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**The Effect of Implementing an Application Performance Monitoring Tool
for E-Banking Services on Customer Experience**

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**The Effect of Implementing an Application Performance Monitoring Tool
for E-Banking Services on Customer Experience**

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Al-Quds University
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Thesis Approval

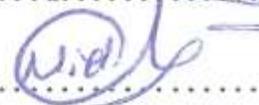
The Effect of Implementing an Application Performance Monitoring Tool for E-Banking Services on Customer Experience

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Declaration

I certify that this thesis is submitted for the degree of Master, is the result of my own research, except where otherwise acknowledged, and that this study (or any part of the same) has not been submitted for a higher degree to any other university or institution.

Signed:**Shatha Sameer Abdullatif Barghouthi****Date: 4/8/2019**

Dedication

To my Husband Yazan & Son Adam who held my hand tightly through this journey and have been extremely patient and tolerant, the encouragement you've provided is unmatched.

To my Father & first teacher Professor Dr. Sameer who taught me how to be tenacious and articulate, and no matter how difficult things get they need to be seen through

To my Mother Amira whose love and support is endless, and who taught me the true meaning of patience and unconditional love.

To my Brother Sinan, the IT guru that I look up to, the journey you took through your education and career has impacted my life in so many ways, I stand here because you set for me the perfect example.

Thank you for everything, without you all none of my success would be possible

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I'd wish to extend my gratitude to the bankers that shared with me a pool of information and for the respondents of the questionnaire, this research wouldn't have been completed if it weren't for you.

Finally, I'd like to thank all those who assisted me in coming this far, especially my colleagues, your support and encouragement has been unwavering

Abstract

For banks to advance and develop, they must capitalize on investing customers and compete with other banks. In keeping up with this task, adoption of new technologies is an uphill battle as new software and technologies are routinely introduced or upgraded by banks to serve their customers and to attract new ones. One of the recent advances in this area is implementation of new software monitoring the performance (Application Performance Monitoring Tool – APM) of the e-banking services being provided. This research examines the significance of implementing such a monitoring solution. The research sample was constituted from commercial bank customers in Amman-Jordan to examine their customer experience since some banks have implemented the monitoring whilst others have not which provided an excellent opportunity to evaluate each individual bank and to compare between banks.

The developed questionnaire used to collect data was reviewed by experts; a pilot sample was used to evaluate the questionnaire. Electronic distribution of the questionnaire returned 2504 responses which were filtered down to 1311 responses. Each question was then analyzed for each bank to determine the level of statistical significance at $\alpha \leq 0.05$ using *t*-test.

The individual results and the collective results were in agreement showing a high level of significant differences between banks implementing the monitoring tool vs. banks that did not apply the tool.

In conclusion the study concluded that the implementation of an APM has a positive impact on customer experience; therefore it is appropriate to recommend the implementation of the Application Performance Monitoring Tool (APM).

Key Words: Application Performance Monitoring, Customer Experience, Commercial Banks, e-Services.

أثر استخدام برمجيات مراقبة أداء الأنظمة البنكية الإلكترونية على تجرید العملاء

إعداد: شذا سمیر عبد اللطیف البرغوثی

إشراف: الدكتور سلی البرغوثی

ملخص الدراسة

لكي تتقدم البنوك وتتطور ، يجب عليها الارتكاز على العملاء المستثمرين والتنافس مع البنوك الأخرى ، تماشياً مع هذه المهمة ، يعتبر اعتماد التقنيات الجديدة معركة شاقة، حيث يتم إدخال أو تحديث البرامج والتقنيات الجديدة بشكل روتيني من قبل البنوك لخدمة عملائها ولجذب عملاء جدد. أحد التطورات الحديثة في هذا المجال هو تنفيذ برنامج جديد يراقب أداء التطبيقات (APM) للخدمات المصرفية الإلكترونية التي يتم توفيرها. يبحث هذا البحث في أهمية تطبيق برامج مراقبة أداء الأنظمة البنكية الإلكترونية هذه. تشكلت عينة البحث من عملاء البنوك التجارية في عمان - الأردن لدراسة تجربة العملاء كون أن بعض البنوك قد نفذت هذه الإداء في حين أن البعض الآخر لم ينفذها وفر فرصة ممتازة لتقييم كل بنك على حدة والمقارنة بين البنوك.

تمت مراجعة الاستبانة المطورة المستخدمة لجمع البيانات من قبل الخبراء ؛ تم استخدام عينة تجريبية لتقييم الاستبانة. أعاد التوزيع الإلكتروني للاستبانة 2504 استجابة تمت تصفيتها وصولاً إلى 1311 إجابة. ثم تم تحليل كل سؤال لكل بنك لتحديد مستوى الأهمية الإحصائية عند $\alpha \leq 0.05$ باستخدام اختبار t.

كانت النتائج الفردية والنتائج الجماعية متفقة على إظهار مستوى عالٍ من الاختلافات الكبيرة بين البنوك التي تنفذ أداة المراقبة مقابل البنوك التي لم تطبق الأداة.

في الختام ، أيدت الدراسة أن تطبيق هذه الأداة له أثر إيجابي على تجربة العملاء ؛ لذلك من المناسب التوصية بتنفيذ أداة مراقبة أداء التطبيقات (APM).

الكلمات المفتاحية: مراقبة أداء التطبيقات ، تجربة العملاء ، البنوك التجارية ، الخدمات الإلكترونية.

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Chapter I

Background of the Study

1.1 Introduction

1.2 Research Problem

1.3 Objectives of the Study

1.4 Research Questions

1.5 Hypothesis

1.6 Importance of the Study

1.7 Research Model

1.8 Scope of the Study

Chapter I

1.1 Introduction

The performance of electronic banking (e-banking) services is one of the most important aspects of contemporary Customer Relationship Management (CRM) approach that has sparked the attention of professionals and researchers in the services industry in general and in the banking vertical, and banking services arena especially.

Lately, the importance of the service industry is growing at an unprecedented rate, and this came tightly coupled with the growing expectations of customers towards the quality of the performance of the services provided, additionally, the acute competition forced organizations to provide outstanding services to surpass their competition through adopting purposeful marketing strategies that aim to obtaining positive customer experience and satisfy their needs and hence, gain their loyalty (Aboud & Kanaan, 2012، عبود وكنعان).

All banks have continuously been working on obtaining the best customer experience through satisfying their different wants and needs, this stemmed off their realization that positive customer experience leads to customer loyalty which makes them regular customers, and from this point, banks have been working on providing their e-banking services through state-of-the-art software's for the sake of customer's positive experience, and thus created a highly competitive environment (Al-Araag, 2013، الأعرج).

The evaluation of a bank's performance by its client is based on the quality of the services being provided, and consequently, banks are seeking to continually improve and enhance their services in-line with customer needs in order to keep up with the changes in the surrounding environment.

Moreover, banks are on a never-ending quest of obtaining positive customer experience so that they can survive in the market since they provide “intangible products” that are materialized first and foremost in the shape of customer experience. The quality of the services is first and foremost influenced by the human force that is providing the service, and therefore, banks are always looking for the highest human resource caliber to be suitably trained to be able to serve customers in the best manner through e-banking services and attending to their various needs. (Hashim *et al*, 2015)

APM is central to enterprises worldwide, it makes sure that performance metrics are met and influences applications to perform past a certain point in order to ensure that service level agreements are met in order to ensure customer satisfaction and higher revenue rates (Dasari & Sasirekha, 2016).

1.2 Research Problem:

The effect that an APM has on customer experience whether it is positive or negative is still not examined in practice, the purpose of the study is:

“To investigate the effects of having an application performance monitoring tool for e-banking services on customer experience”.

1.3 Objectives of the Study

The main objective of the study is to identify the effects of implementing an APM for e-banking services on customer experience; this is done through the following sub-objectives

- 1- To check if an Application Performance Monitoring tool for e-banking services has an effect on service’s reliability.

- 2- To check if an Application Performance Monitoring tool for e-banking services has an effect on service's safety.
- 3- To check if an Application Performance Monitoring tool for e-banking services has an effect on service's speed of service.
- 4- To check if an Application Performance Monitoring tool for e-banking services has an effect on service's speed of service recovery.

1.4 Research Questions

The main research question is as follows:

What is the effect of monitoring the performance of the e-banking services using software on customer experience in Jordanian banks? And therefore, the following sub-questions are derived:

- 1- What is the effect of reliability of the e-banking service on customer experience in Jordanian banks?
- 2- What is the effect of the safety of the e-banking service on customer experience in Jordanian banks?
- 3- What is the effect of e-banking speed of service on customer experience in Jordanian banks?
- 4- What is the effect of e-banking service speed of recovery on customer experience in Jordanian banks?

1.5 Hypothesis:

In order to answer the research questions, the following hypothesis have been set:

H₀: There is no statistically significant effect (level of significance α 0.05) for the implementation of an APM for the e-banking service on customer experience in Jordanian commercial banks

From which we derive the following sub-hypothesis

H₁: There is no statistically significant effect (level of significance α 0.05) for reliability of the e-banking service on customer experience in Jordanian commercial banks

H₂: There is no statistically significant effect (level of significance α 0.05) for safety of the e-banking service on customer experience in Jordanian commercial banks

H₃: There is no statistically significant effect (level of significance α 0.05) for the speed of service of the e-banking service on customer experience in Jordanian commercial banks

H₄: There is no statistically significant effect (level of significance α 0.05) for the speed of recovery of the e-banking service on customer experience in Jordanian commercial banks

1.6 Importance of the Study:

The importance of the study can be highlighted in the role that an APM plays in monitoring and tracking the e-banking services for better customer experience, and supports the continuity of the e-banking services to yield better customer experience, and supports the continuation of the participatory process between the bank and the client and meet the needs of customers in a suitable manner to achieve satisfaction towards the services provided.

The APM industry is growing at a fast rate, a report published in 2014 reported that the value of the APM industry is \$2.72 billion and expected to grow to \$4.98 by 2019¹, a report published in 2017 indicate that the value of the APM industry is at \$4.63 billion and is expected to grow to \$8.77 billion by 2023², the 2019 projected growth of the industry was achieved in 2017 (2 years earlier than anticipated), and hence, it is worth examining the effectiveness of such solutions for the banking industry.

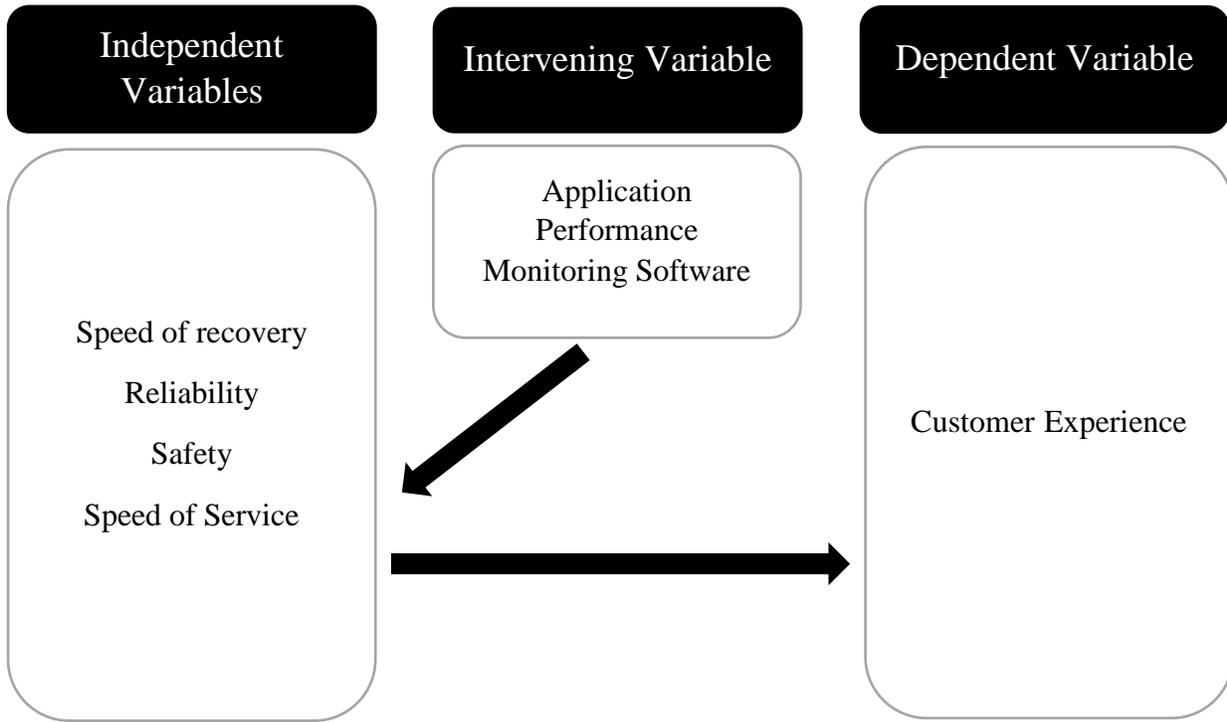
The scientific importance of our study is also through identifying the positive/negative aspects of monitoring the performance of the e-banking service using software on customers' experience.

The practical importance is to help the banks in drawing the attention of the customers to attract them and deal with them by making them realize the quality of service provided through e-banking services. The researcher conducted this study to identify the most important effects of monitoring the performance of the e-banking service on customer experience for commercial banks in Amman-Jordan.

¹ <https://www.marketsandmarkets.com/PressReleases/application-performance-management.asp> (MarketsandMarkets's™) Date: June, 24th, 2019

² <https://www.prnewswire.com/news-releases/global-application-performance-management-market-2018-2023-market-was-valued-at-us4629-billion-in-2017-and-is-projected-to-reach-us8773-billion-by-2023-300592625.html> (PR NewsWire) Date: June, 24th, 2019

1.7 Research Model:



1.8 Scope of the Study

The study is limited to customers of Jordanian commercial banks in Amman.

The study deals with the effect of the monitoring the performance of the electronic banking services using software on customer experience and its effectiveness in Jordanian banks from customers perspective which gives better results. The study was limited to measuring the following variables: (Application Performance Monitoring Software through the following variables: speed of recovery, reliability, speed of service, and safety)

Chapter II

Theoretical Framework & Literature Review

2.1 Theoretical Framework

2.1.1 First Topic: Customer Experience

2.1.2 Second Topic: Application Performance Monitoring

2.1.3 Third Topic: Electronic Banking Services

2.1.4 Forth Topic: Electronic Banking Services Distribution Channels

2.2 Literature Review

2.2.1 Arabic Studies

2.2.2 Foreign Studies

2.1 Theoretical Framework:

The world is heading towards globalization in all its forms, especially in the area of finance, as the financial services industry plays an important role in the economies and markets of most countries, hence, it requires studying the expectations and perceptions of customers for service applications provided to them. (Al-Saran, 2007، الصرن)

The world today is witnessing a huge revolution in the field of information technology and communication, which has generated a strong competition among the various institutions including banks to increase their market share. The traditional business environment has been described as the era of computers and information. The main factor in the economy is land, capital and labor. Contemporary thinking offers a fourth element: computers and information (Noor Al-Din, 2017، نور الدين). The emergence of the Internet, which is a major global network linking a range of computers that are dealt with through multiple procedural programs, It is very important and imperative that banking services via the Internet become part of the cutting-edge technological arena, the fact that the provisioning of banking services via the Internet has great benefits to customers and save a lot of time and many other advantages (Miah, 2013).

Although direct communication between the client and the bank is of great importance, the technical revolution has significantly helped the emergence of computers and the spread of the Internet widely and quickly to devise new ways and methods of providing remote banking services. In light of the overall boom in software and electronic technology, including economic and financial fields in particular and the rest of the other areas in general it was necessary for banks and financial institutions to pay attention to the development of banking services activities.

There is no doubt that IT is now one of the most important strategic issues in the field of banks and this fact will impose on banks great challenges, and the bank's ability to meet their customers' needs in a complete, cost-effective and timely manner, it is necessary to provide some advantages to e-banking services.

First Topic: Customer Experience

2.1.1 The concept of Customer Experience (CX)

Customer experience is one of the most important concepts in the field of marketing services, which is more important in the field of material goods, because the relationship between them and growth and profitability is stronger in services than in material goods. Although there is a clear and definite relationship between the concepts of customer experience and quality of service, researchers in this field have not agreed on the nature of this relationship and its type, and on the concept of each. (Riyadi, 2016، الرياضي).

Customer experience in definition differs from customer satisfaction; customer experience is defined as the emotional, physical, and intellectual subjective perception of a service. (Lemke *et al*, 2011) whereas customer satisfaction is the joy that the customer feels when what he requires is achieved (Riyadi, 2016، الرياضي).

Lemke *et al* (2011) here refers to customer experience as something relative as an individual receiving a service is not in an "absolute" state of mind. Satisfaction consists of comparing what the customer expects to get and what is achieved regardless of other conditions related to the customer.

The researcher here sees that customer satisfaction is "a point in time" and customer experience is "a function of time".

Three levels of customer satisfaction have been identified: if the service surpasses customers' expectations then he falls within the first category which is "joy and pleasure", if the customer gets what is expected, then he falls within the second category which is "Satisfaction", and if the customer does not get what he expects, then he falls within the third category which is "unsatisfied". (Riyadi, 2016، الرياضي)

2.1.2 The importance of customer experience:

Customer experience is very important, and thus, all organizations that want to grow and sustain their operations in the market need to know customer experience within the context of the services being offered to them. Customer satisfaction is a very important issue for success in any business of the importance of their experience of services provided, whether it is traditional or online, and highlights the importance of customer experience to the services provided through the following (Gentile *et al*, 2007):

- Assists in the process of diagnosing the reasons behind not achieving the desired goals.
- Avoid making the same mistakes within the context of service activities provided.
- To know the extent to which the target segment of the services provided is being benefited.
- Help supervisors to expand the scope of service activities provided to cover the largest amount of all eligible categories.
- Determine the extent of customer satisfaction.

2.1.3 Customer Experience Requirements:

There are a range of requirements and characteristics that must be met in order to achieve customer satisfaction from their experience of the services provided. Where the Japanese

professor (Noriaki Kano) proposed three sets of characteristics within his model (Kano-Model) as follows³:

1. Basic Attributes:

Which are very straight forward, and their existence is inevitable to the customer, having them present gives the customer a good experience, and their absence creates a bad customer experience (Kotler, Ph. Armstrong, 2004).

2. Performance Attributes:

These attributes significantly and clearly affect customer experience, since it is not expected to be fulfilled, it will increase the level of experience and pleasure, and their absence in does not lead to dissatisfaction or poor customer experience (Kotler, Ph. Armstrong, 2004).

3. Delight Attributes:

These requirements are commensurate with the experience of the customers in a noticeable manner, since the more they are achieved in the product/service, the better the satisfaction and experience of the customer, and its absence has no effect on customer's experience (Al-Dmour, 2003، الضمور).

2.1.4 Customers and their experience regarding the performance of e-banking services:

The adoption of banks and their severe impact on information and communication technology in the recent period and the resulting developments in customer requirements and expectations has led to banks to pay greater attention to the quality of banking services and electronic banking services in particular in order to achieve better customer experience and increase the competitiveness of banks in an ever-changing environment, for this to be met, certain elements should be covered:

³ For more details related to the Kano Model please visit <https://www.kanomodel.com/> Date: April, 16th, 2019

Customer: “is considered the end user of the services of an institution by which his decisions are influenced by internal factors such as personality and beliefs, and external factors such as resources, family influences or preference groups, individuals or organizations.” (Al-Janabi, 2006، الجنابي)

Electronic Client (E-client): defined as a "person who buys and pays for his purchases online and uses various electronic means." (Sabra, 2010، صبرة)

Service: (Taha, 2007، طه) defined it as "intangible products that provide consumers (customers in the case of banks) with direct benefits as a result of the use of human or mechanical effort." (Lovelock & Wirtz, 2004) defined services as "the act or performance that is meant toward another party, and hence it is considered as an economic activity that creates value and provides benefits to customers”

2.1.5 Customer Experience Measurement (CX):

Forrester’s Inc. conducts surveys related to business strategies and technology; their insights are based on annual surveys that add up to 675,000 consumers and leaders worldwide.⁴

In a recent research, Forrester’s CX index indicated that 72% of the companies included in the research said that improving CX is a priority, yet less than 1% does so.

The below are common metrics used to measure (CX):⁵

- 1- Net-Promoter-Score (NPS): Koladycz *et al*, (2018) identified NPS as the response of a client to more questions which is “how likely are you to recommend a product/service to other people”, a person that is positive in responding is called a “promoter”, and a person that is negative is called “detractor”.

⁴ <https://www.forrester.com/marketing/about/about-us.html> (Forrester Inc.) Date: May, 9th, 2019

⁵ <https://www.usertesting.com/blog/customer-experience-metrics/> (User Testing Inc.) Date: May, 9th, 2019

- 2- Customer Satisfaction: is the joy that the customer feels when what he requires is achieved (Riyadi, 2016، الرياضي).
- 3- Customer Turnover Rate: it is a definition to indicate which customers are in process to abandon a company, product, or service. (Babu & Ananthanarayanan, 2014)
- 4- Average Handling Time: it is the average time spent working on case. (Jafari, 2015)

Second Topic: Application Performance Monitoring

2.1.5 The concept of performance:

2.1.5.1 Performance:

Performance is a concept that has received a great deal of attention and research in management studies due to its importance on both the individual and organization, and the interaction of the factors that affect performance. Performance is what drives institutions and makes their employees work vigorously and effectively. The purpose of the introduction of this topic is to highlight and identify the concept of performance and its components and also identify the factors affecting performance, in addition to the identification of the methods of performance evaluation, as follows:

2.1.5.2 The concept of Performance:

The concept of performance has been referred to as one of the most important pillars of professional work in any functional field, If someone's performance is found to be superior in a fair and equitable work environment, it is logical that this performance will take that person to higher levels in the organizational hierarchy. In an ever-changing environment and in-light of intense competition, an organization can only compete if it is identified by its superior performance, and this performance stems from the performance of individuals in the organization as a whole (Al-Ta'amna, 2009، الطعامة).

It is also indicated that it represents the degree of achievement and completion of the functions that consists an individual's job, and reflects how the individual fulfills the requirements of his job. People are often confused between the concept of efforts and performance due to the overlap between them; Effort refers to the energy consumed to complete a task, while performance is measured on the basis of results (Al-Sawaf, 2000، الصواف).

From the perspective of the functions and responsibilities of the employee, the concept of performance articulates the employee's performance of the tasks and responsibilities assigned to him by the organization or the entity to which his job is linked (Shawish, 2005، شاويش).

The concept of performance is also defined as the set of outputs and objectives that the organization seeks to achieve through its employees. It is a concept that links the aspects of the activities to be performed with the goals that organizations seek to achieve through the tasks and duties of the employees within these organizations (Al-Attiyah, 2003، العطية).

Moreover, performance is defined as an interaction of employee behavior, and that behavior is determined by the interaction of the employee's effort and abilities in the organization, and represents the employee's ability to achieve the objectives of the job he occupies in the organization (Abu Sheikha, 2000، أبو شيخة).

From here, the performance of employees can be measured through the following (Sultan, 2004، سلطان):

1. **The amount of effort:** Indicates the amount of physical or mental energy entailed that an individual exerts to work during a period of time, as well as speed in the performance of work.
2. **Quality of effort:** Indicates the level of quality in the completion of the work, and the degree of matching the efforts entailed to a pre-defined quality benchmark, some tasks are not focused on speed or energy exerted, but focuses on the degree to which the task performed is free of error.
3. **Performance pattern:** The way in which work activities are carried out, for example, through measuring the way a solution is reached, or a problem.
4. **Performance rates:** means that the evaluator increases the productivity of the employee to measure the efficiency of the employee in the work in terms of quality and quantity over a period of time, and then compares the work done with the specified rate.

2.1.5.3 Performance Elements:

Performance consists of a number of elements, the most important of which are the following (al-Attiyah, 2003، العظيمة):

1. Knowledge of job requirements: Includes general knowledge, technical and professional skills, general background of the job and related fields.
2. The quality of work: The extent to which the individual is aware of his work, his desire, skills skill, and the ability to organize and implement the work without making mistakes.
3. The amount of work done: Indicates the amount of work that an employee can accomplish in normal working conditions, and the speed of its achievement.
4. Perseverance: include seriousness, dedication, and the ability of the employee to take responsibility for the work and complete it in the specified time window, and the extent to which and employee needs directions and guidance by supervisors.

2.1.6 Types of performance:

Performance is classified into three types:

1 – Task performance:

Task performance refers to the behaviors that contribute to the achievement of essential processes in the Organization such as the direct production of goods and services, and any performance that directly or indirectly contributes to the implementation of the organization's operations. For example, creating a motivational environment to perform tasks (Casolaro & Gobbi, 2004).

2- Contextual Performance:

Contextual performance refers to behaviors that indirectly contribute to the transformation and processing of core processes in the organization. These behaviors contribute to shaping both the culture and the organizational climate. Performance here is not an additional role in nature, but lies outside the scope of the core functions and depends on circumstance in which processes can be addressed. For example, it is possible to be directed towards colleagues and help them solve a work-related problem or towards the organization as a whole through diligence, perseverance and an extra effort to work or to volunteer to carry out tasks outside the formal role of the job (Reilly & Aronson, 2012).

3- Counter-Productive Performance:

Counter-productive performance differs from the previous two types; it is basically characterized by negative behavior in the workplace such as delayed work or absenteeism, and may include behaviors such as deviation, aggression, abuse, violence, revenge intentions, and attack (Casolaro & Gobbi, 2004).

2.1.7 Performance Standard:

It is a standard to indicate whether the quantity and quality of work required to be performed by an individual or group of individuals within a certain period of time at the lowest cost or a description of the extent of workmanship that must be performed within the enterprise (Mari, 2003، مرعي).

2.1.8 The concept of Application Performance

Software/Application Performance has been defined as the process by which software or applications are evaluated to ensure that business goals are met based on a pre-defined benchmark of what is expected to be achieved (Jabreen & Awad, 2016).

In a study performed by (Heger *et al*, 2017), the researcher defined Application Performance Management (APM) as a complete process with the purpose of making software operate past a certain threshold while it is in production (live workload) and considered it as a core IT operations discipline. Furthermore, APM aims to the detection and resolution of operability issues, and to have the latest metrics in regards to performance incidents. Heger *et al* (2017) also identified the activities of APM as follows (please note that all these activities run simultaneously):

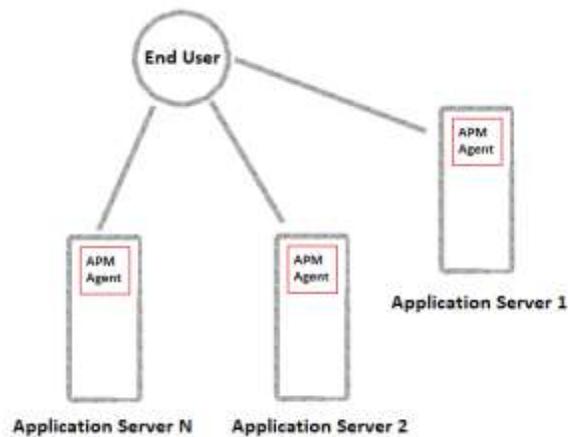
- **Data Collection:** data related to performance needs to be collected from the end users and from the system itself, what needs to be collected as end user insights are number of visitors simultaneously, number of downloads, number of interactions, and length of active session.
- **Data Storage & Processing:** in order to get a centric view of the data, they need to be transferred to a proper data storage repository for them to be processed and analyzed, a database management system (DBMS) is usually used for processing the data. For data representation, most commonly one of two approaches is used, the first is time-series representation by which number of counts, hits, ...etc. are represented, the other approach is “execution traces” that represent the internal flow of functions within the application that is being monitored by which enables us to better understand the architecture and analysis situs of the application/software.
- **Data Presentation:** the visualization of data, making data visual for decision makers either in abstract or details both on the business level or on the technology level; presentation on the business level may show details related to end-user devices and the general health

of the service(s), presentation on the technology level show details relate to underlying infrastructure i.e. servers and middleware.

- Data Interpretation and use: data is used for diagnostics and alerting, root-cause analysis and/or isolation, and for adaptation through the system reacting automatically in cases of performance degradation for it to meet pre-defined service level agreements (SLAs), this can be reactive or proactive in nature.

The below is an illustration of how an APM is implemented in a bank:

Figure (2.1): APM in Banks



Source: the researcher

2.1.9 Application Performance Management Framework (Gartner, 2016):

The APM framework has been identified as follows:

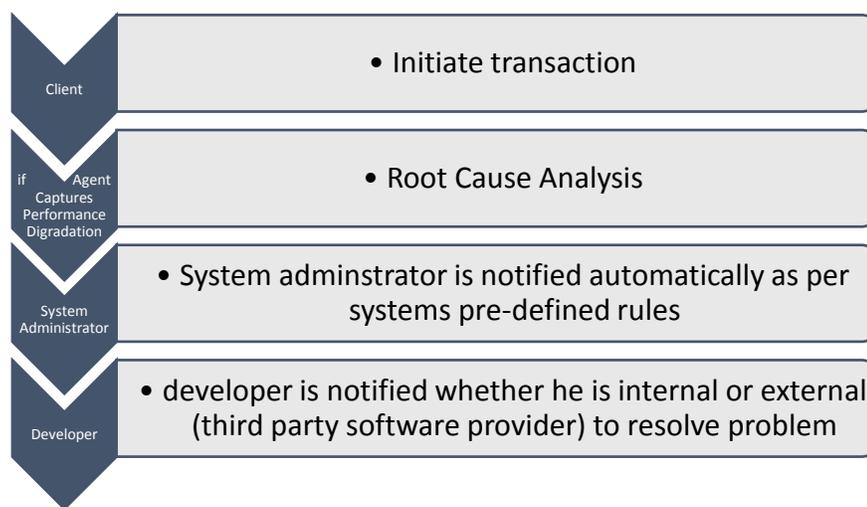
- 1- Digital Experience Monitoring (DEM): which is used to determine, track, and enhance/adjust web-based resources and end-user experience. This tool mostly tracks user behavior and monitors traffic amongst other functions.
- 2- Application Discovery, Tracing, and Diagnostics (ADTD): This is the function responsible for business transaction management, application component monitoring, and application topology discovery and modeling.

3- Application Analytics: this function is crucial since enterprises have multiple applications running on heterogeneous platforms; this function enables business owners to answer performance issues as they arise/progress.

2.1.10 How does an APM work?

considering that a bank has multiple e-banking services running simultaneously on different platforms, in cases of performance degradation it become hard to pinpoint were the problem is exactly in order to remediate, it usually takes a lot of time to resolve problems related to applications due to the fact that the system administrator was unable to identify where the problem actually occurred, this is where the APM tool has an advantage, it monitors slow, very slow, stalling, and falling transactions, provides root cause analysis (and in some tools source code visibility) while the problem is progressing, this enables system administrators to mitigate problems and performance issues as they unveil, and enables them to better remediate in case of significant bottlenecks/downtime, illustrated below is the proposed APM process flow chart:

Figure (2.2): Proposed APM Process Flow Chart



Source: the researcher

Figures 2.1 & 2.2 have been derived after examining multiple APM tools from different vendors (AppDynamics, ManageEngine, Dynatrace, and SolarWinds)

2.1.11 Performance Measurement:

In a study conducted by (Parasuraman & Berry,1985) in an attempt to develop a measure of quality of service and customer satisfaction and based on interviews with four different types of service providers: retail banking, credit card providers, product maintenance and repair, stock handling service, some are the following:

- **Speed of service:** which includes the speed of access to the service, the waiting period to obtain the service and execute it (Parasuraman & Berry,1985).

An experiment conducted by Mozilla to differentiate the page loading time of those who downloaded their browser vs. those who didn't, concluded that the end users that downloaded, the page loaded in less than 2.10 seconds, whereas the ones who didn't, the page loaded in 3.65 seconds and some had to wait for more than 7 seconds, the experiment concluded that an enhancement in the page loading time by 1 second would increase the download rate by 2.7%⁶.

- **Reliability:** The stability of performance (24 Hours availability), and the ability of the organization to provide the service promised in a way that can be relied upon correctly from the first time, and the ability to access it from different platforms (i.e. PC's or mobiles) (Parasuraman & Berry,1985).
- **Safety:** Free of risk and uncertainty. This dimension includes financial security, maintaining the confidentiality of customer transactions with the organization, and the absence of transactions between the client and the bank means risk and uncertainty, such

⁶ <https://blog.mozilla.org/metrics/2010/03/31/firefox-page-load-speed-part-i/> (Mozilla Inc.) Date: Feb,22nd, 2019

as the degree of security for the customer's use of the banking service (Parasuraman & Berry,1985).

In a study conducted by (Maxham III, 2001) to investigate **service recovery**'s effect on customer satisfaction concluded that the faster the time to solve the problem post-failure the higher are the post-failure customer satisfaction rates, and also concluded that the post-failure satisfaction is higher than the satisfaction prior to service failure. This leads to positive customer experience, loyalty, and positive word-of-mouth (WOM).

2.1.12 Why focus on performance?

- Process consists of several stages until they come into being, produce outputs and achieve its objectives. It also needs several resources to interact with each other and produce new material that achieves its objectives. The process may be tangible such as industrial production processes, or intangible processes such as service delivered in different areas. Performance is the main component of the process, which is the living part of it because it is linked to the human / human element that manages the mechanism, and turns the raw materials / resources into products or services that are then assigned a value and sold to the consumer at a higher value than its base value. This is one of the main pillars in the theory of human performance technology, in terms of elevating the value of work performed by the human element in the workplace to the highest possible level to increase its value in the process of production, which will reflect on the bottom-line of the organization (Al-Karala, 2011، القرالة).
- Focusing on performance in the any process leads us to focus on everything related to it, such as ground rules, the hierarchy of the organization itself, such as departments and divisions, and everything related to the employee in the workplace, this will lead us to

focus on improving this performance for development and progression. The fact that we have no control what so ever on the human's physiological composition, we can only focus on his health both physically and mentally, and make sure that his energy is boosted, and focus on his education and training which enables the organization to get the best return. This is one of the dimensions of the introduction of HPT human performance technology (Al-Karala, 2011،القرالة).

Third Topic: Electronic Banking Services

One of the most important verticals affected by the information and communications revolution is the banking vertical. The proliferation in using networks and connecting computers with each other has catalyzed the process of development and upgrading of this sector. Under this section, we identify the most important features of the electronic banking services currently provided by banks.

2.1.13 The concept of electronic banking services

In the adoption of technology, the banking sector witnessed developments and radical changes, the most prominent of which were the emergence of virtual banking entities and the ability of the customer to conduct his transactions easily and easily, at lower costs, at any time and place.

2.1.14 The emergence of electronic banking services:

Some e-banking services go back to the 1970s when banks began to provide their services over the phone that enabled customers to use the telephone line to do some banking work, such as checking their balances, transferring money and paying bills. In the early 1980s, personal computers became a new way to use home banking, after which, the huge leap in Internet technology in the late 1980s, where banks found the best way to “bank” over the internet. The first online banking and financial transactions without real cash movement was in 1995 by NETBANK, and that bank grew by 7.17% in 2000 compared to other financial institutions within that year (Al-Shammari & Al-Abdalat, 2008، الشمري والعبدلات).

Therefore, the emergence and development of e-banking services is due to two key factors: (Moftah & M’arfy, 2007، مفتاح ومعارفي).

- The increasing importance and role of mediation as a result of increased cash flow and financial flows, both in trade and investment, resulting from the globalization of markets;
- The development of information and communication technology or so-called (technological shock), which was mostly a response to the first factor.

The use of modern technology has become an integral part of the banking business due to its efficiency in work, fast delivery, availability of information about customers and markets and its ability to develop new products and deliver them to customers wherever they are or whenever they wanted, as a result of competition in the banking industry.

2.1.15 Definition of electronic banking services:

Before mentioning the most important definitions that were introduced for e-banking services, it should be noted that there are two types of banks that operate electronically. Some banks do not have physical locations/premises; these are called banks or virtual banks through the internet. The others are conventional banks or so-called land banks that provide traditional services as well as e-banking services (Moftah & M'arfy, 2007، مفتاح ومعارفي).

The purpose of electronic banking services is to conduct banking operations in an electronic way, i.e. using ICT, whether for withdrawal, payment, credit, transfer or dealing in securities or other banking business (Hassan & Maraj, 2004، حسن ومعراج).

It has also been defined as work involving all operations or activities carried out, executed or promoted by electronic or visual means such as: telephone, computer, ATM, Internet, digital television, etc., by banks and financial institutions, Operations by e-card issuers as well as institutions that use cash transfers electronically (Al-Shammari & Al-Abdalat, 2008، الشمري والعبدلات).

As mentioned above, we can define e-banking as the provisioning of ICT-based banking services, especially the Internet, ATMs and mobile phones.

According to international studies, specifically American and European supervisory and supervisory studies, there are three main forms of online banking services: (Iyad, 2008، إيراد)

- **Informational site:** It represents the basic level and minimum e-service activity. This website allows the Bank to provide information about its software, products and banking services;

- **Interactive or communicative site:** This site allows the exchange of communications between the bank and customers such as e-mail, filling applications over the Internet, and updating information and account restrictions;

- **Exchange site:** it is the site by which a bank can perform its activities in an electronic environment enabling the customer to manage most of his transactions electronically from paying bills, managing cash flows and conducting all information services between his accounts within the bank or with third parties.

2.1.16 Characteristics of Electronic Banking Services:

E-banking services have many characteristics, including: (Shehata, 2002، شحاتة)

- It is a remote service and without direct contact between the parties of the service, which raised the problem of not being able to properly identify the parties of the transaction, this has been addressed through multiple technologies for electronic identification.
- They are cross-border services and do not know geographical boundaries.
- These services are based on the contract without paper documents and proof, all procedures and correspondence between the parties of the service are carried out electronically and this raised a number of legal issues related to evidence.

Additionally, some other characteristic include: (Al-Shammari & Al-Abdalat, 2008 (الشمري والعبدلات، 2008)

- Ability to manage banking services efficiently online from any geographical location.
- Ability to deliver some products electronically, such as statement of account, balance and others.
- The speed of changing the governing rules, in order to keep pace with the rapid development in the field of electronic transactions, which need to accelerate the drafting process of legislation necessary to keep pace with this development.

2.1.17 The importance of electronic banking services:

Competition among financial institutions in the banking market is very severe which made them provide comprehensive services which are faster at a lower operating cost. Banks with e-banking services have the opportunity to achieve better competitive rates and remain in the market, providing easy access to the site and 24-hour transaction availability (Fazalath, 2013). In addition, the customer is able to manage his or her own banking transactions, and thus saves him from his frequent visits to the bank in order to complete his transactions and the difficulties associated with it such as overcrowding and difficulty in dealing with service providers.

2.1.18 Cognition of the value of banking services:

Cognition is defined as the process of customer acceptance of stimuli as an introduction to behavior. This means that cognition is the process of understanding the environment around humans and giving it meaning. (i.e. the client's observation of something is the five senses) (Al-Dmour, 2003 (الضمور، 2003). Cognition is heterogeneous in nature amongst humans; what may be boring and depressing for someone may be magnificent to someone else, and what the client may

believe in today's service may not be applicable to tomorrow's services, and that is the secret in different views and different opinions about what has been presented (Al-Dmour, 2003، الضمور).

Banking services are the essence of customer's positive experience, and thus, contemporary marketing research and directions have marked the customer as the cornerstone of any bank's marketing strategy, additionally, the customer's judgment regarding a service is related to his expectations, imagination, and mental state of mind, and thus, banking services have been classified into three levels as follows (Naser & Turjuman, 2012، ناصر وترجمان):

- **Essential Service:** which is the customers' understanding of the banking service within the context of the essential financial and credit needs of the customer, and hence, **awareness** is the main driver behind requesting this service, and is the most prominent in nature.
- **Real Services:** which is beyond essential services, and depicts the degree of how much a particular service is being demanded and is considered a measurement of relative quality, here, **service demand** is the main driver behind requesting this service.
- **Supporting Services:** this includes **both above levels** (essential & real), and deems a service to be an end-to-end service that elevates banking services to another level based on customer's expectations and preferences, as well as a set characteristics and comparative advantages associated with their provisioning

2.1.17 Requirements for Electronic Banking Services:

Banks must have the basic requirements of e-banking services:

- **Technical infrastructure:**

The main requirement to ensure the success of e-business and ensure safe and smooth access to the service is the underlying technology which is defined by the

efficiency of the telecom infrastructure, its robustness, the ability to have a disaster recovery site in cases of failure “Highly-Available” infrastructure and the availability of qualified human resources and professional functions to support this (Kathim, 2016، كاظم ; Nasir,2011، نصر)

- **Human tires:**

The availability of qualified human resources capable of performing new business professionally is one of the basic requirements for the transition to electronic banking services. This requires training of various technical, financial, marketing, advisory and administrative positions (Ehsan, 2012، إحسان ; Nasir,2011، نصر)

- **Interaction with technical developments:**

The inertia and waiting for others do not coincide with opportunities for excellence. To build a stand-alone electronic banking business, financial institutions must keep abreast of modern technological developments and not just wait, although the latter is the approach most banks in the Arab world follow today (Nasir,2011، نصر)

- **Continuous monitoring and evaluation:**

Continuity in the performance of e-banking services requires an objective and continuous evaluation of the effectiveness of its electronic tools, with the assistance of specialized entities and staff, and software tools to determine the integrity of their performance and to identify the difficulties encountered in their work and to take the necessary action (Khafaji, 2001، خفاجي ; Nasir, 2011، نصر).

Forth Topic: Electronic banking services distribution channels

2.1.18 Types of electronic banking services:

Among the banking activities offered by banks online and other communication technologies, there are many banking services, the most important of which are: (Wadi, 2008، وادي)

- Inquiries about accounts balance.
- Issuing, freezing or stopping credit cards.
- Transfer money between different customer accounts.
- Obtaining a detailed list of transactions.
- Change the password.
- Transfer of funds between the accounts of the company or to other accounts inside or outside the country.
- Obtaining information about the services provided by the bank.
- View the offers of banks and exchange rates and interest rates.
- Request a check book.
- Fixed payment orders.
- Making bill

(Hussein *et al*, 2013) adds:

- Automated Teller Machines (ATM).
- SMS Banking.
- ATM network with other ATM networks

(Asare & Sakoe, 2015) add:

- Speed banking.

2.1.19 Electronic Distribution Channels:

It is worth mentioning that the banking services provided through these channels are holistic/comprehensive services that begin from selecting the service until the payment of the invoice or the final processing of these machines such as ATMs and electronic points of sale, the most important of these services in addition to the following channels:

- **Domestic Banks:** This system was introduced in 1980 for the first time by the American Bank of Tennessee, but its commercial use was widely realized only after the spread of personal computers, where many customers were able to use it to deal with the system. Data transfer and re-transfer, where the computer is connected to the bank with the PC at the residence of the customers through means of communication, such as the telephone network, and acts here as a terminal to provide banking services through showing customer balances, You can also send instructions from the customer to the bank, such as renewal of deposits, transfer the amount from the customer account to another account, request a new cheque book (Taha, 2007, طه)
- **Telephone Banks:** It is a service provided by banks to their customers. They are given the right to contact the bank through a dedicated number linked to the bank's central computer. The customer is asked to enter his PIN number on the phone and then request the process he wants. Examples of services provided by these banks are transfer from the customer's bank account to pay some of his obligations such as phone or gas bills, balance information services or loan maturities (Asare & Sakoe, 2015).

- **Digital TV:** Is one of the latest channels created which enables banks to interact with customers from their locations, which is a satellite link between the TV at home and the computer bank, can be accessed through a bank's secret number or the Internet and perform the required operations, this channel is especially for housewives And customers who do not have a computer. (Al-Shammari & Al-Abdalat, 2008 (الشمري والعبدلات، 2008))
- **Internet Banks:** Internet banks are wider and easier than the above channels, and has expanded greatly ever since at the beginning of the use of Internet technology and the development of its capabilities and the increase in the number of users and visitors (Al-Shammari & Al-Abdalat, 2008 (الشمري والعبدلات، 2008)), Internet banks are not just an existing branch that offers financial services, it is a financial, administrative and traditional business consultant site with an independent presence on the internet and accordingly, banks on the Internet refer to the system that allows the customer access to his accounts or any information he wants and to access various banking services and products through an information network linked to his computer or by any other means (Masadawi, 2004 (مسودي، 2004))

2.1.20 Requirements for the success of electronic banking services:

The main requirements for ensuring the success of e-Banking services can be summarized as follows: (Al-Araag, 2013 (الأعرج، 2013))

- 1- Supporting research related to the development of e-banking services to ensure the steady expansion of these services.

- 2- Formulate a marketing policy targeting the less-interested in services and e-business provided by banks, and to direct the message to them to provide them with information, knowledge and skills and ways to communicate with these banks.
- 3- Prepare plans to train human resources and raise their competencies.
- 4- Improve the efficiency of information systems and their components of hardware, software, communications, databases and procedures, and configure them according to the requirements of current variables.
- 5- To provide the latest advanced equipment and software available, which must be obtained for the expansion of electronic banking services, and facilitate the procedures for obtaining them.
- 6- Provide government support, which is essential in the ability to switch to electronic banking services by providing the required infrastructure for secure communication networks, and attention to the legislation and laws that support this transformation.
- 7- Develop a communication plan to ensure that all relevant external parties, including bank clients, other parties and the media, are aware of the timely and appropriate manner of serious e-banking failure and resume business without causing any panic in the public mind.
- 8- Create the legal and legislative environment and create a clear and appropriate framework for the recognition of electronic signature.

2.1.21 Advantages of Electronic Banking Services:

Electronic banking services have many advantages, whether for the individual or the bank:

- **With respect to the individual:**

There are many benefits to customers when they use e-banking, including time, cost and access 24 hours a day, which is safer when used as an alternative to traditional services (Shendi, 2011، شندي)

- **With respect to the Bank:**

Among the most important advantages of using the bank for electronic services are: (Wadi, 2008، وادي)

- Access to a broader customer base, not limited to the group of customers residing around;
- Reduce the operating costs and expenses borne by the bank, such as the cost of buying and furnishing the site and labor costs and maintenance and others.
- Enhancing intellectual capital and adapting information technology.
- Reducing geographical distances and removing traditional barriers.
- Establish direct relationships with customers and increase their level of satisfaction.
- Increase the efficiency of banks performance through speed in the completion of work.

In addition to increasing profits, market share and competitiveness by expanding banks in e-banking services and offering full banking services around the clock at lower prices and higher quality (Shammari & Al-Abdalat, 2008، الشمري والعبدلات)

2.1.22 The disadvantages of using electronic banking services:

(Shammari & Al-Abdalat, 2008، الشمري والعبدلات) mention the most important obstacles:

- Lack of security and confidentiality on the use of electronic channels;
- Lack of confidence in the use of electronic banking services and condemnation of dealing with branches directly;
- Lack of equipment for the use of electronic channels;

- the existence of technical defects without the use of electronic banking services in time of need;
- Lack of awareness of the benefits of electronic channels;
- Service restrictions such as setting a ceiling for cash withdrawals;

(Wadi, 2008، وادي) adds the following obstacles:

- Difficulty of use, as language barrier so that most transactions are conducted in a foreign language;
- The high dependence on credit cards in the payment area is a major obstacle to customers, where studies have shown that 60% of network users do not trust the channel for payments, especially as some customers have lost large amounts of money;
- Lack of fast and stable information networks that can transmit information in image and sound at the same time, quickly and high quality.

2.1.23 Problems hindering the application of electronic banking services:

The application of e-banking in banks suffers from several problems, the most important of which are: (Fares, 2013، فارس)

- Security problems:

Are primarily related to the ease of the security breach of the network and the potential for electronic fraud and the associated risk of theft of depositors' funds;

- Technical problems:

Refers to those problems associated with difficulties in obtaining advanced computers, lack of control and maintenance services, weak communication networks and electronic coverage;

- **Problems related to weak technical knowledge of individuals:**

Lack of knowledge and experience to deal with equipment, fear and desire of customers and traders to deal with this method, as well as lack of absolute confidence in obtaining the required service (Nabil, 2010، نبيل).

- **Legal problems:**

It concerns weak regulations and laws that limit network infringement and protect the rights of others to provide security and safety to customers and customers(Nabil, 2010، نبيل).

- **Administrative and organizational problems:**

The transition to e-banking requires the restructuring of traditional banking, which means a significant change in the nature of business, administrative sites, policies and programs, and therefore there may be problems of non-adaptation after the transition (Nabil, 2010، نبيل).

- **Financing problems:**

Refers to the weak financial allocations in order to cover the purchase of electronic equipment, devices, and software, as well as the lack of financial allocations for the implementation of training and development programs for members to raise awareness of the provision of banking services and the development of electronic electronic banking services(Nabil, 2010، نبيل).

2.2 Literature Review

2.2.1 Arabic Studies:

- 1- Al-Hadid *et al*, 2014، الحديد وآخرون: This study aimed at determining the effect of perceived value & trust on customer loyalty in Jordanian banks. This study sought to analyze the above factors and to indicate the strength and direction of their impact on the psychological and behavioral components of the concept of customer loyalty. In the bank and the perceived value of the customer as independent variables on the one hand, and on the other hand, the loyalty and behavioral loyalty as dependent variables. The study community consisted of all the customers of the banks in Jordan and they were represented through a sample of 25 bank customers in Amman. The results indicated that there was a statistically significant relationship between the perceived value of the customer and the client's trust in the bank on both behavioral loyalty and customer loyalty. The results showed that there was an effect on the independent factors represented by (customer confidence) the customer's perceived value on the dependent variable (customer loyalty), as well as the impact of the independent factors (customer confidence in the bank and perceived value of the customer) on the dependent variable (customer loyalty).
- 2- Tawaher & Al-Hawari, 2012، طواهرير والحواري: The study aimed at identifying the role of the quality of electronic service provided through the website of the Algerian Postal Corporation in achieving customer satisfaction using the dimensions of the modified Netqual scale to measure the quality of the electronic service. The study concluded that the Algerian public institution is aware of the development of its postal and financial services in spite of the weakness of the institutions communicational policy in general.

- 3- Al-Radaideh, 2011 الردايدة: This study aimed to determining the impact of the quality of e-banking service in strengthening the relationship with customers in banks in addition to knowing the similarities or differences in the levels of quality of electronic banking service platforms in Jordanian banks and foreign banks operating in Jordan. The sample consisted of 8 Jordanian and foreign banks by which 4 of them are Jordanian banks and the other 4 are foreign banks. The number of valid questionnaires for statistical analysis was 286 out of 350 questionnaires, of which 318 were retrieved, the following dimensions were studied (Reliability, efficiency, confidentiality, connectivity, and responsiveness) and their effect on the strength of the relationship between the client and the bank through the following dimensions (Satisfaction, trust, and commitment). The results of the study showed that the impact of the quality of electronic banking services on the quality of the relationship between the client and the bank in Jordanian banks is higher than in foreign banks.
- 4- Mahamid & Said, 2012 محاميد وسعيد: The aim of this study was to evaluate the quality of the electronic business platforms used by banks operating in Jordan from their employees point of view, in addition to the impact of the quality of electronic business platform on the quality of banking services provided by these banks from the client's point of view, to achieve the objectives of this study, 133 questionnaires were distributed to the employees of the banks for the purpose of identifying the quality of the electronic business platform, additionally, 133 questionnaires were distributed to customers for the purpose of identifying the quality of banking services. The results of the study showed a high level of quality of electronic business platform used in banks operating in Jordan from the employees point of view, and that the level of quality of banking services provided by

banks was also high from the customers point of view , and showed that demographic factors have no significant impact when evaluating the quality of electronic business platforms of bank operating in Jordan from its employees perspective, or in evaluating the quality of banking services by customers, in addition to the absence of a relationship between the quality of electronic business platform and the quality of banking services.

- 5- Nassif, 2009، نصيف: Aimed at explaining electronic banking marketing and its impact on banking services, and has intended to identify customers satisfaction and their desires, and to place them within an integrated strategy that focuses on the quality of e-banking marketing grounded on the strategy of customer satisfaction, in order to meet the objectives of this study, a random sample of 80 clients, the study concluded that there is a relationship between the quality of the banking service (customer centric, process centric, and kaizen centric), and customer satisfaction towards services provided and loyalty.
- 6- Jaber, 2008، جبر: aimed to show the impact of customer relationship management (trust in dealing, communication, meeting customer needs, quality of services, and price) in achieving customer loyalty in Jordanian commercial banks. The study concluded that there is an impact of each dimension of customer relationship management on loyalty, and that there are no statistically significant differences between the banks in the level of customer loyalty due to the number of years of dealing with the bank, monthly income, and the existence of a bank account of a family member in the bank; in addition to having statistically significant differences among banks in the level of achievement of loyalty attributed to the name of the bank and the educational level of the service receiver.
- 7- Al-Jamal, 2007، الجمل: aimed at identifying the reality of customer complaints management at banks operating in Jordan. And concluded that failure to provide the

service leads the customers of these banks to formally submit the complaint, prompting the bank to address that complaint, which in turn leads to the use of specific strategies to revive the service, and that the success of the Bank in the adoption and implementation of strategies that have been proven to be successful in recovering a service indeed lead to recovering/ reviving the service which in turn leads to maintain the level of customer satisfaction with their transactions with the bank or to increase their level of satisfaction; and increasing the level of customer satisfaction with their transactions with banks leads to increasing the degree of loyalty to these banks.

2.2.2 Foreign Studies

- 1- Williams & Smith, 1998: their research intended towards performance evaluation of software architecture, the researcher used Software Performance Engineering (SPE) which is a method used in building software that makes the software meet the performance threshold intended and provide pointers if the software will meet its goals or not. The research concluded that SPE is suitable in order to identify software models that will perform correctly and adequately.
- 2- Bhave, 2014: conducted a research that aimed at revealing the relationship between using Electronic Performance Monitoring (EPM) and employee job performance, EPM constantly collects performance data related to employees for better views, this differs from the traditional way of monitoring which is done at specific points of time and thus provides a more holistic view of performance problems . The research concluded that the use of an EPM resulted in better employee job performance b
- 3- Schumacher, 2011: conducted a research titled “what employees should know about electronic performance monitoring”, the research deals with manufacturers in the

United States that conduct mass productions and cannot go through inventory count on a case-by-case basis and suggests that an electronic performance monitoring will detect corporate policy breaches as theft and assets misappropriation, and suggests that the use of such a solution will result in the usage of production resources in a more efficient way that results in lower-cost. The research concluded that implementing an electronic performance monitoring solution will help organizations in increasing employee productivity.

- 4- Shliefer & Shell, 1998: reviewed the effects of an electronic performance monitoring solution from an employee's point of view, the research suggests that the implementation of this solution is central to organizational superiority since it provides feedback related to performance issues as they occur, and thus helps managers in taking corrective actions, the research concluded that while the solution is useful, yet it can lead to employee stress and suggests to allocate a (stress allowance) for each employee.
- 5- Stein & Ramaseshan, 2016: this research aimed toward identifying the different elements of customer experience (not in a specific industry) and concluded that there are 7 major things that affect it as follows: atmospheric, technological, communicative, process, employee-customer interaction, customer-customer interaction, and product interaction elements. The research has given a starting point for organizations to establish customer experience on individual or collective levels if they choose to.
- 6- Kyguoliene & Makutėnas, 2017: this study aimed at measuring customer experience in the banking industry specifically for the millennial generation, and concluded that

customer experience can be measured using different touch points as referred to by (Stein & Ramaseshan, 2016) and has applied the findings of this research and concluded that the element that delivers the most positive customer experience is technologies, and the reason behind the worst experience is having to wait for long periods of time in the queue.

- 7- Ahmadi *et al*, 2015: This study aimed at revealing the impact of the quality of e-banking service on customer's commitment. This study was on the branches of a Persian Bank in Iran. The study mentioned that the increase in competition was accompanied by wide disturbances in the area of trade and banking, and that many traditional methods have changed and generated a new competitive environment as a result of the use of technology, and that the way the customer is being served has changed around the world. Nowadays, competition in achieving higher quality of service has become a major strategic issue for service organizations which has led banks to use technology more often to keep up with modern methods and improve the quality of services they provide. The main objective of the study was to verify the impact of e-banking services' quality on customer commitment. To reach the objectives of this study, 350 questionnaires were distributed to the customers of the Persian Bank in Tehran, 332 of the total questionnaires were analyzed, and the results showed that the quality of the service has an effect on the pleasure/delight of the customers and also that customer pleasure/delight has an impact on trust & commitment. Additionally, the study has concluded that the quality of e-banking service has partial impact on customer's trust/commitment, and has come out with a set of suggestions to improve the quality of e-banking services.

- 8- Saeed *et al*, 2015: The purpose of this study is to understand the factors affecting service quality in e-services which yield the highest level of customer satisfaction, and justify the integrity of this relationship through the results obtained from previous studies through which was concluded that the management team of a bank should give priority to follow up and improve the quality of customer service in Internet banking service, and that the five dimensions of service quality (Reliability, privacy, evaluation, empathy, and design of the site),all play a vital role in bridging the gap between customer expectations and perceptions with regards to banking services via the Internet, and all of the preceding dimensions play an imperative role in service quality through ATM's, Mobile's, and the internet. The study recommended that the bank should focus on these dimensions as they represent important factors for checking the quality of electronic banking services, and to conduct special field studies with the fluctuation of the market and technology.
- 9- Carlson & O'Casey, 2010: This study aimed to develop a theoretical model to study the relationship between the quality of electronic service and customer satisfaction, customer's attitudes towards the website, and the behavioral intentions of customers through the content of the site. The study used the methodology of data collection from 518 customers through a survey on an Australian website; the survey found that positive evaluations of the quality of e-services have a positive impact on the level of customer satisfaction and attitudes of customers towards the website and their behavior after benefiting from the service. The results of the study provide a useful framework for managing the content of electronic services, as well as researchers in the field of e-service quality.

The study suggested the need to conduct similar studies on other service verticals tourism, governmental and commercial verticals from the perspective of the quality of electronic services and its impact on the intentions of customers.

2.3 What distinguishes this study from other studies

After going through the previous studies, we find that the most important characteristic of the current study is illustrated in a number of aspects, the most important of which are:

- 1- The majority of previous studies were conducted on the e-banking service itself as a competitive advantage to gaining better customer experience than the banks that do not provide it and did not focus on the performance of the service.
- 2- The majority of previous study focused on e-banking service quality not performance.
- 3- The majority of previous studies have been conducted regarding the effect of electronic performance monitoring on employees within the context of performance appraisals not customer experience.
- 4- Little research has been performed regarding APM in the banking industry and its effect on customer experience.

Previous studies have not tackled APM within the banking industry at large; no research has been performed to address the effect of having an APM on customer experience at large as well, this research will bridge the gap between APM for e-banking services and customer experience.

Chapter III

Methodology

- 1.1 Research Method
- 1.2 Data Sources
- 1.3 Research Population Society
- 1.4 Research Sample
- 1.5 Variables Description of Research Sample
- 1.6 Primary Research Tool
- 1.7 Test of Validity and Consistency
- 1.8 Research Procedure
- 1.9 Statistical Processing Tool used for Questionnaire Analysis

Chapter III

3.1 Research Method:

The researcher has used descriptive statistical analysis which describe what is an object and its interpretation, it is interested in identifying the conditions and relationships that exist between the facts, and also identifies common practices and common knowledge and beliefs and trends and their methods of growth and development (Halas, 2006)

3.2 Data Sources:

The researcher has used two main sources for data collection:

Secondary Sources: for the purpose of developing the theoretical framework, the researcher has used secondary data sources such as books, foreign & Arabic studies that are of relevance to the topic, publications, journals, un-published thesis and dissertations, in addition to searching different sites on the World Wide Web.

Primary Sources: for the analytical part, the researcher has gathered information at two different levels, first level is through conducting interviews with all IT executives in the banking industry in Jordan through a set of structured questions, the second level was through the development of a questionnaire, both tools are considered the main research tool.

3.3 Research Society:

Research society consists of commercial bank customers in Amman-Jordan, banks mentioned under Appendix (C).

3.4 Research Sample:

A convenient sample was used; the following table (3.1) highlights the sample size (Banks names have been substituted with a code for confidentiality reasons):

Table (3.1) Sample distribution relative to research population

Bank	Number of respondents	Percentage (%)	Does Bank have an APM
Bank A	101	7.7	Yes
Bank B	591	45.1	Yes
Bank C	102	7.8	No
Bank D	239	18.2	No
Bank E	166	12.7	No
Bank F	112	8.5	No
Total	1311	100	-

All commercial banks are within the scope of the study, after all questionnaire responses were collected and returned, some responses were filtered out due to the fact that they are incomplete or not compatible with the research criteria, this left some banks with a very limited number of responses that cannot be used for generalizations and would contaminate the results, and thus they have been excluded.

3.5 Variables description of research sample:

Following table (3.2) shows the distribution of the sample relative to demographic variables of the research:

Table (3.2) Sample Distribution Relative to Personal Variables

Variable	Level	Frequency	Percentage (%)
Gender	Male	528	40.28
	Female	783	59.72
Academic Qualification	Diploma	93	7.10
	Bachelors	1040	79.30
	Higher Education	178	13.60
Duration of Interaction with the Bank	Less than 4 years	413	31.50
	4 – 8 years	430	32.80
	8 – 13 years	218	16.63
	More than 13 years	250	19.07
Usage of e-banking Services	Daily	272	20.75
	Weekly	572	43.63
	Monthly	467	35.62
Age	Less than 21 years	18	1.37
	21 – 30 years	512	39.05
	30 – 40 years	591	45.08
	More than 40 years	190	14.50

3.6 Primary Research Tool:

3.6.1 Questionnaire:

A questionnaire was developed regarding “The Effect of Implementing an Application Performance Monitoring Tool for E-Banking Services on Customer Experience”

The questionnaire consists of three sections:

First section: consist of characteristics related to the respondents themselves (Gender, Academic Qualification, Duration of interaction with the bank, usage of e-banking services, Age Group)

Second section: consists of a series of questions that measure customer experience from 4 dimensions as follows:

- 1- Reliability (3 Sentences).
- 2- Safety (4 Sentences).
- 3- Speed of Service (7 Sentences).
- 4- Speed of Recovery (2 Sentences).

Third Section: measure customer rating of experience through a numerical ranking of respondent’s experience.

The total number of questions for the second section is 16, responses to this section was using a likert scale as follows:

Table (3.3): Likert Scale

Category	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Code	5	4	3	2	1

Table (3.4): Likert Scale (Reverse Coding)

Category	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Code	1	2	3	4	5

Table (3.5): Likert Scale Correction Key

Mean Value	Degree
More than 3.5	High
2.5 – 3.5	Moderate
Less than 2.5	Low

For the third section, for the measurement of customer experience, respondents selected a score from a numerical scale as follows:

Table (3.6): Ranking

1	2	3	4	5	6	7	8	9	10
Negative									Positive

3.6.2 Interviews:

A set of interviews was conducted with IT executives at all commercial banks in order to verify whether they have an APM or not. And then this was coded as follows:

Table (3.7): Coding Used to Indicate the Existence/Non-Existence of an APM at a Bank

Does the bank have an APM?	No	Yes
Score	1	2

Interview questions are listed under Appendix (B), however due to time constraints not all information could be obtained as it requires official correspondence for it to be provided.

3.7 Test of Validity and Consistency:

Validity of the Tool:

The researcher developed a thesis in its preliminary form; the questionnaire was validated by a group of arbitrators and specialists, they were asked for their opinion regarding: the clarity of the questions, grammar, and the comprehensiveness of the questions. Notes and adjustments were made accordingly, afterwards, a pilot survey was conducted for (25 respondents) and the consistency of the answers was checked, taking into consideration all the notes the final questionnaire was produces as per Appendix (A).

Additionally, the validity of the tool was investigated using Pearson Correlation that concluded highly significant values that indicate the uniformity of the questionnaire section, values as follows:

Table (3.8) Pearson Correlation of Questionnaire Segments

No.	R Value	P-Value	No.	R Value	P-Value
1	0.544	0.000*	8	0.607	0.000*
2	0.579	0.000*	9	0.695	0.000*
3	0.403	0.000*	10	0.652	0.000*
4	0.538	0.000*	11	0.326	0.000*
5	0.504	0.000*	12	0.454	0.000*
6	0.482	0.000*	13	0.477	0.000*
7	0.637	0.000*	14	0.317	0.000*

*Correlation is significant at the 0.05 level (2-tailed).

All R values are positive which indicate a positive relationship and correlation between the sections of the questionnaire; the P-values are also highly significant, which indicate the uniformity and validity of the tool.

Consistency of the tool:

The researcher verified the consistency of the tool through calculating the total value of consistency using Cronbach Alpha, the result indicated that the tool has a consistency that meets the purpose of this study, Cronbach Alpha had a score of (0.841) that indicated that the tool is consistent.

Table (3.9): Cronbach Alpha for dimensions and overall score

Dimension	Consistency Score
Reliability	0.882
Safety	0.751
Speed of Service	0.903
Speed of Recovery	0.775
Overall Score	0.841

3.8 Research Procedures:

after the researcher validated the research tool through validity and consistency tests, the questionnaire was submitted electronically, a convenient sample of 2504 responded to the questionnaire, 1193 responds were eliminated and considered invalid due to the below:

- 1- Incomplete responses.
- 2- Response does not fall within the scope of the study (non-commercial banks, do not reside in Amman, or do not use e-banking services)

Accordingly, 1311 responses were coded into two separate groups (692 respondents representing banks that have an APM and 619 representing the banks that do not have an APM) and analyzed; the researcher used SPSS for the analysis.

3.9 Statistical Processing Tool used for Questionnaire Analysis:

After the collection of the questionnaires and confirming their validity for the analysis, they were coded for statistical processing while aligning to the research questions and objectives, mean values were calculated to determine the degree of agreement or disagreement for each question for each bank, standard deviations were calculated for each question per bank, Pearson Correlation was used to check the nature of the relationship between the dependent variable and independent variable to conclude whether it is positive or negative and to check the strength of the relationship between the dependent and independent variables, Independent 2 Sample t-Test of each question for both bank groups was conducted to test if the difference in mean values of both groups are statistically significant attributed to a specific value, and Cronbach Alpha was calculated to ensure the consistency of the research tool, all of this was done using SPSS (Statistical Package for Social Sciences).

Chapter IV

Data Analysis

4.1 General Results

4.2 Research Questions Results

4.2.1 Results Related to First Sub-Hypothesis

4.2.2 Results Related to Second Sub-Hypothesis

4.2.3 Results Related to Third Sub-Hypothesis

4.2.4 Results Related to Forth Sub-Hypothesis

4.2.5 Results Related to Main Hypothesis

Chapter IV

4.1 General Results:

Below table shows the mean values corresponding to each question in both groups:

Table (4.1) Mean values of responses for banks that have an APM (Bank A & B)

Q#	1	2	3	4	5	6	7	8	9
Mean	4.569	4.258	4.629	4.728	4.298	4.272	4.374	4.197	4.230
Q#	10	11	12	13	14	15	16	17	18
Mean	4.197	4.119	4.493	4.291	4.371	4.289	4.147	*8.309	4.016

*Mean values for a ranking scale from 1 to 10

Table (4.2) Mean values of responses for banks that do not have an APM (Bank C & D & E & F)

Q#	1	2	3	4	5	6	7	8	9
Mean	2.348	4.492	4.478	4.375	2.265	1.725	1.831	2.891	2.080
Q#	10	11	12	13	14	15	16	17	18
Mean	2.124	2.250	4.561	1.914	4.311	2.391	2.144	*6.041	3.372

*Mean values for a ranking scale from 1 to 10

We notice from table (4.1 & 4.2) that there are noticeable discrepancies between the responses of both groups, this will be tackled in the next section.

4.2 Research questions results:

First Question:

Is there an effect from implementing an Application Performance Monitoring tool for e-banking services on customer experience?

In order to answer this question, it has been converted into sub-hypothesis as follows:

4.2.1 First Sub hypothesis:

“There is no statistically significant effect (level of significance α 0.05) for the dimension of recovery speed of the e-banking service on customer experience”

In order to test this hypothesis, means, standard deviations, and t-values have been calculated for each bank individually as follows:

A. Banks that have implemented Application Performance Monitoring (APM)

Tools:

a. Bank A results for speed of recovery:

Table (4.3): Means and Standard Deviations of Research Sample for Recovery Speed for

Bank A

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	Malfunctions happen often with the e-banking services	4.297	0.656	2.830	0.005	Medium
2	In case of a malfunction, the service gets repaired and becomes available within a short period of time	4.158	0.659	6.048	0.000	High
Total Score		4.228	0.658	4.439	0.003	High

b. Bank B results for speed of recovery:

Table (4.4): Means and Standard Deviations of Research Sample for Recovery Speed for Bank B

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	Malfunctions happen often with the e-banking services	4.281	0.652	6.877	0.000	High
2	In case of a malfunction, the service gets repaired and becomes available within a short period of time	4.137	0.651	9.218	0.000	High
Total Score		4.209	0.652	8.048	0.000	High

B. Banks that **have not implemented** an Application Performance Monitoring (APM)

Tools:

a. Bank C results for speed of recovery

Table (4.5): Means and Standard Deviations of Research Sample for Recovery Speed for Bank C

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	Malfunctions happen often with the e-banking services	2.695	0.657	2.902	0.005	Medium
2	In case of a malfunction, the service gets repaired and becomes available within a short period of time	1.833	0.661	2.517	0.013	Medium
Total Score		2.264	0.659	2.710	0.009	Medium

b. Bank D results for speed of recovery

Table (4.6): Means and Standard Deviations of Research Sample for Recovery Speed for Bank D

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	Malfunctions happen often with the e-banking services	1.631	0.627	2.330	0.021	Medium
2	In case of a malfunction, the service gets repaired and becomes available within a short period of time	1.837	0.646	5.740	0.000	High
Total Score		1.734	0.637	4.035	0.011	High

c. Bank E results for speed of recovery

Table (4.7): Means and Standard Deviations of Research Sample for Recovery Speed for Bank E

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	Malfunctions happen often with the e-banking services	3.610	0.649	1.453	0.048	Low
2	In case of a malfunction, the service gets repaired and becomes available within a short period of time	2.947	0.690	5.591	0.000	High
Total Score		3.279	0.670	3.522	0.024	High

d. Bank F results for speed of recovery

Table (4.8): Means and Standard Deviations of Research Sample for Recovery Speed for Bank F

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	Malfunctions happen often with the e-banking services	1.625	0.699	2.224	0.028	Low
2	In case of a malfunction, the service gets repaired and becomes available within a short period of time	1.960	0.689	6.005	0.000	High
Total Score		1.793	0.694	4.115	0.014	High

We notice from table (4.3 to 4.8) that all results are statistically significant at $\alpha = 0.05$ and thus we reject this hypothesis that speed of recovery has no effect on customer experience

For explaining if the differences in the mean values of both sample groups are attributed to the existence/non-existence of an APM, we set the following hypothesis **“There are no statistical differences between the mean values of the bank clients that have an APM tool regarding recovery speed with the mean values of the bank clients that do not have an APM for the same questions”**

Table (4.9) Independent 2 Sample T-test related to “Recovery Speed”

No.	Sentence	F-Value	Sig.	t-value	Sig. (2-tailed)
1	Malfunctions happen often with the e-banking services	4.334	0.039	32.140	0.000
2	In case of a malfunction, the service gets repaired and becomes available within a short period of time	9.435	0.002	29.284	0.000

As table (4.9) indicates, and due to the fact that both questions results are significant at the level ($\alpha = 0.05$), this shows that there is statistical difference between the responses of both

groups at ($\alpha = 0.05$) attributed to the existence/non-existence of an APM, and hence, we reject the hypothesis.

4.2.2 Second Sub Hypothesis:

“There is no statistically significant effect (level of significance α 0.05) for the reliability of the e-banking service on customer experience.”

In order to test this hypothesis, means, standard deviations, and t-values have been calculated for each bank individually as follows:

A. Banks that have implemented Application Performance Monitoring (APM)

Tools:

a. Bank A results for reliability:

Table (4.10): Means and Standard Deviations of Research Sample for Reliability for Bank

A

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	e-banking services are available 24 hours 7 days a week (except for announced times of service updates/upgrades)	4.574	0.517	3.711	0.000	Low
2	I am able to access e-banking services from any mobile device	4.267	0.546	5.210	0.000	High
3	I am able to access e-banking services from any computer	4.634	0.543	2.876	0.005	Medium
Total Score		4.491	0.535	3.932	0.002	High

b. Bank B results for reliability:

Table (4.11): Means and Standard Deviations of Research Sample for Reliability for Bank

B

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	e-banking services are available 24 hours 7 days a week (except for announced times of system updates/upgrades)	4.565	0.516	9.330	0.000	High
2	I am able to access e-banking services from any mobile device	4.250	0.538	12.250	0.000	High
3	I am able to access e-banking services from any computer	4.624	0.544	6.878	0.000	High
Total Score		4.480	0.533	9.486	0.000	High

B. Banks that **have not implemented** an Application Performance Monitoring (APM) Tools:

a. Bank C results for reliability:

Table (4.12): Means and Standard Deviations of Research Sample for Reliability for Bank

C

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	e-banking services are available 24 hours 7 days a week (except for announced times of service updates/upgrades)	1.422	0.515	3.021	0.000	High
2	I am able to access e-banking services from any mobile device	4.275	0.548	3.656	0.000	High
3	I am able to access e-banking services from any computer	4.627	0.541	2.137	0.035	Low
Total Score		3.441	0.535	2.938	0.012	Medium

b. Bank D results for reliability:

Table (4.13): Means and Standard Deviations of Research Sample for Reliability for Bank

D

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	e-banking services are available 24 hours 7 days a week (except for announced times of service updates/upgrades)	2.812	0.559	2.352	0.021	Medium
2	I am able to access e-banking services from any mobile device	4.714	0.561	4.572	0.000	High
3	I am able to access e-banking services from any computer	4.109	0.534	3.325	0.001	High
Total Score		3.878	0.551	4.084	0.007	High

c. Bank E results for reliability:

Table (4.14): Means and Standard Deviations of Research Sample for Reliability for Bank

E

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	e-banking services are available 24 hours 7 days a week (except for announced times of service updates/upgrades)	3.580	0.496	5.210	0.000	Medium
2	I am able to access e-banking services from any mobile device	4.862	0.529	2.891	0.005	Medium
3	I am able to access e-banking services from any computer	4.529	0.603	2.109	0.038	Low
Total Score		4.310	0.543	3.403	0.014	High

d. Bank F results for reliability:

Table (4.15): Means and Standard Deviations of Research Sample for Reliability for Bank

F

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	e-banking services are available 24 hours 7 days a week (except for announced times of service updates/upgrades)	1.579	0.513	4.625	0.000	High
2	I am able to access e-banking services from any mobile device	4.117	0.629	3.340	0.001	Medium
3	I am able to access e-banking services from any computer	4.647	0.591	2.302	0.023	Low
Total Score		3.448	0.578	3.442	0.008	High

We notice from table (4.10 to 4.15) that all results are statistically significant at $\alpha = 0.05$ and thus we reject this hypothesis that reliability of the e-banking service has no effect on customer experience.

For explaining if the differences in the mean values of both sample groups are attributed to the existence/non-existence of an APM, we set the following hypothesis **“There are no statistical differences between the mean values of the bank clients that have an APM tool regarding reliability with the mean values of the bank clients that do not have an APM for the same questions”**

Table (4.16) Independent 2 Sample T-test related to “Reliability”

No.	Sentence	F-Value	Sig.	t-value	Sig. (2-tailed)
1	e-banking services are available 24 hours 7 days a week (except for announced times of service updates/upgrades)	0.020	0.889	36.892	0.000
2	I am able to access e-banking services from any mobile device	2.395	0.124	1.044	0.298
3	I am able to access e-banking services from any computer	0.748	0.388	0.662	0.509

As table (4.16) indicates, and due to the fact that both questions results are insignificant at the level ($\alpha = 0.05$), this shows that there are no statistical difference between the responses of both groups at ($\alpha = 0.05$) attributed to the existence/non-existence of an APM, and hence, we accept the hypothesis.

The researcher sees that this result is attributed to the fact that all banks included in the sample provide their banking services through both computer and mobile distribution channels regardless of the existence of an APM or not, or might be attributed to the different opinions in both groups related to the elements studied under this section

4.2.3 Third Sub Hypothesis:

“There is no statistically significant effect (level of significance α 0.05) for the safety of the e-banking service on customer experience.” In order to test this hypothesis, means, standard deviations, and t-values have been calculated for each bank individually as follows:

A. Banks that **have implemented Application Performance Monitoring (APM) Tools:**

a. Bank A results for safety:

Table (4.17): Means and Standard Deviations of Research Sample for Safety for Bank A

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	The bank offers a security system for the e-banking service such as passwords and one-time-passcodes (OTP)	4.574	0.517	4.803	0.000	High
2	I feel safe when I provide personal information to my bank through the internet	4.356	0.660	2.444	0.016	Medium
3	I am banned from using the e-banking service in case of a security breach/hack	4.278	0.719	3.235	0.002	High
4	the e-banking service provided is safe for financial transactions	4.337	0.605	5.524	0.000	High
Total Score		4.386	0.625	4.001	0.006	High

b. Bank B results for safety:

Table (4.18): Means and Standard Deviations of Research Sample for Safety for Bank B

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	The bank offers a security system for the e-banking service such as passwords and one-time-passcodes (OTP)	4.883	0.544	4.803	0.000	High
2	I feel safe when I provide personal information to my bank through the internet	4.240	0.652	2.444	0.000	Medium
3	I am banned from using the e-banking service in case of a security breach/hack	4.266	0.607	3.235	0.000	High
4	the e-banking service provided is safe for financial transactions	4.412	0.600	5.524	0.000	High
Total Score		4.386	0.625	4.001	0.000	High

B. Banks that **have NOT** implemented Application Performance Monitoring (APM) Tools:

a. Bank C results for safety:

Table (4.19): Means and Standard Deviations of Research Sample for Safety for Bank C

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	The bank offers a security system for the e-banking service such as passwords and one-time-passcodes (OTP)	4.018	0.564	4.074	0.000	High
2	I feel safe when I provide personal information to my bank through the internet	1.634	0.690	5.508	0.000	Medium
3	I am banned from using the e-banking service in case of a security breach/hack	1.716	0.618	4.986	0.000	High
4	the e-banking service provided is safe for financial transactions	1.657	0.605	2.733	0.007	Medium
Total Score		2.256	0.619	4.325	0.002	High

b. Bank D results for safety:

Table (4.20): Means and Standard Deviations of Research Sample for Safety for Bank D

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	The bank offers a security system for the e-banking service such as passwords and one-time-passcodes (OTP)	4.272	0.547	5.380	0.000	High
2	I feel safe when I provide personal information to my bank through the internet	2.083	0.535	3.775	0.000	Medium
3	I am banned from using the e-banking service in case of a security breach/hack	1.636	0.647	3.555	0.000	High
4	the e-banking service provided is safe for financial transactions	1.264	0.716	5.274	0.000	High
Total Score		2.302	0.611	4.496	0.000	High

c. Bank E results for safety:

Table (4.21): Means and Standard Deviations of Research Sample for Safety for Bank E

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	The bank offers a security system for the e-banking service such as passwords and one-time-passcodes (OTP)	4.909	0.591	3.857	0.000	High
2	I feel safe when I provide personal information to my bank through the internet	3.620	0.665	2.119	0.027	Low
3	I am banned from using the e-banking service in case of a security breach/hack	1.735	0.714	3.473	0.000	High
4	the e-banking service provided is safe for financial transactions	2.662	0.608	4.229	0.000	High
Total Score		2.231	0.645	3.412	0.000	High

a. Bank F results for safety:

Table (4.22): Means and Standard Deviations of Research Sample for Safety for Bank F

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	The bank offers a security system for the e-banking service such as passwords and one-time-passcodes (OTP)	4.303	0.899	1.700	0.092	Low
2	I feel safe when I provide personal information to my bank through the internet	1.723	0.674	3.235	0.002	High
3	I am banned from using the e-banking service in case of a security breach/hack	1.813	0.717	3.508	0.001	High
4	the e-banking service provided is safe for financial transactions	1.741	1.596	5.191	0.000	High
Total Score		2.395	0.971	3.409	0.024	High

We notice from table (4.17 to 4.22) that all results are statistically significant at $\alpha = 0.05$ and thus we reject this hypothesis that safety of the e-banking service has no effect on customer experience.

For explaining if the differences in the mean values of both sample groups are attributed to the existence/non-existence of an APM, we set the following hypothesis **“There are no statistical differences between the mean values of the bank clients that have an APM tool regarding safety with the mean values of the bank clients that do not have an APM for the same questions”**

Table (4.23) Independent 2 Sample T-test related to “Safety”

No.	Sentence	F-Value	Sig.	t-value	Sig. (2-tailed)
1	The bank offers a security system for the e-banking service such as passwords and one-time-passcodes (OTP)	0.080	0.776	2.941	0.005
2	I feel safe when I provide personal information to my bank through the internet	19.715	0.000	13.367	0.000
3	I am banned from using the e-banking service in case of a security breach/hack	12.351	0.000	10.506	0.000
4	the e-banking service provided is safe for financial transactions	7.564	0.000	15.918	0.000

As table (4.23) indicates, and due to the fact that both questions results are significant at the level ($\alpha = 0.05$) –except for the first question-, this shows that there are statistically significant difference between the responses of both groups at ($\alpha = 0.05$) attributed to the existence/non-existence of an APM, and hence, we reject the hypothesis.

The researcher sees that the result of the first question is due to the fact that all banks provide passwords and/or one-time-passcodes to access the system, and this is not attributed to the APM.

4.2.4 Forth Sub Hypothesis:

“There is no statistically significant effect (level of significance α 0.05) for the speed of the e-banking service on customer experience.” In order to test this hypothesis, means, standard deviations, and t-values have been calculated for each bank individually as follows:

A. Banks that have implemented Application Performance Monitoring (APM) Tools:

a. Bank A results for speed:

Table (4.24): Means and Standard Deviations of Research Sample for Speed for Bank A

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	The speed of loading of the bank’s website is high	4.101	0.614	2.195	0.031	Medium
2	Access to e-banking services is as high speed	4.141	0.603	4.903	0.000	High
3	When performing a transaction (for example: bill payment) using the e-banking service the process is done at high speed	4.306	0.579	4.493	0.000	High
4*	The problem of slow access to e-banking services is recurring	4.111	0.570	5.324	0.000	High
5*	The problem of slow transaction (for example: bill payment) is recurring	3.990	0.927	4.038	0.000	High
Total Score		4.130	0.658	4.191	0.000	High

*Indicates negative coding (Strongly disagree = 5, strongly agree = 1)

b. Bank B results for speed:

Table (4.25): Means and Standard Deviations of Research Sample for Speed for Bank B

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	The speed of loading of the bank's website is high	4.294	0.707	10.083	0.000	High
2	Access to e-banking services is as high speed	4.319	0.601	9.448	0.000	High
3	When performing a transaction (for example: bill payment) using the e-banking service the process is done at high speed	4.088	0.649	4.359	0.000	High
4*	The problem of slow access to e-banking services is recurring	4.128	0.590	11.886	0.000	High
5*	The problem of slow transaction (for example: bill payment) is recurring	4.592	0.573	9.701	0.000	High
Total Score		4.284	0.624	9.095	0.000	High

*Indicates negative coding (Strongly disagree = 5, strongly agree = 1)

B. Banks that **have NOT** implemented Application Performance Monitoring (APM) Tools:

a. Bank C results for speed:

Table (4.26): Means and Standard Deviations of Research Sample for Speed for Bank C

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	The speed of loading of the bank's website is high	2.882	0.618	3.689	0.000	High
2	Access to e-banking services is as high speed	1.852	0.751	3.976	0.000	High
3	When performing a transaction (for example: bill payment) using the e-banking service the process is done at high speed	2.038	0.578	3.718	0.000	High
4*	The problem of slow access to e-banking services is recurring	2.791	0.575	3.303	0.000	High
5*	The problem of slow transaction (for example: bill payment) is recurring	2.156	0.685	4.291	0.000	High
Total Score		2.344	0.641	3.795	0.000	High

*Indicates negative coding (Strongly disagree = 5, strongly agree = 1)

b. Bank D results for speed:

Table (4.27): Means and Standard Deviations of Research Sample for Speed for Bank D

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	The speed of loading of the bank's website is high	1.904	0.604	4.052	0.000	High
2	Access to e-banking services is as high speed	1.870	0.576	5.879	0.000	High
3	When performing a transaction (for example: bill payment) using the e-banking service the process is done at high speed	2.702	0.579	4.759	0.000	High
4*	The problem of slow access to e-banking services is recurring	1.912	0.651	2.742	0.013	Medium
5*	The problem of slow transaction (for example: bill payment) is recurring	1.164	0.679	4.045	0.000	High
Total Score		1.910	0.618	4.300	0.000	High

*Indicates negative coding (Strongly disagree = 5, strongly agree = 1)

c. Bank E results for speed:

Table (4.28): Means and Standard Deviations of Research Sample for Speed for Bank E

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	The speed of loading of the bank's website is high	3.841	0.618	3.662	0.000	High
2	Access to e-banking services is as high speed	2.971	0.604	5.099	0.000	High
3	When performing a transaction (for example: bill payment) using the e-banking service the process is done at high speed	2.003	0.678	3.852	0.000	High
4*	The problem of slow access to e-banking services is recurring	2.439	0.574	3.454	0.000	High
5*	The problem of slow transaction (for example: bill payment) is recurring	2.157	0.685	4.609	0.000	High
Total Score		2.682	0.632	4.135	0.000	High

*Indicates negative coding (Strongly disagree = 5, strongly agree = 1)

d. Bank E results for speed:

Table (4.29): Means and Standard Deviations of Research Sample for Speed for Bank F

No.	Sentence	Mean	Std. Dev.	t-Value	P-Value	Significance
1	The speed of loading of the bank's website is high	2.938	0.634	3.750	0.000	High
2	Access to e-banking services is as high speed	1.625	0.640	5.875	0.000	High
3	When performing a transaction (for example: bill payment) using the e-banking service the process is done at high speed	1.753	0.593	3.708	0.000	High
4*	The problem of slow access to e-banking services is recurring	1.857	0.517	2.742	0.014	High
5*	The problem of slow transaction (for example: bill payment) is recurring	2.180	0.713	4.027	0.000	High
Total Score		2.071	0.619	4.020	0.003	High

*Indicates negative coding (Strongly disagree = 5, strongly agree = 1)

We notice from table (4.24 to 4.29) that all results are statistically significant at $\alpha = 0.05$ and thus we reject this hypothesis that speed of the e-banking service has no effect on customer experience.

For explaining if the differences in the mean values of both sample groups are attributed to the existence/non-existence of an APM, we set the following hypothesis **“There are no statistical differences between the mean values of the bank clients that have an APM tool regarding speed with the mean values of the bank clients that do not have an APM for the same questions”**

Table (4.30) Independent 2 Sample T-test related to “Speed”

No.	Sentence	F-Value	Sig.	t-value	Sig. (2-tailed)
1	The speed of loading of the bank's website is high	5.400	0.024	3.351	0.002
2	Access to e-banking services is as high speed	8.123	0.006	5.635	0.000
3	Access to e-banking services is as high speed	30.586	0.000	4.699	0.000
4	The problem of slow access to e-banking services is recurring	8.315	0.000	5.126	0.000
5	When performing a transaction (for example: bill payment) using the e-banking service the process is done at high speed	7.767	0.000	5.512	0.000

As table (4.31) indicates, and due to the fact that both questions results are significant at the level ($\alpha = 0.05$) this shows that there are statistically significant difference between the responses of both groups at ($\alpha = 0.05$) attributed to the existence/non-existence of an APM, and hence, we reject the hypothesis.

As an extra measurement, the researcher performed an Independent 2 Sample T-Test to test whether the differences of means related to customer experience ranking are statistically significant, this answers the main hypothesis **“There is no statistically significant effect (level of significance α 0.05 0.05) for the effect of monitoring of the electronic banking service using software on customer experience.”**, and for clarification, we provide the following hypothesis as well **“There are no statistical differences between the mean values of the bank clients that have an APM tool regarding customer experience ranking with the mean values of the bank clients that do not have an APM for the same question”**

Table (4.31) Independent 2 Sample T-test related to “Customer Experience Ranking”

No.	Sentence	F-Value	Sig.	t-value	Sig. (2-tailed)
1	Customer Experience Ranking	45.952	0.000	21.126	0.000

We notice from table (4.32) that the difference in mean values for both study samples is statistically significant at the level $\alpha = 0.05$, and thus, we reject the hypothesis.

Chapter V

Discussion

5.1 Discussion

Chapter V

5.1 Discussion

In the present study, we examined the effect of implementing an APM for e-banking services in Jordanian commercial banks on customer experience through evaluating the effect that an APM has on e-banking services through 4 main dimensions: reliability, safety, speed of service, and speed of recovery.

Analysis related to **reliability** showed high scores for banks that have implemented an APM (4.569, 4.258, and 4.629) as per table 4.1 and high results (except for the first question) for the banks that have not implemented an APM (2.348, 4.492, and 4.478) as per table 4.2, results had a significant t-value and thus implies that reliability has an effect on customer experience and that the more reliable e-banking services are, the higher the customer experience is, this comes in-line with the literature (Parasuraman & Berry, 1985). Furthermore, the independent 2 sample t-test showed an insignificant F-value, this implies that the difference in the mean values of both sample groups is not attributed to the existence or non-existence of an APM

Analysis related to **safety** showed high scores for banks that have implemented an APM (4.728, 4.298, 4.272, and 4.374) as per table 4.1 and low results (except for the first question) for the banks that have not implemented an APM (4.375, 2.265, 1.725, and 1.831) as per table 4.2, results had a significant t-value and thus implies that reliability has an effect on customer experience and that the more safe e-banking services are, the higher the customer experience is, this comes in-line with the literature (Parasuraman & Berry, 1985). Furthermore, the independent 2 sample t-test showed an insignificant F-value, this implies that the difference in the mean values of both sample groups is attributed to the existence or non-existence of an APM, the

preceding results shows a higher mean value for the banks that have implemented an APM than the banks that haven't implemented it.

Analysis related to **safety** showed high scores for banks that have implemented an APM (4.728, 4.298, 4.272, and 4.374) as per table 4.1 and low results (except for the first sentence) for the banks that have not implemented an APM (4.375, 2.265, 1.725, and 1.831) as per table 4.2, results had a significant t-value and thus implies that reliability has an effect on customer experience and that the more safe e-banking services are, the higher the customer experience is, this comes in-line with the literature (Parasuraman & Berry, 1985). Furthermore, the independent 2 sample t-test showed an insignificant F-value, this implies that the difference in the mean values of both sample groups is attributed to the existence or non-existence of an APM, the preceding results shows a higher mean value for the banks that have implemented an APM than the banks that haven't implemented it.

Analysis related to **speed of service (selected sentences from questionnaire 8,9,10,11,13)** showed high scores for banks that have implemented an APM (4.197, 4.230, 4.197, 4.119, and 4.291) as per table 4.1 and low results for the banks that have not implemented an APM (2.891, 2.080, 2.124, 2.250, and 1.914) as per table 4.2, results had a significant t-value and thus implies that speed of service has an effect on customer experience and that the higher the speed of e-banking services, the higher the customer experience is, this comes in-line with the literature (Parasuraman & Berry, 1985). Furthermore, the independent 2 sample t-test showed an insignificant F-value, this implies that the difference in the mean values of both sample groups is attributed to the existence or non-existence of an APM, the preceding results shows a higher mean value for the banks that have implemented an APM than the banks that haven't implemented it.

Within the same context in both sample groups, sentences related to customer churn rate for both sample groups were similar (sentences 12 & 14) for banks that have an APM results are (4.493 and 4.371) as per table 4.1 and for banks that do not have an APM results are (4.561 and 4.311) as per table 4.2. This indicates that a high number of customers would end a transaction if it slows down.

Analysis related to **speed of recovery** showed high scores for banks that have implemented an APM (4.289 and 4.147) as per table 4.1 and low results for the banks that have not implemented an APM (2.391 and 2.144) as per table 4.2, results had a significant t-value and thus implies that speed of service has an effect on customer experience and that the higher the speed of e-banking services, the higher the customer experience is, this comes in-line with the literature (Parasuraman & Berry, 1985). Furthermore, the independent 2 sample t-test showed an insignificant F-value, this implies that the difference in the mean values of both sample groups is attributed to the existence or non-existence of an APM, the preceding results shows a higher mean value for the banks that have implemented an APM than the banks that haven't implemented it.

Chapter VI

Conclusions & Recommendations

6.1 Conclusions and Recommendations

Chapter VI

6.1 Conclusions and Recommendations

In order to address the degree to which the research objectives have been met based on the results obtained and to come out with recommendations, which will be presented as follows

For the purpose of describing customer experience in both groups in terms of the performance of e-banking services, customer experience mean in the first sample group representing banks that have implemented an APM at 83.09% and for the second group that represents banks that do not have an APM at 60.41% (Tables 4.1 &2), both results indicate that there is still a lot of room of enhancements to be done on the services in both sample groups to attain higher customer experience rates.

In both sample 1 & 2 (89.86%) & (91.220%) consecutively of the respondents tend to close the e-banking services web-page/application in case they encountered slow performance, additionally, (87.420%) & (86.22%) tend to end a financial transaction if the e-banking service was performing slowly. This indicates that if in fact an e-banking service is performing poorly, it will reflect on banks financial performance due to loss of transaction through the service.

First hypothesis related to recovery speed: **“There is no statistically significant effect (level of significance α 0.05) for the dimension of recovery speed on customer experience”**

We reject the hypothesis based on the results of the t-tests on all sentences and accept the alternative hypothesis that there is an effect of recovery speed on customer experience.

Hypothesis related to statistical significance of speed of recovery between both sample groups attributed to the existence of an APM : **“There are no statistical differences between the mean**

values of the bank clients that have an APM tool regarding recovery speed with the mean values of the bank clients that do not have an APM for the same sentences”

We reject this hypothesis based on the significance on the independent 2 sample t-test for all sentences and accept the null hypothesis that the means of both sample groups related to sentences under this section are statistically different attributed to the existence of an APM for banks in group 1.

The statistical results in this area show that the higher the speed of recovery is, the better customer experience is.

Recommendations as follows:

- To implement an APM for e-banking services that have most and major performance anomalies for banks not to endure a high capital expense.
- To enhance the human caliber’s ability to debug problems in a more efficient manner through trainings related to different e-banking services platform.
- To create and approve better service level agreements (SLA’s) for e-banking services provided by third-party software/services providers.
- Constant enhancements and developments: to direct efforts toward developing/procuring easier to manager e-banking services platforms

Second hypothesis related to reliability: **“There is no statistically significant effect (level of significance α 0.05) for the dimension of reliability on customer experience”**

We reject the hypothesis based on the results of the t-tests on all sentences and accept the alternative hypothesis that there is an effect of reliability on customer experience.

Hypothesis related to statistical significance of reliability between both sample groups attributed to the existence of an APM: **“There are no statistical differences between the mean values of the bank clients that have an APM tool regarding reliability with the mean values of the bank clients that do not have an APM for the same sentences”**

We accept this hypothesis based on the independent 2 sample t-test for all sentences for both sample that both sample group mean results are not statistically different attributed to the existence of an APM for banks in group 1.

The statistical results in this area show that the higher the reliability of the service, the better customer experience is, on the other hand, the statistical results show that APM has no effect on service reliability.

The researcher sees that this came in significant due to different opinions in both sample groups of what service reliability is, or due to that after implementing an APM the service is stabilized to some extent to which the end user does not feel the change, and reason behind this that banks might take extra measures to enhance reliability and up-time through business alternative sites and disaster recover sites.

Recommendations as follows:

- To do a before and after study for a bank prior to implementing an APM and after to check if reliability metrics have changed (total up-time on during weekdays/weekends)
- To perform a study for this dimension for longer periods of time and to include more metrics related to up-time for separate e-banking services.

- To make sure that the service is reliable during peak times as it impacts customer's experience, this can be done by enhancing underlying infrastructure, middleware, and e-banking platform through development or contracting third-party software providers.
- To add the ability to use e-banking services through multiple platforms including smart mobiles and personal computers.

Third hypothesis related to safety: **“There is no statistically significant effect (level of significance α 0.05) for the dimension of safety on customer experience”**

We reject the hypothesis based on the results of the t-tests on all sentences and accept the alternative hypothesis that there is an effect of safety on customer experience.

Hypothesis related to statistical significance of safety between both sample groups attributed to the existence of an APM: **“There are no statistical differences between the mean values of the bank clients that have an APM tool regarding safety with the mean values of the bank clients that do not have an APM for the same sentences”**

We reject this hypothesis based on the significance on the independent 2 sample t-test for the second and third sentences and accept the null hypothesis that the means of both sample groups related to sentences under this section are statistically different attributed to the existence of an APM for banks in group 1.

The first sentence shows the means of both groups are not statistically different attributed to the existence of an APM due to the fact that all banks provide their customers with passwords and/or One-Time-Passcodes to be able to use the e-banking services.

The statistical results in this area show that the higher the safety is, the better customer experience is.

Recommendations as follows:

- To implement an APM for e-banking services that have most security anomalies for banks not to endure a high capital expense.
- To enhance security infrastructure by implementing state-of-the-art firewalls, and to implement two factor authentication as additional security precautions
- Banks should reminder messages to their clientele reminding them of the importance of not sharing your authentication credentials with anyone, this is critical to lowering the level of security incidents.
- To contract a specialized security services provider to provide managed security services in order to filter out true security threats in order to focus on most dangerous incidents.

Forth hypothesis related to safety: **“There is no statistically significant effect (level of significance α 0.05) for the dimension of speed on customer experience”**

We reject the hypothesis based on the results of the t-tests on all sentences and accept the alternative hypothesis that there is an effect of speed on customer experience.

Hypothesis related to statistical significance of speed between both sample groups attributed to the existence of an APM: **“There are no statistical differences between the mean values of the bank clients that have an APM tool regarding speed with the mean values of the bank clients that do not have an APM for the same sentences”**

We reject this hypothesis based on the significance on the independent 2 sample t-test for all sentences and accept the null hypothesis that the means of both sample groups related to sentences under this section are statistically different attributed to the existence of an APM for banks in group 1.

The statistical results in this area show that the higher the speed is, the better customer experience is. The researcher sees that an APM enhances the speed of the service through flagging slow, very slow, falling, and stalling transactions and keeps reference logs of what has occurred (Machine Learning) and for future incidents, the service notifies administrators that if things continue as is, performance degradation will occur.

Recommendations as follows:

- To implement an APM for e-banking services that have most speed anomalies for banks not to endure a high capital expense.
- To enhance storages and servers hosting the e-banking service (better RAM (Random Access Memory) , higher IOPs (Input Output Per second) to obtain higher response times
- To develop/procure e-banking services that are known to have simplified processes and architecture in order to decrease authentication/transactional time window.

Recommendations for future research:

- 1- Conduct a before an after study in one commercial bank to measure customer experience levels before the implementation of such a tool and afterwards.
- 2- To conduct the research for a long period of time for both city and rural areas.
- 3- The study was conducted in Amman-Jordan only, and thus, the results need to be validated in another country with similar demographics.

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Appendices:

Appendix (A): Questionnaire

Deanship of Graduate Studies

Al-Quds University



The researcher is conducting a study titled "**The Effect of Implementing an Application Performance Monitoring tool for e-Banking Services on Customer Experience**" in Amman-Jordan in partial fulfillment of the requirements of obtaining a master's degree in Business Administration from Al-Quds University - Palestine.

Please take into account the objectivity and credibility in filling out the questionnaire, knowing that full confidentiality will be taken into account and that the data obtained will be used for the purposes of scientific research only.

Thank you very much.

Researcher

Shatha Barghouthi

First: Personal Information:

1- Gender:

Male

Female

2- Age:

Less than 21 years old

from 21 – 30 years old

30 – 40 years old

more than 40 years old

3- Academic Qualification

- Diploma
- Bachelors
- Higher Studies

4- Location

- | | | |
|---------------------------------|------------------------------------|------------------------------------|
| <input type="checkbox"/> Karak | <input type="checkbox"/> Al-Zarqa' | <input type="checkbox"/> Amman |
| <input type="checkbox"/> Tafila | <input type="checkbox"/> Ma'daba | <input type="checkbox"/> Ajloun |
| <input type="checkbox"/> Aqaba | <input type="checkbox"/> Al-Mafraq | <input type="checkbox"/> Jarash |
| <input type="checkbox"/> Ma'an | <input type="checkbox"/> Irbid | <input type="checkbox"/> Al-Balqa' |

5- The name of the bank through which you perform all your financial transaction:

- | | | |
|---|---|---|
| <input type="checkbox"/> Cairo Amman Bank | <input type="checkbox"/> Bank of Jordan | <input type="checkbox"/> Arab Bank |
| <input type="checkbox"/> Jordan Kuwait Bank | <input type="checkbox"/> Jordan Ahli Bank | <input type="checkbox"/> Jordan Commercial Bank |
| <input type="checkbox"/> Invest Bank | <input type="checkbox"/> Bank Al-Etihad | <input type="checkbox"/> Bank ABC |
| <input type="checkbox"/> Capital Bank | <input type="checkbox"/> Housing Bank | <input type="checkbox"/> Soc. Generale |
| <input type="checkbox"/> AJIB | <input type="checkbox"/> Other | |

6- I have been dealing with this bank for:

- | | |
|---|---|
| <input type="checkbox"/> Less than 4 years | <input type="checkbox"/> From 4 to 8 years |
| <input type="checkbox"/> From 8 to 13 years | <input type="checkbox"/> More than 13 years |

7- I use electronic banking services (Mobile and/or internet banking) every:

- | | |
|--------------------------------|--|
| <input type="checkbox"/> Day | <input type="checkbox"/> Week |
| <input type="checkbox"/> Month | <input type="checkbox"/> I do not use this service |

Second: Questionnaire Areas & Paragraphs

No.	Q.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Reliability						
1	e-banking services are available 24 hours 7 days a week (except for announced times of service updates/upgrades)					
2	I am able to access e-banking services from any mobile device					
3	I am able to access e-banking services from any computer					
Safety & Security						
4	The bank offers a security system for the e-banking service such as passwords and one-time-passcodes (OTP)					
5	I feel safe when I provide personal information to my bank through the internet					
6	I am banned from using the e-banking service in					

	case of a security breach/hack					
7	the e-banking service provided is safe for financial transactions					
Speed of Service						
8	The speed of loading of the bank's website is high					
9	Access to e-banking services is as high speed					
10	When performing a transaction (for example: bill payment) using the e-banking service the process is done at high speed					
11	The problem of slow access to e-banking services is recurring					
12	In case accessing e-banking services is slow, I end the transaction					
13	The problem of slow transaction (for example: bill payment) is recurring					
14	In case performing a transaction (for					

	example: bill payment) using the e-banking service is slow, I end the transaction						
Speed of Service Recovery							
15	Malfunctions happen often with the e-banking services						
16	In case of a malfunction, the service gets repaired and becomes available within a short period of time						

Third: Customer's Evaluation of his Experience

17 – I am satisfied with the performance of the e-banking services I use (0 not satisfied, 10 satisfied)

○ ○ ○ ○ ○ ○ ○ ○ ○ ○
1 2 3 4 5 6 7 8 9 10

18 – I would recommend my banks' e-services to my family and friends:

- Strongly Agree
- Agree
- Nuteral
- Disagree
- Strongly Disagree

Thank You

Appendix (B): Interview Questions

- 1- Do you currently have an APM in place?
- 2- Does the APM have an effect on the speed of e-banking services being provided?
- 3- Does the APM have an effect on speed of recovery of the e-banking services being provided?
- 4- Does the APM have an effect on the safety of the e-banking services being provided?
- 5- Does the APM have an effect on the reliability of the e-banking services being provided?
- 6- Did implementing an APM enhance your measure customer experience rate? And to what extent?
- 7- Did implementing an APM have an impact on your customer churn rate?
- 8- Would you recommend to banks that haven't implemented an APM to implement it?

Appendix (C): Commercial Banks in Jordan included in this research

Bank Name
Arab Bank
Bank of Jordan
Jordan Ahli Bank
Jordan Kuwait Bank
Housing Bank for Trade & Finance
Bank Al Etihad

Source: Central Bank of Jordan⁷

⁷ <http://www.cbi.gov.jo/Pages/viewpage.aspx?pageID=307> – Central Bank of Jordan Date: June, 6th, 2019

Appendix (D): Names and Designations of Questionnaire Arbitrators:

	Name	Designation
1	Dr. Sameer A. Barghouthi	Professor
2	Dr. Mazen Salman	Associate Professor
3	Dr. Farid Ghrayeb	Associate Professor
4	Dr. Ghassan Shakhshir	Doctor of Public Administration (DPA)