MIDDLE EAST UNIVERSITY Business College

Business Administration Department

The Role of E-banking Processes in Minimizing Risk Ratios of Commercial Banks in Jordan دور العمليات البنكية الالكترونية في تقليل نسب المخاطر

على البنوك التجارية في الاردن

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Master in E-Business

Authorization

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Dedication

To the ONE who has always settled my heart, whose spirit has accompanied me wherever I go; my beloved Father

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Abstract

The Role of E-banking processes in minimizing risk ratios of commercial banks in Jordan

The use of E- banking services has widely spread all over the world in recent years. This development was substantial in Jordan, where more commercial banks have realized the advantages of E- banking, and have started to transform their bank activities into electronic systems. It's evident from real life and research revised that transformation process can be jeopardized by the imposing risk e-banking brings with it.

The aim of this study is to specify the role of e-banking processes to minimize the risk averages by suggesting solutions and recommendations, and providing an overview of the current developments in the e- banking sector of the commercial banks.

the researcher has investigated the effectiveness of e-baking processes relying in information gathered from 6 banks in Jordan, 2 Jordanian and 4 foreign banks during the period (2006-2010). Five major processes of ebanking were chosen to identify their impact on risk ratio. Quantitative methods were used and the data collected were treated by using Statistical Package for Social Sciences (SPSS), and in conjunction with qualitative information gathered from 9 interviews with bank managers of IT, IS, and Risk Departments .(Appendix 3). And the questionnaire was analyzed

Some of the main results of the study are: - there is a lack of required documentation for the risks of E-banking, and shortage of proper planning required to integrate the Risk Divisions of the banks with their IT and IS Divisions; there is also a need to employ specialists on e-banking to gradually decrease banks reliance upon third parties

ملخص الدراسة

دور العمليات البنكية الالكترونية في تقليل نسب المخاطر على البنوك التجارية في الاردن

شهدت السنوات القليله الراهنه استخداما متزايدا للخدمات البنكية الالكترونية وكان لهذا التطور اثرا كبيرا في الأردن حيث ادركت العديد من البنوك الفوائد التي يمكن ان تحققها بتبني واستخدام انظمه البنوك الالكترونية إلا ان المخاطر التي ترافق انظمة الخدمات البنكية الالكترونية يمكن ان تحد من هذا التوسع كما هو ملاحظ في الواقع ومن خلال البحوث التي تمت مرجعتها.

ان الهدف الرئيسي لهذه الدراسه هو استخدام العمليات البنكية الالكترونية لتقليل نسب المخاطر المحدقه بالبنوك وذلك بأقتراح حلول وتقديم توصيات كفيله بتقليل نسب الخطوره كما تقوم الدراسه باستعراض واسع لأحدث التطورات في مجال الأعمال البنكية الالكترونية في البنوك التجارية.

قامت الدراسه بالتحقق من مدى فعاليه العمليات البنكية الألكترونية بالأستناد الى معلومات عن خمسة عمليات بنكية الكترونية اساسية تم اختيارها للتعرف على اثر كل منها على معدلات الخطوره في عينه البحث وهي عينه مكونه من 6 بنوك تجارية في الأردن 4 منها اجنبية و2 اردنية.

لقد تمت معالجه البيانات احصائيا باستخدام الحزمة الأحصائية للعلوم الأجتماعية (SPSS) statistical package for social science , كما استخدمت الدراسه طرق تحليل احصائي اخرى لنفس الغرض وذلك بالتزامن مع طرق البحث النوعي الحديثه فقد تم اجراء 9 مقابلات مفتوحه مع مديري هذه البنوك ومختصين من المشتغلين فيها, في كل من مجال تكنلوجيا المعلومات وامن المعلومات وادارة المخاطر, وتبع ذلك توزيع استبيان تفصيلي على جميع المشتغلين في هذه الأقسام وتم تحليل نتائج هذا الأستبيان.

ان من اهم النتائج التي توصل اليها البحث هي وجود نقص واضح في عمليات التوثيق المعنيه بالمخاطر الالكترونية كما يوجد نقص في خطط الأدارات البنكية فيما يتعلق بدمج الأقسام المعنيه بتلك المخاطر. وتبرز الحاجه الى توضيف المزيد من المختصين في هذا المجال من اجل تقليل الأعتماد الكبير على الطرف الثالث (الشركات الخارجيه) بشكل تدريجي.

Chapter1

Overall Framework of the study

- 1-1 Preface
- 1-2 Study problem and questions
- 1-3 Hypothesis of the study
- 1-4 Objectives of the study
- 1-5 Significance of the study
- 1-6 Terminologies
- 1-7 Delimitation of the study
- 1-8 Limitation of the study

1-1 Preface

The use of E- banking services have spread worldwide in recent years. This development was substantial in Jordan, where a large number of commercial banks have realized the advantages of E- banking have started to transform their bank activities into electronic systems, and while competition among existing bank organizations has allowed a much wider array of banking products and services, it has also carried risks (brown, 2003:381).

Internet and telephone are the major channels of Electronic Banking. These services are also called (e-banking, virtual banking and online banking); because they allow the customers an access to their bank's information, to conduct financial transactions, to make deposits or withdrawals and payment of bills through the Internet without having the need to physically visit the bank's facilities. It provides the convenience of accessing banking facilities through a bank's secure website. But this rapid expansion in e-banking has also increased banks' exposure to financial and legal risks, and created new risk management challenges for banks (Basel committee, 2003).

Each E-banking process affects the risk average of a bank in a deferent way, and overall risk can jeopardize the e- banking effectiveness coming from upper management and While the Global risk technology expenditure is estimated to increase by 10% in 2010, (Banking Technology Summit Egypt, 2011), therefore; developing techniques and designing models to reshape ebanking processes in a way that can minimize overall risk is the core task of risk management. The aim of this study is to address the risk associated with e-banking processes by using risk average ratios and to find solutions, alternatives and recommendations that would avoid or minimize risk in a case study of 6 commercial banks in Jordan.

1-2 <u>Study problem and questions:</u>

Last year, on a trip to Barcelona world conference, I was asked to send my credit card details in order to pay for fees and expenses, I was reluctant; I recalled stories of fraud and asked if I could do that by transfer payment. Later, realizing that almost all attendants used their credit cards and it was convenient and safe, I wondered if that would be so in Jordan.

It is a starting point of a yearlong study of e-banking and risk management. By conducting many interviews with banks' managers and specialists in the field (Appendix3), the researcher became convinced to study how to minimize the risk in e-banking activities.

Due to the accelerating speed in which technologies are being developed and adopted by the banking sector worldwide, a massive competition has been created between banks to keep abreast with the global banking industry. Hence the adaption of e-banking processes is one of the most important trends for this decade; banks in Jordan are realizing the importance of e-banking to enhance their survival in a highly integrated world of finance.

In Jordan, as it is everywhere else, risk is associated with new developments including e-banking which is associated with great deal of risks that can jeopardize the whole process of adaption. The key to controlling risk lies in adopting effective policies, procedures, and controls to meet the new risk exposures introduced by e-banking which is the core of risk management job.

And since risk management is a continuous process used by a growing number of banks all over the world, especially in the developed and emerging economies, efforts and considerable recourses are dedicated to minimize risk levels by using professionally developed processes.

The adaption of risk management procedures would mimic the growing risk factor, and at the same time, allow keeping current with the whole world development flow of banking industry. In Jordan, risk management disciplines have not evolved at the same speed among banks and many banks, especially the smaller ones, have not been able to incorporate Internet banking risk controls within their existing risk management structures (ISACA, 2001:1).

And in order to verify the role of e-banking processes on the average risk in the Jordanian bank sample, the study used both personal interviews and questionnaire in an attempt to find answers for the following questions:

1. What is the average risk estimation of the e-banking processes, for a sample of six banks in Jordan , (2 Jordanian and 4 foreign)

2. To what extent are the risk averages affected by the e-banking processes?

a. To what extent are the risk averages affected by the ecommerce application?

b. To what extent are the risk averages affected by the Internet banking server?

c. To what extent are the risk averages affected by the website design and hosting?

d. To what extent are the risk averages affected by the network administration?

e. To what extent are the risk averages affected by the firewall configuration and management?

1-3 <u>Hypotheses of the study:</u>

<u>H0</u>

There is no significant effect of the E-banking processes (E-commerce application, Internet banking server, network administration, website design and hosting, firewall configuration and management) on the risk averages rate at (0.05) level.

The researcher constructs a number of sub-hypotheses as follows:

<u>H01</u>

There is no significant effect of the planning process of E-commerce application in the E-banking system on the risk averages rate at (0.05) level.

<u>H02</u>

There is no significant effect of the planning process of Internet banking server in E-banking system on the risk averages rate at a (0.05) level.

<u>H03</u>

There is no significant effect of the planning process of network administration in the E-banking system on the risk averages rate at (0.05) level.

<u>H04</u>

There is no significant effect of the planning process of website design and hosting in the E-banking system on the risk averages rate at (0.05) level.

<u>H05</u>

There is no significant effect of the planning process of firewall configuration and management in the E-banking system on the risk averages rate at (0.05) level.

1-4 Objectives of the study:

The objective of this study is to determine the risk averages and use them to find solutions and ideas to minimize risk through:

- A. Determining risk averages in the six banks included in the sample of the study.
- B. Specifying the risk averages impacted by the e-banking processes (ecommerce application; website design and hosting; network administration; firewall configuration and management; internet banking server).
- C. Minimizing risk effect of all the previously specified e-banking processes.

1-5 <u>Significance of the study:</u>

The importance of this study is highlighted by the following reasons:

- This study deals with both critical and advanced aspects of banking industry (e-banking processes and the risks associated with each process component)
- 2. E-banking activities are the most critical and developing fields in contemporary commercial banking, but it has also come with a heavy burden of risks and complexity. This means that there is a growing need to dedicate time, efforts and resources to handle these burdens, where the reputation and success of banks mostly depend on preventing or, at least, limiting them; therefore, the significance of this research is derived from seeking for solutions and alternatives for the planning process of e-banking processes to minimizes the risk associated with each e-banking components that can affect the bank overall reputation.
- 3. E-banking is a new field in developing countries, and addressing the risk of e-banking in the region is a major issue that needs knowledge and research, it is therefore a rewarding field for investment. It's already a hot topic in developed and emerging economies in which huge investments are made.

1-6 <u>Terminologies:</u>

<u>Risk</u>: A probability or threat of a damage, injury, liability, loss, or other negative occurrence that is caused by external or internal vulnerabilities, and that may be neutralized through preemptive action(CMII,2009:4).

<u>Risk management</u>: A process that systematically aims to identify, evaluate and manage project related risks to improve project performance'' (Maytorena et al., 2007:63).

<u>Risk averages ratio</u>: The ratio of the probability of developing, in a specified period of time, an outcome among those receiving the treatment of interest or exposed to a risk factor, compared with the probability of developing the outcome if the risk factor or intervention is not present (Sistrom CL.,2004,12).

<u>E-banking</u>: Electronic banking is the use of a computer to retrieve and process banking data (statements, Transaction details, etc.), and to initiate transactions (payments, withdrawals, deposits, bank transfers, Requests for services, etc.) directly with a bank or other financial service provider remotely via telecommunications network (IITA, 1994:14), E-banking consists of a number of components like (e-banking booklet, 2003:7):

• E-commerce application.

- Network administration.
- Website design and hosting.
- Internet banking server.
- Firewall configuration and management.

1-7 delimitations of the study:

- Location delimitation: The six banks chosen for empirical study (Cairo Amman Bank, Audi Bank, Bloom Bank, Al Ahli Bank, Capital Bank,
 the Housing Bank for Trade and Finance)
- Timeline delimitation: investigating the e-banking processes and using risk averages between (2006- 2010.).
- Human resource delimitation: Risk Management staff, Information Technology (IT) staff and Information Security (IS) staff.
- Scientific delimitation: Using statistical methods for deriving the average impact ratios for each e-banking component (E-commerce application, internet banking server, website design and hosting, network administration, firewall configuration and management) upon the overall risk.

1-8 <u>Study limitations:</u>

- 1. The study concentrates on the six chosen banks using them as a case study.
- 2. The variables of the study include the Risk averages over five years and five different processes of E-banking system.
- 3.
- 4. People involved are the risk management, information security and information technology employees.
- 5. The accuracy of the study depends on banks' staff co-operation.

Chapter 2

Theoretical framework and previous studies

2-1 Introduction

- 2-2 E-banking
- 2-3 Risk management in E-banking
- 2-4 Previous studies
- 2-5 What distinguish this research

Theoretical framework and previous studies:

2-1 introduction:

We often pay a great deal of attention to developmental issues such as land reform, education and the establishment and financing of major projects. While no one can dispute the importance of these issues for the long-term development of an emerging economy, we must not lose sight of other important developmental issues that are in the 'background'. These may make important contributions to the development of the country over a period of time, eventually, contributing to more rapid alleviation of poverty and a faster pace of reform.

The electronic means and the internet are important fields that should be precisely considered for the long run development of our countries.

That's why during the last years the development of e-banking has been very significant. More and more commercial banks have realized the advantages of e-banking and therefore started to transfer their systems into electronic channels.

Today, financial institutions are offering more online and self-service applications, as well as expanding the methods that clients can use to access these applications. From Internet-based banking to telephone, ATM and now mobile-based access, banks are continually expanding their offers to meet clients' needs and help increase their bottom lines.

With the constant addition of new e-banking applications and access methods, financial institutions are now being faced with the challenge of having to keep pace with the criminal threats targeted at their business.

In this research, the researcher intended to address two important issues first, to give a theoretical overview of the development and tendency of advancement towards e-banking in Jordanian commercial banks versus foreign commercial banks in the recent years. Second, is to seek for solutions that would help facing the challenges e-banking brings with by addressing the major risk and recommending solutions or alternatives to minimize the risk associated with the e-banking processes.

2-2 E-banking:

In its very basic form, e-banking can mean the provision of information about a bank and its services via a home page on the World Wide Web (Shah, 2009). More sophisticated e-banking services provide a customer access to accounts, the ability to move their money between different accounts, and making payments or applying for loans via e-Channels.

Increasing number of banks and other organizations are eager to use the E-banking to deliver their services due to its relatively lower delivery cost, higher sales and potential for offering greater convenience for customers (Fraering, 2006). Many people see the development of e-Banking as a revolutionary development, but broadly-speaking, e-banking could be seen as another step in banking evolution.

The Competition

In the fierce battle over customers, providing a unique experience is the compelling element that will retain customers. A 'customer first' approach is critical for success in e-banking (Avkiran, 1999:66). Customers hold the key to success; and companies must find out what different customers need and provide them with the best available technology, ensuring that they are acting on the latest, most up-to-date information, providing the most suitable process

and alternative among various ones to make sure that the e-banking system is going on the right track.

Providing alternatives

E-banking systems rely on a number of common processes. These processes work together to deliver e-banking services and the following list includes many of the potential components and processes seen in a typical institution (e-banking booklet, 2003:28):

- Website design and hosting,
- Firewall configuration and management,
- Intrusion detection system or IDS (network and host-based),
- Network administration,
- Security management,
- Internet banking server,
- E-commerce applications (e.g., bill payment, lending, brokerage),
- Internal network servers,
- Core processing system,
- Programming support
- Automated decision support systems.

Through a combination of internal and external solutions, management has many alternatives when determining the overall system configuration for the various processes of an e-banking system. One of the solutions is using simulation for determining the best alternatives.

The E-Banking revolution

Although the various aspects of banking business may have been studied for many decades, the area of e-banking has only appeared in IS literature since the mid-1990s (Buhl & Will, 1998; Devlin, 1995; King & Liou, 2004; Liao & Cheung, 2002; Scruggs & Nam, 2002; Yan & Paradi, 1998; Yousafzai, Pallister, & Foxall, 2003, 2005).

E-banking has emerged as a significant and rapidly-growing component of the world economy, and through e-banking the world economy has been reduced to a tiny global village in terms of its information capacity and the resources it holds, researchers are in a hurry, nowadays to study, discover and examine all the aspects of e-banking revolution.

Complimentary not a substitute

But, over all, e-banking seems to serve as a complementary means of interacting with customers rather than a substitute for other channels such as physical branches. Despite the large investments in the Internet facilities as a distribution channel, the branch network remains an important channel for retail banking products (Hernando &Neito, 2007:5).

The transformation process

The development of integrated, customized financial services is becoming an active area of competition between financial sector organizations (Enos, 2001), that's why competing in the financial sector requires a major transformation in the internal foundations of the banking sector using a highly-tuned integration strategy of mixed key cornerstone business, technology and processes, to achieve succession in the e-banking arena.

Banks have acknowledged the value to differentiate themselves from other financial institutions by adopting new service distribution channels (Daniel, 1999:79). That's why banks are becoming wide-open to new innovative methods while concentrating all their efforts to build a strong reputation in this field.

Banks in Jordan

in spite of strong competition between banks in Jordan the researcher has identified a wide gap between them because while few banks has adapted modern and developed systems others almost no even participated in that race ,therefore; the researcher can assume that in the near future this gap will even widen and changes will be enormous affecting the structure and shape of bank rankings in the region.

Why implementing e-banking

Here are some reasons often cited by banks to be their primary motive for implementing e-banking.

- Customer demands: Power is shifting to customers while customers are demanding more value, 24 hours availability, customization and shorter time.
- Changes in the environment: there are shifts in the importance of different sectors of the economy leading to increasing the prominence of service sector organizations, resulting in more pressure on them to diversify their offerings and look beyond their immediate markets to create value.
- Hygiene Factor: competition is a major driver to adapt new technologies and to change the core system of doing business.
- Achieving competitive advantages: Most organizations aspire to achieve competitive advantage, but few are able to sustain it, to gain competitive advantage, Banks must continually develop new and innovative services to differentiate themselves from other contestants.
- Achieving efficiencies: Some banks look at e-banking from a cost savings point of view.

How important is e-banking

Importance of e-banking appears in many aspects like:

- E-banking eliminates physical and geographical boundaries, and time limitations of banking service (Yang et al., 2007:337).
- The application of e-banking can improve banks' performance in terms of the growth in assets, reduction in operating expenses and portfolio enhancement (Dandapani et al., 2008:439).
- Future investment, since the younger generation has a strong tendency to interact with technology, those younger generation of a nation will become the majority of customers or potential customers for online banking service in the future.
- E-banking can help banks to achieve the objectives of higher customer acceptance and satisfaction, higher profitability and enhanced competitive advantages (Shih, 2008:283).
- Operating costs minimization and revenue maximization (Sannes, 2001:14).
- Gain a much deeper understanding of the customers as a result of the interactive nature of e-banking.

Profitability verses Riskability

Key strategic issues addressed in e-banking determines the success of it includes: customer acceptance and satisfaction, privacy concerns, profitability, operational risks, and competition from non-banking institutions (Shin, 2008:17).

Moreover, addressing the issue of creating highly- sophisticated clients with low loyalty that needs personalization in customer communication.

The profitability gains associated with the adoption of e-banking are generally explained by a significant reduction in overhead expenses, but this effect is slow in becoming noticeable.

Moreover one of the issues is that E-banking, in particular Internet banking, can potentially be misused for money laundering because of the lack of face-to-face contact with customers (Schaechter, 2002:6).

To benefit most from e-banking banks should do the following:

- Develop a clear strategy and communicate it throughout the organization. It must be driven by the top management and should take into account the effects of e-banking
- Have an effective process for measuring performance of e-banking against the pre-determined criteria given in the strategic plans.
- Take into account the risks that e-banking will come up with and manage these accordingly.

- Undertake market research, develop systems with adequate capacity and scalability and ensure that they have adequate resources to meet their commitments and a suitable business continuity plan in case of disasters.
- Ensure they have adequate management information architecture to help effective and timely decision-making.
- Develop security plans and implement them to ensure information security. This requires acquiring relevant staff expertise, building in best practice controls and testing and updating these on frequent basis.

Innovation

Another key strategy for the success of e-banking is to promote innovation in organizations. There are many ways by which innovation can be promoted in an organization including: creating room for experiments, tolerance to failure of good ideas, implementing a reward system to encourage individuals as well as teams to innovate. There are also many barriers to innovation, including: short-term result culture, resistance to change, low acceptance rates of new ideas. These barriers can be overcome by promotion of an innovation culture in organizations and careful change management.

Strategic advantage

The wealth of information available through electronic transactions also creates a different type of strategic advantage. With e-transactions, one can track down, among others, the data flow, amount, and source of transactions, which can in turn create a body of knowledge regarding customers and their needs. Most banks utilize such information nowadays, to further segmentation of their customers, identify needs and build customer loyalty (Bakos &Brynjolfsson, 1999:23), furthermore, banks are seeking ways for differentiating themselves and creating competitive advantage where few banks in developed countries are recognizing the importance of customer support within e-service. As a result, banks are increasing attention to their support function. According to a 2001 study by Gomez Inc., 84% of ebanking customers actively use and pursue customer support. Given the increasingly complex financial environment customer support which in the case of financial services also includes financial advising becomes crucial and can provide a major source of competitive advantage (Andreas C. Soteriou, 2003:57).

Creating new opportunities

IT today, E-business, E-commerce is not about routine information management or automation. It is about using these unique tools to create opportunities, create new markets, new processes and growth - the creation of e-wealth (Jide awe, 2006:13).

This will entail creative ideas and solutions, not simply the transplanting of block-and-mortar concepts onto the Internet. The E-Bank must monitor the environment - local and global, with the aim of understanding and mastering its environment. For E-banks, this involves collaboration (local and international) on payments systems, cashless transactions, digital cash and other electronic based projects.

It can be seen that the other immense potentials can only be realized if bank management and staff, not just the systems staff, are sufficiently literate and aware. Presently, the banking industry still has a lot to do in terms of training staff. The speed of change, together with the need for proper orientation for the e-world makes training even more of a necessity.

Problems of E-Banking

E-banking is a relatively recent phenomenon; the strategic issues relating to it are well-documented and may be drawn from existing studies. In essence, it will be shown that the key strategic problem in e-banking is derived from a number of clearly definable factors (Shah & Clarke, 2009:77):

 As with all banking, but arguably in a more critical sense, e-banking is highly dependent on technological development. Any strategy has to combine with often unknown technological improvements into the strategic process.

- 2. E-banking links customers to suppliers in a much "looser" relationship than traditional banking, giving rise to security issues which must be addressed strategically.
- 3. With "counter based" banking, it is much easier for the bank to set up rules and procedures which include elements of customer behavior. E-banking offers opportunities for enhancement of the customer experience, through which banks are able to leverage competitive advantage.

All of this requires a strategic approach which differs from that taken to traditional banking.

In conclusion, to be a true E-bank, each bank must identify its own unique targets, focus and style. Banks need to realize that E-banking is more than simply banking on the Internet. E-banking is more than having a web site. E-banking is about building a web business for the bank.

2-3 Risk management in E-banking

Risk management is the identification, assessment, and prioritization of risks (defined in ISO 31000 as the effect of uncertainty on objectives, whether positive or negative) followed by coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events or to maximize the realization of opportunities (Hubbard, 2009:46), (ISO/IEC Guide, 2009:73).

The fundamental of project risk management can be stated very simply. Any project organization is subject to risks. One which finds itself in a state of perpetual crisis is failing to manage risks properly. Failure to manage risks is characterized by inability to decide what to do, when to do it, and whether enough has been done.

Risk Assessment has three elements (AS/NZS, 1999:4360)

- 1. Identify Uncertainties: To explore the entire project plans and look for areas of uncertainty.
- Analyze Risks: To specify how these areas of uncertainty can impact the performance of the project, either in duration, cost or meeting the users' requirements.
- 3. Prioritize Risks: To rank risks as; Risks that should be eliminated completely because of their extreme impact; Risks that should have
regular management attention, and risks which are sufficiently minor to avoid detailed management attention.

Although the adoption of electronic banking and other e-services offer emerging economies with an opportunity to leapfrog, they also carry potential risks. Most of the crimes that exploit the vulnerabilities inherent in these technologies are not new – fraud, theft, impersonation, denial of service and related extortion demands have plagued the financial services industry for years. However, the widespread use of these technologies exposes users to crimes of greater dimensions in terms of depth and scope (Glaessner, 2003:330).

Risks associated with the emergence of e-banking are mainly strategic in nature, operational, reputational and could also be legal. And accordingly, the Risk Management Principles they fall into three broad, and often overlapping categories of issues; these are: Board and Management Oversight; Security Controls; and Legal and Reputational Risk Management(E-Banking Booklet, 2003:16).

Despite of benefits that offer emerging economies an opportunity to leapfrog, e-banking has turned out a great risk; at the international level the issues of e-banking and its risk management have become very topical. According to the Basel Committee on Banking Supervision (BCBS), the rapid development of e-banking carries benefits as well as risks and BCBS expects such risks to be recognized, addressed and managed by banking institutions in a prudent manner (Basel Committee, 2003).

That is why Risk analysis is carried out in collaboration with all involved departments. Risk analysis is the means to produce the risk management plan which is used to manage risks of e-Banking.

As mentioned before, there are three types of Risk related to the adaption of electronic banking:

• Strategic risk

It is the Board of Directors responsibility to specify strategic risks in Ebanking operations of the bank, actually, this issue is relatively new and, as a result, there can be a lack of understanding among senior management about its potential and implications, because strategic risk differs from other risk categories in which it is more general and broad in nature.

A financial institution's Directing board and management should understand the risks associated with e-banking services, and evaluate the resulting risk management costs by comparison to the potential return on investment prior to offering e-banking services, because poor e-banking planning and investment decisions can increase a financial institution's strategic risk. Therefore, in managing the strategic risk associated with e-banking services, financial institutions should clearly define their e-banking objectives, by which the institution can evaluate the success of its e-banking strategy accordingly, and that's why the financial institution should focus on the following elements: cost involved in monitoring e-banking activities, design, delivery and pricing of e-banking services, retention of any electronic contracts in a format that would be dismissible and enforceable in litigation, cost and availability of staff to provide technical support, competition, adequacy of technical operational compliance or marketing support for e-banking product and services.

• E-Banking Operational Business risk management

It is a process to protect banks from business risks associated with expanding e-banking services, and since e-banking services must be delivered on a consistent and timely basis in accordance with high customer expectations of constant and rapid availability and potentially high transaction demand, and hence the bank must have the ability to deliver e-banking services to all end-users and be able to maintain such availability under different circumstances, operational risks are destined to accelerate rapidly so should risk management processes and costs. It is worth mentioning here that customers of e-banking are changing in characteristics and behaviors compared to traditional banking customers, and because of this trend, Banks are required to carefully study and examine the new customer characteristics giving the best solutions to minimize the business risks.

• Reputational risk

Bank reputation has major influence on its earnings and capital value, hence negative public opinion of a bank forms a serious current and prospective risk.

E-banking can negatively influence an institution's reputation through:

- Loss of trust due to unauthorized activity on customer accounts.
 Disclosure or theft of confidential customer information to unauthorized parties (e.g., hackers).
- Failure to provide reliable service due to the frequency or durational service disruptions.
- Customer complaints about the difficulty in using e-banking services and the inability of the institutions help desk to resolve problems.

 Confusion between services provided by the financial Institution and services provided by other businesses links available on the bank website.

Banks are concerned about the reputational risk as the researcher conducted interviews with a number of different managers in Jordan specifically risk managers, they all mentioned the importance of the reputational risk and the huge budget assigned to it, reputational risks are much more important than any fraud, phishing, accidents happening to the bank, so the reputational risk budget should be capable of covering them before spreading the news or even before dealing with these crimes.

The bank should incorporate the exposures that could give rise to reputational risk into its assessments in order to meet requirements of the securitization framework, taking into consideration the potential adverse impact of providing implicit support to its plans.

Banks need to have a policy statement setting out the e-banking risk management framework; and an organizational structure with clear responsibilities for the implementation of the framework and relevant controls. Adherence to the principles of ISO Standard 17799, the international standard for information security management is helpful in developing organizational structures to manage e-banking related risks (Shah& Clarke, 2009:19); Banks also need to maintain balance between in-house and outsourcing system developments by determining the advantages and disadvantages from the long run perspective of the institute.

Customer education on security risks and precautions can play an important role for consumer protection and for limiting the Bank risk. Security risks can be heightened when a consumer does not understand the necessary security precautions and misuses them inadvertently. Banks should therefore provide prominent and easy to understand advice to customers on the importance of security precautions concerning personal privacy policies. This guidance should be widely understood before any e-banking services are activated (Schaechter 2002:21).

Assisting in the educational process of costumers and potential customers and requiring banks to raise consumer awareness can become a significant procedure to help protect consumers and banks. A number of supervisory authorities view education as part of their mandate to consumer protection and have increased their efforts in that respect (Sokolov, 2007:3)

In Jordan as interviews with banks' clients and managers illustrate, there is a rapid need to spread information and better education about ebanking activities. It is evident that even some of the Bank employees working in distant or small bank branches are not armed with necessary means

to help customers understand and promote e-banking activities that the bank provides; there is lack in proper training and adequate knowledge that has to be provided for bank employees in many bank branches concerning e-banking promotion.

E-banking increases security risks potentially by exposing traditionally isolated systems to the open and risky world of Internet.

Security breaches can affect a financial institution through numerous embedded vulnerabilities. And no single control or security device can adequately protect a system connected to a public network. Effective security of information comes only from establishing layers of various controls, monitoring, and testing methods. While the details of any control and the effectiveness of risk mitigation depends on many factors in general, each financial institution with external connectivity should ensure that the following controls exist internally or at their TSP (Florina, et...al, 2008,8).

Security of information is considered the central operational risk of ebanking. Threats can come from inside and outside the system. They include unauthorized access to the system through, for example, back doors, brute force, hijacking, sniffing or spoofing to retrieve and use confidential consumer information, and use it to add customer assets, subtract customer liabilities or interrupt operations. Similarly, denial of service, attacks, and injecting a virus can disrupt services and affect integrity of information (Schaechter, 2002:13).

2-4 Previous studies

- (Sung, T., Lee, S.,2001) " Electronic Commerce in Korea: Critical Success Factors"
 - The aim of the study is to determines the critical success factors (CSF's) for electronic commerce (EC) and investigates the explanatory power of these CSF's on firm performance in Korea.
 - The scope of the study consists of the top EC managers of EC companies in Seoul, Korea.
 - The main outcome of the study confirms the fact that customers use EC if they feel comfortable about navigating EC for plenty of information about and variety of goods/services without any technical difficulty in a secure and private way.
- (Ben-Jadeed, M. ,Molina, A., 2004)" The Emergence and Evolution of e-Banking in Saudi Arabia: The Case of Samba Financial Group"
 - The aim of the study is to look at the emergence and evolution of e-banking in Saudi Arabia, with particular emphasis on the processes of how banks implement e-banking to improve their capabilities as well as to create new value strategies.
 - The scope of the study is a major Saudi Arabia bank.
 - The main outcome of the study given that the important features of the Samba e-banking constituency-building process are the

result of inter-organizational interactions between the bank and other organizations.

- (Fedrizzi, M. ,et al, 2004) "A model for evaluating the transaction risk in e-banking"
 - The study aims of presenting a model for evaluating one of the factors that are conditioning e-business in general, and e-banking in particular, i.e., transaction risk, therefore; the study describes from a mathematical-statistical point of view the structure of the risk of transaction fraud in an Internet-based context, for a Bank that faces the risk of potential losses due to fraudulent customers using Internet to do their transactions.
 - The scope of the study is large Italian Banking group.
 - The main outcomes of the study reflect the general assessment of relative importance of the risk factors without a specific context by presenting a model that can be used as a starting point for the determination of a transactional risk provision.
- (Rooyen, 2004) "The future effect of e-business on treasury and risk management systems and treasury management in South Africa"
 - The aim of the study is to show the impact of using new technologies on South Africa as a developing country as it may lead to a stronger economy, which, in turn, will make an

important contribution to more rapid alleviation of poverty and more rapid reform in the long run.

- The scope is the treasury management in South Africa.
- The main outcomes is to recommend Embracing technological change offers the potential for high growth and high returns due to progressive changes taking place in South Africa.
- (Cunningham F. Lawrence ,et al, 2005)" Perceived risk and e-banking services: An analysis from the perspective of the consumer"
 - The aim of the study is to investigate the premise that purchasing e-banking services is perceived to be riskier than purchasing traditional banking services.
 - The scope of the study is representative of educated, middle-class workers than the general US population.
 - The main outcome of the study analyses indicates that financial risk drives the risk premium while psychological, physical and time risk play ancillary roles as risk drivers at certain stages of the consumer buying process. A major implication of this study is that there is a risk premium for e-banking services and the risk premium permeates all stages of the consumer buying process.

- (Huang, J., Lee, C., 2005) " E-commerce Critical Success Factors for Chinese Enterprises: An Empirical Research on the Publishing Industry"
 - The study discusses the assessment indicators and impact factors for EC success.
 - The scope of the study is the publishing industry in china.
 - The main outcome of the study shows that factors such as established EC strategy fitted in with company's characteristic, share information between systems, and manage customer relationship" are critical factors for Chinese publishing companies.
- (Alagheband, P., 2006)"Adoption of e-banking services by Iranian customers"
 - The aim of the study is to gain a deep understanding of the factors which influence the adaption and usage of these services by customers in Iran.
 - The scope of the study is a number of Iranian banks.
 - The main outcome of the study found that perception of relative advantages, compatibility and trail-ability of the service, cost and risk as well as gender and social character were found to influence the adoption of electronic banking service.

- (Basili, V., 2006) "Statistical neural network framework for risk management process".
 - The aim of the study is to enhance the currently available formal risk management models and related frameworks by providing an independent mechanism for checking out their results using simulation.
 - The scope of the study is University of Maryland Empirical Software Engineering Group.
 - The main outcome is using comparison between what those frameworks assumed and what the historical data has suggested both before and during the project concerning risk averages.
- (Laosethakul, K., et al, 2006)" Critical Success Factors for E-commerce in Thailand: A Multiple Case Study Analysis"
 - The aim of the study is to identify the critical success factors (CSFs) for e-commerce in Thailand.
 - The scope of the study is e-commerce companies from different industries in Thailand.
 - The main outcome of the study showed that social behavior and national culture, more specifically issues pertaining to trust and shopping behavior, was critical to the success of e-commerce in Thailand.

- 10.(Richard, B., Alemayehu, M., 2006)" Developing E-bankingCapabilities in a Ghanaian Bank: Preliminary Lessons"
 - The aim of the study is to explore some of the issues that affected the key decisions that the bank made.
 - The scope of the study is the Ghanaian bank.
 - The main outcome of the study is highlighting the need for African Banks to understand customers' needs; the corresponding services to offer; the resources and partnerships required to offer it; and develop appropriate e-banking strategies that maximize value for both customers and banks.
- 11.(Shah, M., Siddiqui, F., 2006) " Organizational critical success factors in adoption of e-banking at Woolwich bank"
 - This study brings theory and practice together by synthesizing the existing literature with real-life experience of a UK bank.
 - The scope of the study is the Woolwich bank in UK
 - The main outcome of the study is that banks need to implement considerable organizational changes in order to web-enable themselves. The main focus of their e commerce strategy should be to integrate the e-banking channel with other service delivery channels to maximize benefits.

- 12.(Daghfous, N. ,Toufaily E., 2007) "The adoption of e-banking by Lebanese banks :success and critical factor"
 - The aim of the study is to analyze the organizational, structural and strategic factors which can accelerate or, on the contrary, slow the adoption of this electronic mode of distribution and communication by the banks.
 - The scope of the study is the Lebanese market.
 - The main outcome of the study supports that the international profile of a bank has a significant impact on the degree of adoption of e-banking.
- 13.(Durkin, M., et al, 2007)"On e-banking adoption: from banker perception to customer reality"
 - The aim of the study is to adopt a quantitative methodology and examines customer communication preferences when interacting with their bank, with a particular focus on Internet banking registration.
 - The scope of the study is a large retail bank that has an extensive branch network in Northern Ireland.
 - The main outcome of the study is by revealing factors to predict whether a customer is registered for Internet banking, differences and similarities between registered and non-registered customers are discussed and they reveal some interesting insights.

- 14.(Sokolov, 2007) "E-Banking: Risk Management Practices of the Estonian Banks".
 - The aim of the study is to assess the risk Management practices of the Estonian banks in the field of e-banking as well as their conformity to the BCBS guidelines.
 - The scope of the study is Estonian banks.
 - The main outcome is Estonian banks generally comply with all BCBS guidelines in the field of e-banking risk management.
- 15.(Aghdassi, M., et al, 2008)" causal relation between strategic values and e-banking adoption in Iran with a comparison view between state owned and private owned banks"
 - the study attempts to understand differences among private owned and state owned banks in Iran by also considering the causal effect of strategic value of e-banking on its adoption.
 - The scope of the study is a sample of private and state owned banks in Iran.
 - The main outcome of the study emphasizes the essential difference in the attitude towards e-banking adoption between state owned and private owned banks. This dissimilarity has been found also in their attitude toward strategic value of e-banking.

- 16.(Carroll, 2008) "Risk assessment and management in practice: the Forensicare Risk Assessment and Management Exercise".
 - The aim of this study is to describe a framework, the Forensicare Risk Assessment and Management Exercise (F.R.A.M.E.), employed by a statewide community forensic mental health service, which incorporates two structured professional judgment tools, and explicitly integrates these into case management and psychiatric treatment.
 - The scope of the study is Australian community forensic mental health service that deals with high-risk patients.
 - The main outcomes of the study are to empirically validate this approach and also to consider whether it may have utility elsewhere and this paper has outlined a conceptual framework for assessing risk of violence and other adverse outcomes that could go some way to addressing those attitudinal barriers.
- 17.(Farshid, M., 2008) "investigating CRM activities in E-Banking of Iranian bank".
 - The aim of the study is investigating CRM activities in e-banking among Iranian banks revealing important insights by using comparative approach of their attitude toward CRM.
 - The scope is the Iranian banks.

- The main outcome is revealing the Iranian banks positioning with regard to CRM activities.
- 18.Study (Florina, et al., 2008) under title "Risk management of e-banking activities".
 - The aim of the study is to inquire Institutions to determine the appropriate level of security controls based on their assessment of the sensitivity of the information to the customer and to the institution and on the institution's established risk tolerance level.
 - The scope of the study is financial institutions in Romania.
 - The study recommends that in managing the strategic risk associated with e-banking services, financial institutions should develop clearly defined e-banking objectives by which the institution can evaluate the success of its e-banking strategy.
- 19.(Guido de blasio,2008) " Urban–Rural Differences in Internet Usage, e-Commerce, and e-Banking: Evidence from Italy"
 - The aim of the study is to assess the hypothesis of (reducing the cost of performing isolated economic activities in remote areas, information technology might serve as a substitute for urban agglomeration.) using data on Italian households' usage of the Internet, e-commerce, and e-banking.

- The scope of the study is about 8,000 Italian households.
- The main outcome of the study is that the use of e- commerce is basically unaffected by the size of the city where the household lives, In choosing a bank, non-urban customers give more importance to personal acquaintance than do urban clients, partly because bank account holders in remote areas are more likely to have taken out a loan from their bank.
- 20.(Kloss-Grote, 2008) "How to measure the effectiveness of risk management in engineering design projects? Presentation of RMPASS: a new method for assessing risk management performance and the impact of knowledge management—including a few results".
 - The aim of this study is to use new analysis method, which is easily applicable by practitioners for assessing the performance of project risk management (RM) and knowledge management (KM).
 - The sample of the study is civil aerospace design projects at the gas turbine manufacturer, Rolls-Royce plc, in the UK.
 - The main outcomes of this study are RM successfully prevented a significant amount of surprises by identifying and mitigating the respective risks in advance and therefore saved a significant amount of money and time (not measured) that would have

otherwise had to been invested in crisis management: RM was beneficial.

- 21.(Lai, Jung-Yu, Lin, Ching-Tsung, 2008)" What factors drive corporate customer satisfaction with e-banking services"
 - The aim of the study is to explore what factors affect corporate customer satisfaction with e-banking (CCSEB) which is one surrogate variable of success of e-banking services.
 - The scope of the study is survey of 178 respondents collected from Taiwan companies.
 - The main outcomes of the study are that environmental, globalization factors will affect customer satisfaction with ebanking significantly, Furthermore, there exist a reciprocal relationship between customer satisfaction and post-usage favorite behavior.
- 22.(Ahsanual, Haque ,et al, 2009) "Issues of e-banking transaction: An empirical investigation Malaysian customer perception"
 - The aim of the study is to investigate the determinant factors of consumer perceptionon e-banking transaction in the internet banking by Malaysian bank consumers by developing a framework to testify the statistical relationship between consumer perception and e-banking transaction.

- The scope of the study is Malaysia, Kuala Lampur klang valley, Cyberjaya and Putra aya which indicate highest concentration of e-banking users.
- The main outcomes of the study showed that only secure transaction have significant impact on consumer perception about e-banking transaction and offering insight of e-banking in Malaysia.
- 23.(Al Nahian, Riyadh, et al, 2009) "The Adoption of E-banking in Developing Countries: A Theoretical Model for SMEs"
 - The aim of the study is to investigate the factors that affect SMEs' adoption of e-banking in Bangladesh.
 - The scope of the study is *SMEs in Bangladesh*
 - The main outcome of the study is developing a model that captures the impact of internal factors, external factors as well as the role of institutions upon adapting the e-banking systems.
- 24.(Amiri, Ali-reza, P., et al, 2009)"Improving the effective factors on Ebanking system by using fuzzy TOPSIS in Parisian bank"
 - This study is an investigation and explanation of effective factors on improving e-banking by using Fuzzy TOPSIS.
 - The scope of the study is the Parisian bank.

- The main outcomes showed that the entire factors: operational, technical, strategic have the most effect on improving of e-banking.
- 25.(Ganesan, R., Vivekanandan, K., 2009)"A Secured Hybrid Architecture Model for Internet Banking (e-Banking)"
 - The aim of the study is to propose a secured hybrid architecture model for the internet banking using Hyper elliptic curve cryptosystem and MD5.
 - The scope of the study: e-banking systems
 - The aim of the study is to ensures the privacy and integrity of the transactions and provides confidence on internet banking is stable.
- 26.(Jiaqin, Y., Kh, Tanveer, Ahmed, 2009)" Recent trends and developments in e-banking in an underdeveloped nation an empirical study"
 - This case study is about the major issues and in the development of the electronic banking (e-banking) industry of a relatively underdeveloped nation.
 - The scope of the study interviews with several bankers from selected banks in Bangladesh and web survey.
 - The main outcome of the study reveals that there is a huge gap between those well developed and new emerging economic

powers (like the USA, European nations, and China) and those least-developed nations (like Bangladesh) in terms of development and application of e-banking services.

- 27.(Jiaqin, Yang ,et al, 2009)" A comparative study on e-banking services between China and USA"
 - This study compares some issues in the current e-banking services among the young consumers between two nations: China vs. USA.
 - The scope of the study is young college students from US and china.
 - The main outcome of the study is providing insightful guidelines for the development of e-banking industry in both nations and worldwide. Managerial implications are discussed with suggestions for future research.
- 28.(Kenneth, B., et al., 2009) "Building Trust in E-Banking: Where is the Line between Online and Offline Banking?",
 - The aim of the study is to examine the role of situational normality cues (online attributes of an e-banking website) and structural assurance cues (size and reputation of the bank, and the quality of traditional service at the branch) in a consumer's trust in and use of e-banking.

- The scope of the study is faculty and administrative staff was selected across 10 departments of a large Australian university.
- The main outcomes are showing that traditional service quality and website features that give customers confidence build trust in e-banking. Bank managers should use good service at the branch as an opportunity to build trust in e-banking.
- 29.(Nikolaï, Partnov, Thibault, Estier, 2009)" E-Commerce Applications Evolution Issue:the case of e-banking"
 - The aim of the study is to extrapolate from E-Banking cases a framework to understand main business drivers over web-based applications evolution and change management.
 - The scope of the study is several players of Swiss banking sectors.
 - The main outcome of the study confirms the existence of the phenomenon of software evolution in such specific domain as E-Banking.and identifying issues associated with E-Banking applications evolution.
- 30.(Sarlak, M. et al, 2009) "Recognition of factors affecting the successful implementation of Electronic-banking in Iran"
 - The aim of the study is to examine the factors that can speed up the successful implementation of E-banking innovations in the Iran's country.

- The scope of the study is the experts and IT managers of 90 banks in Iran.
- The main study revealed a significant relationship between the three factors (co-structural, content and context) and the successful implementation of e-banking in Iran.

31.(Devinaga, Rasiah, 2010)" ATM Risk Management and Controls"

- The aim of the study is to investigate risk management, security and controls in the context of automated teller machines (ATMs).
- The scope of the study is number of banks Bank Negara Malaysia comprises domestic commercial banks, LIFBs, Islamic banks and finance companies in malaysia.
- The main outcome of the study indicated that although comprehensive computer insurance cover is available to Banks for losses relating to ATMs, it is important to note that they vary significantly. By utilizing careful ATM analysis and the best prevention and reduction methods acceptable levels of ATM risks can be maintained.
- 32.(Goi, Lee, C., Sarawak, M., 2010)" Web sites for e-banking: a study of web sites performance in Malaysia"
 - The aim of the study is to inspect the performance of Web site used by commercial banks in Malaysia for E-banking.
 - The scope of the study is local commercial banks in Malaysia.

- The study identified eight major problems: total objects, total images, total size, images size, multi size, script size, html size and CSS size. Finally, the overall of performance satisfaction level is at 60%.
- 33.(Ooba, et al., 2010) "Resolving a Double Standard for Risk Management of Thalidomide".
 - The aim of the study is to Evaluate Two Different Risk Management Programs in Japan (TERMS and SMUD) establish a way to resolve the 'double standard' for risk management of thalidomide treatment in Japan.
 - The scope of the study is the faculty of medicine in Japan.
 - The main outcome of the study is on average, a total of about 1000 patients are estimated to be using thalidomide on any one day in Japan. It is likely that those patients are placed under one of two different risk management programmes. SMUD should be improved so that all patients are monitored in a way that results in a similar level of risk management.
- 34.(Salehi, M.,2010) "investigating website success in the context of erecruitment :an analytical network process (ANP) approach",
 - The aim of the study is to find out the relative importance of website success factors in selecting the most preferred e-

recruitment website by identifying different relative importance of each website success factors and priority of alternative websites across e-recruitment domain in Iran.

- The scope of the study is a sample of 383 different individual in Iran.
- The main outcome of the study provides decision makers of erecruitment companies with useful insight to enhance their website quality.

2-5 What distinguish this research

It's one of few studies conducted in Jordan about e-banking subjects which is considered to be one of the most important contemporary issues since adoption of e-banking became a necessity for banks that wish to maintain their market share and retain their customers.

We used new forms of original data from banks, based on a comprehensive questionnaire, and open-ended interviews with managers and IT managers of six banks. Data and information gathered concerned impact of E- banking on productivity, problems and solutions experienced by banks when using E-commerce, Fire -wall configuration and management, Network administration, Website design and hosting, and Internet banking server.

A comparison between Jordanian and foreign banks branches in Jordan provided an insight of current and future banking sector achievements and limitations.

We used a new model to mach with the kind of data we are dealing with real world data.

This study is distinguished also for using both qualitative and quantitative methods in a complimentary manner focusing and further clarifying troublesome aspects of risk management.

The study also gives an overview of the recent developments in the banking sector concerning e-banking adoption in Jordan, proposing solutions and alternatives for successful e-banking activities in order to meet its customer demands and requirements, and go along with the pace of international banks.

Chapter Three Method and Procedures

- 3-1 Introduction
- 3-2 Study Methodology
- 3-3 Study population and sample
- 3-4 Descriptive demographic variables to study sample
- 3-5 Study model
- 3-6 Study tools and data collection
- 3-7 Statistical treatment
- 3-8 Validity and Reliability

3-1 Introduction

This chapter is divided into seven sections as follows: Study Methodology; Study Population and Sample; Study Model; Study Tools and Data Collection; Statistical Treatment; Reliability and Validity.

3-2 Study Methodology

Descriptive research involves collecting data in order to test hypotheses or answer questions concerned with the current status of the subject of the study. Typical descriptive studies assess attitudes, opinions, demographic information, conditions, and/or procedures. The research design chosen for this study is survey research. A survey is an attempt to collect data from members of a population in order to determine the current status of that population with respect to one or more variables. Survey research at its best can provide valuable data. It represents considerably more than asking questions and reporting answers; it involves careful design and execution of each of the components of the research process. The researcher designed a survey instrument that could be administered to selected subjects. The purpose of the survey instrument was to collect data about the respondents on E-banking Process.

3-3 Study Population and Sample

To increase credibility, it is important to choose a sample that will represent the population under investigation. The population of this study includes the total number of employees in the sections of Risk management, IT Staff and IS staff at the six banks chosen for this study. These banks were: the Cairo Amman Bank, Audi Bank, Bloom Bank, Capital Bank, AL Ahli Bank, and The Housing Bank for Trade and Finance).

3-4 Descriptive Demographic Variables of the Study Sample

Table (3 - 1): the demographic variables of the study sample.

Table (3-1): Descriptive sample of the demographic variables of the study.

No.	Variables	Categorization Frequency		Percent
1		Younger than 30	25	45.5
	Age	30-40	25	45.5
1		41 - 50	5	9
		Above 50	-	-
2	Gender	Male	38	69.1
		Female	17	30.9
3	Experience	Less than 5 years	19	34.5
		5 – 10	15	27.3
		11 – 15	12	21.8
		Above 15	9	16.4
4	Section	IT staff	32	58.1
		Risk Management Staff	14	25.5
		IS Staff	9	16.4
5	Specialization	Related to IT	37	67.3
		Related to Business	18	32.7
6	Academic degree	B.A.	40	72.7
		M.A.	12	21.8
		Ph.D.	2	3.6
		Diploma	1	1.9
7	Career Position	Director	1	2

Manager	18	33
Employee	36	65

The table shows that 69.1 % of the study sample is male and 30.9 % is female. In terms of age, 90% of the sample ranged below 41 years. This indicates that the focus will be on the element of youth and new blood. From the educational level, all members of the study sample have scientific qualifications which reflect the high educational qualifications needed to accomplish the work in the banking sector.

3-5 Study Model

An Experimental Hypothetical Model is prepared in order to give a preliminary comprehensive insight into the research variables and the relations among them. This model also provides a quantitative perception of all the variables relevant to this study.



H0

Model (1-1)

Done by the researcher

3-6 Study Tools and Data Collection

The current study is both theoretical and practical. In the theoretical side, the researcher relied on the scientific studies/and literature that are related to the current study. Whereas in the practical side, the researcher relied on descriptive and analytical methods to collect, analyze data and test hypotheses.

The data collection, manners analysis and programs used in the current study are based on two sources as follows:

- 1-Secondary sources: books, and journals, theses provided the theoretical framework of the study.
- 2-Primary source: raw data related to risk average for the e-banking process. This involved interviews and a questionnaire, designed to yield information relative to the objectives and questions of this study.

3-7 Statistical Treatment

The data collected from the respondents of the study questionnaire was based , on *Statistical Package for the Social Sciences (SPSS)* for analysis and conclusions. Finally, the researcher used the suitable statistical methods that consist of:

- Cronbach'sα to test reliability.
- Percentage and Frequency to test importance and weight.
- Arithmetic Mean and Standard Deviation to test Importance levels.
- Simple Linear and Multiple Regression Analysis to measure the impact of study variables on testing direct effects.
- Relative importance, assigning due to Liccardi scale:

Class Interval= —		Maximum (Class – Minimum C	lass
		Number of Level		
	Class Interval=	5 – 1	_ 4	= 1.33
	(1035 III/CI YUI— —	3	3	

The Low degree from 1- less than 2.33

The Medium degree from 2.33 - 3.66

The High degree from 3.67 and above.

3-8 Validity and Reliability

(A)Validation

To test the questionnaire for clarity and to provide a coherent research questionnaire, a macro review that covers all the research constructs was performed by academic reviewers from Jordanian universities specialized in Business Administration, Marketing, and Statistics. Some items were added based on their valuable recommendations. As expected, some others were reformulated to enhance the research instrument. The academic reviewers are 5 and the overall percent of responses100% (See Appendix 1).

(B)Study Tool Reliability

The reliability analysis applied to the level of Cronbach Alpha (α) is the criteria of internal consistency which was at a minimum acceptable level (Alpha ≥ 0.60) suggested by (Sekaran, 2003). The overall Cronbach Alpha (α) = (0.884). Whereas the High level of Cronbach Alpha (α) is to internet banking server = (0.847). The lowest level of Cronbach Alpha (α) is to website design and hosting = (0.687). These results represent the acceptable level as suggested by (Sekaran, 2003). The results shown in Table (3-2).

Table (3-2)

No.	Dimensions	Alpha Value (α)
1	E-commerce Application	0.731
2	Internet Banking Server	0.847
3	Website Design and Hosting	0.687
4	Network Administration	0.713
5	Firewall Configuration and	0.748

Reliability of Questionnaire Dimensions
Management	
All Questionnaire	0.884

Chapter Four Results Analysis & Hypotheses Test

- 4-1 Introduction
- 4-2 Descriptive analysis of study variables
- 4-3 Risk Average in banking
- 4-4 Study Hypotheses Test

4-1 Introduction

According to the purpose of the research and the research framework presented in the previous chapter, this chapter describes the results of the statistical analysis of the data collection for the research questions and research hypotheses. The data analysis includes a description of the Means and Standard Deviations for the questions of the study; Multiple and Simple Linear Regression analysis are used.

4-2 Descriptive analysis of study variables

E-commerce application:

The researcher used the arithmetic mean, standard deviation, item importance and importance level as shown in Table (4-1).

Table (4-1) Arithmetic mean, SD, item importance and importance level of Ecommerce application

No.	E-commerce application	Mean	Standard deviation	Item importance	Importance level
1	Bank customers have the tendency to conduct complex activities over the internet, (e.g. such as trading securities, applying for insurance ect.)	3.04	1.05	7	Median
2	Bank customers usually stick only with the basic banking functions over the internet	3.87	0.79	1	High
3	there Is absence or inadequacy of legal infrastructure governing the operations of e-commerce	3.38	0.99	5	Median
4	E-commerce services are provided equally to all consumers	3.47	0.96	2	Median
5	There is no framework that governs the customer's right of choice regarding to what preferred degree they would like to use e-commerce applications (in a ranking from 1-5)	3.40	0.83	4	Median
6	Customers use of credit card tend to be limited	3.45	1.02	3	Median
7	Entrepreneurs usually tend to accept credit card payment over the internet	3.31	0.92	6	Median

General Arithmetic mean and standard deviation	3.42	0.94	

Table (4-1) Clarifies the importance level of E-commerce application, where the arithmetic means range between (3.04 - 3.87) compared with General Arithmetic mean amount of (3.42). We observe that the highest mean for item "Bank customers usually stick only with the basic banking functions over the internet" with arithmetic mean (3.87), Standard deviation (0.79). While the lowest arithmetic mean was for item "Bank customers have the tendency to conduct complex activities over the internet, (e.g. such as trading securities, applying for insurance)" With Average (3.04) and Standard deviation (1.05). Such results show that in Jordan clients usually tend to conduct the bank transaction the old fashioned way or stick with the basic e-banking functions which is obvious that there is no strong cultural awareness and tendency of using e-banking activities and that it's still in the early process of propagation.

Website design and hosting:

The researcher used the arithmetic mean, standard deviation, item importance and importance level as shown in Table (4-2).

Table (4-2) Arithmetic mean, SD, item importance and importance level of website design and hosting

No.	Website design and hosting	Mean	Standard deviation	Item importance	Importance level
8	The bank depends fully on a third party for hosting it's website	3.42	1.13	5	Median
9	It's better for the bank to conduct all the website hosting and design by itself	3.64	1.22	2	Median
10	The security breaches that the bank faced during the past few years could have been avoided by applying new systems and changing the way of how this job has been done	3.62	0.91	3	Median
11	The bank website should examine radical changes	3.60	0.87	4	Median
12	The estimation of the website design and hosting budget exceeds the stated limits stated by the board of directors	2.82	0.90	10	Median
13	The website of the bank will jeopardize it's reputation unless some changes are made in the near future	3.24	1.02	7	Median
14	The website of the bank should be transactional	3.69	0.88	1	High
15	A community discussion space on the website could be beneficial	3.35	1.11	6	Median
16	The website of the bank would not be appropriate if it were to be used in a foreign developed country	3.00	1.19	9	Median
17	The number of the team members handling this job item is insufficient	3.05	1.01	8	Median

General Arithmetic mean and standard deviation	3.34	1.02	

Table (4-2) Clarifies the importance level of website design and hosting, where the arithmetic mean ranges between (3.69 - 2.82) compared with the General Arithmetic mean amount of (3.34). We observe that the highest mean for the item "**The website of the bank should be transactional**" with arithmetic mean (3.69) and Standard deviation (0.88). While the lowest arithmetic mean was for the item "**The estimation of the website design and hosting budget exceeds the stated limits stated by the board of directors**" with Average (2.82) and Standard deviation (0.90).

This might indicate that in the near future banks will face rapid changes in the field of e-banking to imitate the strong and rapid development of the field in the highly developed banks worldwide, while banks are allocating a lot of resources dedicated for this matter.

Internet banking server:

The researcher uses the arithmetic mean, standard deviation, item importance and importance level as shown in Table (4-3).

Table (4-3) Arithmetic mean, SD, item importance and importance level of
internet banking server

No.	Internet banking server	Mean	Standard deviation	Item importance	Importance level
18	Having more servers will save you a lot of work (less work)	3.36	1.06	4	Median
19	Recommend using hybrid models for more secure servers such as HECC(Hyper-Elliptic Curve Cryptosystems)and MD5(Message Digest version 5)	3.53	0.74	2	Median
20	Outsourcing expertise is the only good solution with issues related to banking server	3.53	0.74	2	Median
21	Storing the customer's and bank's data using old fashioned ways due to security and fraud breaches is preferred	2.76	1.10	5	Median
22	Training courses are needed to handle any related internet banking server jobs properly	3.85	0.91	1	High
G	General Arithmetic mean and standard deviation		0.91		

From that table, the arithmetic means ranges from (2.76 - 3.85) compared with the General Arithmetic mean amount of (3.41). We observe that the highest mean for the item "**Training courses are needed to handle any related internet banking server jobs properly**" with arithmetic mean (3.85) and Standard deviation (0.91). While the lowest arithmetic mean was for the item "**Storing the customer's and bank's data using old fashioned ways due to security and fraud breaches is preferred**" with Average (2.76) and Standard deviation (1.10), This can be explained by the willingness and the readiness of the bank mentalities that contrive the strategies in the pace of transformation into expanded e-banking adoption regardless of the risk conceived with it.

Firewall configuration and management:

The researcher uses the arithmetic mean, standard deviation, item importance and importance level as shown in Table (4-4).

Table (4-4) Arithmetic mean, SD, item importance and importance level of firewall configuration and management

No.	firewall configuration and management	Mean	Standard deviation	Item importance	Importance level
23	The security policy that the bank enforce is sufficient	3.78	0.79	1	High
24	The firewalls used to prevent intrusion inside the bank are equivalent in quality to prevent outsiders intrusion	3.60	0.89	3	Median
25	The firewall configuration is reviewed exactly every 6 months	3.42	0.98	5	Median
26	It's urgent to get ISO certificate concerning firewall configuration and management	3.76	0.90	2	High
27	The firewall policy is developed fully by the bank	3.53	1.00	4	Median
28	It's necessary to adapt the firewall configuration from outside the bank	3.09	0.99	6	Median
General Arithmetic mean and standard deviation		3.53	0.92		-

Table (4-4) Clarifies the importance level of Firewall configuration and management, where the arithmetic mean ranges between (3.09 - 3.78) compared with the General Arithmetic mean amount of (3.53). We observe that the highest mean for the item "**The security policy that the bank**

enforce is sufficient" with arithmetic mean (3.78) and Standard deviation (0.79). While the lowest arithmetic mean was for the item " It's necessary to adapt the firewall configuration from outside the bank" with Average (3.09) and Standard deviation (0.99), this may reflect that the banks reinforced against outside breaches through adapting policies from specialists and well-known companies in the field are thinking to start doing this by their own.

Network Administration:

The researcher uses the arithmetic mean, standard deviation, item importance and importance level as shown in Table (4-5).

No.	Network Administration	Mean	Standard deviation	Item importance	Importance level
29	The staff of network administration is the only side who check the compliance of firewall and server configuration with security policies	2.91	1.17	5	Median
30	dual controls over this job is causing delay and should be removed	2.85	1.19	6	Median
31	Periodic Segmentation is done for the data by breaking the network into different security zones	3.58	0.92	1	Median
32	Breaking the network into different security zones is unavoidable for security reasons	3.36	0.87	3	Median
33	Customers are to blame for misusing their accounts and lack the required knowledge to avoid security breaches	3.35	0.89	4	Median
34	The best policy for implementing secure networks architecture is to adapt the basic security maxim	3.45	0.92	2	Median

Table (4-5) Arithmetic mean, SD, item importance and importance level of Network Administration

General Arithmetic mean and standard deviation	3.25	0.99	

Table (4-5) Clarifies the importance level of Network Administration, where the arithmetic means range between (3.58 - 2.85) comparing with General Arithmetic mean amount of (3.25). We observe that the highest mean for item "**Periodic Segmentation is done for the data by breaking the network into different security zones**" with arithmetic mean (3.58) and Standard deviation (0.92). While the lowest arithmetic mean was for item "**dual controls over this job is causing delay and should be removed**" with Average (2.85) and Standard deviation (1.19), gives us a clear messagethat the bank staff have a clear understanding of the required actions that should be taken in order to maintain a highly reliable network transactions and activities through out the network.

4-3 Risk Average in banking

The researcher uses the Risk Average in percent as shown in Table (4-6).

No.	Bank		RISK							
		e-commerce application	Website design and hosting	Internet banking server	Firewall configuration and management	Network administration and management	Total			
1	Cairo Amman	0.34	0.35	0.42	0.52	0.41	0.41			
2	Capital	0.50	0.36	0.96	0.47	0.54	0.57			
3	Housing	0.41	0.31	0.38	0.55	0.51	0.43			
4	Bloom	0.32	0.41	0.74	0.67	0.66	0.56			
5	Ahli	0.44	0.27	0.46	0.34	0.25	0.35			
6	Audi	0.45	0.43	0.58	0.54	0.55	0.51			
	Risk Average	0.41	0.47	0.49	0.52	0.59	0.36			

Done by the researcher

Risk = SD for Process / SD for all SD banks

SD= standard deviation

From the above table (4-6) we observe that the lower risk is (0.25) for AL Ahli Bank.

And the higher Risk is (0.96) for the Capital Bank

from the researcher point of view, this indicates that Al Ahli Bank is one of the oldest banks in Jordan with a large number of bank branches , giving it the ability for adequate and precise control over their own ebanking processes unlike the Capital Bank which is new in the field with less experience concerning the e-banking transactions and less Bank branch es.

4-4 Study Hypotheses Test

The researcher in this part tested the main hypotheses and studied sub hypotheses, through Multiple, Simple Linear Regression analysis with (F) test using ANOVA table as follows:

HO: There is no significant effect of the E-banking processes (Ecommerce application, Internet banking server, network administration, website design and hosting, firewall configuration and management) on the risk averages rate over the years (2006-2009) at level ($\alpha \le 0.05$).

To test this hypothesis, the researcher uses the multiple regression analysis to ensure the effect of E-banking processes (E-commerce application, Internet banking server, network administration, website design and hosting, firewall configuration and management) on the risk averages rate over the years (2006-2009). As shown in Table (4-7).

Table (4-7) Multiple regression analysis test results of the effect of Ebanking processes on the risk averages rate

	(R)	(R ²)	F Calculate	F Tabulated	β		β		Degree of freedom	Sig*
E-banking					ECA WDH	0.606 0.849	5			
processes on the risk averages rate	0.675	0.455	8.190	2.404	IBS FCM	0.129	49	0.000		
				NA	0.319	54				

* the impact is significant at level ($\alpha \le 0.05$)

Table (4-7) shows that there is a significant effect of E-banking processes on the risk averages rate. The *R* was (0.675) at level ($\alpha \le 0.05$). Whereas the *R*² was (0.455). This means the (0.455) of risk averages rate changeability's results from the changeability in E-banking processes variables. As β was (*E*-commerce application: 0.606; website design and hosting: 0.849; Internet banking server: 0.129; firewall configuration and management: 0.228; network administration: 0.319). This means that an increase of one unit in E-banking processes variables concerned will increase risk averages rate (*E*-commerce application: 0.606; website design and hosting: 0.849; Internet banking server: 0.129; firewall configuration and management: 0.228; network administration: 0.306; website design and hosting: 0.849; Internet banking server: 0.129; firewall configuration and management: 0.228; network administration: 0.319). Assuring significant impact $F_{Calculate}$ was (8.190) and it's significance at level ($\alpha \le 0.05$) compared with F_{Tabled} was (2.404). This indicates the invalidity of the main hypothesis. Thus the null hypothesis is rejected and accepts the alternative hypothesis that states:

There is a significant effect of the E-banking processes (E-commerce application, Internet banking server, network administration, website design and hosting, firewall configuration and management) on the risk averages rate over the years (2006-2009) at level ($\alpha \leq 0.05$).

To ensure the effect of E-banking processes (E-commerce application, Internet banking server, network administration, website design and hosting, firewall configuration and management) on the risk averages rate, the researcher divides the first main hypothesis to three sub hypotheses, and uses the Simple Regression analysis to test each subhypothesis, as a follows: HO₁: There is no significant effect of E-commerce application on risk averages rate at level ($\alpha \le 0.05$).

To test this hypothesis, the researcher uses the Simple regression analysis to verify the effect of E-commerce application on risk averages rate, as shown in Table (4-8).

Table (4-8) Simple regression analysis test results of the effect of E-commerce application on risk averages rate

		(R)	(R ²)	F Calculate	F Tabulated	β	Degree of freedom	Sig*
risk aver rate	ages	0.555	0.308	23.644	4.019	0.605	1 53 54	0.000

* the impact is significant at level ($\alpha \le 0.05$)

Table (4-8) shows that there is a significant effect of E-commerce application on risk averages rate. The *R* was (0.555) at level ($\alpha \le 0.05$). Whereas the R^2 was (0.308). This means the (0.308) of risk averages rate changeabilities result from the changeability in E-commerce application. As β was (0.605) this means the increase of one unit in E-commerce application will increase risk averages rate value (0.605). Assuring significant impact *F* _{Calculate} was (23.644) and it's significant at level ($\alpha \le$ 0.05) comparing with F_{Tabled} was (4.019), and that assuring invalid first sub-hypotheses. Unaccepted null hypothesis and accepted alternative hypothesis:

There is a significant effect of E-commerce application on risk averages rate at level $(\alpha \le 0.05)$.

HO₂: There is no significant effect of internet banking server on risk averages rate at level ($\alpha \le 0.05$).

To test this hypothesis, the researcher uses the Simple regression analysis to verify the effect of internet banking server on risk averages rate, as shown in Table (4-9).

 Table (4-9) Simple regression analysis test results of the effect of internet

 banking server on risk averages rate

	(R)	(R ²)	F Calculate	F Tabulated	β	Degree of freedom	Sig*
risk averages rate	0.586	0.343	29.753	4.019	0.308	1 53 54	0.000

* the impact is significant at level ($\alpha \le 0.05$)

Table (4-9) show that there is a significant effect of internet banking server on risk averages rate. The *R* was (0.586) at level ($\alpha \le 0.05$). Whereas the R^2 was (0.343). This means the (0.343) of risk averages rate changeabilities result from the changeability in internet banking server. As β was (0.308) this means the increase of one unit in internet banking server will increase risk averages rate value (0.308). Assuring significant impact *F* _{Calculate} was (29.753) and it's significant at level ($\alpha \le 0.05$) comparing with *F* _{Tabled} was (4.019), and that assuring invalid second subhypotheses. Unaccepted null hypothesis and accepted alternative hypothesis:

There is a significant effect of internet banking server on risk averages rate at level $(\alpha \le 0.05)$.

HO₃: There is no significant effect of website design and hosting on risk averages rate at level ($\alpha \le 0.05$).

To test this hypothesis, the researcher uses the Simple regression analysis to ensure the effect of website design and hosting on risk averages rate, as shown in Table (4-10).

		C					
			F	F		Degree of	G : *
	(R)	(R ²)	Calculate	Tabulated	β	of freedom	Sig*
						1	
risk averages rate	0.640	0.410	39.550	4.019	0.361	53	0.000

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Table (4-10) Simple regression analysis test results of the effect of website design and hosting on risk averages rate

* the impact is significant at level ($\alpha \le 0.05$)

Table (4-10) shows that there is a significant effect of website design and hosting on risk averages rate. The *R* was (0.640) at level ($\alpha \le 0.05$). Whereas the R^2 was (0.410). This means the (0.410) of risk averages rate changeabilities result from the changeability in website design and hosting. As β was (0.361) this means the increase of one unit in website design and hosting will increase risk averages rate value (0.361). Assuring significant impact *F* _{Calculate} was (39.550) and it's significant at level ($\alpha \le 0.05$) comparing with *F* _{Tabled} was (4.019), and that assuring invalid third sub-hypotheses. Unaccepted null hypothesis and accepted alternative hypothesis:

There is a significant effect of website design and hosting on risk averages rate at level ($\alpha \le 0.05$).

HO₄: There is no significant effect of network administration on risk averages rate at level ($\alpha \le 0.05$).

To test this hypothesis, the researcher uses the Simple regression analysis to ensure the effect of network administration on risk averages rate, as shown in Table (4-11).

Table (4-11) Simple regression analysis test results of the effect of network administration on risk averages rate

_	(R)	(R ²)	F Calculate	F Tabulated	β	Degree of freedom	Sig*
risk averages rate	0.745	0.555	71.155	4.019	0.472	1 53 54	0.000

* the impact is significant at level ($\alpha \le 0.05$)

Table (4-11) shows that there is a significant effect of network administration on risk averages rate. The *R* was (0.745) at level ($\alpha \leq$ 0.05). Whereas the *R*² was (0.555). This means the (0.555) of risk averages rate changeabilities result from the changeability in network administration. As β was (0.361) this means the increase of one unit in network administration will increase risk averages rate value (0.472). Assuring significant impact $F_{Calculate}$ was (71.155) and it's significant at level ($\alpha \le 0.05$) comparing with F_{Tabled} was (4.019), and that assuring invalid fourth sub-hypotheses. Unaccepted null hypothesis and accepted alternative hypothesis:

There is a significant effect of network administration on risk averages rate at level $(\alpha \le 0.05)$.

HO₅: There is no significant effect of firewall configuration and management on risk averages rate at level ($\alpha \le 0.05$).

To test this hypothesis, the researcher uses the Simple regression analysis to ensure the effect of firewall configuration and management on risk averages rate, as shown in Table (4-12).

Table (4-11) Simple regression analysis test results of the effect of firewall configuration and management on risk averages rate

	(R)	(R ²)	F Calculate	F Tabulated	β	Degree of freedom	Sig*
risk averages rate	0.592	0.351	30.834	4.019	0.294	1 53 54	0.000

* the impact is significant at level ($\alpha \le 0.05$)

Table (4-12) shows that there is a significant effect of firewall configuration and management on risk averages rate. The *R* was (0.592) at level ($\alpha \le 0.05$). Whereas the R^2 was (0.351). This means the (0.351) of risk averages rate changeabilities result from the changeability in firewall configuration and management. As β was (0.294) this means the increase of one unit in firewall configuration and management will increase risk averages rate value (0.294). Assuring significant impact *F* _{Calculate} was (30.834) and it's significant at level ($\alpha \le 0.05$) comparing with *F* _{Tabled} was (4.019), and that assuring invalid fifth sub-hypotheses. Unaccepted null hypothesis and accepted alternative hypothesis:

There is a significant effect of firewall configuration and management on risk averages rate at level ($\alpha \le 0.05$).

Chapter Five

Results, Conclusions and Recommendations

5-1 Results

- 5-2 Conclusions
- 5-3 Recommendations

5-1 Results

The current study posed a set of questions, placing the hypotheses and their relation to the impact within the study variables. The study yielded many results that contributed to solve the study problem described in chapters (1-2), answering the questions and hypotheses of the study. The main results are:

1. The importance level of E-commerce application was Median with mean (3.42).

2. The importance level of Internet banking server was Median with mean (3.34).

3. The importance level of Website design and hosting was Median with mean (3.41).

4. The importance level of Website design and hosting was Median with mean (3.53).

5. The importance level of Network Administration was Median with mean (3.25).

6. There is a significant effect of the E-banking processes (E-commerce application, Internet banking server, network administration, website design and hosting, firewall configuration and management) on the risk averages rate in the years 2006-2009 at level ($\alpha \le 0.05$).

7. There is a significant effect of E-commerce application on risk averages rate at level ($\alpha \le 0.05$).

8. There is a significant effect of Internet banking server on risk averages rate at level ($\alpha \le 0.05$).

9. There is a significant effect of website design and hosting on risk averages rate at level ($\alpha \le 0.05$).

10. There is a significant effect of network administration on risk averages rate at level ($\alpha \le 0.05$).

11. There is a significant effect of firewall configuration and management on risk averages rate at level ($\alpha \le 0.05$).

5-2 Conclusions

On the basis of the study results, the researcher concludes with the following points.

• There is a lack of the required documentation for the risks of Ebanking, and there is no dedicated framework responsible for recording and calculating the risk averages of e-banking processes followed by the banks. Independent and dedicated communications among the various divisions of the bank

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concerning e-banking activities and processes are lacking or nonexistent.

- Plans to educate bank staff and clients on e-banking processes, activities and services are insufficient.
- The banks in Jordan in general are in the early steps in the field of e-banking and they mostly depend upon third parties, concerning the e-banking infrastructure, securities, policies and support services.
- There is a strong rivalry among banks in Jordan. As a result, we find many differences between banks and gaps regarding the ways that banks gradually adopt various stages of e-banking. Another result is that banks are adopting more efforts to enhance their reputations as early adapters, and as reliable and secure banks.
- In the near future there will be huge transformation in the banking sector where a few banks that are out raced in the competition will be left behind and only the well-known, state-of-the-art banks will survive and flourish.
- Proper plans required to integrate the Risk Division of the bank with its IT and IS Division are lacking.
- rules and regulations concerning e-banking are not sufficient

5-3 Recommendations

On the basis of study results and researcher conclusions, we suggest the following recommendations to meet the study objectives:

- Over the coming years the growing risks will raise concerns and become more crucial. Banks in Jordan need to be aware of this dilemma and fortify themselves against it. Risk Divisions, especially, require substantial integration and preparation for the next generation of bank transformations and the adoption of e-banking.
- An extensive framework for documentation processes is required, with dedicated communication methods that would serve e-banking processes and activities.
- Banks should take immediate steps towards the adoption of ebanking, modeled after successful methods already developed.
- There should be extensive efforts to provide the required levels of knowledge and understanding of e-banking for the bank staffs and clients using multiple dedicated methods and channels.
- Integration channels between bank divisions and communications for the purpose of efficient and effective ebanking should be reinforced.

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- Banks need to start developing in house support systems and technical systems, and they need to employ specialists on ebanking to gradually decrease their reliance upon third parties. This step is important for the following reasons: ebanking will continue to evolve worldwide, and a strong reliance on third parties will increase. As this occurs the power will shift toward parties that already have expertise in ebanking.. It is not sufficient for Jordanian banks to meet the standards of large international banks, but they need to keep up with continuing change. Alternately, mergers and very strong long-term alliances should be recommended.
- Urgent need for revising and produce proper and state of the art rules and regulations concerning e-banking.

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Appendices:

Appendix (1)

Names of arbitrators

No.	Name	Specialization	Work Place
1	Dr. Kamel Moghribi	Business Administration	Middle East University
2	Dr. Najim Al Azzawi	Business Administration	Middle East University
3	Dr. Sabah Al Agha	Business Administration	Middle East University
4	Dr. Laith Al Rubaie	Business Administration	Middle East University
5	Dr. Haitham Al zoubie	Business Administration	Middle East University

Appendix (2) Questionnaire

The aim of the study is to enhance e-banking processes by using risk indicators, through the mean of simulation program.

We would like to express our appreciation to you for supporting this research by spending time on reading the questionnaire and providing information that would contribute to it.

Demographic factors of respondents:

1.	Age			
	Less than 30		30-40	
	41-50		over 50	
2.	Gender			
	Male		Female	
3.	Experience	_		
	Less than 5 years		5-10	
	1 1-15		over 15	
4.	section			
	IT staff		Risk management sta	afi
	IS staff			
5.	Specialization			
	Related to IT		Related to Business	
6.	Academic degree			
	Bachelor		Master	
	Doctoral		Diploma	
7.	Career position	_		
	Director		manager	
	Employee			

		Answer Alternatives					
No.	Item	Strongly agree	agree	neutral	disagree	Str dis	
		(5)	(4)	(3)	(2)	(1)	
E-co	mmerce application						
1	Bank customers have the tendency to conduct complex activities over the internet, (e.g. such as trading securities, applying for insurance ect.)						
2	Bank customers usually stick only with the basic banking functions over the internet						
3	there Is absence or inadequacy of legal infrastructure governing the operations of e- commerce						
4	E-commerce services are provided equally to all consumers						
5	There is no framework that governs the customer's right of choice regarding to what preferred degree they would like to use e- commerce applications (in a ranking from 1-5)						
6	Customers use of credit card tend to be limited						
7	Entrepreneurs usually tend to accept credit card payment over the internet						
Web	site design and hosting						
8	The bank depends fully on a third party for hosting it's website						
9	It's better for the bank to conduct all the website hosting and design by itself						
10	The security breaches that the bank faced during the past few years could have been avoided by applying new systems and changing the way of how this job has been done						
11	The bank website should examine radical changes						
12	The estimation of the website design and hosting budget exceeds the stated limits stated by the board of directors						
13	The website of the bank will jeopardize it's reputation unless some changes are made in the near future						
14	The website of the bank should be transactional						

15	A community discussion space on the website could be beneficial		
16	The website of the bank would not be appropriate if it were to be used in a foreign developed country		
17	The number of the team members handling this job item is insufficient		
Inter	met banking server		
18	Having more servers will save you a lot of work (less work)		
19	Recommend using hybrid models for more secure servers such as HECC(Hyper-Elliptic Curve Cryptosystems)and MD5(Message Digest version 5)		
20	Outsourcing expertise is the only good solution with issues related to banking server		
21	Storing the customer's and bank's data using old fashioned ways due to security and fraud breaches is preferred		
22	Training courses are needed to handle any related internet banking server jobs properly		
Fire	wall configuration and management		
23	The security policy that the bank enforce is sufficient		
24	The firewalls used to prevent intrusion inside the bank are equivalent in quality to prevent outsiders intrusion		
25	The firewall configuration is reviewed exactly every 6 months		
26	It's urgent to get ISO certificate concerning firewall configuration and management		
27	The firewall policy is developed fully by the bank		
28	It's necessary to adapt the firewall configuration from outside the bank		
Netv	vork administration		
29	The staff of network administration is the only side who check the compliance of firewall and server configuration with security policies		

30	dual controls over this job is causing delay and should be removed			
31	Periodic Segmentation is done for the data by breaking the network into different security zones			
32	Breaking the network into different security zones is unavoidable for security reasons			
33	Customers are to blame for misusing their accounts and lack the required knowledge to avoid security breaches			
34	The best policy for implementing secure networks architecture is to adapt the basic security maxim			

Appendix (3) Interviews

1. Abdelaziz N. Hammoudeh (Capital Bank) 16-3-2011 (12 pm- 1 pm)

Position: Application systems maintenance & support manager

The interview took place in the main branch; we discussed mainly the bank's strategy in e-banking at present and future plans. In this regard I can summarize main thoughts as:

- The bank is adapting the segmentation market or niche market strategy, where only large companies with big assets can participate in, this is required to enable the bank to adapt adequate e-banking services with high level of quality that can imitate the developed banks in that field.

- The bank now is considering changes in strategy and is also concentrating on widening the market share by providing ebanking services for every client.
- That means implementing a system with multiple qualifications.
- 2. Rafah K. Al-Jamal (Bank Audi) 14-3-2011 (1pm- 2 pm)

Position: Head of credit and Risk management Department

Discreet

Mss. Rafah discusses the confidential aspects of the risk management job especially concerning the e-banking breaches and how it should not be transparent for the time being also discusses the future prediction for this job item (risk manager) and how it will change and evolve more tasks by integrating divisions into a single communication zone and the risk manager will take the role of observing and aggregating all the relevant information's from all the divisions and monitoring the process.

Ahmed A. Abdel-Qader (the Housing Bank for Trade & finance)
Position: IT Governance Manager, IT Division

15-3-2011 (10 pm- 12 pm)

Mr. Ahmed talked about the latest trends of technology the Housing bank has been adapting; the strategy they are using is linked to technology based decisions. He mentioned some of the drawbacks of the current processes as;

- Security: The bank is taking major steps concerning security, they are shifting from preventing threats only from outside the bank system, by securing the servers of every single machine that is used in the bank, by taking in to N security steps and instead of adapting the strategy of preventing only from outside to → inside the opposite is taken in account also.
- Using very sign certification
- Implementing Pin2 code to systems
- Using pin code on every debit card for preventing ATM breaches.

Saffuh Abu Taha (Ahli Bank) 14-3-2011 (10:30 am- 11 am)
Position: Executive Manager, Operational Risk& Basel II

In this interview the benefits of third party sponsoring was addressed and main ideas were;

- Ahli bank is depending on third party that fully sponsor ebanking Infrastructure and follow ups.
- Ahli is depending on agreements between the bank and large institutes like Microsoft for providing all its products concerning e-banking activities where the company is responsible for it and for any breaches the bank face.
- The bank is shifting to use pin code on their debit cards and credit cards to prevent ATM breaches.
- Kamal Qumhieh (Bloom Bank) 14-3-2011 (9 am- 10am), 16-3-2011 (10 am-10:30 am)

Position: Operational Risk section Head

- The bank is still new in the field of e-banking, the website is informational only, and the bank is in need for enormous steps towards e-banking adaption.

- There is no organized documentation regarding the e-banking breaches or issues
- Dr. Adnan Shaher Al'Araj(Bloom Bank) 14-3-2011 (8:30 am-9 am)

Position: General Manager

- There is a strong tendency for the bank to participate in the race for e-banking adaption.
- Mr. tariq as a head he inspirit to fastening the process of adaption and transformation.
- 7. Yousef A.Abul Haija (Cairo Amman Bank)14-3-2011 (12:20 pm 3 pm)

Operational Risk Department Manager, Risk Division

 Mr. Yousif talked about the logistics of risk management process and how it's still the same even though they're implementing more servers and connection lines.

- Cairo bank is still working on implementing the segmentation system (security zones) where clients are segmented to levels of security requirement.
- The risk management division is not entirely responsible of security revision of firewall and other means of security, there is a dual cooperation between departments in the bank, where every new suggestion of adding new features or change in policies of using the system should be approved by the IT department.
- The bank is considering the use of Iris of the eye confirmation means and it is one of the up to date contemporary trends in the developed worlds.
- There is a strong competition between banks in recent years, the bank in considering major shifts and development of new and up to date procedures and strategies
- Also the bank is taking into the account the importance of giving a good impression by supporting, and dealing with every social level regardless of the asset they have.

8. Nizar Shanaah (Cairo Amman Bank) 17-3-2011 (11 am- 2 pm)

IT security and Procedures Manager

- Mr. Nizar discusses the importance of the reputational risk and how it overtops other risk categories, the bank allocate huge amount of money to recover from and prevent any breaches or expected breaches regardless of the amount, because the bank allocate large amount of money for protecting its reputation.
- the bank depends fully on a third party concerning website hosting and firewall configuration, in his point of view it's the right thing to do because of the lack of accumulation of expertise required to fulfill this job while there is expert and well known companies with high reputation dedicated for this job, while arguing the fact that this phase is temporary.
- using extensive schedule for reviewing day to day firewall policies
- the bank is using Artificial intelligence programs for security reasons by registering every single activity conducted in the bank, and producing frequent reports, and when any suspicious activity conducted, the system will immediately produces a

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warning report, and that system is feeding itself with the information registered and creating knowledge from it.

- ISO is considered to be formality, the bank is doing much beyond what is required to obtain the ISO certificate and if the bank fulfills it then it's for the publicity reasons.
- The bank highly recommends using hybrid systems and considers it a must.
- 9. Ziad Kokash (Ahli Bank) 14-3-2011 (11 am- 11:30 am)

Position: Risk Management Head

Mr. Ziad was very interested in the topic of e-banking and he encourages any new idea and innovations concerning e-banking field, he discusses the some issues facing the banks here in Jordan and it's summarizes in the few points:

- The lack of technical knowledge that have to be available in the Risk management team as a whole about e-banking
- There is no framework that calculates the e-banking risks independently of course proceeded with the type of communication that have to be dedicated for this matter.