study followed the descriptive and analytical approach to achieve the results. The descriptive statistical methods were used to describe the dimensions of the study and its variables and to describe the sample of the study. The analytical method was used to test the relationships between the variables of the study. Finally, the study presented applications of the study model, recommendations from the study findings, and recommendations for future research.

5.4 Recommendations

Recommendations for Practice Based on the study results have been performed, some recommendations can be proposed by the study; Firstly, manufacturing sectors need to focus on Supply Chain Collaboration (Collaboration with Customers and Collaboration with Competitors) by utilizing E-business effectively to improve the quality of Firm Performance. Secondly, Supply Chain officers' need to contribute significantly to increase the quality of Firm Performance provided to different beneficiaries. Thirdly, Manufacturing sectors should focus on recruiting highly skilled and specialized personnel in the Supply Chain departments and subject them to intensive training courses in international quality standards; therefore, they can deal with Customers and Competitors in accordance with specific guidelines. Fourthly, there are growing needs to arrange training courses for staff members who work in Manufacturing sectors on the Supply Chain Collaboration and enhance the performance of

manufacturing sector. Finally, Adopting manufacturing sectors for Supply Chain Management authorization a change in thinking ways as well as practices. It means that Supply Chain Management needs to define its role, tasks, and begin to employ value-added activities across the value chain aspects to improve quality of manufacturing sectors.

Of the results achieved during the stages of development of the scale, the researcher recommends administrations in manufacturing sectors to focus on the dimensions contained in the scale (E-business, Collaboration with Customers, Collaboration with Competitors and Firm Performance). The fact that this measure has undergone tests of validity and reliability in its various stages, and because these dimensions have a high explanatory power.

Recommendation for future research

This study was limited in manufacturing sectors in Jordan, and these results cannot be generalized. The researcher recommends that future research should include other sectors such as services, other industries, telecommunications, etc. The study was limited to managers, recommending the inclusion of all employees as they are the most targeted group in the collaboration process. Finally, the study determined the collaboration factors in two types (Customers and Competitors), the researcher recommends that the future researches should include other types of collaboration such as retailers, suppliers, wholesalers, distributors, academic institutions, etc.

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Appendix 1

List of Esteemed Academics that Arbitrated the Questionnaire

Ahmad Ali Salih Al- Limey	Prof Faculty of Business	Middle East University
Sameer Aljabali	Assistant Professor	Middle East University
Hiba Hasan Naser Al- Deen	Prof Faculty of E- Business	Middle East University
Nidal AL- Hawamdeh	Faculty of E- Business	Mo'tah University
Fares Musallam Abu Qaood	Associate Professor	Alesraa University

Appendix 2

Initial Research Questionnaire

Dear participant

The researcher conducts a study entitled "**The Role of E-business in Firm Performance: Impact of Supply Chain Collaboration in Manufacturing Sector in Jordan**".

Please kindly give us a few minutes of your valuable time to answer the questions, knowing that the data will be used for scientific research only and will be treated confidentially.

I wish you continued progress

Researcher: Dima Khalil Al-Hinn

Phone no. :0797763196

e-mail: dima.alhinn2014@gmail.com

Middle East University,

Business Department,

Master Program in E-business

Amman, Jordan

Part 1: Demographic data

Please, give us a few minutes of your valuable time to answer the following questionnaire using multiple choice.

-Job Title

a) CEO-President. b) Vice President.

c)Manager. d)Director.

e) Others.

-Firm Size

a)1-50 b)51-100

c)101-250 d)251-500

e)501-1000 f)1001-and more

-Industry Sub-Sector

a) Miscellaneous manufacturing b) Electrical \ Electronic equipment

c)Chemical d) Fabricated metal

e) Rubber and plastic manufacturing f) Computer \ electronic equipment

g) Machinery manufacturing h) Transport equipment manufacturing

i)Apparel manufacturing j) Food manufacturing

k) Furniture and related product manufacturing l) Beverage manufacturing

m)Wood product manufacturing n) Paper manufacturing

o) Others

Part 2: Questionnaire items

Please give us a few minutes of your valuable time to answer the following questionnaire using (x) in the specific box

#	E-business	Strongly disagree	disagree	neural	agree	Strongly disagree
1-	The company uses e-business technology					

	according to the field that the company work with					
2-	The company uses e-business proportionally with the competition requirements					
3-	The company uses e-business technology according to the needs of its key customers					
4-	The company relies on e-business technology in operating business processes					
5-	E-business is considered very important for the industry					
6-	The purposes of the e-business technologies used in the company agree with the purposes of the company.					
7-	E-business facilitates the coordination between departments within the company					
8-	e-business facilitates the continuous organizational review of the company's performance					
9-	E-business is considered an integral part of the strategic planning operation					
10-	The company does the planning and the scheduling for the operations performed through the internet					
#	**Collaboration with customers**	**Strongly disagree**	**disagree**	**neural**	**agree**	**Strongly agree**
1-	We consider the customers of the company as an extension to it					

2-	We consider the relationship with our customers as a long-term alliance					
3-	We exchange basic information with our customers					
4-	The Company has as inter-changeable communications with its partners within the supply chain					
5-	We develop new products and new services in cooperation with our customers					
6-	We respond quickly to our customers' needs					
7-	We cooperate with other suppliers to specify the customers' needs					
#	**Collaboration with competitors**	**Strongly disagree**	**disagree**	**neural**	**agree**	**Strongly agree**
1-	The company cooperates with competitors in the development processes of the new product					
2-	The Company receives information about the competitor's abilities within the supply chain					
3-	The company joins forces with other specific competitors to develop new products or new technologies					
4-	We conduct research and development with competitors for beneficial cooperation as long as there is no professional secrets					
5-	We exchange information with competitors to achieve common standards, to be					

	informed about whatever is new in the market and technology tendencies					
6-	The company cooperates with suppliers to discover new markets to its competitors					
7-	The company has face to face communication with its competitors					
8-	The company exchanges information continuously and accurately with its competitors					
9-	The company cooperates with competitors in the technology field					
10-	We cooperate with our competitors to identify customer's needs					
11-	The company has knowledge exchange with its competitors					
#	**To what extent do you evaluate your company's performance concerning the following in comparison with competitors**	**A great deal higher**	**Quite a bit higher**	**About the same**	**A great deal lower**	**Quite a bit lower**
1-	Performance of the company in cost reduction					
2-	The company's performance in improving product quality					
3-	The performance of the company in the speed of entering new products to the market					
4-	The company's performance in improving quick delivery					
5-	The company's performance in the job satisfaction of the employees					

6-	The performance of the company for the total cost of the product					
7-	The performance of the company in the required time of the production					
8-	The company's performance in sales growth					
9-	The company's performance in the return on investment					
10-	The performance of the company in the profit margin of sales					
11-	The performance of the company in customer satisfaction					
12-	The performance of the company in the precision process					

Appendix 3

Modified Questionnaire after EFA

Dear participant

The researcher conducts a study entitled "**The Role of E-business in Firm Performance: Impact of Supply Chain Collaboration in Manufacturing Sector in Jordan**".

Please kindly give us a few minutes of your valuable time to answer the questions, knowing that the data will be used for scientific research only and will be treated confidentially.

I wish you continued progress

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Amman, Jordan

Part 1: Demographic data

Please, give us a few minutes of your valuable time to answer the following questionnaire using multiple choice.

-Job Title

a) CEO-President. b) Vice President.

c)Manager. d)Director.

e) Others.

-Firm Size

a)1-50 b)51-100

c)101-250 d)251-500

e)501-1000 f)1001-and more

-Industry Sub-Sector

a) Miscellaneous manufacturing b) Electrical \ Electronic equipment

c)Chemical d) Fabricated metal

e) Rubber and plastic manufacturing f) Computer \ electronic equipment

g) Machinery manufacturing h) Transport equipment manufacturing

i)Apparel manufacturing j) Food manufacturing

k) Furniture and related product manufacturing l) Beverage manufacturing

m)Wood product manufacturing n) Paper manufacturing

o) Others

Part 2: Questionnaire items

Please give us a few minutes of your valuable time to answer the following questionnaire using (x) in the specific box

#	**Collaboration with competitors**	**Strongly disagree**	**disagree**	**neural**	**agree**	**Strongly agree**
1-	The company has knowledge exchange with its competitors					
2-	The company cooperates with competitors in the technology field					

3-	The company has face to face communication with its competitors					
4-	The company exchanges information continuously and accurately with its competitors					
5-	The company joins forces with other specific competitors to develop new products or new technologies					
6-	We conduct research and development with competitors for beneficial cooperation as long as there are no professional secrets					
7-	We exchange information with competitors to achieve common standards, to be informed about whatever is new in the market and technology tendencies					
8-	The company cooperates with competitors in the development processes of the new product					
9-	The Company receives information about the competitor's abilities within the supply chain					
#	**To what extent do you evaluate your company's performance concerning the following in comparison with competitors**	**A great deal higher**	**Quite a bit higher**	**About the same**	**A great deal lower**	**Quite a bit lower**
10	The performance of the company in the total product cost					
11-	The company's performance in the speed of entering new products to the market					
12-	The company's performance in sales growth					
13-	The company's performance in improving quick delivery					
#	**E- Business**	**Strongly disagree**	**disagree**	**neural**	**agree**	**Strongly agree**

14-	The company uses e-business technology according to the field that the company works with					
15-	The company uses e-business proportionally with the competition requirements					
16-	The company uses e-business technology according to the needs of its key customers					
#	**Collaboration with customers**	**Strongly disagree**	**disagree**	**neural**	**agree**	**Strongly agree**
17-	We consider the customers of the company as an extension to it					
18-	We consider the relationship with our customers as a long-term alliance					
19-	We respond quickly to our customer's need					

Appendix 4

Modified Questionnaire after CFA

Dear participant

The researcher conducts a study entitled "**The Role of E-business in Firm Performance: Impact of Supply Chain Collaboration in Manufacturing Sector in Jordan**".

Please kindly give us a few minutes of your valuable time to answer the questions, knowing that the data will be used for scientific research only and will be treated confidentially.

I wish you continued progress

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Business Department,

Master Program in E-business

Amman, Jordan

Part 1: Demographic data

Please, give us a few minutes of your valuable time to answer the following questionnaire using multiple choice.

-Job Title

a) CEO-President. b) Vice President.

c)Manager. d)Director.

e) Others.

-Firm Size

a)1-50 b)51-100

c)101-250 d)251-500

e)501-1000 f)1001-and more

-Industry Sub-Sector

a) Miscellaneous manufacturing b) Electrical \ Electronic equipment

c)Chemical d) Fabricated metal

e) Rubber and plastic manufacturing f) Computer \ electronic equipment

g) Machinery manufacturing h) Transport equipment manufacturing

i)Apparel manufacturing j) Food manufacturing

k) Furniture and related product manufacturing l) Beverage manufacturing

m)Wood product manufacturing n) Paper manufacturing

o) Others

Part 2: Questionnaire items

Please give us a few minutes of your valuable time to answer the following questionnaire using (x) in the specific box

#	**Collaboration with competitors**	**Strongly disagree**	**disagree**	**neural**	**agree**	**Strongly agree**
1-	The company cooperates with competitors in the technology field					
2-	The company has face to face communication with its competitors					

3-	The company exchanges information continuously and accurately with its competitors					
4-	The company joins forces with other specific competitors to develop new products or new technologies					
5-	We conduct research and development with competitors for beneficial cooperation as long as there are no professional secrets					
6-	We exchange information with competitors to achieve common standards, to be informed about whatever is new in the market and technology tendencies					
7-	The company cooperates with competitors in the development processes of the new product					
8-	The Company receives information about the competitor's abilities within the supply chain					
#	**To what extent do you evaluate your company's performance concerning the following in comparison with competitors**	**A great deal higher**	**Quite a bit higher**	**About the same**	**A great deal lower**	**Quite a bit lower**
9-	The performance of the company in the total product cost					
10-	The company's performance in the speed of entering new products to the market					
11-	The company's performance in sales growth					
#	**E- Business**	**Strongly disagree**	**disagree**	**neural**	**agree**	**Strongly agree**
12-	The company uses e-business technology according to the field that the company works with					
13-	The company uses e-business proportionally with the competition requirements					

14-	The company uses e-business technology according to the needs of its key customers					
#	**Collaboration with customers**	**Strongly disagree**	**disagree**	**neural**	**agree**	**Strongly agree**
15-	We consider the customers of the company as an extension to it					
16-	We consider the relationship with our customers as a long-term alliance					
17-	We respond quickly to our customer's need					

MEU جامعة الشرق الأوسط MIDDLE EAST UNIVERSITY

استبيان البحث

عزيزي المشارك

أجرى الباحث دراسة بعنوان "دور الأعمال الإلكترونية في أداء الشركة: تأثير تعاون سلسلة التوريد في قطاع الصناعة التحويلية في الأردن."

يرجى التكرم بإعطائنا بضع دقائق من وقتك الثمين للرد على الأسئلة، مع العلم أن البيانات سوف تستخدم للبحث العلمي فقط، وسيتم التعامل معها بشكل سري.

وأتمنى لكم التقدم المستمر

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