

**The Role of E-Business Adoption and Business Process
Reengineering: Impact on Competitive Advantage in
Private Hospitals in Amman**

دور تبني الأعمال الإلكترونية وإعادة هندسة الأعمال في التأثير على
الميزة التنافسية في المستشفيات الخاصة في عمان

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**Thesis Submitted in Partial Fulfillment of the Requirements for
Master Degree in E-Business.**

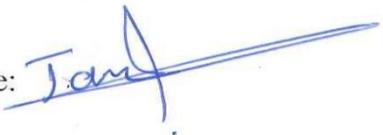
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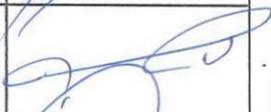
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Examination Committee's Decision

This thesis of the student Tamara Mustafa Hamidi, which studied (The Role of E-Business Adoption and Business Process Reengineering: Impact on Competitive Advantage in Private Hospitals in Amman) has been defined accepted and approved on 2/6/2018.

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First, I would like to thank Allah. This work could not have been finished without His faith. I am requesting Allah to bless all people who supported me to complete this work.

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Finally, many thanks goes for the examination committee for devoting much of their valuable time reviewing and discussing the material of the study.

Tamara Mustafa Hamidi.

Dedication

منذ ان وعيت على هذه الدنيا، ووجها الباسم كان يبث بداخلي الكثير من القوة، وصدورها الدافئ كان ملاذا لي عندما اشعر بالضعف، ما زالت كلماتها تترد بداخلي تشجعني في خطواتي نحو النجاح.

رغم رحيلها عني والتي كنت اتمنى لو كانت تجلس مع الحضور امامي، أرى وجهها والسعادة تزينه.

أعلم ان كل حرف مما كتبت لن تقرئيه لأنك في عالم آخر غير عالمنا.لكنها مشيئة الرحمن لا اعتراض عليها

اهدي رسالتي لروحك الطاهر يا أمي..

كما أهدي رسالتي الى والدي الذي أنار لي درب النجاح والذي علمني الصمود مهما تبدلت الظروف..

إلى زوجي الذي وهبني كل ما يملك حتى أحقق ما اريد، إلى من كان يدفعني قدما نحو الأمام لنيل المبتغى، إلى الإنسان الذي ساندني وتحمل معي أعباء دراستي...

كما أهدي ثمرة جهدي لوالد زوجي الدكتور أحمد الحميدة ووالدة زوجي أمي الثانية اللذان كلما تظلمت الطريق أمامي لجأت إليهما فأنارها لي، وكلما دب اليأس في نفسي زرعاً فيا الأمل

لأساتذتي الاجلاء الذين صنعوا بكل اقتدار خطوات تعليمي...
لجميعهم انحناءة اجلال ولمكانتهم السامية واسماؤهم الجليلة أسمى عبارات الاعتزاز والتقدير....

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List of Abbreviations

Abbreviations	Meaning
AVE	Average Variance Extracted
BPR	Business Process Reengineering
CA	Competitive advantage
CFA	Confirmatory factor analysis
CFI	Comparative Fit Index
EB	E-Business
EFA	Exploratory factor analysis
EHR	Electronic health record
GFI	Goodness of Fit Index
NFI	Normal Fit Index
NPV	Net present value
RMSEA	Root Mean Square Error of Approximation
SEM	Structural equation model
TLI	Tucker Lewis Index
FMC	flexibility of manufacturing competence

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The Role of E-Business Adoption and Business Process Reengineering: Impact on Competitive Advantage Private Hospitals in Amman

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Abstract

This study aims to present theoretical models which investigate the impact of E-Business on Competitive Advantage taking into account the role of Business Process Reengineering (BPR), the study was conducted in five private hospitals in Amman, The researcher used the exploratory factor analysis in the first phase of the analysis. A total of 50 questionnaires were distributed and considered for pilot testing. In the second phase, confirmatory factor analysis was conducted to validate the measurement scale.

The researcher distribute 250 questionnaires, a total number of 120 questionnaires were used to validate the measurement scale. Then the researcher used structural equation modeling SEM to examine the relationship between the dimensions of the study to measure the impact of E-Business on Competitive Advantage, and to measure the mediating effect of Business Process Reengineering.

The study presents recommendations for managers in private hospitals in Amman that may be helpful for them in order to make a full use of the E-Business and to achieve Competitive Advantage. It recommends that private hospitals in Amman need to focus on E-Business activities in order to improve the quality of their services and provide training courses for staff members who work in hospitals to train and prepare them to the new systems, procedures and tasks.

Key words: E-Business, Business Process Reengineering, Competitive Advantage.

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المستشفيات الخاصة في عمان

أعداد

تمارا مصطفى حميدي

إشراف

الدكتور محمد العضاييلة

يهدف هذا البحث إلى بناء نموذج لاختبار تأثير الأعمال الإلكترونية على الميزة التنافسية مع الأخذ في الاعتبار دور اعاده هندسه الاعمال ، وقد أجريت الدراسة في خمسة مستشفيات خاصة في عمان ، استخدم الباحث التحليل العاملي الاستكشافي في المرحلة الأولى من التحليل، حيث قام بتوزيع 50 استبياناً، ثم المرحلة الثانية التحليل العاملي التوكيدي حيث قام الباحث بتوزيع 250 استبياناً، تم استخدام 120 استبياناً للتحقق من صحة اداة القياس ثم استخدم الباحث نموذج المعادلة الهيكلية لفحص العلاقة بين أبعاد الدراسة وقياس تأثير الاعمال الإلكترونية على الميزة التنافسية، وقياس تأثير المتغير الوسيط وجدت نتائج الدراسة أن الاعمال الإلكترونية واعاده هندسه الاعمال لهما تأثير ذو دلالة إحصائية على الميزة التنافسية. لم يدعم اختبار نتائج نموذج المعادلة الهيكلية دور اعاده هندسه الاعمال في تأثير الاعمال الإلكترونية على الميزة التنافسية ، قدمت الدراسة توصيات للمدراء في المستشفيات الخاصة في عمان من أجل الاستفادة من الاعمال الإلكترونية لتحقيق الميزة التنافسية أهمها أن المستشفيات الخاصة في عمان تحتاج إلى التركيز على أهميه الأعمال الإلكترونية من أجل تحسين جودة الخدمات ، وهناك حاجة متزايدة لترتيب دورات تدريبية للموظفين الذين يعملون في المستشفيات لتدريبهم .

الكلمات المفتاحية: الاعمال الالكترونية، اعاده هندسة الاعمال، الميزة التنافسية.

Chapter One

Background of the Study

1.1 Introduction

1.2 Study Problem

1.3 Study Objectives

1.4 Study Significance

1.5 Study Questions and Hypothesis

1.6 Study Model

1.7 Study limitations

1.8 Study Delimitations

1.9 Theoretical Definitions

1.1 Introduction:

Many Hospitals deploy E-Business (EB) models to increase the effectiveness and achieve a radical development in the health care services provided to customers, and provide them with the best services' standards as well as economic efficiency; it also aims at improving work procedures that is positively reflected on the patients' experience in the health care.

Firms moved to web-based business-to-business (B2B) platforms promoting speed and efficiency. The need to implement EB technologies has grown significantly in business in general, and in specific. Companies are more and more recognizing the importance and the need of EB technologies because EB is the new economy that decides achievements for companies (Phan, 2003). There has been significant managerial interest in seeking opportunities in EB to create Competitive Advantage (CA). For companies and supply networks in the current and the unstable business environment, new models of EB may be a source of value creation (Amit&Zott, 2001).

Many studies have identified the benefits associated with EB solutions, namely improved communication, improved customer service and the procurement process became easier (Porter, 1998; Oliver, 1997; Christensen&Methlie, 2003; Chong, et.al, 2010). Those benefits in the academic literature (Gordijn, et.al, 2001; Sila, &Dobni, 2012) are often related to the CA of the company.

Various studies seek to examine the EB impact on the business processes claimed that EB improves business processes through the automation and optimization of usual business processes (Pilinkiene, et.al, 2013). This study has investigated the benefits that EB solutions would deliver to CA taking into account the role of Business Process Reengineering BPR; the conceptual study framework integrates EB adoption in the usual

business processes to achieve a CA. This study conceptualized CA as cost, leadership, Quality, flexibility, and delivery due to EB adoption.

The importance of the study comes from the fact that EB can radically affect health care organizations and health care delivery. EB change more rapid outside than within the healthcare industry (Al-Qirim, 2007). Other industries faced the similar transformations and developed theories and methods that are being applied to healthcare.

Implementing the use of electronic patient records could reduce the frequency of medical errors. The BPR perspective of healthcare provides insight to the processes that are facilitated by technology. Using EB technology to improve CA maintaining support from top management on the benefits of EB operations (Wu, et.al., 2003).

This study provides the decision-makers in health care sector in Jordan with the most benefits that EB, provide to Private Hospitals in Amman, helping them to identify the interrelations between each factor. It also gives recommendations for the decision makers based on the results about how they can achieve CA using new technology.

1.2 Study Problem

E-Business is the tool that can be used to connect business internally and externally using the internet (Pilinkiene, et.al, 2013). Today's companies consider EB as a primary tool when attempting to compete successfully in any industry and market. Solutions that can EB provide such as supply chain management, resource planning system, e-commerce and others create benefits for the companies. In other word, studies on the EB benefits regarding EB solutions are an important source of CA.

Many organizations have implemented EB and have not taken into account the BPR which is a very essential step before applying EB. The integration of EB solutions in the business processes may improve all activities.

According to (Sentanin, et.al, 2008), BPR is redesigning all processes of the company. (Kesavaraja, et.al, 2010) States that BPR is not only restructuring, reorganizing, and downsizing but it is a dramatic change in the overall organizational processes and structures, employee responsibilities, management systems, and performance measurements. (Hammer, 1993) visualize BPR as the fundamental and radical redesign of business processes to achieve its goals in critical measures of CA such as cost leadership, quality, flexibility and delivery. (Teng, et.al., 1994) view BPR as the critical analysis and radical redesign of existing business processes to achieve breakthrough improvements in performance measures.

Technology affects CA if it has a significant role in determining cost leadership, quality, flexibility and delivery. Since technology is stereophonic in every activity and is engaged in achieving links among activities, (Herzog, et.al, 2007) mention that to succeed companies need to search and Implement new strategies that take advantage of both the power of the Internet and the changes in both traditional and electronic markets.

EB can radically affect health care organizations and health care delivery. However, EB change more rapid outside than within the healthcare industry (Shia & Chang, 2017). Other industries faced the similar transformations and developed theories and methods that are being applied to healthcare (Salancik, & Pfeffer, 1978; Lin, & Lin, 2008; Ammenwerth, et.al, 2006).

The idea of the study came after implementing the application of Hakim, which is the first Jordanian health care system that was launched by His Majesty King Abdullah in 2010; to improve quality of patient care and safety. This project started as a pilot in two public hospitals and one public medical center, and up to this date the system is still not applied in the rest of the hospitals in Amman because of the challenges and problems that occurred after the implementation of the system. My study focuses on the importance of the idea of BPR before applying EB to ensure the maximum use and benefits of it, and to minimize any problems that may arise later.

1.3 Study Objectives

The current study seeks to identify the Impact of EB adoption on CA in Private Hospitals in Amman taking into consideration the role of BPR.

The main objectives of this study are:

- Providing a conceptual framework that shows the overall relationships between study variables.
- Developing the measurement scale for the study variables (EB, BPR, CA).
- Estimate the effects between study variables (EB, BPR, CA).
- Providing recommendations based on the results for decision maker in Private Hospitals in Amman.
- To identify which aspects of web-based technologies to adopt, and the best dimensions of CA to focus on.

1.4 Study Significance

The world has witnessed tremendous developments in EB on many levels. So, it is clear that some sort of reforming or reengineering is necessary to exploit the full benefits. This study is to investigate the extent to which EB can be used in the health services systems to provide assistance to hospitals so that they can provide medical services with high efficiency to catch up, overcome obstacles and bring in the benefits of upgrading the EB system.

1.5 Study Questions and Hypothesis

Main question: What is the role of EB adoption on achieving CA considering the role of BPR?

This study tries to answer the below questions:

- 1) What is the role of EB in CA?
- 2) What is the role of PBR in achieving CA?
- 3) How does EB impact BPR?
- 4) How does PBR mediate the impact of EB on CA?
- 5) What are the main factors underling the study variables (EB, BPR, CA)?

Study Hypotheses:

These study tests five main hypotheses according to the above mentioned questions and objectives, which are shown as follows:

- **H_{o1}:** There is a positive and direct impact of E-Business on Competitive advantage of significance at the level ($\alpha \leq 0.05$).
- **H_{o2}:** There is a positive impact of BPR on Competitive advantage of significance at the level ($\alpha \leq 0.05$).
- **H_{o3}:** There is a positive and direct impact of E-Business on Business process reengineering of significance at the level ($\alpha \leq 0.05$).
- **H_{o4}:** Business process reengineering mediate the impact of E-Business on Competitive Advantage of significance at the level ($\alpha \leq 0.05$)

1.6 Study Model:

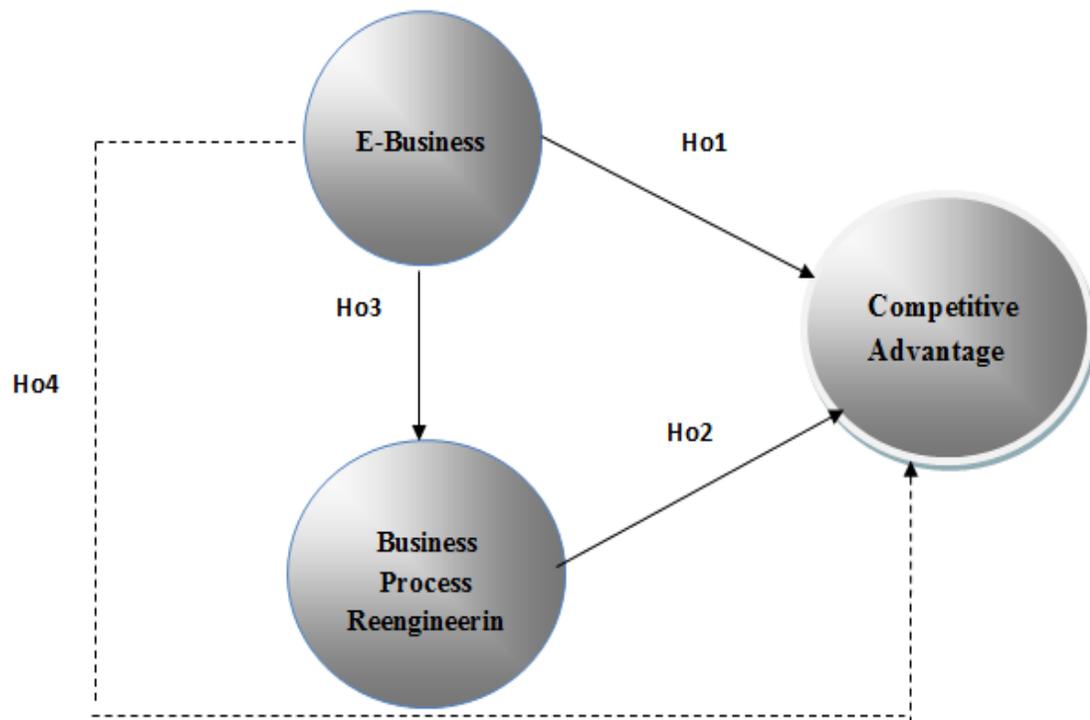


Figure (1-1): Conceptual Framework for the Study Which Hypothesized the Relationships between Study Variables

- **Independent variable** (E-Business, BPR): (WU, et.al, 2003). The framework depends on the study of BPR: (kuhil, 2013; Shia & Chang 2017).
- **Dependent variable:** (competitive advantage): (Pilinkiene, et.al, 2013;Phan,2003;Porter& Millar, 1985). Other dependent variable is BPR.

1.7 Study limitations

As defined by Creswell, et.al. (2006), a limitation is weakness in the research that potentially could be caused by any element that may block data collection within the study.

However; the limitations of the study can be listed as follows:

- ❖ **Human limitations:** The study measured General Managers, Executive Managers, Administrative Managers, Sales Managers and the Directors of Information Technology in private hospitals in Amman.
- ❖ **Place limitations:** The study included managers of five private hospitals in Amman (Alhamaideh hospital, Jordan hospital, specialty hospital, Alhanan hospital, Dar El Salam hospital)
- ❖ **Time limitations:** This study started on February 27,2018 and ended on May 2,2018
- ❖ **Scientific Limitations:** The study follows an established model which was developed as a unified approach of other models and previous studies.

1.8 Study Delimitations

This study is implemented in private hospitals in Amman which limited it' can be generalized to other Hospitals.

- Study results are restricted only in private hospitals in Amman and managers.
- The amount of data collection depends on managers responses to the questionnaires.

1.9 Theoretical Definitions

E-Business: linking the companies with the World Wide Web to create competitive advantage through customer relationships, operational efficiency, innovative services and products, and speed (Trad. & Kalpić, 2018).

Business Process Reengineering: remove non-value added work, making work automatic through science and technology, From four perspectives: re-position, re-organization, re-system, and re-vitalizing (Nassar, & Moawad, 2018).

Competitive Advantage: is the character that allows an organization to be better than other competitors. Competitive advantage may include access to natural resources, such as low-cost power source, geographic location, highly skilled labor, access to new technologies and high entry barriers (Liu, & Gima, 2018).

Chapter Two

Review of Related Literature and Previous Studies

2.1 Theoretical Framework.

2.1.1 E-Business.

2.1.2 Competitive Advantage.

2.1.3 Business Process Reengineering.

2.1.4 Relationship between variables

2.2 Previous Studies.

2.3 Distinctive Features of the Current Study.

2.1 Theoretical Framework:

This chapter starts discussing the conceptual and theoretical framework, a relationship between variables followed by introducing previous studies and finally, what differentiates this study from previous studies.

2.1.1 E-Business

In every area of business, EB offers amazing opportunities to change the way a company operates (Tobias, 2002).

Firms adopted EB initiatives to deal with their external and internal processes and to compete in the dynamic environment (WU et.al, 2003), EB is the use of Internet technologies to connect suppliers, customers, business partners, and employees. EB also offers customer-service websites, intranets and enterprise information portals, sales transactions, extranets and supply chains, and electronic data interchange.

EB solutions enable companies to manage operations and control the inventory, which increase the effectiveness of those processes. When the transactions become automated this help in increasing the effectiveness and saving time. Also EB solutions help to improve flexibility and meet the demands of customers more accurately.

EB is not limited to sales activities and procurement. All activities used for defining EB can be classified into one of the following three groups: 1) Internal versus External. Some definitions limit EB to communication that crosses company boundaries, definitions also take internal communication into account. 2) Processes Definitions limit EB to specified

processes. Examples of processes used in EB questionnaire definitions are collaborating, inventory and transacting.

3) Trade cycle, definitions limit EB to the automation of certain aspects of the trade cycle. Aspects used for limitation are payment, delivery, order, invoice, and settlement (Graaf, & Muurling, 2005)

Benefits of E-Business:

1) Communication process:

EB can be divided into three parts. It can be within the same organization using called Intranet. The Intranet uses Internet principles for electronic communication. On Intranet organization has its specific web sites; these web sites are separated from the others of the world by firewalls and other security measures. So the privacy of the web site is very high.

The second part is (B2B) Extranet. The Extranet is two Intranets connected via the Internet, B2B networks have existed a long time earlier than the Internet. Organizations have private networks to talk to the others and customers. But maintaining the Extranet is very expensive.

The third part (B2C) this is the most important and well known one, this is what most people know as e-commerce selling and buying via the internet (Amor, 2000).

2) **Improve customer service:** Customer satisfaction became one of the top priorities of business nowadays (Kardaras, & Karakostas, 1999). Satisfied customers are more effective and less expensive than advertising when the customer says a positive word of mouth about

something (Bhattacharjee, 2001). Customer satisfaction helps to ensure customer retention because it is less costly than the new customer (Creyer, 1997).

Many organizations believe that EB can provide opportunities to improve customer service operations by enabling making relations with the customers and enhance the organization's contact with them. The use of the Internet basically changes the nature of contacting the customers (Lee, & Lin, 2005).

3) **Procurement process:**B2B or B2C purchase and sale of service and supplier through the Internet and other information and networking systems, such as Electronic Data Interchange and Enterprise Resource Planning (Sudrajat,2016).

There are a lot of benefits associated with the change from a manual procurement process to e-Procurement: an increase in procedures quality, process innovation and enhancement, reduced procurement cost, improved customer service, user satisfaction product innovation, increased responsiveness market expansion, reduction in purchasing cycle time, reduction in staff time and managerial effectiveness.

2.1.2 Competitive Advantage:

Barney (2001) discusses four ways to measure the corporate competitiveness, The measurement is simple accounting measures, firm's survival stakeholder approach, and adjusted accounting measures, (Feurer, &Chaharbaghi, 1994) measure quantitatively competitiveness by the capability of profit to raise cash flow and capital in conditions of liquidity. (Vorhies, & Morgan, 2005) adds delivery and cost, quality dependability, flexibility and innovation as factors formulating such a competitive position. (Porter, & Millar, 1985) indicate that a company experiences CA when few competing companies are

engaging in similar actions and when their actions in an industry create economic value. (Jardon, &Martos, 2012; Sultan, 2007;Srivastava, et.al, 2001) indicate that a firm has a CA when it can reach to competing for the favor of customer.

There are many researchers who used the concept of CA before Porter, Porters' works (1990) is still the starting point for any discussion of CA (Straub and Klein, 2001; Jones &Tilley, 2003).and (Barney ,2001)discussed that the term of CA did not appear in Porter's work until the year 1985, whereas (Caves, 1984;Day, 1984;Spence, 1984;Barney, 1986)used the term around the same time as Porter while Penrose (1959) was the first one who introduced the concept of CA.

Barney (2001) shows that a corporate experiences a competitive parity when the company's action creates economic value applied in several other firms engaging in a similar action. The goal of the commercial foundation is to optimize shareholders returns. However, optimizing short-term profitability not necessarily ensure optimal shareholders returns since shareholder value represents the net present value NPV of expected future earnings.

Organizations nowadays dispute on how to reduce fixed costs for more profit. To reduce fixed Costs organizations have been working to identify techniques that facilitate processes improvement. Organizations adopt BPR as a panacea of reducing fixed Cost (Jones&Tilley 2003).Cost leadership strategy refers to obtaining CA through demanding lower prices than other competitors (Rindova, &Fombrun, 1999). The company can achieve this by reducing costs incurred in distribution and production to the minimum cost of items (Kiprotich, et.al, 2018). According to (Rintamäki, et.al, 2007) in business sectors where there is value control, this can still be envisioned through computing, adaptability of generation along these lines by eliminating the widespread inefficiency of the construction process. While

the Organization continues to reduce costs without reducing operating costs, it risks being depleted and becomes particularly vulnerable in a highly aggressive competitive market. (Qian, et.al, 2008) assume that cost leadership may be a cost leader, but this does not of course mean that regulation items would be low-cost. It is important that the organizations can be customized for each case and bear a normal cost taking into account the easy power methodology and the reinvestment of additional business benefits.

According to (Lynch & Baines, 2004) the risk of adopting a cost management strategy is that the organization's focus on cost-cutting up and down at the expense of other key variables may become so dominant that the company loses its vision. So cost leadership strategy is an important step to achieve competitive advantage.

Focusing on improving the quality of products and services for existing customers leads to gain customer satisfaction then customer loyalty, lower prices, and differentiation. According to (Kim, & Lee, 2010) many leaders find it difficult to create a CA because they are not sufficiently familiar with the threats and opportunities in the external environment or the strength of their company and their unique weaknesses and competencies.

Flexibility can improve the CA of companies (Carney, 2005) explains that flexibility is a source to improve firms efficiency.

Companies that can improve flexibility capabilities would have the opportunity to improve CA. According to (Zhang, & Li, 2003) his research showed that flexibility of manufacturing competence (FMC) affected CA. The results of (Zhang, & Jensen, 2007) also show that flexibility, quality and responsiveness have a positive influence on CA. Reuter, et.al, (2010) found that flexibility relationship consisting of delivery, sourcing, and

logistic with the implementation of CA .The response to customer demand and the speed of service has become one of the factors of competition between companies; this makes the customer pay more attention for the products or services they need in a given time. Whenever, the organization was able to respond to the requirements and the needs of the customer quickly and shortly compared to other competitors, it will receive a larger market share and charge higher prices for their services, at least until the arrival of other competitors to the market. According to (Diab, 2014),companies can produce (service or product)faster delivery than its competitors whenever achieved speed delivery, reduction in costs and large market share can be measured as Reducing the delivery time from the customer order the service or product to the time that the service deliver the customer .

2.1.3 Business Process Re-engineering

According to (Hammer, et.al, 1994) BPR is essentially rethinking and radical redesign of business process to achieve dramatic improvements in business procedures.

The purpose of BPR is to make all Business processes in the best way (Arem,&Ayanda,2008) BPR has managed to become an approved approach in reforming and transformation efforts of organizations in developing and developed economies (Mihyo,et.al, 2011).The BPR such as the implementation of effective measurement and management systems (Ahadi, 2004) and the empowerment of process (Sia, & Neo, 2008) have also been shown to have the effect of institutionalizing the change introduced by the BPR, sustaining its outcome and further enhancing customer satisfaction and service delivery.

The BPR concepts involve four dimensions: 1) Innovative Rethinking: This is process dependent on motivation and creativeness. 2) Process Function means make everything in the organization systematic according to (Hammer, et.al, 1994) there are functions that take one or more kinds of inputs and create a valuable output to the customer. 3) Radical change: In radical change a key business process is the transformation of organizational elements, it is important for an organization's sustainability to change. Because changing and making new technologies and ideas, is important, an organization must recognize the need for change and learn to manage the process effectively (Aremu, & Ayanda, 2008).

4) Organizational performance and development: the firm efficiency and way to improve activity level to survive from the competitive pressure and to meet up to standards.

There are several benefits of BPR according to (Adeyemi, & Aremu, 2008). The benefits are: reduced fixed costs, improved services and quality, speed in delivering, improved productivity, flexibility and finally it brings CA to an organization. BPR techniques bring riddance to organizations.

Many BPR projects have failed in some companies. The failure of BPR implementation was due to factors like unrealistic objectives, ineffective methodology, not implementing IT system in a professional way, lack of appropriate processes, lack of top management support (Shuleski, & Cristea, 2014), and lack of staff knowledge; this means not knowing the size of the benefits that come back to the organization from implementing BPR (Chen, 2001).

Top management's affect BPR by integrating internal knowledge and importing external knowledge (Liang, et.al, 2007). Top managers are the most important assets for the business benefits they derive from their experience to give benefits to the organization, top management needs to assume and recognize the responsibility for both the technical and organizational changes (Leonard-Barton, 1988), top management is responsible for changing the values, norms and culture within an organization, and enable organization employees to adapt to the new technology. (Liang, et.al, 2007).

BPR implementation make reorganization in all business processes, it is important to recognize re-engineering efforts. Teams in companies must know the benefits that the firm can derive from implementing everything new. Management has to play a vital role and very good communication skills in explaining everything new. The first thing that they have to determine is the documentation needs and the training needs. Then a prototype must be built that includes all future business processes and map them into the ERP software functionalities. At this stage all system gaps can be determined, finally the gap between top management and the lower would be solved, companies had to be together as a group to help implement solutions and brainstorm management and control issues(Huq, et.al, 2006).

Every organization have its culture, there is powerful subcultures that are fundamental to all actions, relationships and operations in the organization (McNabb, &Sepic, 1995). Culture sets both the direction and limits of movement in organizations. BPR requires a cultural conversion: once it is established it becomes common and the changed way of doing things

would take root. The employees knew what to expect from the company and what expected of them.

BPR requires creation of a culture that is supportive of the new work procedures, because the organization may face barrier to implementing it.

To make process is successfully completed the organization needs a set of resources

- Financial resources: BPR is more successful if the implementers have the financial capability to start with the BPR process.
- Technical: there are methods, techniques, activities or process that is more effective than the rest of the techniques to get a better result in implementing BPR.
- Human: the implementation of BPR that is directly reliant on the staff skills, high quality human resource management can provide significant improvement of the BPR process.
- Time: The employees who have worked for a shorter time in the company are more likely to adopt BPR. (Mashari & Zairi, 1999)

2.1.4 Relationship between Variables:

The researcher has scanned the internet and searched in many universities and academic centers to find the previous study or research correlating EB with CA considering the role of BPR, The researcher found that many studies examined the relationship between EB, BPR, and CA, as follows:

(Pilinkiene,et.al,2013)	Explained that EB solutions such as ERPS, SCM, e-commerce, and others give the opportunity for the organization to be unique and leader. Although the integration of EB solutions in the business processes may improve all activities throughout the value chain and there is the positive impact of EB on CA.
(phan, 2003)	Discussed the fast development in the technology field, organizations must enter EB So for the ability to keep up with this big and fast change and to be able to compete.
(Bliemel&Hassanein, 2004)	Rethinking and Redesign to achieve CA is necessary for hospitals in Canada .and it is clear that redesign is necessary to e-healthcare services that Canadians receive.
Aremu&Ayanda (2008)	Argued that EB is a resource that facilitates the radical change and enables a firm to achieve CA.
Hammer&Champy(1993)	Declared the Relationship BPR and EB consider IT as the key factor in BPR for the organization that wants to make a full change in its operation.
(Davenport & Short, 1990)	Discussed IT and BPR have the recursive relationship, IT capability should support BPR and BPR should be in terms of the capability of IT.
(Aremu&Ayanda, 2008)	In this dynamic, competitive environment organizations can enhance its CA if it effectively designs and implements BPR selected processes.
(Sungau&Ndunguru, 2015)	Presented the organizations has adopted BPR as a panacea for reducing fixed-Cost.
(MAUREEN, et.al, 1995; MAGUTU, et.al, 2010)	The BPR has the direct and positive impact on CA.

2.2 Previous Studies:

(Keramati, et.al, 2007) study entitled “Assessing the impact of information technology on firm performance considering the role of intervening variables: organizational infrastructures and business processes reengineering”

The purpose of this study is to present a tool to study the role of two principal variables including organizational infrastructures and business processes reengineering in a relationship. In this study a survey in 200 companies of car part manufacturers in Iran have been assessed and four variables have been examined. the study show that practical effort for organizational infrastructures including work empowerment, training, teamwork, process management ,decentralization, customer relationship, changes in supplier relationship and leadership, strengthen the relationship between IT and firm performance.

(Adeyemi & Aremu 2008) study entitled “Impact Assessment of Business Process Reengineering on Organizational Performance”.

This study focuses on testing the effect of BPR on an organization, and how BPR can assist in positive changes in the organizations, especially in Nigerian Banks. The authors concluded that BPR can affect different elements of an organization; employees, technology. Also it was concluded that it is important for any business to survive in the competing world, to conduct BPR projects in order to accomplish high levels of performance and organizational growth on long term basis.

(Groznik & Maslaric, 2010) study entitled “Achieving competitive supply chain through business process re-engineering: A case from developing country”.

The study is in a Serbian oil downstream company. Serbia is an upper-middle income economy by the World Bank. The point of the case study is to present methodological approach applied in the company of the one developing country which can be helpful for the companies in other developing countries. The results are Implementing of IT without Structural and organizational changes in business processes would not contribute to achieving the full benefit.

(AlSomali, et.al, 2010) study entitled “E-business adoption and its impact on performance”.

This study deals with EB adoption and its impact on performance. The researcher's result with the EB based metrics differs sharply from those obtained when the adoption of EB is measured as a structured construct. Institutional pressure may explain the variation largely because the researcher studies the whole chain of EB adoption, reliability and performance impact, Adoption decisions driven by institutional pressures and customer pressure have not resulted in significant improvements in business performance.

(Stojkovic&Djuricic,2011)study entitled “Bpr Concept As The Factor Of Successful Electronic Business Of A Modern Companies”.

This article explains the relationship between BPR and EB. Because we live in the fast dynamic age of internet, it is very important to apply successful BPR before having an electronic business, the researchers vehicles were the application of information technology on the one hand and the restructuring of the business process in question on the other. BPR for EB it is redesigning business processes at both the enterprise and supply chain level to make use of Internet connectivity and find new ways to add value.

(Pilinkiene, et.al, 2013) study entitled “E-Business as a Source of Competitive Advantage”.

The article aim to find out the relationship between EB benefits and the CA,1010 randomly companies in Spain participated in the study, Data in the research was analyzed and hypotheses tested using structural equation modeling The results are positive impact of EB on nine different business processes.

(Chen &Holsapple, 2013) study entitled “Impact Analysis in E-Business: A Case of Adoption Research”.

The study examined the EB adoption .The authors focused on 618 journal Articles that cope with EB adoption. The results of this study compared with prior Studies. This study has found new trends in EB adoption researches are detected which linked the five dimensions and practical implications for EBadoption.

(Naveeda, 2014) study entitled “Business Process Reengineering and Organizational Structure – A case study of Indian Commercial Banks”

This study discusses the correlation between carrying out a successful BPR and Organizational Structure especially in State Bank of India.

This article also, to compare the BPR processes in SBI and in Jammu Rural Bank, to understand the BPR projects in both banks and to propose enhancement techniques for JRB.

A questionnaire was given to 100 employees in both the SBI and the JRB, from all of the levels; top, middle and lower levels of management.

It was concluded that it is important for all organizations that seek excellence to conduct BPR to keep up with other organizations and to achieve high level of work and growth.

(Othman, &Hayajneh, 2015) study entitled “An Integrated Success Model for an Electronic Health Record: A case study of Hakeem Jordan”

This research aims to build models which assess the Electronic Health Record (EHR) in Hakeem, the research has undertaken the task of integrating two models namely: the Delone and Mclean's information system success model, and the Balanced Scorecard. The models contributed to perspectives which assess the success of Hakeem. This research has proposed an integrated EHR model that could be used in assessing the success of any EHR implementation.

(Nzewi, et.al, 2015) study entitled “Business process reengineering and performance of courier service organizations in Anambra state, Nigeria”.

The objective of the study is to consider the effect of BPR implementation on the operational performance of selected organizations in Anambra State. The population of this study is the entire staff of the Organizations ,The study suggest that Top management should manage change with opening communication channel, organizational process should be redesigned to meet changing market conditions and improvement , and IT infrastructure must be parallel with organization’s business strategies.

(Mathu r& Asthana, 2016) study entitled “The Impact of Business Process Reengineering Interventions - A Case Study of State Bank of India”.

This study was to investigate the concept of BPR in state Bank of India and to improve its functions. The result is positive impact of BPR initiatives.

In this dynamic world, the banking scenario is based to experience new changes such as BPR exercise and there would be a continued need to review the existing initiatives and take up new ones for sustainable growth of State Bank of India.

(Benitez, et.al, 2017) study entitled “Impact of E-business Technology on Operational Competence and Firm Profitability over Time”.

This study examines the impact of EB technology on operational efficiency and profitability using a panel dataset collected from a sample of 154 large manufacturing and service companies in Spain for the period 2008-2010. The results of this study are EB technology that has a positive impact on operational efficiency; the time and ability of a

company to leverage a portfolio of operational capabilities have a positive impact on profitability that becomes more important over time.

(Sheikh, et.al, 2017) study entitled “The Growth of E-Marketing in Business-to-Business Industry and its Effect on the Performance of Businesses in Pakistan: Marketing Success”.

The purpose of this research is to examine the mediating role of use of e-marketing between organizational, technological, environmental factors and the performance of small and large firms in Pakistan, the paper recognized the link between e-marketing uses and the performance of firms working in Pakistan. The important hypotheses resulted that UEM mediates the relationship among its background and the performance of businesses in Pakistan. The results established that UEM by the enterprises positively impact on firm performance and it can be determined that higher the e-marketing use by the businesses, higher is the probability of distended corporate performance.

(Malkawi, 2017) study entitled “Enhancing Entrepreneurship through E-Commerce Adoption – Applied Study at Small Companies, Irbid, Jordan”

This study aimed to know how to achieve entrepreneurship through E-Commerce adoption. This Study was at Small Companies- Irbid- Jordan. The results of the study are: Small Companies use E-Commerce at high rates, entrepreneurship also high, there is a significant statistical effect of E-Commerce on entrepreneurship as a whole and on all its indicators.

(Rasmi, et.al, 2018) study entitled “Healthcare professionals' acceptance Electronic Health Records system: Critical literature review (Jordan case study)”

This research aimed to build a model to explain the exercise behavior of healthcare professionals to use an EHR system.

this paper show the degree of acceptance of Electronic Health Records (EHRs) system in the Jordan eHealth sector, for the purpose of developing the quality of hospitals, reduce medical error issues and reduce health costs.

2.3 Distinctive Features of the Current Study

The researcher agreed that EHRs hold great promise for improving healthcare quality and efficiency. EB systems describe the gains from adopting the technology primarily in terms of improved workflows leading to better clinical outcomes.

My study was in private hospitals in Amman with a purpose of reducing the challenges that can occur after implementing a new system . The researcher focuses on the importance of BPR before applying the EB system.

There is a study for (Diab,2014)“using the Competitive Dimensions to Achieve CA” in Jordanian Private Hospitals but also without considering the role of BPR another study “ E-health: applying business process reengineering principles to healthcare in Canada” for (Bliemel&Hassanein.2004) This study explored the area of e-health and the technologies and a business process reengineering (BPR) framework was used. It does not measure the dimensions on CA.

Chapter Three

Study Methodology (Method and Procedures)

3.1 Introduction

3.2 Study Methodology

3.3 Study Population

3.4 Study Sampling and data collection.

3.5 Study Reliability

3.6 Study Validity

3.7 Study Variables

3.8 Data Analysis

3.1 Introduction

In this chapter, the researcher describe the methodology used in this study then present the study population and sample, after that, describe the study data analysis, exploratory factor analyses and confirmatory factor analyses, then the structural Equation Modeling.

3.2 Study Methodology

The study follows the descriptive and analytical approach. The Descriptive approach is used to describe the study sample, study variables. Analytical approach is deployed to investigate and examine the relationships between the variables. This is fields study which follows descriptive, analytical method, to recognize the impact EB on CA taking into consideration the mediating role of BPR.

3.3 Study Population

This population includes managers in private hospitals in Amman, a sample has been selected based size of the population, the sample has been applied on (5) private hospitals that located in Amman the total number of private hospitals in Amman is (53). The survey unit of analysis has been composed of different 250 managers of Jordanian Private Hospitals.

3.4 Study Sampling and Data Collection

Five private hospitals in Amman were chosen, if the population is homogeneous with respect to the characteristic under study, then the sample drawn through simple random sampling was expected to provide a representative sample (Collins, et.al, 2006). Based on above, the samples of this study 250.

Data was collected using a structured self-completion questionnaire. Questionnaires was distributed and collected directly by the researcher. The participants were asked to complete form. Although almost all the measures employed in this research have extensively been used in other studies, it is necessary to assess the developed questionnaire. A pretest was conducted on a nonrandom sample of 250 participants. Based on the pretest results, slight revisions have been made to clarify the meanings of ambiguous questions.

3.5 Study Reliability

Cronbach alpha coefficient, composite reliability, and Average Variance Extracted (AVE) using exploratory factor analysis were calculated to measure reliability.

3.6 Study Validity

Construct Validity: factor loading, high regression weights and square multiplied correlations of the items are significantly correlated to specify constructing would contribute to construct validity (Hair, et.al, 2010).

Convergent validity: indicates the degree to which items measure the underlying construct. CFA verified that each item loads onto one single component factor without any cross-loading onto another factor.

And finally, discriminate validity indicates the extent to which the latent variables are different (Al-Hawari, et.al, 2005). Each item measures one latent construct and not measure deferent latent construct at the same time (Williams & Vaske, 2003).

3.7 Study Variables

-Independent variable: EB

-Dependent variable: BPR, and CA.

3.8 Data Analysis

To analyze the demographic characteristics and study variables Descriptive statistics was used. The assumption regarding normality of the distribution of multivariate data were tested by assessing skewness and kurtosis coefficients. Although there is no statistic that captures all the aspects of multivariate normality (Chin & Todd, 1995). Statistic for multivariate normality is widely used. A normalized multivariate kurtosis value not much larger than 3 or 4 is regarded as satisfactory. In addition to Mardia's measure of multivariate kurtosis, we consider it satisfactory if the absolute value of skewness of all variables is less than 3 and the absolute value of the kurtosis is less than 10 (Lin & Hsieh, 2010). This thesis has been used SPSS, AMOS for data analysis.

Exploratory factor analyses (EFA)

Exploratory factor analyses of all items related to EB, CA, and BPR was used, a principal-components factor analysis with the principle component method was used to evaluate the latent dimensionality of the instrument. Items that show a minimum factor loading of 0.4 and factors with an Eigenvalue of 1 has been retained. The assessment includes Kaiser-

Meyer-Olkin measure of sampling adequacy (KMO) and Bartlett's test of sphericity. Factor analysis is considered appropriate if the value of KMO is larger than .8 and the Bartlett's p is significant (Kim & Lee,2010).

Confirmatory Factor Analyses (CFA)

Confirmatory Factor Analysis (CFA) was used to validate the constructs (Wang & Ahmed, 2004). Many researchers had identified CFA as an appropriate statistical test particularly when some factors required explaining inter-correlations among the measurement variables (Sureshchandar, et.al, 2002).

Additionally, the observed variables that is more likely to be reliable indicators of a particular factor (Sureshchandar, et.al, 2002). The study model is based on logic, previous empirical studies and theoretical findings. Confirmatory Factor Analysis (CFA) would be appropriate method to confirm the proposed factors the study. The researcher tests the reliability and validity to meet certain empirical properties and standardizing the measurement scale.

Cronbach alpha coefficient, composite reliability, and Average Variance Extracted (AVE) was calculated to measure reliability for each factor in both models. The other empirical property for measurement model is validity. CFA is considered to determine construct validity. Whenever the correlation of items within the same construct is relatively high it is said to have the construct validity. Additionally, factor loading, high regression weights and square multiplied correlations of the items are significantly correlated to specify construct would also contribute to construct validity (Hair, et.al, 2010). Convergent validity on the other hand indicates the degree to which items measure the underlying construct. CFA verified that each item loads onto one single component factor without any cross-loading

onto other factor. And finally, discriminate validity indicates the extent to which the latent variables are different (Al-Hawari, et.al, 2005). Each item measures one latent construct and not measure different latent construct at the same time (Harris, 1995).

Structural Equation Modelling (SEM)

Based on the results of reliability and validity for the CFA models. Approved measurement models facilitate further adoption of structural equation modeling. SEM was used to assess the structural relationships between EB, CA, and BPR. Structural equation modeling techniques with maximum likelihood estimation was used to examine the hypothetical and modified models (if applicable). And to estimate the significances of effects.

To evaluate model fit, several indices was used: the chi-square to degrees of freedom ratio $((X^2)/DF)$, goodness of fit index (GFI), normal fit index (NFI), comparative fit index (CFI), root mean square error of approximation (RMSEA), Tucker Lewis Index (TLI) and other fit indices when necessary to assess model fitting with sample data (Kline, 2005).

CHAPTER FOUR

Analysis and Results

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 EFA

4.4.1 Exploratory Factor Analysis (EFA)

4.4.2 Exploratory Factor Analysis (EFA) for Validity

4.4.3 Analysis for Reliability

4.5 Comprehensive Survey and Confirmatory Factor Analysis

4.5.1 Confirmatory Factor Analysis (CFA)

4.5.2 Data Screening

4.5.3 Model Specification

4.5.4 Assessment of Validity, Reliability, and Normality of Measurement Model

4.6 Testing the Structural Model

4.6.1 The Procedure for Testing Mediation in a Complex Model

4.7 Testing the hypothesized model (Hypothesizes)

4.1 Sample of Study and Data Collection

The study was conducted initially in five private hospitals in Amman namely (Jordan Hospital, Alhamaideh Hospital, Alhanan Hospital, Dar Al salamHospital, andAl Esraa hospital) A total of 50 questionnaires were received from these five hospitals in the first stage of data collection. The response rate was 100% since the Data collection used is face-to face survey questionnaire, all of the 50 responses were considered valid for EFA analysis.

The researcher chooses this method because face to face communication is more effective. This method of data collection is mainly helpful in explaining results and examining what, and why people think that way as the researcher met the managers and the concerned employers themselves. The study also follow (McKenna & Crick, 1994)who indicated that collecting data through this, manner Validity of questionnaires and response has been increasing as our planned sample size is small due to the exploratory nature of this stage of analysis.

4.2 Descriptive Statistics for the Initial Sample

The response rate of (100%) was very high as most of the sample was interviewed directly. Data are coded using SPSS and checked for missing values, no cases excluded and the total amount of valid respondents were (50).

Table1 illustrates the descriptive statistics which include mean, standard deviation, minimum, and maximum for EB, BPR, and CA. It was discovered that CA has high importance criteria (M=3.7455), then BPR (M=3.4814), for EB (M=3.1071).

Next, the results revealed that the variable is approximately normally distributed based on the degree of skewness and kurtosis as both were less than one and the value of z-score of Skewness and Kurtosis coefficients in the range of ± 1.96 standard error ($p > 0.05$). Descriptive analysis for demographical data was not analyzed as it has been conducted for the extended survey.

Table (4-1): Descriptive Statistics

#	N	Mean Statistic	Std. Deviation	Skewness	Kurtosis
				Statistic	Statistic
EB	50	3.1071	.77675	.071	-.699
BPR	50		.69684	.211	-.801
CA	50	3.7455	.84784	-.933	.895
Total	50	3.4215	.58668	-.302	-.439

4.3 The Instrument (Questionnaires)

This study investigates the impact of EB on CA, considering the role of BPR. The questionnaires are divided into three sections: EB, BPR, CA. A total of 39 items were developed from the literature. The initial paragraphs of the questionnaire were listed in table (4-1), the sample selected were required to answer these paragraphs.

Table (4-2): Initial Questionnaire

no		Features	Sources
1-	E-Business	1- our hospital use E-Business to facilitate electronic communication within firm 2- our hospital use E-Business to facilitate Electronic communication with customers and suppliers 3- Our hospital use E-Business to Provide customers with general information 4- Our hospital Send to patients updates about new services 5- Our hospital adapt E-Business to perform internal administration work 6- Our hospital adapt E-Business for order taking process 7- Our hospital adapt E-Business for procurement and sourcing from suppliers 8- Our hospital use E-Business to understand customer insight. 9- Our hospital use E-Business for advertising and promotion. 10- Our hospital performs financial and managerial work electronically. 11- Our hospital provides informational response to answer questions and request via searchable online database. 12- Our hospital use E-Business to Share inventory information with our suppliers. 13- Our hospital use E-Business for service development. 14- Our hospital provides solutions to customer problems via web based service solution.	Kurtinaityte, L. (2007) Breen, L., & Crawford, H. (2005)
2-	(BPR)	15- Top management in our hospital are the main motivator of BPR 16- We made many changes in our hospital regarding: organizational structure. 17- We made many changes in our hospital regarding: information dissemination 18- We made many changes in our hospital regarding: training and education 19- We made many changes in our hospital regarding: Employee empowerment 20- Managers in our hospital assure that the new	Huy, Q. N. (2001) Aremu. M and Ayanda. M,2008

		<p>BPR will not necessarily lead to staff layoffs</p> <p>21- Financial, Technical, Human, and Time resources are available to support BPR in hospital</p> <p>22- Important decisions in our hospital are made by upper-level management.</p> <p>23- lower-level employees are allowed to make many decisions</p> <p>24- The integration of jobs is used to design work that is performed along process lines rather than functional lines.</p> <p>25- We Gather requirements from customers before the BPR begins</p> <p>26- The culture in hospital supports sharing organizational vision</p> <p>27- The culture in hospital supports open communication</p> <p>28- The culture in hospital supports participation in decision making.</p>	
3-	Competitive advantage	<p>29- Reduction in inventory cost</p> <p>30- Reduction in operational cost</p> <p>31- Providing high performance services</p> <p>32- Meeting the service delivery promises</p> <p>33- Procuring material at competitive prices</p> <p>34- Offering a large number of service features</p> <p>35- Offering a large degree of service variety</p> <p>36- Increasing labor productivity</p> <p>37- Providing reliable and punctual medical services</p> <p>38- Providing affordable and competitive services</p> <p>39- Offering medical services with updated equipment</p>	Boyer, K. K., & Lewis, M. W. (2002)

4.4 Data Analysis and EFA

The aim of the study is to investigate the impact of EB on CA, considering the role of BPR. In order to recognize the idea, an Exploratory Factor Analysis (EFA) was conducted to examine the factor structure of the scale. Then, a reliability analysis was carried out to test the reliability of the questionnaires.

4.4.1 Exploratory Factor Analysis (EFA)

The exploratory factor analysis process began with the assumption of factorability, to assess that, correlations between variables (items) were calculated. The correlation matrix was examined and reveal that 94 of the 229 (41%) are significant at 0.01 and the correlation between variables are over 0.30 which provide evidence for proceeding to examination of factor analysis as recommended by (Hair et.al, 1995); Tabachnick and Fidell, 2007; Hair, et.al, 2009) that testing the correlation matrix (often termed Factorability of R) for correlation coefficients over 0.30.

EFA is a data technique used to decrease a large number of variables to a small set of primary factors that summarize the important (Hammett, 2007).+Factor analysis was used as an exploratory technique to summarize the structure of a set of variables (EFA). A Kaiser-Meyer-Olkin (KMO) test and Bartlett's Test of Sphericity were first conducted to verify if the data set was suitable for factor analysis. The purpose of both tests is to measure the sampling adequacy in order to determine the factorability of the matrix or data set as a whole (Hammett, 2007). If Bartlett's Test of Sphericity is large and significant, and the KMO measure is greater than 0.50, it can be assumed that the factorability in data set does exist.

The maximum likelihood extraction method with Varimax rotation method was used to extract the underlying factors in this study. By combining these two methods, the value of eigenvalues and Scree plot analysis were obtained and then, the number of factors that exist in data set can be obtained. The value of eigenvalues must exceed '1' in order to classify it as one factor. The Scree Plot technique was also used in order to confirm the results obtained from the analysis of eigenvalues (Hammett, 2007).

In order to confirm whether all factors extracted from this analysis are reliable or not as suggested by (MacCallum, et.al, 1999), the communality value for each item must be within 0.3 ranges. Items with communalities less than 0.3 must be excluded from the analysis. This sample size is good enough for the exploratory nature of our study, provided there are relatively few factors each with only small number of items. Another criterion that was used to assess the factors that were extracted by the factor analysis to see if it was reliable or not is by assessing the value of factor loading for each item. Factor loadings can be assessed by looking at the pattern matrix table. Field (2009) argued that the most preferable loading value for each item must exceed 0.30 and the item loading value which is less than 0.30 must be excluded from this analysis.

The next criterion, which is the reliability analysis, was conducted on the set of factors that was extracted from this analysis to ensure all items contained in each factor consistently reflect the construct that is measured (MacIntosh & Doherty, 2010). According to Hair et al (2009), identifying the accepted factor loading for the sample size less than or equal 50 respondents is 0.75. The researcher decided to remain all items that loaded more than 0.40, this because the researcher seeking to include more items as much as possible for the

purpose of the study and due to the exploratory nature of the study, also because the researcher has been conducted Confirmatory Factor analysis later in the second stage of measurement development.

The confirmatory approach has been 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 performed to assess the reliability of the measurement. According to Haron (2010), argued that the widely accepted social science cut-off point, alpha value should be .70 or higher for a set of items to be considered a scale, but some use 0.75 or 0.80, while others are as lenient as 0.60. Cronbach's Alpha values are quite sensitive to the number of items in the scale and the Cronbach's Alpha values have been reduced below 0.60. In this case, these are deemed as appropriate.

4.4.2 Exploratory Factor Analysis (EFA) for Validity

Exploratory Factor Analysis is a procedure used to identify, reduce, and organize a large number of questionnaire items into a specific construct for independent variable in the study. EFA was conducted on the 39 items with varimax rotation using SPSS version 22. In this study, three criteria namely (i) EB, (ii)BPR, (iii) CA. The Kaiser-Meyer-Olkin (KMO) indexes of sampling adequacy for all factor analyses were explored using Kaiser-Meyer-Olkin (KMO) this is to ensure the sufficiency of covariance in the scale items to warrant factor analysis. The Bartlett's test for sphericity was also applied to each analysis to ensure the correlation matrix was not an identical matrix. While all KMO values for individual items were >0.50 , which is above the acceptable limit of 0.50 (Field, 2009).

Meanwhile, the Kaiser-Meyer-Olkin measure demonstrated the sampling adequacy for the analysis, $KMO=0.723$, which is above the acceptable limit 0.5. Meanwhile, Bartlett's test of sphericity, $\chi^2(335)=1214.246$, $p<0.000$ specified that the correlations between items were adequately large for EFA. Table (4-3) shows the results of measuring *Sampling Adequacy and Bartlett's Test of Sphericity*. Chi Square/Df was 3.62 which indicated fitting of the model structure for the sample data based on Hair (2010).

Table (4-3):Kaiser Meyer-Olkin (KMO) of Sampling Adequacy and Bartlett's Test of Sphericity

<i>Kaiser Meyer-Olkin (KMO) of Sampling Adequacy and Bartlett's Test of Sphericity</i>		
Kaiser Meyer-Olkin (KMO) of Sampling Adequacy		0.723
Bartlett's Test of Sphericity	Approx. Chi Square	1214.246
	Df	335
	Sig	0.000

As a result of the initial EFA, three factors had eigenvalues more than one, like the scree plot which is illustrated in Figure (4-1).

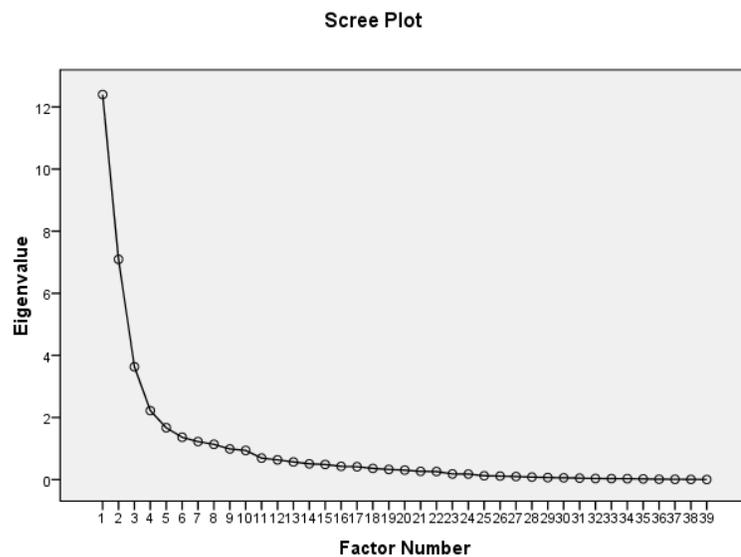


Figure (4-1): Scree Plot

Table (4-4): show the Result for the Extraction of Component Factors, three factors have eigenvalue greater than 1.0, viewing the eigenvalue for fourth factor, we found it less than 1.0 (0.985). The third factors retained explain 55.984 of variance of the 3 factors, which means very sufficient regarding total variance explained.

Table (4-4): Result for the Extraction of Component Factors

Initial Eigenvalues			
Component	Total	% of Variance	Cumulative%
1	10.479	26.869	26.869
2	6.549	16.793	43.662
3	4.805	12.322	55.984

39 item structures were found to explain 55.984 percent of variance in the data as shown in Table (4-4). The first factor accounted for 26.869 percent of the total variance with an eigenvalues of 10.479. The second factor accounted for 16.793 percent of the total variance with an eigenvalues of 6.549. And the third accounted for 12.322 percent of the total variance with an eigenvalues of 4.805.

To investigate Factor loading for items in the first EFA, we performed EFA many time to investigate which variables (Items) are attributable to each factor. Variable which load less than 0.40 was excluded; items which loaded on two or more factors and items which have cross-loading were also eliminated. With rotation, we examine the rotated factor matrix for the pattern of variables loading significantly.

The non- significant loading, cross loading variables were eliminated and the structure of variables were subjected to specification. In first EFA, the items which loaded less than 0.40 were eliminated. We founded that some items loaded on two or more factors, for example (EB2) loaded in factor 3 (CA), and EB4 loaded in (BPR). Totally 13 items were deleted due to cross loading. After the deletion process for non- significant loading, low item loading and the cross loading, EFA was conducted for the final structure, results indicated that 26 items were retained as they loaded well on their factors.

We applied a VARIMAX- rotated analysis in order to get a completely clean set of factor loading and avoiding non-cross loading of items to another factors, and maximizing the loading of each variable on one factor. Factor loading indicate the degree of association (correlation) of each variable with each factor (Hair et al, 2009). Based on above, table (4-5) display the rotated component analysis after deletion of items that loaded in many factors. The table shows the results of three factors that were extracted (factor loading of each variable).

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

#	Item			
	E-Business	Factor 1	Factor 2	Factor 3
1-	our hospital use E-Business to facilitate electronic communication within firm		.514	
2-	Our hospital use E-Business to Provide customers with general information		.681	
3-	Our hospital adapt E-Business to perform internal administration work		.438	
4-	Our hospital adapt E-Business for procurement and sourcing from suppliers		.780	
5-	Our hospital use E-Business to understand customer insight		.875	
6-	Our hospital perform financial and managerial work electronically		.644	
7-	Our hospital provide informational response to answer questions and request via searchable online database		.724	
8-	Our hospital use E-Business to Share inventory information with our suppliers		.954	
9-	Our hospital use E-Business for service development		.820	
10	Our hospital provide solutions to customer problems via web based service solution		.784	
	Business Process Reengineering(BPR)			
11-	Top management in our hospital are the main motivator of BPR			.602
12-	Managers in our hospital assure that the new BPR will not necessarily lead to staff layoffs.			.598
13-	Financial, Technical, Human, and Time resources are available to support BPR in hospital			.624
14-	Important decisions in our hospital are made by upper-level management.			.448

15-	lower-level employees are allowed to make many decisions			.819
	Competitive advantage			
16-	Reduction in inventory cost	.674		
17-	Reduction in operational cost	.795		
18-	Providing high performance services	.903		
19-	Meeting the service delivery promises	.863		
20-	Procuring material at competitive prices	.830		
21-	Offering a large number of service features	.812		
22-	Offering a large degree of service variety	.766		
23-	Increasing labor productivity	.858		
24-	Providing reliable and punctual medical services	.924		
25-	Providing affordable and competitive services	.930		
26-	Offering medical services with updated equipment	.852		

Table (4-6) below displays the new Eigenvalues, Total Variances Explained for refined measurement scale, the total of three eigenvalues is (17.569) which represent the total amount of variance extracted by factors has increased to (60.702).

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

Total Variance Explained									
Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
	1	8.983	33.272	33.272	8.062	29.861	29.861	7.948	29.438
2	5.711	21.150	54.422	5.620	20.814	50.675	6.003	22.233	51.671
3	2.902	10.746	65.169	2.707	10.027	60.702	2.439	9.031	60.702

Based on the above analysis, we found that the measurement scale of 39 items was reduced to 26 items loaded on 3 factors. 13 items were deleted. The new Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity were calculated. Results in table (4-7) indicate the adequacy of sample as the KMO was (0.0.725) which is above the acceptable limit 0.5. Meanwhile, the test of Sphericity also was significant (0.000). Also significant Chi Square indicated correlations between items were sufficiently large for EFA. Bartlett's test of sphericity, $\chi^2(325)=1231.296$, $p<0.000$ specified that the correlations between items were adequately large for EFA.

Table(4-7):Kaiser Meyer-Olkin (KMO) of Sampling Adequacy and Bartlett's Test of Sphericity

<i>Kaiser Meyer-Olkin (KMO) of Sampling Adequacy and Bartlett's Test of Sphericity</i>		
Kaiser Meyer-Olkin (KMO) of Sampling Adequacy		0.725
Bartlett's Test of Sphericity	Approx. Chi Square	1231.296
	Df	351
	Sig	0.000

4.4.3 Analysis for Reliability

The purpose of reliability function is to estimate the degree of a measurement either it is free of random or unstable error (Bunyasi, et.al, 2014). An item analysis was conducted to test the reliability of the factors. The entire factors used in this study have an excellent internal consistency of measurement. It is because each measurement has Cronbach's Alpha value more than 0.90. Table (4-8) shows the correlation matrix between factors which indicate high correlation between all factors.

Table (4-8): Factor Correlation Matrix

Factor	CA	EB	BPR
CA	1		
EB	0.74	1	
BPR	0.506	0.651	1

To assess the reliability, the Cronbach's Alpha had been calculated for all items retained in measurement scale. Satisfactory internal consistency range between 0.7-0.9 (Blunch 2008). The factors in the scale had a high internal consistency and high rating of reliability. The higher rate of internal consistency for factors was (0.964) for BPR, and the lowest is EB (0.895).

Table (4-9): Cronbach's Alpha for Elements

Cronbach's Alpha for Elements			
	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Number of Items
CA	0.918	0.916	11
EB	0.899	0.895	10
BPR	0.963	0.964	5

Based on the above analysis, the result of exploratory factor analysis show that the instrument of has three factor structure. The three factors explained 60.702% of variance among the items, All factors had high reliabilities (Cronbach's Alpha is greater than 0.70). 26 items retained in the final scale after deleting 13 item which cross-loaded on multiple factors and due to factor loading is less than 0.40. The final factor structure of the measurement scale is EB and has 10 items:

- 1- Our hospital use E-Business to facilitate electronic communication within firm.
- 2- Our hospital use E-Business to provide customers with general information.
- 3- Our hospital adapts E-Business to perform internal administration work.
- 4- Our hospital adapts E-Business for procurement and sourcing from suppliers.
- 5- Our hospital use E-Business to understand customer insight.
- 6- Our hospital performs financial and managerial work electronically.
- 7- Our hospital provides informational response to answer questions and request via searchable online database.
- 8- Our hospital use E-Business to Share inventory information with our suppliers.
- 9- Our hospital use E-Business for service development.
- 10- Our hospital provide solutions to customer problems via web based service solution

BPR included five items:

- 1- Top management in our hospital are the main motivator of BPR
- 2- Managers in our hospital assure that the new BPR will not necessarily lead to staff layoffs.
- 3- Financial, Technical, Human, and Time resources are available to support BPR in hospital

- 4- Important decisions in our hospital are made by upper-level management
- 5- lower-level employees are allowed to make many decisions

Finally CA included 11 items:

- 1- Reduction in inventory cost
- 2- Reduction in operational cost
- 3- Providing high performance services
- 4- Meeting the service delivery promises
- 5- Procuring material at competitive prices
- 6- Offering a large number of service features
- 7- Offering a large degree of service variety
- 8- Increasing labor productivity
- 9- Providing reliable and punctual medical services
- 10- Providing affordable and competitive services
- 11- Offering medical services with updated equipment

The data which used in this analysis was appropriate and serve well to perform EFA based on the descriptive statistics analysis and the sample is slightly enough for pilot testing based on (Hair, et.al, 1995). The new measurement scale was used for extensive and comprehensive surveying of managers in private hospitals in Jordan. As stated before, EFA is not sufficient tool to test the theoretical foundations of the instrument. Further analysis is necessary to examine the relationships which exist among the latent variables and indicators (Items) by conducting a confirmatory factor analysis (CFA).

4-5 Comprehensive Survey and Confirmatory Factor Analysis

The design of the research was based on developing and validating reliable construct of EB, BPR and CA which suggested and adapted from literature. The resulted measurement scale from EFA was used (see Table 4-5) for extensive survey for selected sample. A total of 26 items of full measurement scale was used (10 for EB, and 5 for BPR, and 11 for CA) to collect data. The researcher used survey to collect data from diverse hospitals from different private hospitals in Amman. Online survey has been conducted along with a direct interview. The data set consisted of four categories of respondent managers.

The data were used to validate the measurement model according to Respondents who have relevant experience in the field of EB, BPR, and CA. A sampling strategy followed a random sample technique in which the sample was used to ensure the representativeness and generalizability of the sample for study. Participants in the study meet several criteria. First, they must be engaged in EB model and have been engaged for several years. They have access to and are able to use different resources of online processes. Secondly, the distribution of private hospitals in Amman was considered and multiple and diverse respondents can be obtained from the same hospital. The gender distribution was not considered as the main focus of this study is to estimate the impact of independent variables (Exogenous) and dependent (Endogenous) variables. Sample size is the third criteria to assure that the sample is adequate enough to achieve meaningful parameter estimates. According to (Jöreskog, 1978; Hair, et.al, 2009), testing and development of structural equation modelling theory using maximum likelihood (ML) estimation method and the transition from exploratory to confirmatory analysis require large-sample.

Based on (Anderson & Gerbing, 1988; Bentler, 1983) a sample size of 150 or more typically will be needed to obtain meaningful parameter estimates. According to Hair (2009), there is no clear-cut about minimum sample size required for conducting SEM. He suggests that regarding Model Characteristics (Number of latent constructs and items), if the model has Five or less latent constructs and Each latent construct has more than three items, 100 sample respondent would be enough.

Total number of (250) questionnaires were sent to selected sample. The initial response rate was 55.6% (139) respondents which indicate low response rate. Then number of questionnaires distributed was to be representative to the total population at the selected private hospitals.

The sample was selected of many regions in Amman to ensure representativeness of the sample. The reason for the low response rate (55.6%) since the study focused on a small group of managers and owners of hospitals. There is little response in other surveys have focused on managers, such as the study of (Byrd & Turner, 2001; Wisner, 2003) where the response rates asymptotic to this study. Despite the low response rate, the responses from the managers and owners of hospitals can be considered valuable and provide insight as previous studies indicated. The distribution of sample size in each hospital is shown in table (4-10).

Table (4-10): Descriptive Statistics, Job Title, Age, and Experience.

Job Title	frequency	%
Executive manager	10	0.07
Director General	20	0.14
Administrative manager	31	0.22
Head of section	7	0.05
Other position	52	0.37
Age	frequency	%
Less than 28 years old	10	0.07
29-37 years old	20	0.14
38-46 years old	31	0.22
47-55 years old	31	0.22
More than 56 years old	7	0.05
Experience	frequency	%
Less than 5 years	17	0.12
6-13 years	30	0.21
14-20 years	54	0.38
More than 21 years	19	0.13

An online survey have been conducted along with direct surveying, online surveying was performed using e-mails which obtained from the hospitals databases, also through WhatsApp groups after uploading the questionnaire on Google document and disseminating the web link. Most of managers were contacted directly due to small numbers of administrators in each hospital. The high number of respondent was administrative managers were (31 of total sample) and the approximate percentage was 40.8% of respondents. Results in table 10 showing that high number of the sample size (25.8%) were engaged in online process for more than 1 year, which indicated that most of the sample selected were informant and experienced. It also indicates that the surveys are usable and respondents are able to have insight about the questionnaire paragraphs which required a full perception of EB and BPR

4.5.1 Confirmatory Factor Analysis (CFA)

Based on the results of EFA for the measurement scale, the measurement scales incorporate a well-defined set of factors to measure EB, BPR, and CA in private hospitals in Amman. In developing the overall measurement model, we consider how all individual constructs (factors) will converge together. To ensure this, we used Unidimensional measures (Hair et al, 2009) in which variables (indicators/ items) can be explained by only one construct. Quite contrary from EFA, individual measured variable is hypothesized to relate to only single construct, and this mean that there aren't any cross- loading as in exploratory analysis (all cross-loading are hypothesized to be zero).

We designed the hypothesized model that will produce the confirmatory results, the measurement model have been tested. We applied the standard rules and procedures to produce valid model. The same sample that been used in resulted valid model was used to test the structural model SEM for testing the relationships between EB,BPR, and CA. Before conducting CFA, initial data analysis performed to identify problems in data, and assessment of normality of the data come prior fitting the measurement model and before proceeding to testing the model.

As indicated by (Hair et al, 2009), normalization of data makes interpreting the coefficients and response values easier, so the normalization should be conducted prior to model estimation. In CFA, we used several statistical validity tests and analysis like reliability and validity tests using (CFA) for construct validity and discriminate validity, composite reliability, and average variance extracted and, fitting the hypothesized and revised CFA model.

4.5.2 Data Screening

The final data set which coded into SPSS version 19 was composed of 139, the number questionnaires were not fully answered (more than 11% of items have blank responses) are 15. Those were considered of low interest and have been excluded. Other procedures were followed to manipulate 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, we assessed the Mahalanobis distance for identifying the potential outliers in data sample. 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 other observations in a dataset. Some of observations were deleted to improve the multivariate normality based on the observation number. The data set of 135 were checked and screening for outliers, 4 observations are deleted from data set due to Mahalanobis distance values more than the χ^2 value ($\chi^2=96.39$; $n=28$, $p<0.001$), the final data set remain to be analyzed is (120) (see table 4-10). Since the sample is large (more than 100), the new sampling distribution would be closer to normal distribution.

4.5.3 Model Specification

The CFA model for EB, BPR, and CA hypothesizes that the responses to the items in the questionnaire can be explained by 3 factors as mentioned above. Each item has non-Zero loading on its factor and Zero loading on all other factor. All three 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 (Sureshchandar, et.al, 2002), 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 particular factor.

Based on (Taq&Taq, 1997), we are able to decide priori whether the factors would correlate or not, also impose which factor pairs that are correlated and which observed variables are affected by which common factors. CFA considered as a tool to confirm the proposed factors. To purify the measurement model, two step approaches were 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&Gerbing, 1988).

For specifying the measurement model, we specify free for estimation the indicators related to each construct and the correlation between them. And we also didn't specify cross-loading as in EFA. In specifying the constructs, we set a scale for latent construct because it not observed and has no metric scale (no range of values), therefore, we fix one of the factor loading on each construct to specific value (we used 1.00).

We performed CFA for all three latent constructs and we ensured Unidimensionality before assessing Validity and Reliability. Items with low factor loading don't fit the measurement model should be removed from the model.

According to (Hair, et.al,2009), factor loading for every item should exceed 0.6. The deletion process has started with regarding to lowest factor loading. After the deletion, we run the new measurement model repeatedly until achieving unidimensionality 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 to the data, several Fitness Indexes used. There are a lot of argument about which fitness indexes to use, according to (Hair, et.al, 1995) and (Afthanorhan, 2013). The researcher should at least one fitness index from each category of model fit (Absolute Fit, Incremental Fit, and Parsimonious Fit). Based on their discussion, table 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-Suare/ 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 χ^2 (chi-square) that tests for the degree of misspecification. A non-significant χ^2 is indication of a model that fits the data well. P-value attached to the χ^2 to be non-significant in order to accept the null hypothesis that there is no significant difference between the model-specified and observed variances and covariance's. χ^2 is too sensitive to sample size increases so probability level tends to be significant. Also χ^2 also tends to be greater when the number of observed variables increases, so we 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., 1995; Curran, et.al, 1996), we 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 (χ^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, BPR, and CA.

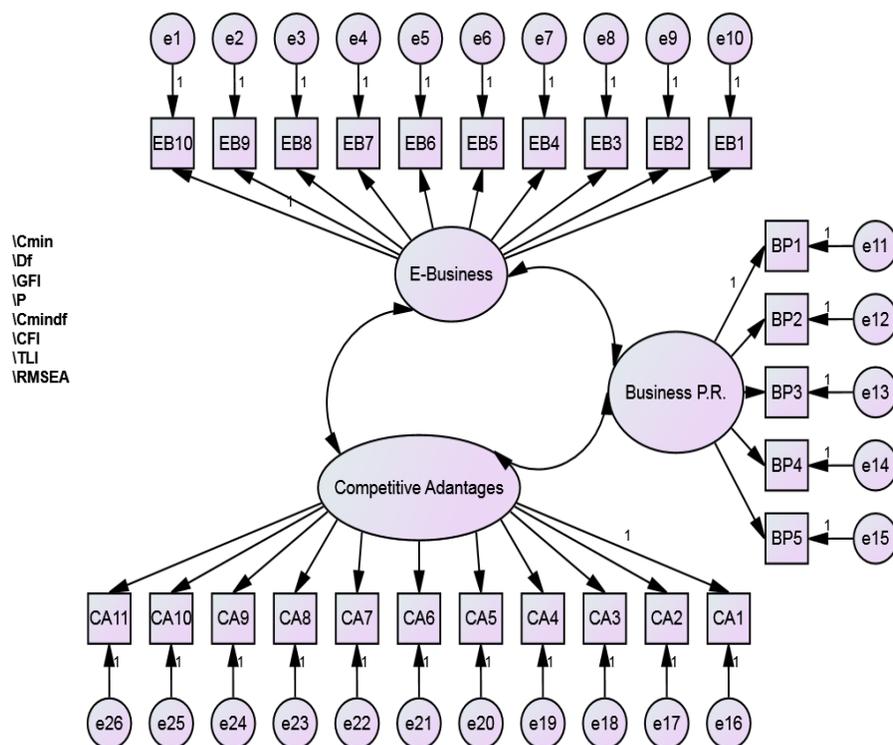


Figure (4-2): The Measurement Model Combining All Constructs Involved In the Study

The model consists of three constructs namely:

E-business scale measured using ten indicators:

- 1- Our hospital use E-Business to facilitate electronic communication within firm.
- 2- Our hospital use E-Business to provide customers with general information.
- 3- Our hospital adapts E-Business to perform internal administration work.
- 4- Our hospital adapts E-Business for procurement and sourcing from suppliers.
- 5- Our hospital use E-Business to understand customer insight.
- 6- Our hospital performs financial and managerial work electronically.
- 7- Our hospital provides informational response to answer questions and request via searchable online database.
- 8- Our hospital use E-Business to Share inventory information with our suppliers.
- 9- Our hospital use E-Business for service development.
- 10- Our hospital provide solutions to customer problems via web based service solution

Business process reengineering scale measured using five indicators

- 1- Top management in our hospital is the main motivator of BPR.
- 2- Managers in our hospital assure that the new BPR will not necessarily lead to staff layoffs.
- 3- Managers in our hospital assure that the new BPR will not necessarily lead to staff layoffs.
- 4- Important decisions in our hospital are made by upper-level management.
- 5- Lower-level employees are allowed to make many decisions.

Competitive advantage scale measured using 11 indicators

- 1- Reduction in inventory cost.
- 2- Reduction in operational cost.
- 3- Providing high performance services.
- 4- Meeting the service delivery promises.
- 5- Procuring material at competitive prices.
- 6- Offering a large number of service features.
- 7- Offering a large degree of service variety.
- 8- Increasing labor productivity.
- 9- Providing reliable and punctual medical services.
- 10- Providing affordable and competitive services.
- 11- Offering medical services with updated equipment.

The researcher employed the Pooled-CFA for all constructs of measurement model, all constructs are combined as shown in Figure (4-1), and the CFA analysis is performed at once. We 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 (4-12).

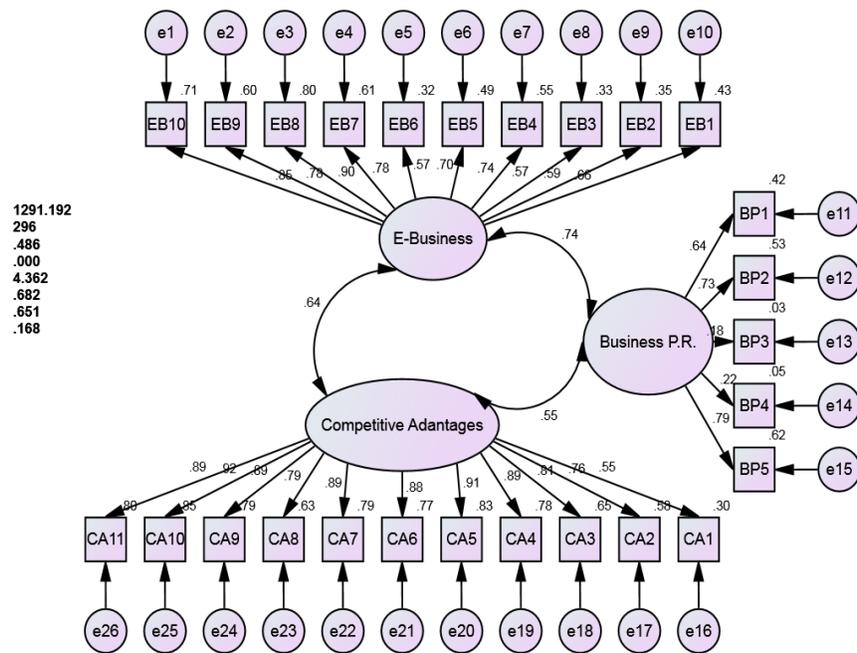


Figure (4-3): Factor Loading For All Items Related To Each Construct

The output of CFA in figures (4-3) shows the factor loading for each items, and the correlation between the constructs. The results indicated that fitness indices (RMSEA, GFI, AGFI, and Chisq/df) didn't achieve the required accepted level. This is because of some items have low factor loading less than 0.6). Table (4-12) shows fitness indices for the initial CFA model result.

Table (4-12): Fitness Indices for Measurement Model

Fitness Indexes	index	Index value	Acceptance
Absolute fit	RMSEA	0.168	Not Accepted
	GFI	0.486	Not Accepted
Incremental fit	CFI	0.682	Not Accepted
	TLI	0.651	Not Accepted
Parsimonious fit	Chisq/df	4.362	Not Accepted
P-Value= 0.000			

Each item that have a factor loading lower than 0.6 and an R2 (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 particular construct. Keeping these items will affect 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:

E-Business:

EB2: our hospital use E-Business to facilitate Electronic communication with customers and suppliers.

EB4: Our hospital Send to patients updates about new services.

EB6: Our hospital adapts E-Business for order taking process.

Business Process Reengineering:

BPR3: We made many changes in our hospital regarding: information dissemination.

BPR4: We made many changes in our hospital regarding: training and education.

BPR10: The integration of jobs is used to design work that is performed along process lines rather than functional lines

BPR11: We Gather requirements from customers before the BPR begin.

BPR12: The culture in hospital supports sharing organizational vision.

BPR13: The culture in hospital supports open communication.

BPR14: The culture in hospital supports participation in decision making.

Competitive advantage

CA2: Reduction in inventory cost

CA8:Increasing labor productivity

Additionally, after deletion of factors that loaded less than 0.60, we ran the new measurement model and examined the model Fitness, but fitness still not achieved after low factor loading deletion and based on criteria mentioned in table (4-12). That's led us to examine the Modification Indices (MI), in which that high value of MI (above 15) reveals that there are redundant items in the model, MI indicates that there are pair of items are redundant. The redundancies between items caused the measurement model to have a poor fit. To overcome redundancy in the measurement model, we selected the lower factors loading and deleted them.

Another solution for overcoming the redundancies is setting the pair of redundant item as “free parameter estimate” by covary them (setting error covariance). Table 13 shows the Modification Indices which provide Covariance between Items redundant. We found that item EB5 (e6) is redundant with item EB10 (e1), and EB9 (e2) is redundant with item EB10 (e1), CA2 (e17) with CA3 (e18) and finally CA7 (e22) with CA10 (e25) those Items were paired together because they considered very important to hypothesized model and theory.

Table (4-13): Modification Indices (covariance) for Redundant Items

Factor number		Factor number	M.I	Par Chang
E6	<-->	E1	18.789	0.156
E1	<-->	E2	17.186	0.132
E17	<-->	E18	16.144	0.113
E25	<-->	E22	24.787	0.143

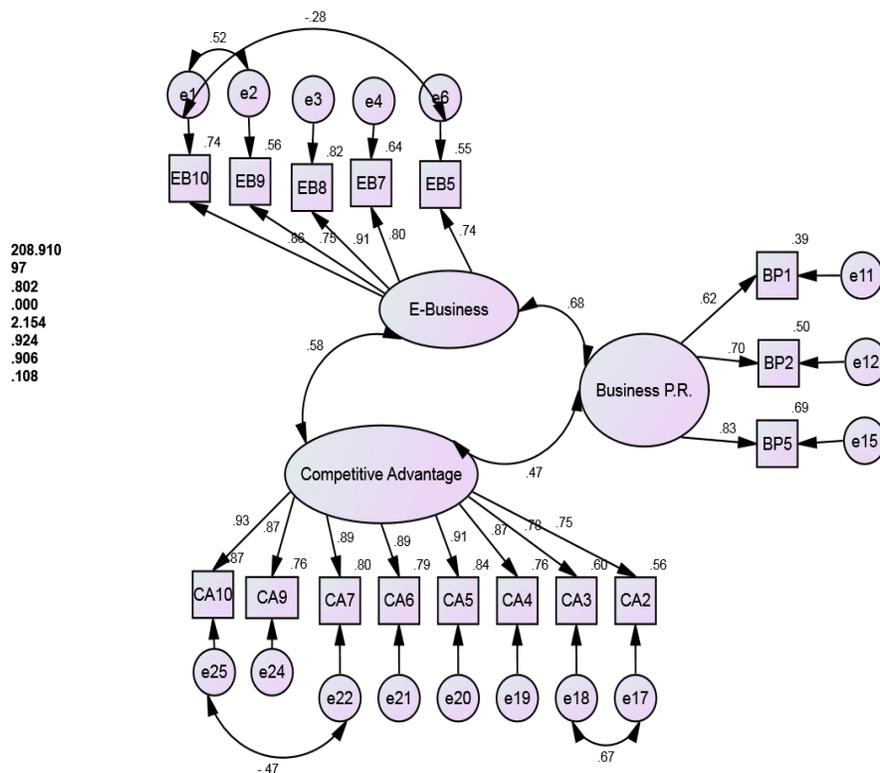


Figure (4-4): Factor Loading For Each Items, And The Correlation Between The Constructs.

We have modified the model based on modifications indices, the resulted model is shown in figure (4-4), and the fitness indices are shown in table 13. 10 Items were deleted in the second measurement estimation, and four items were paired as follow:

1. EB5 and EB10 are Paired
2. EB10 and EB9.
3. CA2 with CA3.
4. CA7 with CA10

Table (4-14): Fitness Indices for the Modified Measurement Model

Fitness Indexes	index	Index value	Acceptance
Absolute fit	RMSEA	0.108	Not Accepted
	GFI	0.802	Accepted
Incremental fit	CFI	0.924	Accepted
	TLI	.906	Accepted
Parsimonious fit	Chisq/df	2.154	Accepted
<i>P-Value= 0.000</i>			

The results in table (4-14) indicate good fit as fit indices have improved after deletion of items with low factor loading, redundant items, note that the new Measurement Model is shown after some items are set as Free Estimate (Paired). Sixteen Items were resulted from the second measurement model estimation. Those items were confirmed and the requirement for Unidimensionality 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 private hospitals in Amman has three constructs as Standardized path coefficient for the three constructs are greater than 0.70 and the significances level are ($P \leq 0.05$) see (Figure 4-3). The items related to the three constructs EB, BPR, CA model are fit with the data selected which indicated that measurement model can serve as a good measurement scale of EB, BPR, and CA in private hospitals in Amman.

After completion of CFA measurement model of, we have to ensure that our model indicate validity and reliability of the construct. Assessment of model unidimensionality, validity, and reliability is required before proceeding to modeling the structural model. Also examining the normality of the data in order 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.

4.5.4 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.

Average Variance Extracted (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 will not enhance Convergent Validity. Construct Validity on the other hand, can be achieved when Fitness Indices for construct be acceptable. Results from table (4-13) (Fitness Indices) indicated good model fit for the items in measuring their respective latent constructs. Finally, Discriminate 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 Average Variance Extracted (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).

Average Variance Extracted (AVE) indicates the average percentage of variation explained by the measuring items for a latent construct. According to (Hair, et.al, 1995;Holmes-Smith, 2002;Luqman& Abdullah, 2011) suggest that composite reliability should be greater than 0.7 and AVE is greater than 0.5. As can be shown in table 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. We used the equation below to calculate AVE and Composite Reliability (Hair et al, 1995,2009).

$$AVE = \frac{\sum R^2}{n}$$

$$CR = \frac{(\sum R)^2}{[(\sum R)^2 + (\sum 1 - R^2)]}$$

Table (4-15): 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
E-Business	0.906										.907	.664
EB5		3.09	1.053	-0.098	0.107	0.74	0.088	7.681	0.000	0.548		
EB7		3.025	1.136	0.056	-0.276	0.80	0.085	9.615	0.000	0.640		
EB8		3.00	1.084	0.121	-0.268	0.91	0.077	11.65	0.000	0.828		
EB9		3.08	1.192	-0.284	-0.813	0.75	0.066	12.34	0.000	0.563		
EB10		3.15	1.276	-0.499	-0.986	0.86				0.740		
BPR	0.76										.763	.521
BP1		4.32	1.05	-1.29	0.59	0.62				0.384		
BP2		3.05	0.928	0.075	0.529	0.70	0.19	5.346	0.000	0.490		
BP5		3.35	1.12	-0.675	-0.36	0.83	0.26	5.689	0.000	0.689		
CA	0.961										.959	.745
CA2		3.72	0.916	-1.422	2.264	0.75				0.563		
CA3		3.8	0.9	-1.433	2.52	0.78	0.07	13.97	0.000	0.608		
CA4		3.825	1.03	-0.938	0.616	0.87	0.14	9.281	0.000	0.757		
CA5		4.07	1.18	-1.06	-0.126	0.91	0.16	9.833	0.000	0.828		
CA6		3.719	1.05	-0.759	0.066	0.89	0.14	9.942	0.000	0.792		
CA7		3.833	1.006	-0.712	0.112	0.89	0.13	9.508	0.000	0.792		
CA9		3.9	0.964	-0.881	0.433	0.87	0.13	9.281	0.000	0.757		
CA10		4.05	1.215	-1.069	-0.052	0.93	0.17	9.991	0.000	0.865		
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.												

We examined the normality of the data in order to assess the distribution for each variable in a dataset after fitting the measurement model. Measuring of skewness for every item was conducted to assess normality, the absolute value of skewness 1.0 or lower reveals that the data is normally distributed. All of resulted skewness are lower than 1.0. Also, by looking to multivariate kurtosis, we found the critical ratio of (c.r) for the kurtosis does not exceed 3.0 according to (Kline, 2005).

According to Hair et al (2010), SEM using the Maximum Likelihood Estimator (MLE) is robust to skewness greater than 1.0 and also 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, we are 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 (Luqman& Abdullah, 2011), 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). We 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, and other values are the correlation between the constructs. Discriminant validity for all constructs is achieved when the square root of AVE values are higher than the values in its row and column (Hair, et.al, 1995). Thus, we conclude that discriminant validity for all eleven constructs is achieved.

Table (4-16): Discriminant Analysis Results, Correlations and AVE

Construct	EB	BPR	CA	AVE
EB	0.846			0.664
BPR	0.578	0.716		0.521
CA	0.592	0.504	0.911	0.745

4.6 Testing the Structural Model

Structural Equation Modeling (SEM) is integrating of regression analysis and exploratory factor analysis (Afthanorhan, 2013). SEM is a more powerful statistical technique running the Confirmatory Factor Analysis (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 a double role has. 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 variable (BPR) mediates the relationship between an independent variable (EB) and a dependent variable (CA) (Chin,1998) indicated that the power of mediator variable is relies on correlation of coefficient or square multiple correlation (SMC) in the model. (SMC) is exist once this variable has been exerted by other variables whereby independent or exogenous variables.

Mediator variable comes upon the independent variable has an effect on the particular variables. (Schumacker& Lomax, 2012) indicated that (SMC) higher than 0.80 consider high total variation. There are three types concerning on testing mediated effect beginning by (Müller, et.al, 2010) followed of (Preacher & Hayes, 2004) and has been improve by Sobel test (Preacher & Leonardelli, 1982). All of these types use the z-score or z-test to indicate the significant level for their theory.

As stated before, mediation effect (intervening effect), mediator 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 mediational effects, we explore to examine the influences between (EB, BPR, CA 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 (BPR) is modeled as the mediator between the EB variable and the ultimate dependent variable CA. This mediating model was proposed based on literature as stated on theoretical review.

According to (Baron & 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 CA then the mediator must have effect on the dependent variable. In this model BPR must affect CA. These conditions were examined; it appeared that the three conditions were not met. (Hair, et.al, 2009) indicated that testing mediation effect using SEM requires significant correlations between independent variable, mediating variable, and the dependent variable.

The Researcher have proposed that BPR is mediator, then addressed several steps before testing the mediating effect using structural equation modeling, firstly the researcher Construct each variable with the number of items. For Example, EB factor have 5 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 Average Variance Extracted (AVE) were also achieved. Finally, the researcher estimated the path of each variable regarding the theoretical framework.

In this case, three variables are performed including one mediators variable. The researcher executed the structural model. In this case, the researcher used maximum likelihood 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 constructs. Table (17) shows the Standardized Regression Weights, Critical Ratio, and Probability Value.

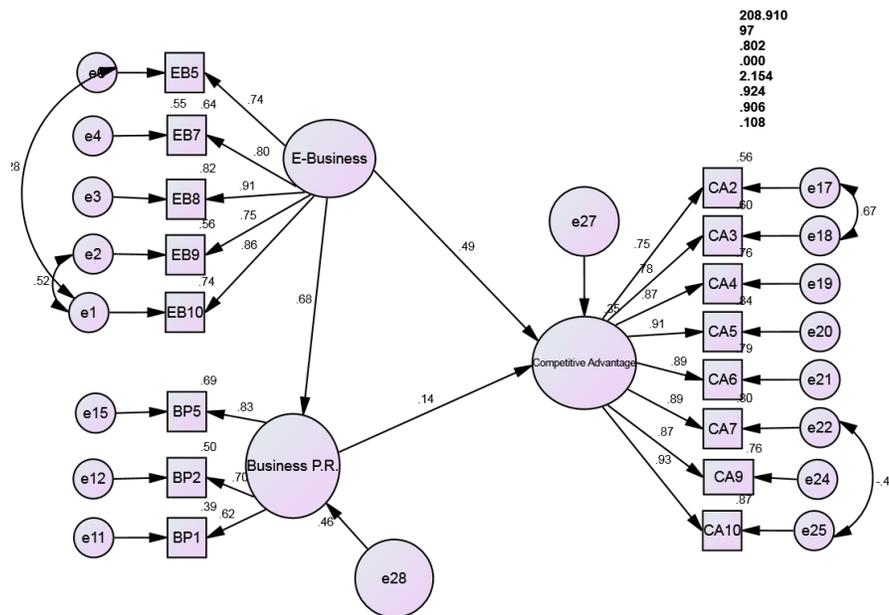


Figure (4-5): Standardized Regression Weights for EB, BPR, and CA

Table (4-17): Standardized Regression Weights, Critical Ratio, and Probability Value

	Estimate	Critical ratio	Probability value	Result
E-Business → Business Process Reengineering	0.682	4.882	***	Significant
Business Process Reengineering → Competitive Advantage	0.139	0.957	0.339	Not Significant
E-Business → Competitive Advantage	0.490	3.364	***	Significant

4.6.1 The Procedure for Testing Mediation in a Complex Model

Figure (4-5) present the structural model with fitness indexes, the fitness required in structural equation model has been reached, the findings is emphasized once achieve the required level for (CFA) using covariance based structural equation modeling. The figure (4-5) demonstrates the path coefficient of standardized regression weight for causal effect of exogenous variables on endogenous variables. EB factor has significant impact on BPR. On the other hands, the EB factor is also has impact on CA. BPR does not have impact on CA, Means that, BPR factor has less correlation on CA.

The researcher seeking to certify whether the mediator variables are to be interested to apply for the subsequent analysis. BPR factor 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 taking into account of Independent variable→ Mediator variable→ Dependent variable of which value of standardized regression weight

for both path should be multiplied. (Baron & Kenny, 1986) inherits the Sobel (1982) 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 affect on the main factor can be defined as non-mediation occurs. Thus, this variables probable might be appropriate to perform as independent variable since does not give any contribution that can give a tremendous advantages 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 drawing the deduction based on our findings but it does not mean we should neglect the significant of this variable. In other words, the researchers should address the probability value as a first step followed on value of Independent and Mediator* value of Mediator and Dependent calculated. In order 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, we press on the calculation between indirect and direct effect as aforementioned. The calculation bellow explains deeper understanding about the mediation affect.

The indirect effect (EB*PBR) = $0.682 \times 0.139 = 0.0095$.

The direct effect = 0.490.

(EB to CA) is significant and (BPR to CA) is no significant means that Non mediation occurs

4.7 Testing the Hypothesized Model (Hypothesizes)

Testing the mediation effect using structural equation modeling indicated that BPR does not meet the condition to be mediator variable. The variable is fail at the beginning once the mediator variable having insignificant path on endogenous construct. Since the result of direct impact is unchanged once include a mediator variable, thus, the mediation effect is not occurs. Also, the result of direct impact is suddenly increase once include a mediator variable when all path coefficient are significant, calculate the result of indirect impact. If value of direct impact is higher than indirect impact, the non-mediation effect is not occurring. Table (4-18) below presents the hypothesis testing

Table (4-18): Testing the Hypothesis

hypothesis	estimate	p-value	Supported or not
H1: There is a positive impact of E-Business on Competitive advantage at the level ($\alpha \leq 0.05$)	0.49	0.000	Supported
H2: There is a positive impact of E-Business on Business process reengineering at the level ($\alpha \leq 0.05$)	0.682	0.000	Supported
H3: BPR mediate the impact E-Business on competitive advantage	0.139	0.339	Not supported

Results in table (4-18) which shown no mediation effect have accrued cannot be presume as a fail findings or analysis but can be elaborate as no effect on endogenous construct. This might be happen 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 Five

Discussion, Conclusion and Recommendation

5.1 Discussion

5.1.1 Exploratory factor analysis (EFA)

5.1.2 Confirmatory factor analysis (CFA)

5.1.3 Structural Equation Model (SEM)

5.3 Conclusion

5.4 Recommendation

5.5 Future Work

5.1 Discussion

5.1.1 Exploratory Factor Analysis (EFA)

The exploratory factor analysis (EFA), has three factors (EB, BPR, CA) explained 66.69% of the variance in the pattern of relationships among the items. All the three factors had high reliabilities (all cronbach's $\alpha > 0.70$), the first questioner was 39 item 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 (EB2) loaded in factor 3 (CA), and EB4 loaded in (BPR). Totally 13 items were deleted due to cross loading 26 items remained. After the deletion process we applied a VARIMAX- rotated analysis to get a completely clean set of factor loading and avoiding non-cross loading of items to another factors, and maximizing the loading of each variable on one factor.

According to (Osborne & Fitzpatrick, 2012) it was confirmed that the data included this study was appropriate in order to conduct a valid exploratory factor analysis (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 three factor structures by deleting the items which cross loaded on multiple factors and The variable which load less than 0.4(Osborne & Fitzpatrick, 2012).

This research examined the reliability and validity, Based on the results of the EFA of this research. Further analysis is necessary to examine the relationships which exist among the latent and clear variables by conducting a confirmatory factor analysis (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

EB2: our hospital use EB to facilitate communication with customer and supplier.

EB4: Our hospital Send to patients updates about new services.

EB6: Our hospital adapts E-Business for order taking process.

EB9: Our hospital use E-Business for advertising and promotion.

BPR16: We made many changes in our hospital regarding: organizational structure

BPR17: We made many changes in our hospital regarding: information dissemination.

BPR18: We made many changes in our hospital regarding: training and education.

BPR19: We made many changes in our hospital regarding: Employee empowerment.

BPR24: The integration of jobs is used to design work that is performed along process lines rather than functional lines.

BPR25: We Gather requirements from customers before the BPR begin because information from customers drives the BPR process.

BPR26: The culture in hospital supports sharing organizational vision.

BPR27: The culture in hospital supports open communication.

BPR28: The culture in hospital supports participation in decision making.

After verifying the model, Validity, reliability and, consistency were assured. Which indicates that the new model is valid and serving as appropriate measurement scale to measure the three factors of the study. Results also indicate the model is appropriate for the second phase of the analysis.

5.1.2 Confirmatory Factor Analysis CFA:

The second step after EFA is performing CFA, based on data from 120 questioners. The researcher chose maximum likelihood estimation because our data were normally distributed. The data came from 26 questions are distributed in five private hospitals in Jordan. A Result of multivariate normality and CFA Model table with means and standard deviations is shown in Table 15; the theoretical model is presented in Figure (4-5). The researcher hypothesized a three-factor model to be confirmed in the measurement portion of the model. Then evaluated the assumptions of multivariate normality and linearity through SPSS 19.0. Using box plots and Mahalanobis distance, the researcher observed no univariate or multivariate outliers. Then removed 10 questions from the model because they did not follow directions. The final sample size was 120; there were no missing data.

The comparative fit index (CFI) =0.682, the Tucker-Lewis fit index (TLI) = 0.651, and the RMSEA = 0.168 Those values didn't indicate a good fit between the model and the observed data. The other results indicated that fitness indices (RMSEA, GFI, AGFI, and Chisq/df) didn't achieve the required accepted level. This is because of some items have

low factor loading less than 0.6). Most of literatures are frequently reported indexes (RMSEA, GFI, CFI and, Chisq/df) to be used, and their level of acceptance are also varied. After the deletion process, estimation has been calculated again, some modifications were necessary to be performed as there were some errors to be cover.

Based on the modification indices in table (4-13), many error terms have been paired. CFA Model have been conducted again and resulted in a good model fit. The results indicated good fit as fit indices have improved after deletion of items with low factor loading, redundant items. The new Measurement Model is shown after some errors are set as Free Estimate (Paired). Sixteen Items were resulted from the second measurement model estimation. Those items were confirmed and the requirement for Unidimensionality was achieved through the item deletion process for low factor loading items.

Results indicated that the measurement scale for the sample selected from private hospitals in Amman has three components as Standardized path coefficient for constructs are greater than 0.60 and the significances level are ($P \leq 0.05$). The modified measurement good fit with sample data as it yielded p- value= 0.000, normed chi-square= 2.154, Comparative fit index CFI is 0.924, Goodness of Fit Index GFI is (0.802), and RMSEA= 0.108. All fit indices are adequate to conclude that the re-specified CFA measurement model is correct. It indicates that the model fit the data, and the loading was ranged from 0.55 to 0.93. Convergent validity for the measurement model was also supported as the re-specified model indicates that all 16 items converge into three factors. Construct Validity for the overall model was achieved since the fitness Indices for all constructs were acceptable, which means good model fit for the items in measuring their respective latent constructs.

Each individual item measure one latent construct and not measure deferent latent construct at the same time. Results in table (4-14) reveals that Discriminant Validity is achieved for the measurement model when all redundant items are either deleted or constrained, AVE values are higher than the values in its row and column which indicates that all construct are different. Finally, the composite reliability, AVE and Cronbach Alpha values exceeded the minimum acceptable values, indicating that measures were reliable and introducing consistent results.

From the above results, we can simply conclude that the private hospitals in Amman should focus on these items in order to bring the benefits EB initiatives. The purpose of Factor analysis (EFA, CFA) was to validate the values that are related to EB, BPR, and CA as suggested by (Kurtinaityte, 2007;Phan&Deo, 2008) who provide evidence to three dimensions of CFA model that can be used in private hospitals in Amman, they also hints that these factors are important in driving EB toward enhancing CA. Our results are relevant to theories and practice based on finding of previous literature.

The results empirically support the validity of our instrument for evaluating EB, BPR and CA. Finding suggest that. The implications of these results enable us to understand the measurement validity in EB and BPR research. Appendix (3) display the final measurement scale.

5.1.3 Structural Equation Model (SEM):

Structural Equation Modeling (SEM) has become one of the techniques of choice for researchers across disciplines and increasingly is a 'must' for researchers. However, the issue of how the model that best represents the data reflects underlying theory, known as model fit, is by no means agreed (Hooper, et.al, 2008).

The structural equation model is the third step of the analysis the researcher performed a SEM analysis based on data from 120 questioners on the 16 questions. We chose maximum likelihood parameter estimation over other estimation methods (weighted least squares, two-stage least squares, asymptotically distribution-free [ADF]) because the data were distributed normally (Kline, 2005). As the hypothesized model appears to be a good fit figure (4-5) to the data. The CFI is 0.924 TLI is 0.906; and the RMSEA is 0.108. We did not conduct post-hoc modifications because of the good fit of the data to the model.

Testing the structural model reveal that EB has a significant on CA, This result was agreed with several studies (Pilinkiene, et.al, 2013;phan, 2003), where many researchers pointed to the importance of using EB to achieve CA.

The study revealed a statistically significant effect of BPR in achieving CA and this agreed with many studies agreed with many previous studies (Bliemel&Hassanein,2004)

The results did not support the role of BPR in the impact of EB on CA. This result differed from previous studies in this field, although many previous studies have indicated the positive impact of BPR in influencing CA such as a study (MAGUTU, et al., 2010).

The reasons for the difference can be summarized in that the sample of the study does not have an integrated view in BPR, and some of the hospitals have not reached maturity of the need of implementing BPR. Some studies have indicated that implementing BPR fail for several reasons. For example, failure of BPR implementation may attributed to factors like Ineffective goals setting, and way of implementing BPR, IT system is not compatible with the process, lack of top management support, and lack of staff knowledge. This mean not knowing the size of the benefits that will come back to the organization from implementing BPR (Chen, 2001).

No mediation effect cannot be suppose as a fail findings or analysis but can be elaborate as no effect on endogenous construct. This might be happen due to less correlation with endogenous construct or view of respondent at the targeted population that believe this factor is unnecessary to be addressed.

5.2 Conclusion:

The electronic health record (EHR) is considered as the data base for all patients, in addition electronic health information system holds a great possibility for developing the health care sectors in countries, and these countries have adopted the EHR to reduce medical errors, improve the quality of their services, and improve patient care by accessing accurate information at any time. Jordan has been working to enlarge and improve its healthcare services. (Dua'A, et.al, 2013).

The researcher proposes that a BPR perspective is important when implementing EB system, the role of BPR in the healthcare sector is reforming the procedures that are facilitated by technology, and examines what changes are required for procedures within the healthcare system to exploit the full benefits of adopting EB.

The researcher suggests for an EHR system to be successful, communication must be effective between executives, practitioners, and vendors. In addition, the system must have a clear leadership structure and good communication regarding performance expectations. The change to a new EHR system should be well planned in order to avoid loops or gaps in information access, as these could be critical in treating patients. Technical equipment, support, and training are also critical elements when implementing EHR.

The study found that EB and BPR have a statistically significant impact on CA. The results of the study did not support the role of BPR in the impact of EB on CA. This is because the managers were not aware of the importance of BPR and linking it with EB in addition to the inability to optimize the capabilities of using EB.

5.3 Recommendations:

The recommendations the researcher proposes from the results of the study are as follows (1) Private hospitals in Amman need to focus on EB activities in order to improve the quality of their services. (2) Managers of hospitals need to play a vital role in changing the way people think and encourage them to accept the changes and the new system and procedures because of the great benefits that could be added to the hospital. (3) Hospital management should focus on recruiting highly skilled and specialized employees in the

information system department and subject them to intensive training courses in international standards. (4) Provide training courses for staff members in order to prepare them for the new systems, procedures and tasks. (5) Adopting EB system with the role of BPR mandates a change in thinking ways. It means that EB needs to define its role, tasks, and begin to employ value-added activities and focusing on opportunistic efforts to improve the quality of services. Finally from the results achieved during the stages of development of the scale, the researcher recommends managers in private hospitals to focus on the dimensions that contained a high factor loading for EB such as:

- Our hospital adapts E-Business for procurement and sourcing from suppliers.
- Our hospital use E-Business to understand customer insight.
- Our hospital provides informational response to answer questions and request via searchable online database.
- Our hospital use E-Business to Share inventory information with our suppliers.
- Our hospital use E-Business for service development.
- Our hospital provide solutions to customer problems via web based service solution

BPR:

- lower-level employees are allowed to make many decisions
- Top management in our hospital are the main motivator of BPR

CA:

- Reduction in operational cost
- Providing high performance services

- Meeting the service delivery promises
- Procuring material at competitive prices
- Offering a large number of service features
- Increasing labor productivity
- Providing reliable and punctual medical services
- Providing affordable and competitive services
- Offering medical services with updated equipment

The fact that these measures have been tested for validity and consistency, and because these dimensions have a high factor loading.

5.4 Future Work

Due to the limitation of the study, and the results of statistical analysis, the study proposed application for further research. For example, this study was limited to 5 private hospitals in Amman, the researcher recommends expanding the study to include different hospitals in Jordan. The study was limited to managers as a main source of data, the researcher recommends the inclusion of all employees, as employees are the most targeted group in the BPR projects. This study was limited to private hospitals in Amman, the researcher suggests the inclusion of government hospitals to ensure generalization of the study results.

The study was limited to the hospital sector, and these results cannot be generalized. The researcher recommends that future researches should include other sectors such as services, industries, and telecommunications.

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Appendixes

Appendix (1): Panel of Referees Committee

الاسم	الدرجة العلمية	الجامعة
الدكتور أحمد علي صالح	استاذ دكتور	جامعة الشرق الاوسط
الدكتور هبه ناصر الدين	استاذ دكتور	جامعة الشرق الاوسط
الدكتور احمد الحراسيس	استاذ مساعد	جامعة الشرق الاوسط
الدكتور محمود ابو جمعه	استاذ مساعد	جامعة الشرق الاوسط
الدكتور خالد ابو الغنم	استاذ مشارك	جامعه الملك عبد العزيز - السعودية
الاستاذ الدكتور نضال الحوامدة	استاذ دكتور	جامعه مؤته

Appendix (2)



مستشفى الأردن
JORDAN HOSPITAL



الإشارة: م/أم ع/ ق /! 1090
التاريخ: 2018/03/14

السادة جامعة الشرق الاوسط الكرام

تحية وبعد ،

اشير الى كتابكم تاريخ 2018/12/12 ونعلمكم بالموافقة على تسهيل مهمة الطالبة

تمارا مصطفى حميدي في بحثها .

يرجى الإيعاز للمذكورة بمراجعة قسم العلاقات العامة / السيد سفيان عبد الهادي لاستكمال الإجراءات .

وتفضلوا بقبول فائق الاحترام ،،،،

المدير الإداري
المهندس أحمد خطاب



نسخة الى :

- دائرة الجودة
- رئيس قسم العلاقات العامة
- ملف خدمة المجتمع



مستشفى د. أحمد الحميدة العام
مركز جراحة وقسطرة القلب والشرايين والتخصصات الشاملة

٢٠١٨/٠٣/١٥

السادة جامعة الشرق الأوسط الكرام

تحية وبعد ..

أشارة إلى كتابكم بتاريخ ٢٠١٧/١٢/١٢ نعلمكم بالموافقة على تسهيل مهمة الطالبة تمارا مصطفى حميدي في بحثها، يرجى الإيعاز للمذكورة بمراجعة قسم شؤون الموظفين/ السيد رياض عمرو لاستكمال الاجراءات .

وتفضلوا بقبول فائق الاحترام

المدير العام
د. أحمد الحميدة



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هاتف: ٠٠٩٦٢ ٦٤٧٨٥٥٥٥
فاكس: ٠٠٩٦٢ ٦٤٧٨٨٠٥٥
ص.ب: ٥٧٨ عمان ١١٦٢٣ الأردن

Appendix (3)

Thesis Questionnaires

Initial Questionnaire (1):

no	Features	Sources	
1-	E-Business	<p>1- our hospital use E-Business to facilitate electronic communication within firm</p> <p>2- our hospital use E-Business to facilitate Electronic communication with customers and suppliers</p> <p>3- Our hospital use E-Business to Provide customers with general information</p> <p>4- Our hospital Send to patients updates about new services</p> <p>5- Our hospital adapt E-Business to perform internal administration work</p> <p>6- Our hospital adapt E-Business for order taking process</p> <p>7- Our hospital adapt E-Business for procurement and sourcing from suppliers</p> <p>8- Our hospital use E-Business to understand customer insight.</p> <p>9- Our hospital use E-Business for advertising and promotion.</p> <p>10- Our hospital performs financial and managerial work electronically.</p>	<p>Kurtinaityte, L. (2007)</p> <p>Breen, L., & Crawford, H. (2005)</p>
2-	(BPR)	<p>11- Our hospital provides informational response to answer questions and request via searchable online database.</p> <p>12- Our hospital use E-Business to Share inventory information with our suppliers.</p> <p>13- Our hospital use E-Business for service development .</p> <p>14- Our hospital provide solutions to customer problems via web based service solution.</p> <p>15- Top management in our hospital are the main motivator of BPR</p> <p>16- We made many changes in our hospital</p>	<p>Huy, Q. N. (2001)</p> <p>Aremu. M and Ayanda. M,2008</p>

3-	Competitive advantage	<p>regarding: organizational structure.</p> <p>17- We made many changes in our hospital regarding: information dissemination</p> <p>18- We made many changes in our hospital regarding: training and education</p> <p>19- We made many changes in our hospital regarding: Employee empowerment</p> <p>20- Managers in our hospital assure that the new BPR will not necessarily lead to staff layoffs</p> <p>21- Financial, Technical, Human, and Time resources are available to support BPR in hospital</p> <p>22- Important decisions in our hospital are made by upper-level management.</p> <p>23- lower-level employees are allowed to make many decisions</p> <p>24- The integration of jobs is used to design work that is performed along process lines rather than functional lines.</p> <p>25- We Gather requirements from customers before the BPR begins</p> <p>26- The culture in hospital supports sharing organizational vision</p> <p>27- The culture in hospital supports open communication</p> <p>28- The culture in hospital supports participation in decision making.</p> <p>29- Reduction in inventory cost</p> <p>30- Reduction in operational cost</p> <p>31- Providing high performance services</p>	Boyer, K. K., & Lewis, M. W. (2002)
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		<p>32- Meeting the service delivery promises</p> <p>33- Procuring material at competitive prices</p> <p>34- Offering a large number of service features</p> <p>35- Offering a large degree of service variety</p> <p>36- Increasing labor productivity</p> <p>37- Providing reliable and punctual medical services</p> <p>38- Providing affordable and competitive services</p> <p>39- Offering medical services with updated equipment</p>	
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Modified Questionnaire (2):

Dear participant

The researcher conducts a study entitled “**The Role of E-Business adoption and Business Process Reengineering: Impact on Competitive Advantage in Private Hospitals in Amman** “in order to clarify the impact of E-business on competitive advantage, considering the role of Business process Reengineering.

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 Administration Department - Business Faculty

Master Program in E-business

Amman, Jordan

Part 1: Demographic data**Gender**

- Male. Female.

Age

- Less than 28 years old. 29-37 years old.
 38-46 years old. 47-55 years old.
 More than 56 years old.

Job Title

- Executive Manager. Director General.
 Administrative Manager. Head of Section.
 Other Position.....

Years of Experience in Current Company

- Less than 5 years. 6-13 years.
 14-20 years. More than 21 years.

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)	agree	Strongly agree	Neither agree nor disagree	disagree	Strongly disagree
1-	our hospital use E-Business to facilitate electronic communication within firm					
2-	our hospital use E-Business to facilitate Electronic communication with customers and suppliers					
3-	Our hospital use E-Business to Provide customers with general information about our hospital					
4-	Our hospital Send to patients updates about new service plans and new developments within our hospital					
5-	we adapt E-Business to perform internal administration work					
6-	we adapt E-Business for order taking process					
7-	we adapt E-Business for procurement and sourcing from suppliers					
8-	We use E-Business to understand customer insight					
9-	We use E-Business for advertising and promotion					
10-	We use E-Business for service development					
11-	We perform financial and managerial work electronically					
12-	We provide informational response to answer question and request via searchable online database					
13-	Our hospital use E-Business to Share inventory information with our suppliers					
14-	We provide solutions to customer problems via web based service solution					
#	Business process Reengineering (BPR)					
1-	Top management in our hospital are the main motivator of BPR					
2-	We made many changes in our hospital regarding: organizational structure, information dissemination, training and education and Employee empowerment					

3-	Managers in our hospital assure that the new BPR will not necessarily lead to staff layoffs by training and let them know more about everything new					
4-	Financial, Technical, Human, and Time resources are available to support BPR in hospital					
5-	Important decisions in our hospital are made by upper-level management.					
6-	lower-level employees are allowed to make many decisions					
6-	The integration of jobs is used to design work that is performed along process lines rather than functional lines.					
7-	Our hospital formalize a set of written rules and regulations developed to handle decision making and BPR					
8-	We Gather requirements from customers before the BPR begins because information from customers drives the BPR process					
9-	The culture in hospital supports sharing organizational vision, open communication and, participation in decision making.					
#	To what extent do you evaluate your hospital regarding (competitive advantage)	Very good	good	Acceptable	poor	Very poor
1-	Reduction in inventory cost					
2-	Reduction in operational cost					
3-	Providing a high performance services					
4-	Meeting the service delivery promises					
5-	Gaining low cost materials procurement					
6-	Offering a large number of service features					

7-	Offering a large degree of service variety					
8-	Increasing labor productivity					
9-	Providing fast and on time services for patients					

Modified Questionnaire (3):

EB5	Our hospital use E-Business to understand customer insight
EB7	Our hospital provide informational response to answer questions and request via searchable online database
EB8	Our hospital use E-Business to Share inventory information with our suppliers
EB9	Our hospital use E-Business for service development
EB10	Our hospital provide solutions to customer problems via web based service solution
BP1	Top management in our hospital are the main motivator of BPR
BP2	Managers in our hospital assure that the new BPR will not necessarily lead to staff layoffs
BP5	lower-level employees are allowed to make many decisions
CA2	Reduction in operational cost
CA3	Providing high performance services
CA4	Meeting the service delivery promises
CA5	Procuring material at competitive prices
CA6	Offering a large number of service features
CA9	Providing reliable and punctual medical services
CA10	Providing affordable and competitive services