ISTANBUL COMMERCE UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES
DEPARTMENT OF BUSINESS ADMINISTRATION
MASTER OF BUSINESS ADMINISTRATION

RELATIONSHIP BETWEEN TECHNOLOGICAL INNOVATIONS AND ORGANIZATIONAL PERFORMANCE OF MOROCCAN BRANDS

MA Thesis

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ISTANBUL, 2022

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DEDICATION

I dedicate all the required information in this title 'RELATIONSHIP BETWEEN TECHNOLOGICAL INNOVATIONS AND ORGANIZATIONAL PERFORMANCE OF MOROCCAN BRANDS' has been written in accordance with the academic manners and ethical commitment. I would clarify that all the materials, sources, data and all extra inputs have been benefited well throughout the writing procedure of this thesis. All matters contained in this thesis are my personal opinion and do not reflect the official view of Istanbul Ticaret University.

JAWHARA CHERRADI

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First I would like to dedicate this project to my beloved parents for being my source of patience during this whole process and taught me that is never too late to chase my goals, I appreciate their support with the little they have to make me have this education opportunity. To my brothers and friends who have always been there for me, showing their constant support, thank you very much. And I thank my project advisor for the support and guidance.

ABSTRACT

The forces of competition and the ever changing needs of the customers are a big threat of performance of the firms. In Morocco for instance, some of the leading have been marred with poor performance. Against this background, the present study sought to establish the relationship between technological innovations and organizational performance of Moroccan brands. The specific objectives of the study were to: establish the technological innovation practices among Moroccan brands and their effect on organizational performance, analyze the risks presented by technological innovations among Moroccan brands and their effect on organizational performance and to appraise the joint relationship between technological innovation practices, the risks presented by technological innovations and organizational performance of Moroccan brands. The study adopted descriptive survey research design that was quantitative in nature. This study targeted 53 high technology brands with operations in Rabat, Morocco. The selection of these firms was done purposively with some of the criteria being firms that had been operation for at least 15 years with well established, independent and functional IT departments. Thus, purposive sampling was adopted in this study to select these firms. Information was obtained in its primary form using the questionnaire and the analysis was through percentages, means correlation and regression analysis. It was observed that the highly adopted aspect of technological innovation in the studied firm was technological knowledge management (M=4.01) followed by information sharing (M=3.86), incremental technological innovation (M=3.84), information technology infrastructure (M=3.75) and radical technological innovation (M=3.72). Technological innovations presented a number of risks to Moroccan brands which data breach (M=3.89) followed by data privacy (M=3.79), reputational risk (M=3.78), operational risks (M=3.78) and lastly cyber security risk (M=3.73). It emerged that on overall, technological innovation practices ($p<0.05$) and the risks presented by technological innovations ($p<0.05$) all have a significant joint effect on organizational performance. The study recommends that risk managers working in Moroccan brands should review and enhance on the existing risk management frameworks so as to effectively manage the risks that are occasioned by technological innovations. The ICT managers working in Moroccan brands should constantly enhance and review the existing technologies to permit and allow innovation. The policy makers working in the government in Morocco should enact sound rules and regulation to guide the adoption of new technologies among the firms so as to permit innovation for superior organizational performance.

Key words: *technological innovations, organizational performance, Moroccan brands, technological innovation practices band risks presented by technological innovations*

ÖZET

Rekabet güçleri ve müşterilerin sürekli değişen ihtiyaçları, firmaların performansı için büyük bir tehdit oluşturmaktadır. Örneğin Fas'ta, önde gelenlerden bazıları düşük performansla gölgelendi. Bu arka plana karşı, bu çalışma Fas markalarının teknolojik yenilikleri ile organizasyonel performansı arasındaki ilişkiyi kurmaya çalıştı. Çalışmanın özel hedefleri şunlardı: Faslı markalar arasındaki teknolojik yenilik uygulamalarını ve bunların organizasyonel performans üzerindeki etkisini belirlemek, Faslı markalar arasındaki teknolojik yeniliklerin sunduğu riskleri ve bunların organizasyonel performans üzerindeki etkisini analiz etmek ve teknolojik yenilik uygulamaları arasındaki ortak ilişkiyi değerlendirmek. , teknolojik yeniliklerin sunduğu riskler ve Faslı markaların organizasyonel performansı. Çalışma, doğası gereği nicel olan tanımlayıcı tarama araştırması tasarımını benimsemiştir. Bu çalışma, Fas'ın Rabat şehrinde faaliyet gösteren 53 yüksek teknoloji markasını hedef almıştır. Bu firmaların seçimi, bazı kriterler en az 15 yıldır faaliyet gösteren, iyi kurulmuş, bağımsız ve işlevsel BT departmanlarına sahip firmalar olmak üzere amaçlı olarak yapılmıştır. Bu nedenle, bu çalışmada bu firmaları seçmek için amaçlı örnekleme benimsenmiştir. Bilgi, anket kullanılarak birincil formunda elde edildi ve analiz, yüzdeler, ortalama korelasyon ve regresyon analizi yoluyla yapıldı. İncelenen firmada teknolojik yeniliğin en çok benimsenen yönünün teknolojik bilgi yönetimi (M=4.01) olduğu, bunu bilgi paylaşımı (M=3.86), artan teknolojik yenilik (M=3.84), bilgi teknolojisi altyapısı (M=3.75) takip ettiği görülmüştür.) ve radikal teknolojik yenilik (M=3.72). Teknolojik yenilikler, Faslı markalar için veri ihlali (M=3,89), ardından veri gizliliği (M=3,79), itibar riski (M=3,78), operasyonel riskler (M=3,78) ve son olarak siber güvenlik riski (M=3,79) olmak üzere bir dizi risk sunuyordu. =3.73). Genel olarak, teknolojik yenilik uygulamaları ($p<0.05$) ve teknolojik yeniliklerin sunduğu risklerin ($p<0.05$) organizasyonel performans üzerinde önemli bir ortak etkiye sahip olduğu ortaya çıktı. Çalışma, Fas markalarında çalışan risk yöneticilerinin, teknolojik yeniliklerin neden olduğu riskleri etkin bir şekilde yönetmek için mevcut risk yönetimi çerçevelerini gözden geçirmeleri ve geliştirmeleri gerektiğini önermektedir. Fas markalarında çalışan BİT yöneticileri, yeniliğe izin vermek ve izin vermek için mevcut teknolojileri sürekli olarak geliştirmeli ve gözden geçirmelidir. Fas'ta hükümette çalışan politika yapıcılar, üstün organizasyonel performans için inovasyona izin verecek şekilde firmalar arasında yeni teknolojilerin benimsenmesine rehberlik edecek sağlam kurallar ve düzenlemeler çıkarmalıdır.

Anahtar kelimeler: teknolojik yenilikler, organizasyonel performans, Fas markaları, teknolojik yenilik uygulamaları ve teknolojik yeniliklerin sunduğu riskler

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ABBREVIATIONS

AI : Artificial Intelligence

BSC : Balance Scorecard

DOI : Diffusion of Innovation

IT : Information Technology

MNCs : Multinational Corporations

NPLs : Nonperforming Loans

TAM : Technology Acceptance Model

INTRODUCTION

1.1 Background to the Study

Performance is one of the goals as to why firms exist and operate and it is represented by financial and non-financial indicators. One of the widely adopted tools for measuring performance is the Balance Scorecard (BSC) that was developed by Kaplan and Norton and it has four perspectives: the customers, financial, learning and growth as well as the internal business processes. The unique advantage of the BSC is that it links performance with the strategic goals of the firm. The owners who are shareholders of the firm are increasingly demanding and expecting management to maximize their wealth hence performance as one of the contractual responsibilities in the agency-principal framework (Wang, 2019).

In order to effectively perform, firms have realized the need to adopt strategies, one of them being technological innovation (Cusick, 2013). Indeed, the forces of globalization coupled with increased competition are driving organizations to increasingly adopt technological innovation in order to remain viable and compete hence performance. Literature point out that adoption of technological innovation result into enormous benefits in terms of boosting performance of the firm. These views are consistent with El-Chaarani and El-Abiad (2018) who shared that investing in technological innovation has direct implication on performance of firms especially in the context of Lebanon. In the Kenyan context, Mwangi (2021) observed that technological innovation is key tool of enhancing financial performance of the entity. Letangule, Letting and Nicholas (2012) observed some of the technological innovation practices covering models of technological innovation, the process of technological innovation as well as factors impacting on the need to adopt technological innovation.

Wang (2019) operationalized and recognized technological innovation into radical as well as well as incremental strategies of innovation. Subrahmanya (2011) shared that innovative firms are made up of entrepreneurs who are technically qualified. There are a number of technological innovation practices that firms are leveraging to remain competitive including technological competencies, technological collaboration and technology transfer as well as technology orientation. Adoption of technological innovation poses a number of risks to the firms. These risks include cyber-security, privacy concerns and system down time as well as operational and

reputational risks. These risks can complicate and adversely affect the ability of firms to enhance performance.

Morocco is one of the countries in North Africa and it is regarded as one of the countries with strong national brands as shown by the national brand index. Its capital city is Rabat that is a home of leading Multinational Corporations (MNCs). The country is guided by strong macroeconomic policies that have stabilized the inflationary pressure at 2% which is the prescribed threshold. According to the recent Africa Capacity Report (2016), Morocco is the leading country in innovation and technology in the entire Africa as a continent. It is against this background that the present study will seek to appraise if technological innovation have contributed towards performance of the Moroccan brands.

1.2 Research Problem

The forces of competition and the ever changing needs of the customers are a big threat of performance of the firms. In Morocco for instance, some of the leading brands especially in the banking sector have been marred with poor performance. For instance, as at the end of 2020, the ratio of Nonperforming loans (NPLs) rose by 14.5% in the banking industry in Morocco signifying concerns about performance of the banks. This trend in performance of the Moroccan brands raises a question of whether these firms have fully adopted technological innovations and whether they are deriving the desired benefits.

1.3 Research Objectives

The study was guided by the following objectives:

i. To establish the technological innovation practices among Moroccan brands and their effect on organizational performance
ii. To analyze the risks presented by technological innovations among Moroccan brands and their effect on organizational performance
iii. To appraise the joint relationship between technological innovation practices, the risks presented by technological innovations and organizational performance of Moroccan brands

1.4 Research Questions

i. What are the technological innovation practices among Moroccan brands and their and their effect on organizational performance?
ii. What are the risks presented by technological innovations among Moroccan brands and their effect on organizational performance?
iii. What is the joint relationship between technological innovation practices, the risks presented by technological innovations and organizational performance of Moroccan brands?

1.5 Justification and Scope of the Study

In spite of the significant contribution of adoption of technological innovation on performance of the firm (El-Chaarani & El-Abiad, 2018; Mwangi 2021; Letangule et al., 2012; Wang, 2019 & Subrahmanya, 2011), its adoption pose a number of risks to the firm including cybercrime. This is to imply that the adoption of technological innovations can lead to positive as well as negative consequences to the firm. Thus, this study seeks to clear these inconsistencies in literature and establish the exact nexus between technological innovation and performance. Such literature is particularly scanty in the context of Morocco. In terms of scope, the study determined the interplay between technological innovation and performance. More specifically, the study focused on technological innovation practices and the risk posed by technological innovations. The study was conducted among Moroccan brands.

1.6 Organization of the Study

The study is organized into five chapters. The background of the study is covered in chapter one. Literature review is conducted in chapter two. The methodologies to guide answering the formulated research questions are covered in chapter three. The fourth chapter presents the findings of analysis as guided by the objectives. Conclusion and recommendations are covered in chapter five.

LITERATURE REVIEW

2.1 Theoretical Review

Most studies on technological innovation have been informed by the technology acceptance model theory (TAM) advanced by Davis (1989) that provide an explanation of key issues that provide an ample opportunity for the adoption of technologies in an organization and within a socially established setting. Other literature has focused on diffusion of innovation (DOI) theory developed by Rogers (1995). However, these theories have been critiqued by scholars because of the weaknesses occasioned by their premises. One of the criticisms arises from the fact that these theories fail to place emphasis on how structures and contexts would impact and shape innovation practices in the organization, but rather, they consider people in an organization as social groups that are characterized by passiveness which exist irrespective of the object. In spite of these flaws, these two theories will be used to provide anchorage to the present investigation. This theory was developed by Rogers (1962) where diffusion is regarded as a process that allow dissemination of an invention among people in a socially establishes system as time progresses. The theory has been widely adopted to help in explaining why there exist differences in the need to acquire and spread innovation in a socially established setting. The theory provides four key issues that influence the spread of innovation: socially established structures, timing, communication channels and invention.

2.2 Technological Innovation Practices and Organizational Performance

The rapid evolution of technology is revolutionizing and transforming the way businesses carry out their operations (Al-Khatib & Al-ghanem, 2021). Technological innovation practices vary and range from radical to incremental. Scholars agree that incremental technological innovation practices aim at coming up with solutions for improving the already available services or products for instance, the addition of new features which may not lead to significant variation in the market (Coccia, 2017). On the other hand, radical technological innovation practice involves solutions that are relatively new as well as different from the existing ones and they help in generation of new markets. Lynn and Akgün (2001) determined radical innovation in terms of high uncertainty in the market and high technological uncertainty. Radical technological innovation helps in incorporating new technologies resulting in new market infrastructures. Radical technological innovation helps in creating demand that is not recognized previously by

consumer. New and advanced technology plays an instrumental role in driving innovation in organization. As observed by Stella, García-Morales, Martín-Rojas, Pavaloaia and Popescul (2018), the application of processes and products that are developed on the basis of advancement in new technologies. Through radical technological innovation, an organization is able to come up with new market structures or industries. Radical innovation result into significant revolution and it allows organizations to make substantial changes to strategic management system including the development of new customers, markets and networks (Dastane, 2020).

Technological innovation practices can also be recognized in terms of technology adoption, technological change, information technology (IT) infrastructures as well as IT knowledge management. Adopting new technologies is featured by unpredictability over profits in future areas (Pomaquero, Lopez & Lopez, 2019). Within the IT context, the hard and software components, networks, data centers and any associated facilities and resource are collectively referred to at IT infrastructure. IT infrastructures help an organization to deliver technology related services to its stakeholders (Broadbent, Weill & Clair, 1999). IT infrastructure provides the basis and foundation of adopting the technological innovation practices needed for an organization to complete in an increasingly turbulent environment. All business and technology related solutions in an organization require effective and proper functioning of the existing IT infrastructures (Chege & Wang, 2020).

The necessary condition for effective adoption and functioning of technological innovation is IT knowledge management practice (Anadon, Chan, Harley, Matus, Moon, Murthy & Clark, 2016). For most organization, effective adoption and implementation of knowledge management infrastructures is an essential require for adoption of technological innovations aimed at ensuring superior performance (Haas & Hansen, 2005). Enhancing the processes of acquisition and usage of knowledge is critical in any IT knowledge management practices in the firm (Heisig, 2009). IT knowledge management contributed towards technological learning ability and capability that is critical in driving innovations in an organization (Ni, 2018).

Technological innovation practices also cover an array of issues that lead and promote research and development undertakings that help in design of new products while improving those already in place and generate new forms of technological knowledge (Diaconu, 2011). To embrace technological innovation, an organization should have adequate information sharing mechanisms. Lee (2015)

provided the definition of information sharing as an activity involving official on non-official transfer of knowledge between organizations. Because of the spread of social technologies, organizations are able to share information more easily without any effort (Martin & van-Bavel, 2013). When appropriate, timely and accurate information is shared, it facilitate effective and reasonable decision making contributing towards more effectiveness (Xiao & Su, 2022). Timely sharing of information can also result into reduction in uncertainty that may encounter during the decision making process of the organization. Theoretically, the sharing of information related to technology can allow an organization to gain a competitive edge (Diaconu, 2011).

2.3 Risks Presented by Technological Innovations and Organizational Performance

A number of risks accrue to a firm after it has massively invested in technological innovations. One of these risks concerns the need to protect and ensure privacy of the data of the consumers (Littler & Melanthiou, 2006). Organizations are increasingly facing the security of legal violations occasioned by this risk (Bearth & Siegrist, 2016). Consumers are always on a look out for firms that have fully put in place relevant avenues of establishing where their data end up and the purpose it serves. The possibility of data breach is another risk that an organization investing in technological innovations does face (Hellström, 2003). A report by UBM (2019) provided that on average, data breach cost firms an amount equal to $3.92 million. Even in circumstances when an organization has fully implemented relevant mechanisms, data breach does arise.

Reputation risk is evident when a firm has invested in technological innovations. A firm can invest in artificial intelligence systems (AI) that are susceptible to errors with high subjectivity to biasness and hackers can easily hack them. When all these arise, an organization can be exposed to a lot of criticism from the public contributing to reputation risks to the firm (Brown & Osborne, 2013). In return, this may have a long term negative implication on the public image of the firm. Zerzan (2009) observed that some of the technological innovations in an organization can be prone and susceptible to terrorist financing abuse. This is occasioned by the fact that some new technologies at time arise without full knowledge and awareness by those responsible for their supervision. By leveraging on this, aggressive terrorists can be able to meet their hidden goals. The World Bank has been required by most countries around the globe to share some information concerning the new methods of making payments like the use of electronic

value cards, the internet as well as mobile phones. This is because each of these payment methods is associated with opportunities as well as risks (Zerzan, 2009).

Security risk is a major concern once an organization has invested in technological innovations. As observed by Ferreira, Jalali, Meidutė and Viana (2015), terrorist and cybercrime activities are one of the key concerns for organizations in the current business environment. Block technologies are significant components of the overall technological innovations that firms have embraced to counter the increasing incidences of security risks. Block chain technologies utilize crypt data aimed at reducing information breach to other parties. The privacy of financial data in most organization is enhanced through security risk. Another way of safeguarding the security risk in an organization is the use personal identification number (PIN), biometric methods and passwords are key security measures. These measures are aimed at minimization of risks of attacks in an organization. Some organizations have embraced sophisticated security measures like the use of cards, security and palm prints, fingerprints as well as the eyes and this provide restricted accessibility to facility resources.

2.4 Relationship between Technological Innovation and Organizational Performance

There is plenty of literature linking technological innovation and organizational performance at firm level. Investing in ICT can help in strengthening and replacing the available information systems and networks and this contribute towards new markets for the firms (Hartoyo & Daryanto, 2016). Investment in ICT is an important avenue of disseminating knowledge and information which help in developing bringing about economic and social changes (Osborn, Amy & Ullah, 2015). Integration of technology and business in every stage of development of business contributes towards operational costs and thus increasing the level of efficiency (Apulu & Latham, 2010). Empirical evidence indicate that timely accessibility to reliable information increasingly contribute towards performance of the firm. Technology contributes towards effective decision making as far as innovation is concerned as far as complexity and compatibility are concerned. Innovative organizations have greater edge that allows firms to gain greater profits and thus contributing towards sustainability (Atuahene-Gima, 2004).

Technological innovation contributes towards product value creation and this may include the need to package or label product for special markets including the addition of new features to

already available products (Njiraini, Omolo & Gachanja, 2018). It may also contribute towards the development of new products from the primary established ones. Some of key measures of technological innovations include the inputs going through the process of innovation for instance expenditure on R&D as well as direct measures on outputs of innovation like new processes or products (Akinwale et al., 2017). IT innovation is an important variable that help in explaining strategic decision making that contributing towards an edge in an organization.

The study by Mbogori and Moguche (2021) focused on technological innovation and performance of firms that engage in manufacturing of cement in Kenya. It was observed from the findings that technological innovation is positive and significant predictor of performance of manufacturing entities. In a study by Owuor (2018), the main focus was on disruptive technology and its implication on ability of insurance firms in Kenya to perform. The study observed that mobile phone technologies have significantly contributed towards the growth of insurance entities. It was noted that when a firm improves its technological innovation landscape, it is likely to attain superior performance.

Otii, Lawrence and Omondi (2020) did an assessment of factors promoting technological innovation and performance at firm level. It emerged from the analysis that the promoters of technological positively lead to performance of the firm. Gichohi (2022) was keen in exploring how technological innovation impacts on performance of firms dealing in manufacture of cement in Kenyan context. From regression, it was predicted that technological innovation shapes and enhances performance at firm level. Keitany, Chepkilot and Tanui (2018) were interested in predicting the nexus between technological innovation ability of firms to remain competitive in Kenyan context. The study noted that firms that have adopted technological innovation are more competitive as compared to those that have ignored the benefits of the same.

The study conducted by Wambua, Muturi, Rotich and Ogollah (2017) placed emphasis on strategy for technological innovation and the implication on performance at firm level. It emerged from the results that technological innovation is a key predictor of performance at the firm level. Chege and Wang (2020) were interested in bringing out the nexus between technological innovation and performance at the small and medium enterprise level. The sample comprises of 204 small firms and analysis was done through regression. It was observed that v technological innovation allow firms to achieve better outcomes in terms of efficiency and

effectiveness which are salient features of performance. It was shown from the findings that technological innovation has an effect that is significant on ability of the firm to perform.

Wasike (2016) did an analysis of the implication of technological innovation on loyalty of customers in a banking sector context. It was observed that the adoption of technological innovation enhances performance at firm level. In a study conducted by Atandi, Bwisa and Sakwa (2016), the main focus was on technological innovation and the role it plays as far as performance at firm level is concerned. The study noted that technological innovation allow the firm to introduce new products in the market which in turn translates to superior performance. The study raised the need for firms to innovate new technologies for delivering the products as well as the services. Wachira (2013) focused on technological innovation and the role it plays as far as performance in financial terms of the firm is concerned. The specific focus of the study was on Kenyan commercial banks. A positive and significant implication of technological innovation on firm performance was registered in this study.

The focus of the study conducted by Mutie (2018) was on technological innovation and how it affects performance of agencies of the government in Kenyan context. The specific aspects of technological innovation that were covered include enhance and development of system, integration of departments and innovations that are based on information technologies. Results were that the adoption and heavy investment in technological innovation enhances performance at firm level. The focus of the study conducted by Nyamai (2017) was on technological innovation and its implication on development Kenya as a country. The specific aspects of technological innovation that were addressed in this study include the need to introduce new products, methods, new markets and sourcing of appropriate raw materials. It emerged from the analysis that firms that adopt technological innovations attain superior performance as compared to those that have not done the same.

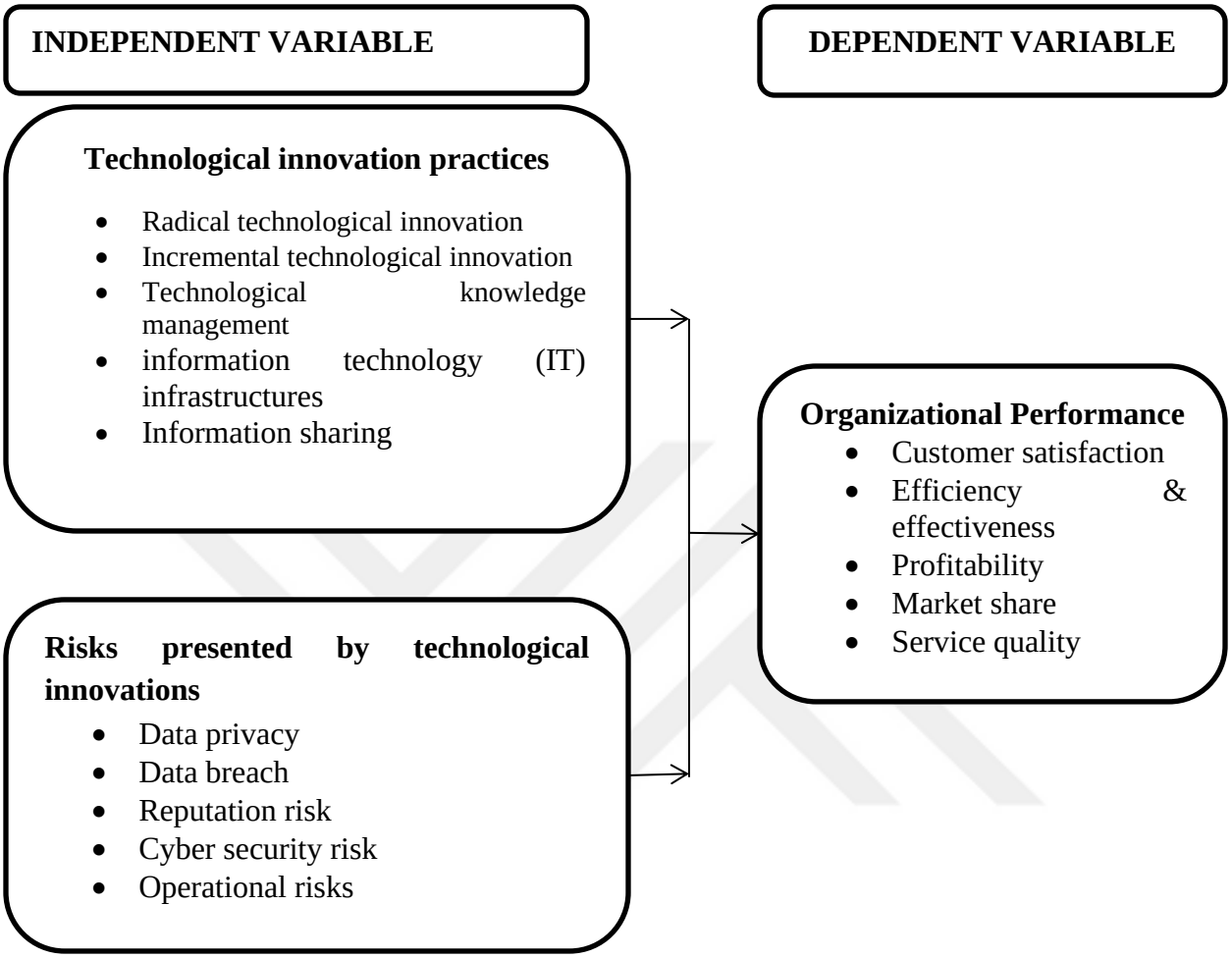
In a study conducted by Kamau (2019), the main focus was on technological innovation and the implication on performance in the real estate context. The variables covered in the study include internet innovation, operational integration as well as building technology. Results were that these proxies are salient aspects of technological innovation that contribute towards an enhancement in firm performance. Chege, Wang and Suntu (2020) did an inquiry whose focus was on innovation in terms of information technology and its link with performance at firm level.

It emerged from the analysis that technology innovation is a key predictor of performance in positive terms. Mohammed (2021) did an appraisal of technological innovation and its link with the growth of the economy focusing on Kenya as the case. It emerged from analysis that technological innovation is a significant contributor towards the growth of the economy of a country. Samuel and Kepha (2021) were interested in predicting how the strategy to adopt technological innovation contributes towards performance in the banking sector context. It was shown that the increasingly turbulent and competitive business environment has forced financial institutions to embrace technological innovations in order to survive

2.5 Conceptual Framework

From the conceptual framework in Figure 2.1, it is predicted that technological innovation practices would have an effect on organizational performance. Investing in radical technological innovation is expected to enhance efficiency and effectiveness at which operations of the firm are conducted. When a firm invests in incremental technological innovation, there is possibility of increasing the quality of the products. Technological knowledge management is expected to enhance the level of customer satisfaction. A firm with adequate information technology (IT) infrastructures generates products that are of high quality standards which may in turn contribute to an increase in market share.

The risks presented by technological innovations are expected to have an inverse relationship with organizational performance. When a firm takes good care of the privacy of customer data, customer satisfaction is likely to be enhanced which would lead to an increase in market share and profitability. A breach of confidentiality of data of customers may lead to reputation risk which may in turn affect customer satisfaction. Interference in technological systems of the firm may lead to reputational risk which may reduce customer satisfaction. Cyber security risk is occasioned may result into a situation where a firm loose data to competitors and this may recce the market share. Operational risks may lead to reduced product quality and profitability of the firm. Figure 2.1 is the conceptual framework that guides the proposed study:


INDEPENDENT VARIABLE
DEPENDENT VARIABLE
Technological innovation practices
Radical technological innovation
Incremental technological innovation
Technological knowledge management
information technology (IT) infrastructures
Information sharing
Risks presented by technological innovations
Data privacy
Data breach
Reputation risk
Cyber security risk
Operational risks
Organizational Performance
Customer satisfaction
Efficiency & effectiveness
Profitability
Market share
Service quality

METHODS AND INSTRUMENTS

3.1 Research Design

Research design is a collection of procedures and methods that are critical in the collection and analysis of the measures and specific constructs of the variables used in the study. It can also be viewed as an overall strategy selected by the researcher for integration of a set of elements of the study in a way that is coherent and logical (Harris, Holyfield, Jones, Ellis & Neal, 2019). This helped in ensuring that the research problem of the study has been addressed in a way that is effective. The study adopted descriptive survey research design that was quantitative in nature. Through this design, it was possible to provide a detailed account and description of technological innovations and performance with specific reference to the Moroccan brands.

3.2 Population and Sample Design

Population is a collection of events or objectives that have similar attributes which the researcher has interest to explore (Marvasti, 2018). It is also defined as a complete set of objects having attributes that are same (Bougie & Sekaran, 2019). This study targeted 53 high technology brands with operations in Rabat, Morocco. The selection of these firms was done purposively with some of the criteria being firms that had been operation for at least 15 years with well established, independent and functional IT departments. Thus, purposive sampling was adopted in this study to select these firms.

3.3 Sources of Data

There are two broad sources of data in a study, primary and secondary sources. Data in its primary form is usually gathered from first hand sources of information in an inquiry. On the other hand, information in its secondary form is usually obtained from the already existing sources like books, journals and other relevant publications (Ghauri, Grønhaug & Strange, 2020). In the present inquiry, information was obtained in its primary form supported by the questionnaire. Questionnaire is an instrument in research that covers a set of questions which respondents are required to respond to them in a most appropriate manner. In the design of the questionnaire, a five point Likert scale of 1-strongly disagree and 5-strongly agree was adopted. The study leveraged the existing scales and constructs identified in theoretical and empirical

literature to design the questionnaire items. There were a total of four sections on the questionnaire that included the organizational information in section A, technological innovation practices among Moroccan brands in section B, risk presented by technological innovations among Moroccan brands in section C and performance of Moroccan brands in section D respectively.

The IT managers in the identified firms were the main respondents to the questionnaire of this study. The rationale of selecting upon these staff was because of their knowledge and experience with technological innovations which was the central theme in the present study. As such, these people were believed to have relevant information to share that aided the study in realization of the stated objectives in the first chapter. The contact information (emails) of these IT managers each from the identified brands were inquired after which the questionnaire was shared with them. On receipt of the questionnaire through email, the IT managers were expected to print and fill in the questionnaire before scanning and sending back for analysis. Similarly, respondents can as well receive the questionnaire on email and fill in as a word document then send back for coding and subsequent analysis. Participants in the study were given adequate time to give their responses and share back the questionnaire to ensure the same does not interfere with their daily work activities.

3.4 Research Quality

In this study, research quality was ensured through validity and reliability as discussed in the subsequent sections.

3.4.1 Validity of the Questionnaire

Validity is the extent which a tool provides measurement of a construct that the study seeks to investigate (Strijker, Bosworth & Bouter, 2020). Content validity was adopted in this study with the aid of two experts in the field of IT. In this regard, the experts reviewed the specific contents contained in the questionnaire and suggest some revisions that were effected in the final copy of the questionnaire before proceeding to the field for actual data gathering.

3.4.2 Reliability of the Questionnaire

A questionnaire is said to be reliable when it is consistent in its measurement (Wan, 2022). In this study, reliability of the questionnaire was ensured through pilot testing. The questionnaire

was pilot tested among 5 respondents drawn from IT-related firms in Morocco and the same were excluded in the final study. The responses from the pilot study were used to compute the values of Cronbach Alpha Coefficients. As shared by Yin (2017), such values above 0.7 provide an indication that the study tool is reliable.

3.5 Data Analysis

Data analysis is the processing of the collected information using appropriate tools and software depending on whether it is qualitative or quantitative in nature (Dźwigoł, 2019). In this study, information gathered was quantitative in nature and the analysis will be guided by descriptive (percentages, means) and inferential statistics (correlation and regression analysis). The following regression model was adopted to aid in analyzing the third objective: Table 3.1 provides a breakdown on how the study objective will be analyzed:

Table 3.1: Data Analysis

Objective	**Data Analysis**
To establish the technological innovation practices among Moroccan brands and their effect on performance	Percentages, means, correlation and regression $\mathbf{Y= \beta_0 +\beta_1X_1+\beta_2X_2 +\beta_3X_3 +\beta_4X_4+\beta_5X_5 +\varepsilon}$ Where; Y-is the dependent variable organizational performance $\boldsymbol{\varepsilon}$ is the error term $\boldsymbol{\beta_0}$ is the regression beta coefficient $\mathbf{X_1}$ = Radical technological innovation $\mathbf{X_2}$ = Incremental technological innovation $\mathbf{X_3}$ = Technological knowledge management $\mathbf{X_4}$= information technology (IT) infrastructures $\mathbf{X_5}$= Information sharing
To analyze the risks presented by technological innovations among Moroccan brands and their effect on performance	Percentages, means, correlation and regression $\mathbf{Y= \beta_0 +\beta_1X_1+\beta_2X_2 +\beta_3X_3 +\beta_4X_4+\beta_5X_5 +\varepsilon}$ Where; Y-is the dependent variable organizational performance $\boldsymbol{\varepsilon}$ is the error term $\boldsymbol{\beta_0}$ is the regression beta coefficient $\mathbf{X_1}$ = Data privacy $\mathbf{X_2}$ = Data breach $\mathbf{X_3}$ = Reputation risk $\mathbf{X_4}$= Cyber security risk $\mathbf{X_5}$= Operational risks
To appraise the joint relationship between technological innovation practices, the risks presented by technological innovations and performance of Moroccan brands	Correlation and regression $\mathbf{Y= \beta_0 +\beta_1X_1+\beta_2X_2 +\varepsilon}$ Where; Y-is the dependent variable organizational performance $\boldsymbol{\varepsilon}$ is the error term $\boldsymbol{\beta_0}$ is the regression beta coefficient X_1 = Technological innovation practices X_2 = Risks presented by technological innovations

RESULTS AND DISCUSSIONS

4.1 Introduction

The chapter is a presentation and discussion of the findings after an analysis that was conducted on the data that was gathered from the field. The analysis revolved around three research questions that guided the study. These were as follows:

i. What are the technological innovation practices among Moroccan brands and their and their effect on organizational performance?
ii. What are the risks presented by technological innovations among Moroccan brands and their effect on organizational performance?
iii. What is the joint relationship between technological innovation practices, the risks presented by technological innovations and organizational performance of Moroccan brands?

4.2 Response Rate

A total of 53 questionnaires were administered to employees working high technology brands with operations in Rabat, Morocco. Out of these, 41 were completely filled and returned. This was equivalent to a response rate of 77.4 as shown in Figure 4.1.

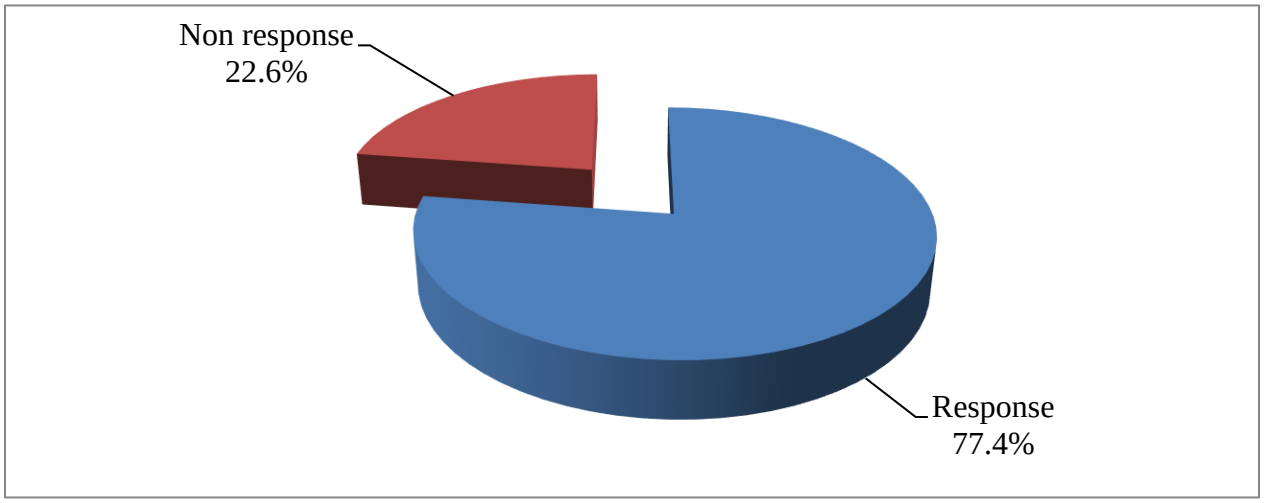


Figure 4.1: Response Rate

The response rate in Figure 4.1 was adequate and consistent with the assertion of Johnson and Owens (2003) who opined that such a rate above 70 per cent is ideal for analysis and presentation of findings in a survey.

4.3 Organizational Information

Information on the studied organizations covering the years of operation, existence of a fully-fledged IT department, their scale of operation as well as average employees were determined and summarized as indicated in the subsequent sections. In this section, the presentation of the results was done through tables and figures that were meant to give a good visual impression.

4.3.1 Years of Operation

Table 4.1 is a breakdown of results on years of operation of the studied firms.

Table 4.1: Years of Operation

	Frequency	Percent
Less than 10 years	7	17.1
11-20 years	14	34.1
21-30 years	13	31.7
Over 31 years	7	17.1
Total	**41**	**100.0**

The findings in Table 4.1 are further summarized in Figure 4.2.

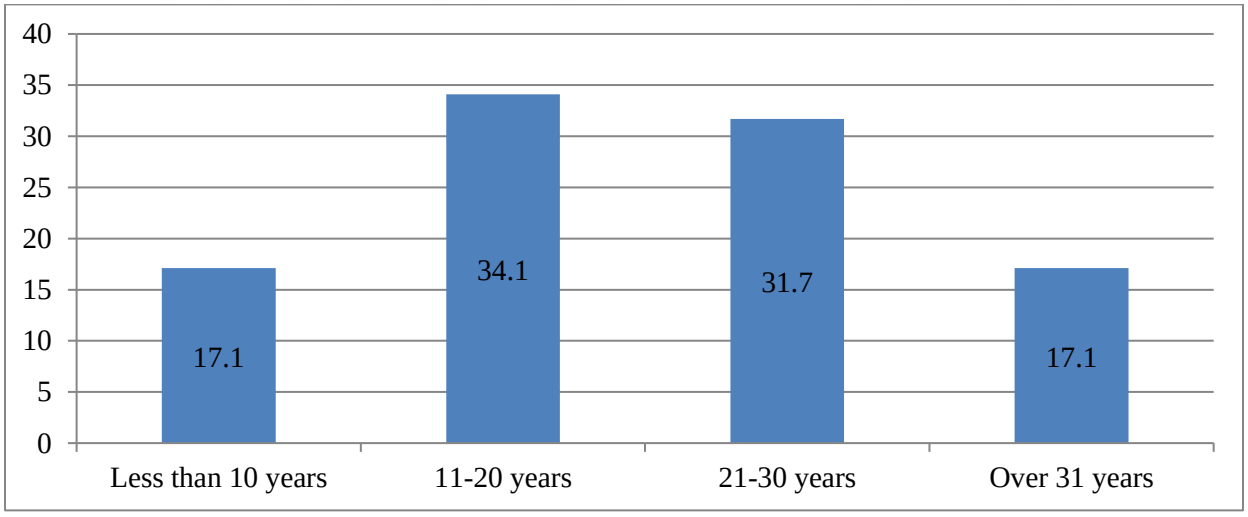


Figure 4.2: Years of Operation

From Tables 4.1 and Figure 4.2, it can be observed that while 34.1% of the studied organizations had been in operation for 11-20 years, 17.1% tied at less than 10 and over 31 years respectively. Thus, the firms that were studied had operated for a significant period of time and thus their suitability for survey as deemed by this study.

4.3.2 Existence of a fully-fledged and functional information and communication technology (ICT) department

Table 4.2 is a breakdown of the findings on whether the studied firms had fully-fledged and functional information and communication technology (ICT) department.

Table 4.2: Existence of a fully-fledged and functional information and communication technology (ICT) department

	Frequency	Percent
Yes	34	82.9
No	7	17.1
Total	**41**	**100.0**

The findings in Table 4.2 are further summarized in Figure 4.3.

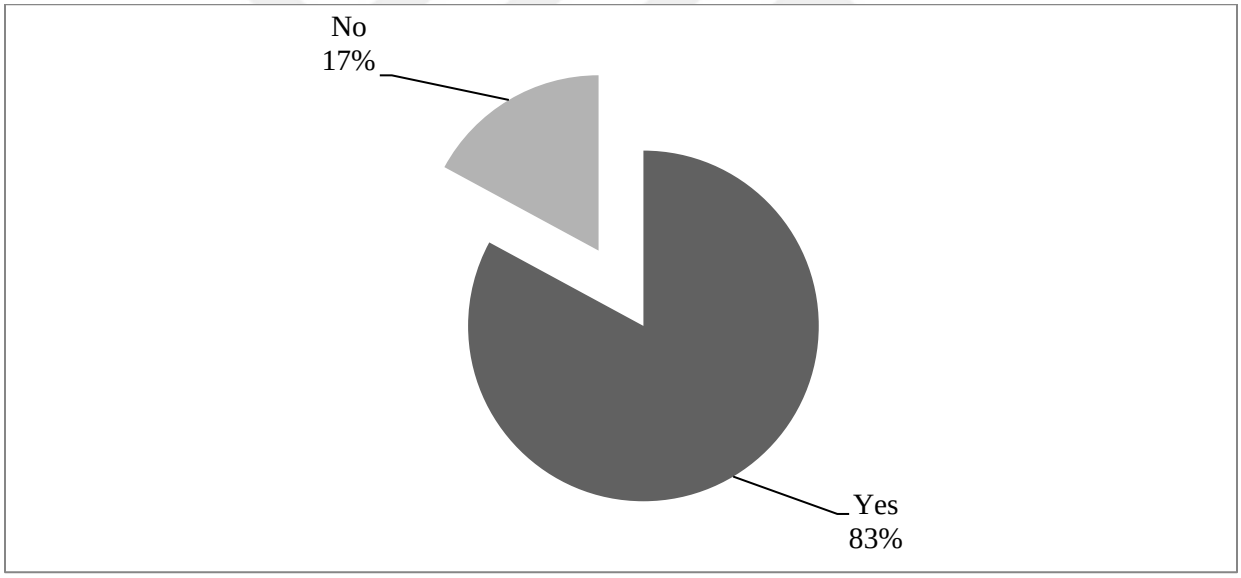


Figure 4.3: Existence of a fully-fledged and functional information and communication technology (ICT) department

Table 4.2 and Figure 4.3 shows that 83% of the studied firms had fully fledged and operational IT departments. Thus, the firms that were selected in the present study greatly valued ICT, providing a strong indication and the need for IT innovation which was the central theme in the present study.

4.3.3 Scale of Operation

The results on scale of operation of the studied firms were determined and summarized as indicated in Table 4.3.

Table 4.3: Scale of Operation

	Frequency	Percent
Locally established	7	17.1
Regionally established	20	48.8
Globally established	14	34.1
Total	**41**	**100.0**

A breakdown of the results in Table 4.3 is further provided in Figure 4.4.

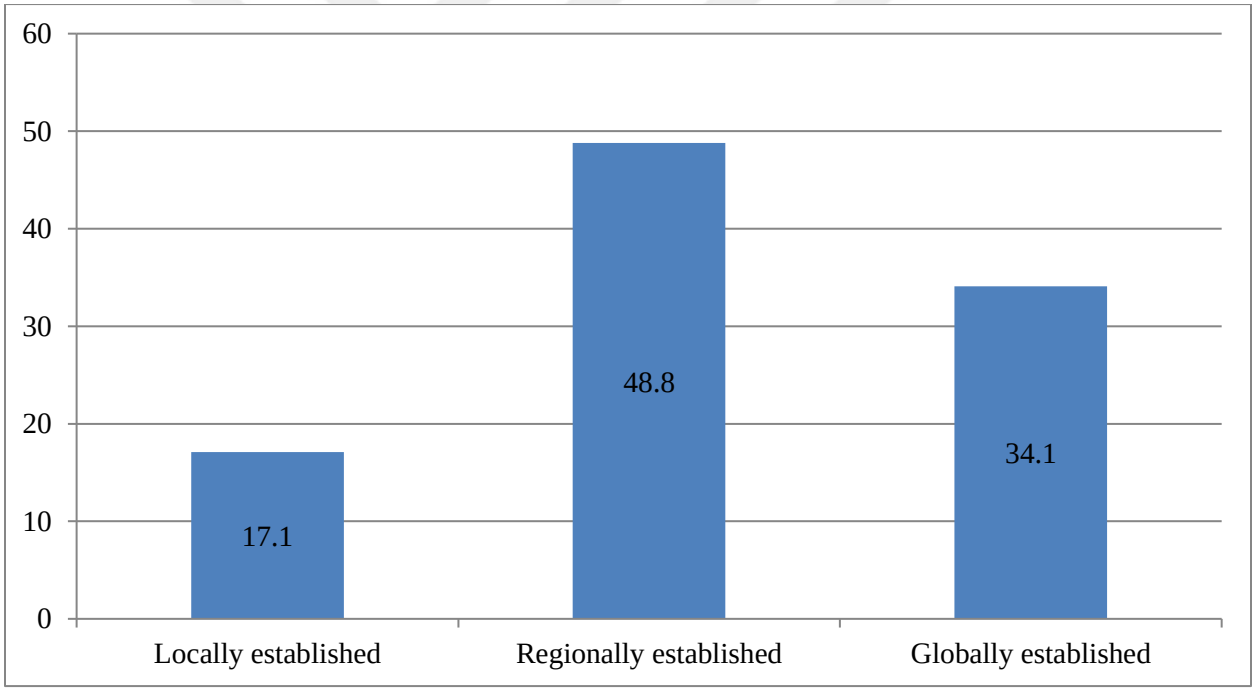


Figure 4.4: Scale of Operation

From the findings in Table 4.3 and Figure 4.4, it is evident that while 48.8% of the studied firms had a regional scale of operation, 17.1% operated locally. This shows that there was a blend between local, regional and international establishments, implying that versatile views of technological innovations were sought.

4.3.4 Average Employees

The results on average employees in the studied firms were determined and summarized as shown in Table 4.4.

Table 4.4: Average Employees

	Frequency	Percent
11-20 employees	5	12.2
21-30 employees	6	14.6
31-40 employees	10	24.4
Over 41 employees	20	48.8
Total	**41**	**100.0**

The findings in Table 4.4 are further provided in Figure 4.5.

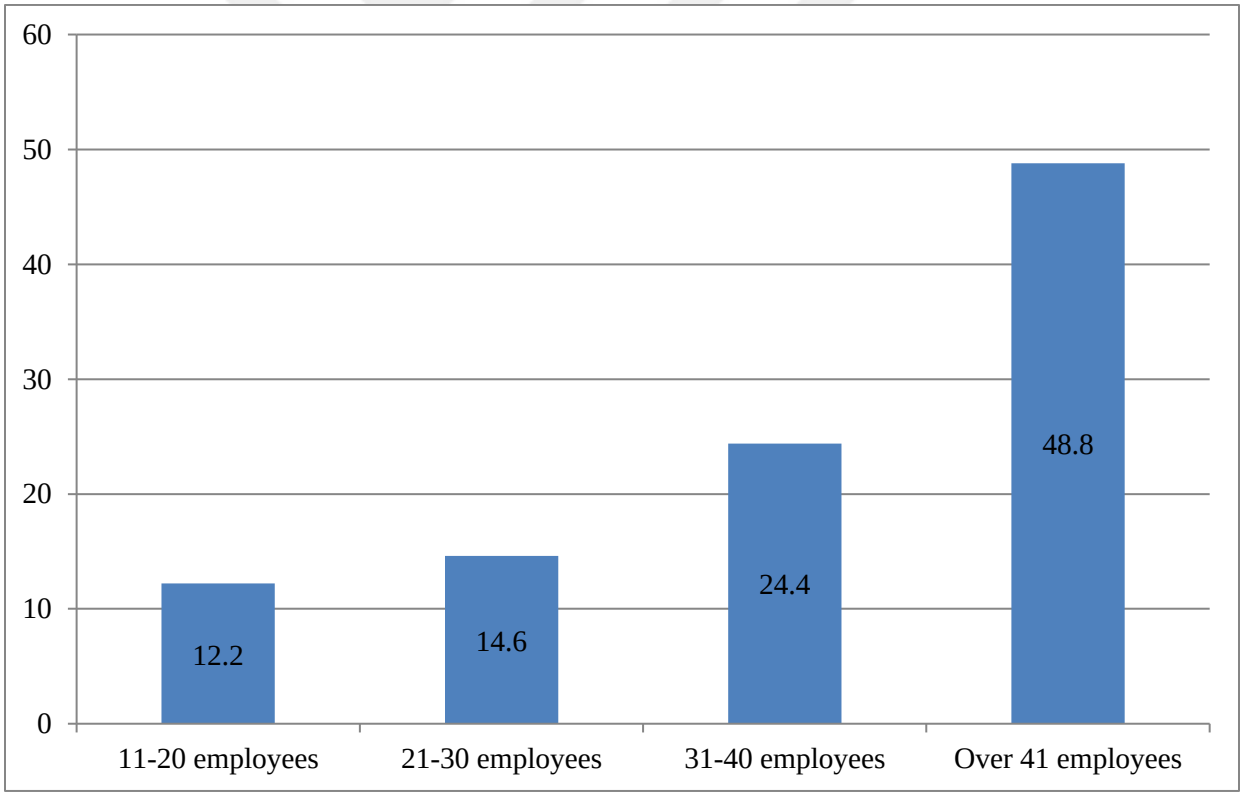


Figure 4.5: Average Employees

The findings in Figure 4.5 show that while 48.8% of the studied firms had over 41 employees, 12.2% had 11-20 employees. This means that most of the studied firms opted to have a lean team for better performance of their duties which in turn contributed towards better performance.

4.4 Organizational Performance

The subsequent sections provide findings on organizational performance which was the dependent variable of the study.

4.4.1 Customer satisfaction

The findings on customer satisfaction as an indicator of organizational performance were determined and presented as shown in Table 4.5.

Table 4.5: Customer satisfaction

Statements on Customer satisfaction	Strongly disagree	disagree	undecided	agree	Strongly agree	Mean
The firm seeks to satisfy the needs of customers	0.0%	2.4%	31.7%	51.2%	14.6%	3.78
The firm exceeds the expectations of the customers	2.4%	2.4%	34.1%	48.8%	12.2%	3.66
Average						**3.72**

The value of average in Table 4.5 is given as (M=3.72), this implies that the studied firms ensured that there was customer satisfaction in their operations. This fact was reinforced by 65.8% and 61% of the respondents who agreed that their firms firm sought to satisfy the needs of customers besides exceeding the expectations of their customers respectively. Thus, customer satisfaction in the studied firms entailed satisfaction of the needs and meeting or exceeding the expectations of the customers.

4.4.2 Efficiency & effectiveness

Table 4.6 is a breakdown of results on efficiency and effectiveness.

Table 4.6: Efficiency & effectiveness

Statements on Efficiency & effectiveness	Strongly disagree	disagree	undecided	agree	Strongly agree	Mean
I am an efficient in my firm	0.0%	14.6%	14.6%	61%	9.8%	3.66
I effectively discharge my duties in this firm	0.0%	0.0%	22%	48.8%	29.3%	4.07
Average						**3.86**

The results in Table 4.6 show the value of average as (M=3.86), this implies that the studied firms strived to realize efficiency and effectiveness in the operations. Through this, 78.1% and 70.8% of the respondents agreed that they effectively discharged their duties besides being efficient respectively.

4.4.3 Profitability

The findings on profitability were determined and summarized as shown in Table 4.7.

Table 4.7: Profitability

Statements on Profitability	Strongly disagree	disagree	undecided	agree	Strongly agree	Mean
The firm has improved on its ROA for the last five years	0.0%	14.6%	0.0%	68.3%	17.1%	3.88
There has been an improvement in ROE of your firm for the last 5 years	0.0%	9.8%	0.0%	80.5%	9.8%	3.90
Average						3.89

Table 4.7 shows that on overall, the studied firms aimed at achieve profitability (M=3.89). Through this, 90.3% and 85.4% of the respondents agreed that there had been an improvement in ROE and ROA in the studied firms respectively. Thus, ROE and ROA guided the profitability goal and objective of the studied firms.

4.4.4 Market share

The findings on market share were determined and summarized in Table 4.8.

Table 4.8: Market share

Statements on Market share	Strongly disagree	disagree	undecided	agree	Strongly agree	Mean
There has been a general improvement in market share of this firm	0.0%	2.4%	17.1%	73.2%	7.3%	3.85
I aim at improving the market share of my firm	2.4%	17.1%	14.6%	41.5%	24.4%	3.68
Average						**3.76**

The findings in Table 4.8 indicate the average value as (M=3.76), this means that market share was highly valued among the studied. Through this, 80.5% and 65.9% of the respondents were in

agreement that there had been a general improvement in market share besides staff aiming at improving the market share of their respective firms. This implies that improving the market share was one of the objectives that guided existence and operations of the studied firms.

4.4.5 Serve Quality

The findings on service quality were determined and summarized as shown in Table 4.9.

Table 4.9: Serve quality

Statements on Serve quality	Strongly disagree	disagree	undecided	agree	Strongly agree	Mean
I ensure quality services to customers	0.0%	12.2%	14.6%	61%	12.2%	3.73
The firm has well established quality expectations	0.0%	0.0%	29.3%	58.5%	12.2%	3.83
Average						**3.78**

The results in Table 4.9 are that the studied firms were doing well in terms of service quality (M=3.78). This was supported by 73.2% and 70.7% of the respondents who shared that they ensured ensure quality services to customers besides their firms having well established quality expectations respectively. This means that service quality enabled the studied firms to ensure quality services and expectations which in turn contributed to better performance.

4.4.6 Ranking of the Indicators of Performance

Table 4.10 provides the ranking of the indicators of organizational performance of the studied firms. This was done based on the values of the average for each of the indicators of organizational performance.

Table 4.10: Ranking of the Indicators of Performance

Indicator	Average	Rank
Profitability	3.89	1
Efficiency & effectiveness	3.86	2
Service quality	3.78	3
Market share	3.76	4
Customer satisfaction	3.72	5

From Table 4.10, it can be observed that the highly realized indicator of performance of the studied firms was profitability (M=3.89) followed by efficiency & effectiveness (M=3.86), service quality (M=3.78), market share (M=3.76) and lastly customer satisfaction (M=3.72). This means that organizational performance in the studied firms revolved around an array of indicators.

4.5 Technological innovation practices among Moroccan brands and their effect on organizational performance

The first objective aimed at determining the technological innovation practices among Moroccan brands and their effect on performance. This objective was achieved through percentages, means, correlation and regression analysis.

4.5.1 Technological innovation practices among Moroccan brands

The findings on technological innovation practices were determined and summarized as indicated in the subsequent sections.

4.5.1.1 Radical technological innovation

The first aspect of technological innovation practices was radical technological innovation. The findings were established through percentages and means and summarized as indicated in Table 4.11.

Table 4. 11: Radical technological innovation

Statements on Radical technological innovation	Strongly disagree	disagree	undecided	agree	Strongly agree	Mean
Your company has adopted technological solutions that are relatively new in the industry	0.0%	12.2%	7.3%	73.2%	7.3%	3.76
Your firm has embraced new technological solutions that are different from the existing ones	0.0%	19.5%	14.6%	41.5%	24.4%	3.71
Radical technological innovation has helped this firm to create demand that was not recognized previously by consumer	0.0%	12.2%	24.4%	43.9%	19.5%	3.71
Average						**3.72**

The findings in Table 4.1 are that radical technological innovation was practiced in the studied firms (M=3.72). Due to this, 80.5% of the respondents agreed that their firm had adopted technological solutions that were relatively new in the industry. At the same time, 65.9% of respondents were in agreement that their firm had embraced new technological solutions that were different from the existing ones while 63.4% said that radical technological innovation had helped the firm to create demand that was not recognized previously by consumer.

4.5.1.2 Incremental technological innovation

The findings on incremental innovation were established and summarized as shown in Table 4.12.

Table 4.12: Incremental technological innovation

Statements on Incremental technological innovation	Strongly disagree	disagree	undecided	agree	Strongly agree	Mean
The firm has adopted technological solutions aimed at improving the already available services	0.0%	12.2%	14.6%	46.3%	26.8%	3.88
New technological features that may not lead to significant variation in the market have been added to the already existing ones in this firm	0.0%	4.9%	22%	58.5%	14.6%	3.83
The company has been consistent on making small improvements to the available services	0.0%	12.2%	9.8%	61%	17.1%	3.83
Average						3.84

The results in Table 4.12 indicated that the studied firms practiced incremental technological innovation (M=3.84). By leveraging this incremental technological innovation, 78.1% of the respondents agreed that their firm had been consistent on making small improvements to the available services. A further 73.1% of the respondents observed that their firm had adopted technological solutions aimed at improving the already available services. Besides, 73.1% also agreed that new technological features that did not lead to significant variation in the market had been added to the already existing ones in the firm. This implies that incremental innovation

enabled the studied firms to ensure consistent continuous improvement while at the same time adding new technologies to the already existing portfolio.

4.5.1.3 Technological knowledge management

The findings on technological knowledge management were determined and summarized as presented in Table 4.13.

Table 4.13: Technological knowledge management

Statements on Technological knowledge management	Strongly disagree	disagree	undecided	agree	Strongly agree	Mean
The processes of acquisition of knowledge is key in any IT knowledge management practices	0.0%	7.3%	0.0%	75.6%	17.1%	4.02
The usage of knowledge is critical in any IT knowledge management practice of a firm like yours	0.0%	7.3%	12.2%	46.3%	34.1%	4.07
IT knowledge management has contributed towards technological learning capability that is critical in driving innovations in your firm	0.0%	7.3%	12.2%	58.5%	22%	3.95
Average						4.01

From Table 4.13, it can be observed that technological knowledge management was practiced in the studied firms (M=4.01). By adopting technological knowledge management, 92.7% of the respondents agreed that the processes of acquisition of knowledge were key in any IT knowledge management practices. At the same time, 80.5% of the respondents shared that IT knowledge management had contributed towards technological learning capability that was critical in driving innovations in the firm. The findings were that 80.4% of the respondents shared that usage of knowledge was critical in any IT knowledge management practice of a firm.

4.5.1.4 Information technology (IT) infrastructures

The findings on information technology (IT) infrastructures were determined and summarized as shown in Table 4.14.

Table 4.14: Information technology (IT) infrastructures

Statements on information technology (IT) infrastructures	Strongly disagree	disagree	undecided	agree	Strongly agree	Mean
IT infrastructures helps this firm to deliver technology related services to its stakeholders	0.0%	7.3%	26.8%	58.5%	7.3%	3.66
IT infrastructure provides the foundation of adopting the technological innovation practices needed for this firm to remain competitive	0.0%	12.2%	12.2%	46.3%	29.3%	3.93
All technology related solutions in your firm require effective functioning of the existing IT infrastructures	0.0%	7.3%	26.8%	58.5%	7.3%	3.66
Average						**3.75**

From Table 4.14, it is evident that information technology (IT) infrastructures were in place in the studied firms (M=3.75). According to 75.6% of the respondents, the IT infrastructure provided the foundation of adopting the technological innovation practices needed to remain competitive while 65.8% observed that the IT infrastructures helped their firm to deliver technology related services to its stakeholders. It emerged from 65.8% of the respondents that all technology related solutions in the firm required effective functioning of the existing IT infrastructures.

4.5.1.5 Information sharing

The findings on information sharing as another component of technological innovation practice were determined and summarized as pointed out in Table 4.15.

Table 4.15: Information sharing

Statements on Information sharing	Strongly disagree	disagree	undecided	agree	Strongly agree	Mean
The spread of social technologies has allowed your firm to share information more easily without any effort	0.0%	4.9%	9.8%	63.4%	22%	4.02
Accurate information sharing facilitate effective decision making in your firm	0.0%	19.5%	12.2%	39%	29.3%	3.78
Timely sharing of information has resulted into reduction in uncertainty in this firm	0.0%	7.3%	26.8%	46.3%	19.5%	3.78
Average						**3.86**

The findings in Table 4.15 indicate that there was information sharing in the studied firms (M=3.86). Through this information sharing, 85.4% of the respondents shared that the spread of social technologies had allowed the firm to share information more easily without any effort. A further 68.3% of the respondents were in agreement that accurate information sharing facilitated effective decision making in the firm. It emerged from 65.8% of the respondents that timely sharing of information had resulted into reduction in uncertainty in the firm.

4.5.1.6 Ranking of the Technological innovation practices

The ranking of the indicators of technological innovation practices was done guided by the values of averages and a breakdown shown in Table 4.16.

Table 4.16: Ranking of the Technological innovation practices

	Average	Rank
Technological knowledge management	4.01	1
Information sharing	3.86	2
Incremental technological innovation	3.84	3
Information technology (IT) infrastructures	3.75	4
Radical technological innovation	3.72	5

The findings in Table 4.16 are that the highly practiced technological innovation in the studied firm was technological knowledge management (M=4.01) followed by information sharing (M=3.86), incremental technological innovation (M=3.84), information technology infrastructure (M=3.75) and radical technological innovation (M=3.72).

4.5.2 Relationship between Technological innovation practices and organizational performance

Correlation analysis was adopted to predict the relationship between technological innovation practices and organizational performance. Table 4.17 is a breakdown of the findings.

Table 4.17: Relationship between Technological innovation practices and organizational performance

		Organizational performance	Radical technological innovation	Incremental technological innovation	Technological knowledge management	information technology (IT) infrastructures	Information sharing
Organizational performance	Pearson Correlation	1	.687				
Radical technological innovation	Pearson Correlation	.687	1				
Incremental technological innovation	Pearson Correlation	.370	.221	1			
Technological knowledge management	Pearson Correlation	.547	.527	.132	1		
information technology (IT) infrastructures	Pearson Correlation	.544	.456	.408	.567	1	
Information sharing	Pearson Correlation	.777	.883	.347	.630	.513	1

Table 4.17 shows that while information sharing (r=0.777), radical technological innovation (r=0.687), technological knowledge management (r=0.547) and information technology (IT) infrastructures (0.544) all had strong and positive relationship with organizational performance; incremental technological innovation had a strong and moderate relationship. It then follows that technological innovation practices have positive relationship with organizational performance.

4.5.3 Effect of Technological innovation practices on organizational performance

The effect of technological innovation practices on organizational performance was explored through regression analysis. Table 4.18 is the result of the model summary.

Table 4.18: Model Summary of Technological innovation practices and organizational performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.798	.637	.585	1.48299

From Table 4.18, it can be deduced that technological innovation practices have strong and far reaching implication on organizational performance (R=0.798). It can further be observed that 58.5% change in performance of Moroccan brands is explained by the technological innovation practices that have been adopted. It then follows that aside from technological, there are still other additional factors with an implication on performance of these that should be addressed by further studies. Table 4.9 is a breakdown of the coefficients and significance.

Table 4.19: Regression Beta Coefficients of Technological innovation practices and organizational performance

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	3.307	1.368		2.417	.000
Radical technological innovation	.259	.103	.044	2.555	.027
Incremental technological innovation	.316	.102	.082	3.098	.013
Technological knowledge management	.361	.104	.046	3.471	.017
information technology (IT) infrastructures	.253	.122	.157	2.071	.011
Information sharing	.791	.336	.600	2.356	.024

$Y= 3.307+0.259X_1+0.316X_2 +0.361X_3 +0.253X_4+0.791X_5$ …… (i)

Where;

Y-is the dependent variable organizational performance

X_1 = Radical technological innovation

X_2 = Incremental technological innovation

X_3 = Technological knowledge management

X_4= information technology (IT) infrastructures

X_5= Information sharing

From Table 4.19 on the basis of the beta coefficients, it can be observed that a unit increment in radical technological innovation would lead to 0.259 unit increase in performance. An increase in incremental technological innovation by a unit would result into 0.316 unit increase in performance. An improvement in technological knowledge management by a unit would lead to 0.361 unit increase in performance. An increase in it infrastructure by a unit would result into 0.253 unit increase in performance. An improvement in information sharing by a unit would result into 0.791 unit increase in performance. Thus, it can be summed up that an increase in information sharing exerted the greatest effect on performance followed by technological knowledge management, incremental technological innovation, radical technological innovation and lastly technological knowledge management. In terms of significance, it can be inferred that radical technological innovation ($p<0.05$), incremental technological innovation ($p<0.05$), technological knowledge management ($p<0.05$), information technology (IT) infrastructures ($p<0.05$) and information sharing ($p<0.05$) are all significant predictors of organizational performance.

4.6 Risks presented by technological innovations among Moroccan brands and their effect on organizational performance

The second objective was designed to determine the risks presented by technological innovations among Moroccan brands and their effect on organizational performance. The findings were determined and presented as indicated in the subsequent sections.

4.6.1 Risks presented by technological innovations

The subsequent sections detail the findings of descriptive statistics on the risks that are presented by technological innovations.

4.6.1.1 Data privacy

The findings on data privacy were established and summarized as shown in Table 4.20.

Table 4.20: Data privacy

Statements on Data privacy	Strongly disagree	disagree	undecided	agree	Strongly agree	Mean
Safeguarding the privacy of the data of the consumers has been a risk in your firm	0.0%	0.0%	34.1%	46.3%	19.5%	3.85
It is risky for this firm to ensure that private information of consumers end up to the purpose it serves	0.0%	7.3%	19.5%	65.9%	7.3%	3.73
Average						**3.79**

Table 4.20 indicate that data privacy was one of the risk that were occasioned by technological innovations that had been embraced by the studied firms (M=3.79). Through data privacy, 73.2% of the respondents agreed that it was risky for the firm to ensure that private information of consumers ended up to the purpose it served. It further emerged from 65.8% of the respondents that safeguarding the privacy of the data of the consumers had been a risk in the studied firms.

4.6.1.2 Data breach

The results on data breach were determined and summarized as shown in Table 4.21.

Table 4.21: Data breach

Statements on Data breach	Strongly disagree	disagree	undecided	agree	Strongly agree	Mean
The possibility of data breach is a serious risk in this firm	0.0%	0.0%	26.8%	46.3%	26.8%	4.00
The risk of data breach has caused significant financial loss to this firm	0.0%	7.3%	26.8%	46.3%	19.5%	3.78
Average						**3.89**

The results in Table 4.21 indicate that data breach was identified as one of the risks associated with technological innovation that the studied firms had adopted (M=3.89). It was shown from 73.1% of the respondents that possibility of data breach was a serious risk in the firm and 65.8% shared that the risk of data breach had caused significant financial loss to the firm.

4.6.1.3 Reputation risk

The findings on reputational risk were determined and presented as shown in Table 4.22.

Table 4.22: Reputation risk

Statements on Reputation risk	Strongly disagree	disagree	undecided	agree	Strongly agree	Mean
Susceptibility of the systems of your firm to biasness has led to reputation risk	0.0%	14.6%	7.3%	65.9%	12.2%	3.76
The fact that hackers can penetrate the systems of your firm expose the firm to reputation risk	0.0%	7.3%	12.2%	73.2%	7.3%	3.80
Average						**3.78**

From Table 4.22, it is evident that reputation risk was a serious in the studied firms (M=3.78). Through this reputational risk, 80.5% of the respondents observed that fact that hackers could penetrate the systems of the firm exposed it to reputation risk while 78.1% shared that susceptibility of the systems of your firm to biasness has led to reputation risk.

4.6.1.4 Cyber security risk

The findings on cyber security risk were established and summarized as shown in Table 4.23.

Table 4.23: Cyber security risk

Statements on Cyber security risk	Strongly disagree	disagree	undecided	agree	Strongly agree	Mean
Terrorist activities are one of the key risks presented by technological innovations in this firm	0.0%	14.6%	12.2%	63.4%	9.8%	3.68
Cybercrime is a risk that has been presented by heavy investment in technological innovations by your firm	0.0%	4.9%	24.4%	58.5%	12.2%	3.78
Average						3.73

From Table 4.23, the study observed that cyber security risk resulted from technological innovations that the studied firms had adopted (M=3.73). It was shown from 73.2% of the respondents that terrorist activities were one of the key risks presented by technological innovations in the firm. The findings from 70.7% of the respondents were that cybercrime was a risk that had been presented by heavy investment in technological innovations by the firm.

4.6.1.5 Operational risks

Table 4.24 is a breakdown of the findings on operational risks

Table 4.24: Operational risks

Statements on Operational risks	Strongly disagree	disagree	undecided	agree	Strongly agree	Mean
Operational risks had led to reduction of service quality in your firm	0.0%	4.9%	17.1%	63.4%	14.6%	3.88
Operational risk have contributed to an increase in operating expenses in your firm	0.0%	0.0%	7.3%	17.1%	75.6%	3.68
Average						**3.78**

Table 4.24 shows that operational risks was evident in the studied firms (M=3.78). Because of this reputational risk, 92.7% of the respondents observed that operational risk had contributed to an increase in operating expenses in the firm. At the same time, 78% of the respondents shared that operational risks had led to reduction of service quality in the firm.

4.6.1.5 Ranking of the Risks presented by technological innovations

The ranking of the risks presented by technological innovations and the findings established were summarized as shown in Table 4.25.

Table 4.25: Ranking of the Risks presented by technological innovations

	Average	Rank
Data breach	3.89	1
Data privacy	3.79	2
Reputation risk	3.78	3
Operational risks	3.78	4
Cyber security risk	3.73	5

The findings in Table 4.25 indicate that the most prevent risk that technological innovations had created was data breach (M=3.89) followed by data privacy (M=3.79), reputational risk (M=3.78), operational risks (M=3.78) and lastly cyber security risk (M=3.73). This means that technological innovation practices in the studied firms resulted into significant risks.

4.6.2 Relationship between Risks presented by technological innovations and organizational performance

The between risks presented by technological innovations and organizational performance was explored through correlation analysis and the findings presented as shown in Table 4.26.

Table 4.26: Relationship between Risks presented by technological innovations and organizational performance

		Organizational performance	Data privacy	Data breach	Reputation risk	Cyber security risk	Operational risks
Organizational performance	Pearson Correlation	1					
Data privacy	Pearson Correlation	.399	1				
Data breach	Pearson Correlation	.486	.264	1			
Reputational risk	Pearson Correlation	.468	.546	.279	1		
Cyber security risk	Pearson Correlation	.397	.206	.470	.052	1	
Operational risks	Pearson Correlation	.437	.243	.170	.289	.265	1

The findings in Table 4.26 indicate that data breach (r=0.486), reputational risk (r=0.468), operational risk (r=0.437), data privacy (r=0.399) as well as cyber security risk (r=0.397) all have moderate and positive relationship with organization. It then follows that the risks occasioned by technological innovation are positive correlates of organizational performance.

4.6.3 Effect of Risks presented by technological innovations on organizational performance

Regression analysis was adopted to predict the risks presented by technological innovations on organizational performance. The findings of the model summary were established and summarized as shown in Table 4.27.

Table 4.27: Model Summary of the Effect of Risks presented by technological innovations on organizational performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.836[a]	.700	.657	1.34862

The findings in Table 4.27 are that on overall, 65.7% change in performance of Moroccan brands is explained by the risks presented by technological innovations. This means that there are other additional that have an effect on organizational performance that future studies should seek to establish.

Table 4. 28: Regression Coefficients of Effect of Risks presented by technological innovations on organizational performance

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	3.383	1.332		2.540	.000
Data privacy	.702	.273	.272	2.573	.014
Data breach	.582	.190	.302	3.055	.004
Reputation risk	.304	.135	.126	2.252	.000
Cyber security risk	.196	.091	.115	2.154	.026
Operational risks	.264	.095	.062	2.779	.027

From Tabled 4.28, the following equation is predicted between risks presented by technological innovations and organizational performance:

$$\mathbf{Y= 3.383 +0.702X_1+0.582X_2+0.304X_3 +0.196X_4+0.264X_5} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.. \mathbf{(II)}$$

Where;

Y-is the dependent variable organizational performance

$\mathbf{X_1}$ = Data privacy

$\mathbf{X_2}$ = Data breach

$\mathbf{X_3}$ = Reputation risk

$\mathbf{X_4}$= Cyber security risk

$\mathbf{X_5}$= Operational risks

Taking the level of significance as 5%, the study documented that data privacy ($p<0.05$), data breach ($p<0.05$), reputational risk ($p<0.05$), cyber security risk ($p<0.05$) and operational risk ($p<0.05$) are all significant predictors of organizational performance. It then follows that the risks presented by technological innovations are significant predictors of organizational performance.

4.7 Joint relationship between technological innovation practices, the risks presented by technological innovations and organizational performance

The last objective of the study was to establish the joint effect of technological innovation practices, the risks presented by technological innovations and organizational performance. The findings were established and summarized as shown in the subsequent sections.

4.7.1 Joint Correlation Results

The findings on the joint relationship between technological innovation practices, the risks presented by technological innovations and organizational performance were determined and summarized as shown in Table 4.29.

Table 4.29: Joint Correlation Results

		Organizational performance	technological innovation practices	risks by technological innovations
Organizational performance	Pearson Correlation	1		
technological innovation practices	Pearson Correlation	.607	1	
risks by technological innovations	Pearson Correlation	.710	.487	1

The findings in Table 4.29 show that when considered jointly, the risks presented by technological innovations (r=0.710) and technological innovation practices (r=0.607) are positive correlate of organizational performance.

4.4.2 Joint Regression Results

The findings on the joint effect of technological innovation practices, the risks presented by technological innovations on organizational performance were determined through regression. Table 4.30 is a breakdown of the model summary.

Table 4.30: Joint Model Summary Results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.770[a]	.593	.572	1.50574

The findings in Table 4.30 indicate that on overall, technological innovation practices and the risks presented by technological innovations jointly explain 57.2% variation in organizational performance (Adj. R^2= 0.572). This shows that there are other additional factors aside from technological innovation practices and the risks presented by technological innovations that have an effect on organizational performance that future studies should seek to establish. Table 4.31 is a breakdown of the beta coefficients and the significance.

Table 4.31: Joint Beta Coefficient Results

	Unstandardized Coefficients		Standardized Coefficients		
	B	**Std. Error**	**Beta**	**t**	**Sig.**
(Constant)	5.081	4.521		1.124	.268
technological innovation practices	.232	.080	.342	2.886	.006
risks presented by technological innovations	.517	.113	.544	4.589	.000

From Table 4.31, the following equation is predicted between technological innovation practices and the risks presented by technological innovations and organizational performance

$Y= 5.081 +.232X_1+.517X_2$…….…… (III)

Where;

Y-is the dependent variable organizational performance

X_1 = Technological innovation practices

X_2 = Risks presented by technological innovations

Table 4.31 shows that on overall, technological innovation practices ($p<0.05$) and the risks presented by technological innovations ($p<0.05$) all have a significant joint effect on organizational performance.

4.8 Discussion

4.8.1 Technological innovation practices among Moroccan brands and their effect on organizational performance

The findings were that technological innovation practices had been adopted among Moroccan brands. The highly practiced technological innovation in the studied firm was technological knowledge management (M=4.01) followed by information sharing (M=3.86), incremental technological innovation (M=3.84), information technology infrastructure (M=3.75) and radical technological innovation (M=3.72). The findings were that radical technological innovation was practiced in the studied firms (M=3.72). Through these radical innovations, Dastane (2020) observed that organizations are able to come up with new market structures or industries. Radical innovation result into significant revolution and it allows organizations to make substantial changes to strategic management system including the development of new customers, markets and networks.

Due to the adoption of radical innovation, 80.5% of the respondents agreed that their firm had adopted technological solutions that were relatively new in the industry. This agrees with Coccia (2017) who shared that radical technological innovation practice involves solutions that are relatively new. At the same time, 65.9% of respondents were in agreement that their firm had embraced new technological solutions that were different from the existing ones. This finding is in agreement with Coccia (2017) who noted that radical technological innovation practice involves solutions that are relatively new as well as different from the existing ones and they help in generation of new markets. On the other hand, 63.4% said that radical technological innovation had helped the firm to create demand that was not recognized previously by consumer. The finding agree with Lynn and Akgün (2001) who observed that radical technological innovation helps in creating demand that is not recognized previously by consumer.

The results indicated that the studied firms practiced incremental technological innovation (M=3.84). By leveraging this incremental technological innovation, 78.1% of the respondents agreed that their firm had been consistent on making small improvements to the available services. A further 73.1% of the respondents observed that their firm had adopted technological

solutions aimed at improving the already available services. Besides, 73.1% also agreed that new technological features that did not lead to significant variation in the market had been added to the already existing ones in the firm. This implies that incremental innovation enabled the studied firms to ensure consistent continuous improvement while at the same time adding new technologies to the already existing portfolio. Coccia (2017) shared that this incremental technological innovation practices aim at coming up with solutions for improving the already available services or products for instance, the addition of new features which may not lead to significant variation in the market.

It was observed that technological knowledge management was practiced in the studied firms (M=4.01). By adopting technological knowledge management, 92.7% of the respondents agreed that the processes of acquisition of knowledge were key in any IT knowledge management practices. At the same time, 80.5% of the respondents shared that IT knowledge management had contributed towards technological learning capability that was critical in driving innovations in the firm. The findings were that 80.4% of the respondents shared that usage of knowledge was critical in any IT knowledge management practice of a firm. The necessary condition for effective adoption and functioning of technological innovation is IT knowledge management practice (Anadon, Chan, Harley, Matus, Moon, Murthy & Clark, 2016). For most organization, effective adoption and implementation of knowledge management infrastructures is an essential require for adoption of technological innovations aimed at ensuring superior performance (Haas & Hansen, 2005). Enhancing the processes of acquisition and usage of knowledge is critical in any IT knowledge management practices in the firm (Heisig, 2009). IT knowledge management contributed towards technological learning ability and capability that is critical in driving innovations in an organization (Ni, 2018).

The study noted that information technology (IT) infrastructures were in place in the studied firms (M=3.75). According to 75.6% of the respondents, the IT infrastructure provided the foundation of adopting the technological innovation practices needed to remain competitive while 65.8% observed that the IT infrastructures helped their firm to deliver technology related services to its stakeholders. It emerged from 65.8% of the respondents that all technology related solutions in the firm required effective functioning of the existing IT infrastructures. For most organization, effective adoption and implementation of knowledge management infrastructures is

an essential require for adoption of technological innovations aimed at ensuring superior performance (Haas & Hansen, 2005).

The findings indicate that there was information sharing in the studied firms (M=3.86). Through this information sharing, 85.4% of the respondents shared that the spread of social technologies had allowed the firm to share information more easily without any effort. A further 68.3% of the respondents were in agreement that accurate information sharing facilitated effective decision making in the firm. It emerged from 65.8% of the respondents that timely sharing of information had resulted into reduction in uncertainty in the firm. To embrace technological innovation, an organization should have adequate information sharing mechanisms. Lee (2015) provided the definition of information sharing as an activity involving official on non-official transfer of knowledge between organizations.

The results show that while information sharing (r=0.777), radical technological innovation (r=0.687), technological knowledge management (r=0.547) and information technology (IT) infrastructures (0.544) all had strong and positive relationship with organizational performance; incremental technological innovation had a strong and moderate relationship. It then follows that technological innovation practices have positive relationship with organizational performance. It was observed that 58.5% change in performance of Moroccan brands is explained by the technological innovation practices that have been adopted. In terms of significance, it can be inferred that radical technological innovation ($p<0.05$), incremental technological innovation ($p<0.05$), technological knowledge management ($p<0.05$), information technology (IT) infrastructures ($p<0.05$) and information sharing ($p<0.05$) are all significant predictors of organizational performance. Thus, technological innovations have positive relationship with organizational performance. The study by Mbogori and Moguche (2021) focused on technological innovation and performance of firms that engage in manufacturing of cement in Kenya. It was observed from the findings that technological innovation is positive and significant predictor of performance of manufacturing entities. It emerged from the analysis that the promoters of technological positively lead to performance of the firm. Wachira (2013) focused on technological innovation and the role it plays as far as performance in financial terms of the firm is concerned. The specific focus of the study was on Kenyan commercial banks. A positive

and significant implication of technological innovation on firm performance was registered in this study.

Thus, technological innovation practices have significant effect on organizational performance. These views agree with El-Chaarani and El-Abiad (2018) who shared that investing in technological innovation has direct implication on performance of firms especially in the context of Lebanon. In the Kenyan context, Mwangi (2021) observed that technological innovation is key tool of enhancing financial performance of the entity. Letangule, Letting and Nicholas (2012) observed some of the technological innovation practices covering models of technological innovation, the process of technological innovation as well as factors impacting on the need to adopt technological innovation. In a study by Owuor (2018), the main focus was on disruptive technology and its implication on ability of insurance firms in Kenya to perform. It was noted that when a firm improves its technological innovation landscape, it is likely to attain superior performance. Gichohi (2022) was keen in exploring how technological innovation impacts on performance of firms dealing in manufacture of cement in Kenyan context. From regression, it was predicted that technological innovation shapes and enhances performance at firm level. Keitany, Chepkilot and Tanui (2018) were interested in predicting the nexus between technological innovation ability of firms to remain competitive in Kenyan context. The study noted that firms that have adopted technological innovation are more competitive as compared to those that have ignored the benefits of the same. The study conducted by Wambua, Muturi, Rotich and Ogollah (2017) placed emphasis on strategy for technological innovation and the implication on performance at firm level. It emerged from the results that technological innovation is a key predictor of performance at the firm level. Chege and Wang (2020) were interested in bringing out the nexus between technological innovation and performance at the small and medium enterprise level. It was shown from the findings that technological innovation has an effect that is significant on ability of the firm to perform. Wasike (2016) did an analysis of the implication of technological innovation on loyalty of customers in a banking sector context. It was observed that the adoption of technological innovation enhances performance at firm level.

4.8.2 Risks presented by technological innovations among Moroccan brands and their effect on organizational performance

Technological innovations presented a number of risks to Moroccan brands. The most prevent risk that technological innovations had created was data breach (M=3.89) followed by data privacy (M=3.79), reputational risk (M=3.78), operational risks (M=3.78) and lastly cyber security risk (M=3.73). This means that technological innovation practices in the studied firms resulted into significant risks. It was shown that data privacy was one of the risk that were occasioned by technological innovations that had been embraced by the studied firms (M=3.79). Through data privacy, 73.2% of the respondents agreed that it was risky for the firm to ensure that private information of consumers ended up to the purpose it served. It further emerged from 65.8% of the respondents that safeguarding the privacy of the data of the consumers had been a risk in the studied firms.

The results were that data breach was identified as one of the risks associated with technological innovation that the studied firms had adopted (M=3.89). It was shown from 73.1% of the respondents that possibility of data breach was a serious risk in the firm and 65.8% shared that the risk of data breach had caused significant financial loss to the firm. It emerged that reputation risk was a serious in the studied firms (M=3.78). Through this reputational risk, 80.5% of the respondents observed that fact that hackers could penetrate the systems of the firm exposed it to reputation risk while 78.1% shared that susceptibility of the systems of your firm to biasness has led to reputation risk.

The study observed that cyber security risk resulted from technological innovations that the studied firms had adopted (M=3.73). It was shown from 73.2% of the respondents that terrorist activities were one of the key risks presented by technological innovations in the firm. The findings from 70.7% of the respondents were that cybercrime was a risk that had been presented by heavy investment in technological innovations by the firm. Operational risks was evident in the studied firms (M=3.78). Because of this reputational risk, 92.7% of the respondents observed that operational risk had contributed to an increase in operating expenses in the firm. At the same time, 78% of the respondents shared that operational risks had led to reduction of service quality in the firm.

The findings indicate that data breach (r=0.486), reputational risk (r=0.468), operational risk (r=0.437), data privacy (r=0.399) as well as cyber security risk (r=0.397) all have moderate and positive relationship with organization. It then follows that the risks occasioned by technological innovation are positive correlates of organizational performance. It then follows that the risks occasioned by technological innovation have positive interplay with organizational performance. A number of risks accrue to a firm after it has massively invested in technological innovations. One of these risks concerns the need to protect and ensure privacy of the data of the consumers (Littler & Melanthiou, 2006). Organizations are increasingly facing the security of legal violations occasioned by this risk (Bearth & Siegrist, 2016). Consumers are always on a look out for firms that have fully put in place relevant avenues of establishing where their data end up and the purpose it serves. The possibility of data breach is another risk that an organization investing in technological innovations does face (Hellström, 2003). A report by UBM (2019) provided that on average, data breach cost firms an amount equal to $3.92 million. Even in circumstances when an organization has fully implemented relevant mechanisms, data breach does arise.

The findings were that on overall, 65.7% change in performance of Moroccan brands is explained by the risks presented by technological innovations. Taking the level of significance as 5%, the study documented that data privacy ($p<0.05$), data breach ($p<0.05$), reputational risk ($p<0.05$), cyber security risk ($p<0.05$) and operational risk ($p<0.05$) are all significant predictors of organizational performance. It then follows that the risks presented by technological innovations are significant predictors of organizational performance. . Zerzan (2009) observed that some of the technological innovations in an organization can be prone and susceptible to terrorist financing abuse. This is occasioned by the fact that some new technologies at time arise without full knowledge and awareness by those responsible for their supervision. By leveraging on this, aggressive terrorists can be able to meet their hidden goals. The World Bank has been required by most countries around the globe to share some information concerning the new methods of making payments like the use of electronic value cards, the internet as well as mobile phones. This is because each of these payment methods is associated with opportunities as well as risks (Zerzan, 2009). Security risk is a major concern once an organization has invested in technological innovations. As observed by Ferreira, Jalali, Meidutė and Viana (2015), terrorist and cybercrime activities are one of the key concerns for organizations in the current business environment.

4.8.3 Joint relationship between technological innovation practices, the risks presented by technological innovations and organizational performance

The findings show that when considered jointly, the risks presented by technological innovations (r=0.710) and technological innovation practices (r=0.607) are positive correlate of organizational performance. The findings indicate that on overall, technological innovation practices and the risks presented by technological innovations jointly explain 57.2% variation in organizational performance (Adj. R^2= 0.572). It emerged that on overall, technological innovation practices ($p<0.05$) and the risks presented by technological innovations ($p<0.05$) all have a significant joint effect on organizational performance. There is plenty of literature linking technological innovation and organizational performance at firm level. Investing in ICT can help in strengthening and replacing the available information systems and networks and this contribute towards new markets for the firms (Hartoyo & Daryanto, 2016). Investment in ICT is an important avenue of disseminating knowledge and information which help in developing bringing about economic and social changes (Osborn, Amy & Ullah, 2015). Integration of technology and business in every stage of development of business contributes towards operational costs and thus increasing the level of efficiency (Apulu & Latham, 2010). Empirical evidence indicate that timely accessibility to reliable information increasingly contribute towards performance of the firm. Technology contributes towards effective decision making as far as innovation is concerned as far as complexity and compatibility are concerned. Innovative organizations have greater edge that allows firms to gain greater profits and thus contributing towards sustainability (Atuahene-Gima, 2004). Technological innovation contributes towards product value creation and this may include the need to package or label product for special markets including the addition of new features to already available products (Njiraini, Omolo & Gachanja, 2018). It may also contribute towards the development of new products from the primary established ones. Some of key measures of technological innovations include the inputs going through the process of innovation for instance expenditure on R&D as well as direct measures on outputs of innovation like new processes or products (Akinwale et al., 2017). IT innovation is an important variable that help in explaining strategic decision making that contributing towards an edge in an organization.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

A summary of the analyzed findings is presented in the subsequent sections.

5.1.1 Technological innovation practices among Moroccan brands and their effect on organizational performance

The findings were that technological innovation practices had been adopted among Moroccan brands. The highly practiced technological innovation in the studied firm was technological knowledge management (M=4.01) followed by information sharing (M=3.86), incremental technological innovation (M=3.84), information technology infrastructure (M=3.75) and radical technological innovation (M=3.72).

The findings were that radical technological innovation was practiced in the studied firms (M=3.72). Due to this, 80.5% of the respondents agreed that their firm had adopted technological solutions that were relatively new in the industry. At the same time, 65.9% of respondents were in agreement that their firm had embraced new technological solutions that were different from the existing ones while 63.4% said that radical technological innovation had helped the firm to create demand that was not recognized previously by consumer.

The results indicated that the studied firms practiced incremental technological innovation (M=3.84). By leveraging this incremental technological innovation, 78.1% of the respondents agreed that their firm had been consistent on making small improvements to the available services. A further 73.1% of the respondents observed that their firm had adopted technological solutions aimed at improving the already available services. Besides, 73.1% also agreed that new technological features that did not lead to significant variation in the market had been added to the already existing ones in the firm. This implies that incremental innovation enabled the studied firms to ensure consistent continuous improvement while at the same time adding new technologies to the already existing portfolio.

It was observed that technological knowledge management was practiced in the studied firms (M=4.01). By adopting technological knowledge management, 92.7% of the respondents agreed that the processes of acquisition of knowledge were key in any IT knowledge management

practices. At the same time, 80.5% of the respondents shared that IT knowledge management had contributed towards technological learning capability that was critical in driving innovations in the firm. The findings were that 80.4% of the respondents shared that usage of knowledge was critical in any IT knowledge management practice of a firm.

The study noted that information technology (IT) infrastructures were in place in the studied firms (M=3.75). According to 75.6% of the respondents, the IT infrastructure provided the foundation of adopting the technological innovation practices needed to remain competitive while 65.8% observed that the IT infrastructures helped their firm to deliver technology related services to its stakeholders. It emerged from 65.8% of the respondents that all technology related solutions in the firm required effective functioning of the existing IT infrastructures.

The findings indicate that there was information sharing in the studied firms (M=3.86). Through this information sharing, 85.4% of the respondents shared that the spread of social technologies had allowed the firm to share information more easily without any effort. A further 68.3% of the respondents were in agreement that accurate information sharing facilitated effective decision making in the firm. It emerged from 65.8% of the respondents that timely sharing of information had resulted into reduction in uncertainty in the firm.

The results show that while information sharing (r=0.777), radical technological innovation (r=0.687), technological knowledge management (r=0.547) and information technology (IT) infrastructures (0.544) all had strong and positive relationship with organizational performance; incremental technological innovation had a strong and moderate relationship. It then follows that technological innovation practices have positive relationship with organizational performance.

It was observed that 58.5% change in performance of Moroccan brands is explained by the technological innovation practices that have been adopted. In terms of significance, it can be inferred that radical technological innovation ($p<0.05$), incremental technological innovation ($p<0.05$), technological knowledge management ($p<0.05$), information technology (IT) infrastructures ($p<0.05$) and information sharing ($p<0.05$) are all significant predictors of organizational performance.

5.1.2 Risks presented by technological innovations among Moroccan brands and their effect on organizational performance

Technological innovations presented a number of risks to Moroccan brands. The most prevent risk that technological innovations had created was data breach (M=3.89) followed by data privacy (M=3.79), reputational risk (M=3.78), operational risks (M=3.78) and lastly cyber security risk (M=3.73). This means that technological innovation practices in the studied firms resulted into significant risks. It was shown that data privacy was one of the risk that were occasioned by technological innovations that had been embraced by the studied firms (M=3.79). Through data privacy, 73.2% of the respondents agreed that it was risky for the firm to ensure that private information of consumers ended up to the purpose it served. It further emerged from 65.8% of the respondents that safeguarding the privacy of the data of the consumers had been a risk in the studied firms.

The results were that data breach was identified as one of the risks associated with technological innovation that the studied firms had adopted (M=3.89). It was shown from 73.1% of the respondents that possibility of data breach was a serious risk in the firm and 65.8% shared that the risk of data breach had caused significant financial loss to the firm. It emerged that reputation risk was a serious in the studied firms (M=3.78). Through this reputational risk, 80.5% of the respondents observed that fact that hackers could penetrate the systems of the firm exposed it to reputation risk while 78.1% shared that susceptibility of the systems of your firm to biasness has led to reputation risk.

The study observed that cyber security risk resulted from technological innovations that the studied firms had adopted (M=3.73). It was shown from 73.2% of the respondents that terrorist activities were one of the key risks presented by technological innovations in the firm. The findings from 70.7% of the respondents were that cybercrime was a risk that had been presented by heavy investment in technological innovations by the firm. Operational risks was evident in the studied firms (M=3.78). Because of this reputational risk, 92.7% of the respondents observed that operational risk had contributed to an increase in operating expenses in the firm. At the same time, 78% of the respondents shared that operational risks had led to reduction of service quality in the firm.

The findings indicate that data breach (r=0.486), reputational risk (r=0.468), operational risk (r=0.437), data privacy (r=0.399) as well as cyber security risk (r=0.397) all have moderate and positive relationship with organization. It then follows that the risks occasioned by technological innovation are positive correlates of organizational performance. The findings were that on overall, 65.7% change in performance of Moroccan brands is explained by the risks presented by technological innovations. Taking the level of significance as 5%, the study documented that data privacy ($p<0.05$), data breach ($p<0.05$), reputational risk ($p<0.05$), cyber security risk ($p<0.05$) and operational risk ($p<0.05$) are all significant predictors of organizational performance. It then follows that the risks presented by technological innovations are significant predictors of organizational performance.

5.1.3 Joint relationship between technological innovation practices, the risks presented by technological innovations and organizational performance

The findings show that when considered jointly, the risks presented by technological innovations (r=0.710) and technological innovation practices (r=0.607) are positive correlate of organizational performance. The findings indicate that on overall, technological innovation practices and the risks presented by technological innovations jointly explain 57.2% variation in organizational performance (Adj. R^2= 0.572). It emerged that on overall, technological innovation practices ($p<0.05$) and the risks presented by technological innovations ($p<0.05$) all have a significant joint effect on organizational performance.

5.2 Conclusion

5.2.1 Technological innovation practices among Moroccan brands and their effect on organizational performance

The findings were that technological innovation practices had been adopted among Moroccan brands. The highly practiced technological innovation in the studied firm was technological knowledge management followed by information sharing, incremental technological innovation, information technology infrastructure and radical technological innovation. Radical technological innovation allowed the studied firms to adopt technological solutions that were relatively new in the industry while embracing new technological solutions that were different from the existing ones. Radical technological innovation helped the firm to create demand that

was not recognized previously by consumer. By leveraging this incremental technological innovation, the studied firms had been consistent on making small improvements to the available services. The firms had adopted technological solutions aimed at improving the already available services. New technological features that did not lead to significant variation in the market had been added to the already existing ones in the firm.

By adopting technological knowledge management, the processes of acquisition of knowledge were key in any IT knowledge management practices. IT knowledge management had contributed towards technological learning capability that was critical in driving innovations in the firm. The usage of knowledge was critical in any IT knowledge management practice of a firm. The IT infrastructure provided the foundation of adopting the technological innovation practices needed to remain competitive. The IT infrastructures helped their firm to deliver technology related services to its stakeholders. All technology related solutions in the firm required effective functioning of the existing IT infrastructures. Through information sharing, the spread of social technologies had allowed the firm to share information more easily without any effort. Accurate information sharing facilitated effective decision making in the firm. Timely sharing of information had resulted into reduction in uncertainty in the firm.

While information sharing, radical technological innovation, technological knowledge management and information technology (IT) infrastructures all had strong and positive relationship with organizational performance; incremental technological innovation had a strong and moderate relationship. It then follows that technological innovation practices have positive relationship with organizational performance. Over half per cent variation in performance of Moroccan brands is explained by the technological innovation practices that have been adopted. Radical technological innovation, incremental technological innovation, technological knowledge management, information technology (IT) infrastructures and information sharing are all significant predictors of organizational performance.

5.2.2 Risks presented by technological innovations among Moroccan brands and their effect on organizational performance

Technological innovations presented a number of risks to Moroccan brands that included data breach, data privacy, reputational risk, operational risks and lastly cyber security risk. This

means that technological innovation practices in the studied firms resulted into significant risks. Through data privacy, it was risky for the firm to ensure that private information of consumers ended up to the purpose it served. Safeguarding the privacy of the data of the consumers had been a risk in the studied firms. Through reputational risk, hackers could penetrate the systems of the firm exposed it to reputation risk. Susceptibility of the systems of your firm to biasness has led to reputation risk. Terrorist activities were one of the key risks presented by technological innovations in the firm. Cybercrime was a risk that had been presented by heavy investment in technological innovations by the firm. Operational risk had contributed to an increase in operating expenses in the firm. Operational risks had led to reduction of service quality in the firm.

The findings indicate that data breach, reputational risk, operational risk, data privacy as well as cyber security risk all have moderate and positive relationship with organization. It then follows that the risks occasioned by technological innovation are positive correlates of organizational performance. On overall, over half per cent change in performance of Moroccan brands is explained by the risks presented by technological innovations. The study documented that data privacy, data breach, reputational risk; cyber security risk and operational risk are all significant predictors of organizational performance. It then follows that the risks presented by technological innovations are significant predictors of organizational performance.

5.2.3 Joint relationship between technological innovation practices, the risks presented by technological innovations and organizational performance

When considered jointly, the risks presented by technological innovations and technological innovation practices are positive correlate of organizational performance. On overall, technological innovation practices and the risks presented by technological innovations jointly explain over half variation in organizational performance. On overall, technological innovation practices and the risks presented by technological innovations all have a significant joint effect on organizational performance.

5.3 Recommendations

Based on the analyzed results, the study suggests the following recommendations:

i. The risk managers working in Moroccan brands should review and enhance on the existing risk management frameworks so as to effectively manage the risks that are occasioned by technological innovations
ii. The ICT managers working in Moroccan brands should constantly enhance and review the existing technologies to permit and allow innovation
iii. The policy makers working in the government in Morocco should enact sound rules and regulation to guide the adoption of new technologies among the firms so as to permit innovation for superior organizational performance

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APPENDICES

Appendix I: Questionnaire

SECTION A: ORGANIZATIONAL INFORMATION

1. Kindly indicate the number of years this firm has been in operation

Less than 10 years	( )
11-20 years	( )
21-30 years	( )
Over 31 years	( )

2. Do we have a fully-fledged and functional information and communication technology (ICT) department in your firm?

Yes	( )
No	( )

3. What is the scale of operation of your firm?

Locally established	( )
Regionally established	( )
Globally established	( )

4. How many employees on average are there in your firm

Less than 10	( )
11-20 employees	( )
21-30 employees	( )
31-40 employees	( )
Over 41 employees	( )

SECTION B: TECHNOLOGICAL INNOVATION PRACTICES AMONG MOROCCAN BRANDS

5. Given below are statements on technological innovation practices among Moroccan brands. Kindly indicate the extent of your agreement with each of these statements. Use a scale of 1-5 where 1-strongly a=disagree, 2-disagree, 3-undecided, 4-agree and 5-strongly agree**.**

Statements on Radical technological innovation	**1**	**2**	**3**	**4**	**5**
Your company has adopted technological solutions that are relatively new in the industry					
Your firm has embraced new technological solutions that are different from the existing ones					
Radical technological innovation has helped this firm to create demand that was not recognized previously by consumer					
Statements on Incremental technological innovation	**1**	**2**	**3**	**4**	**5**
The firm has adopted technological solutions aimed at improving the already available services					
New technological features that may not lead to significant variation in the market have been added to the already existing ones in this firm					
The company has been consistent on making small improvements to the available services					
Statements on Technological knowledge management	**1**	**2**	**3**	**4**	**5**
The processes of acquisition of knowledge is key in any IT knowledge management practices					
The usage of knowledge is critical in any IT knowledge management practice of a firm like yours					
IT knowledge management has contributed towards technological learning capability that is critical in driving innovations in your firm					
Statements on information technology (IT) infrastructures	**1**	**2**	**3**	**4**	**5**
IT infrastructures helps this firm to deliver technology related services to its stakeholders					

IT infrastructure provides the foundation of adopting the technological innovation practices needed for this firm to remain competitive					
All technology related solutions in your firm require effective functioning of the existing IT infrastructures					
Statements on Information sharing	**1**	**2**	**3**	**4**	**5**
The spread of social technologies has allowed your firm to share information more easily without any effort					
Accurate information sharing facilitate effective decision making in your firm					
Timely sharing of information has resulted into reduction in uncertainty in this firm					

SECTION C: RISK PRESENTED BY TECHNOLOGICAL INNOVATIONS AMONG MOROCCAN BRANDS

6. Given below are statements on risk presented by technological innovations among Moroccan brands. Kindly indicate the extent of your agreement with each of these statements. Use a scale of 1-5 where 1-strongly a=disagree, 2-disagree, 3-undecided, 4-agree and 5-strongly agree**.**

Statements on Data privacy	**1**	**2**	**3**	**4**	**5**
Safeguarding the privacy of the data of the consumers has been a risk in your firm					
It is risky for this firm to ensure that private information of consumers end up to the purpose it serves					
Statements on Data breach	**1**	**2**	**3**	**4**	**5**
The possibility of data breach is a serious risk in this firm					
The risk of data breach has caused significant financial loss to this firm					
Statements on Reputation risk	**1**	**2**	**3**	**4**	**5**
Susceptibility of the systems of your firm to biasness has led to reputatoio0n risk					
The fact that hackers can penetrate the systems of your firm expose the firm to reputation risk					
Statements on Cyber security risk	**1**	**2**	**3**	**4**	**5**

Terrorist activities are one of the key risks presented by technological innovations in this firm					
Cybercrime is a risk that has been presented by heavy investment in technological innovations by your firm					
Statements on Operational risks	**1**	**2**	**3**	**4**	**5**
Operational risks had led to reduction of service quality in your firm					
Operational risk have contributed to an increase in operating expenses in your firm					

SECTION D: PERFORMANCE OF MOROCCAN BRANDS

7. Given below are statements on organizational performance among Moroccan brands. Kindly indicate the extent of your agreement with each of these statements. Use a scale of 1-5 where 1-strongly a=disagree, 2-disagree, 3-undecided, 4-agree and 5-strongly agree**.**

Statements on Customer satisfaction	**1**	**2**	**3**	**4**	**5**
The firm seeks to satisfy the needs of customers					
The firm exceeds the expectations of the customers					
Statements on Efficiency & effectiveness	**1**	**2**	**3**	**4**	**5**
I am an efficient in my firm					
I effectively discharge my duties in this firm					
Statements on Profitability	**1**	**2**	**3**	**4**	**5**
The firm has improved on its ROA for the last five years					
There has been an improvement in ROE of your firm for the last 5 years					
Statements on Market share	**1**	**2**	**3**	**4**	**5**
There has been a general improvement in market share of this firm					
I aim at improving the market share of my firm					
Statements on Serve quality	**1**	**2**	**3**	**4**	**5**
I ensure quality services to customers					
The firm has well established quality expectations					

THANK YOU

Appendix II: SPSS Logs

Descriptive Statistics

```
GET
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FREQUENCIES VARIABLES=VAR00001 VAR00002 VAR00003 VAR00004 VAR00006
VAR00007 VAR00008 VAR00009
  VAR00010 VAR00011 VAR00012 VAR00013 VAR00014 VAR00015 VAR00016
VAR00017 VAR00018 VAR00019 VAR00020
  VAR00022 VAR00023 VAR00024 VAR00025 VAR00026 VAR00027 VAR00028
VAR00029 VAR00030 VAR00031 VAR00033
  VAR00034 VAR00035 VAR00036 VAR00037 VAR00038 VAR00039 VAR00040
VAR00041 VAR00042 VAR00044 VAR00045
  VAR00046 VAR00047 VAR00048
 /ORDER=ANALYSIS.
```

Correlation Analysis

```
CORRELATIONS
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 /MISSING=PAIRWISE.
CORRELATIONS
 /VARIABLES=VAR00056 VAR00050 VAR00051 VAR00052 VAR00053 VAR00054
 /PRINT=TWOTAIL NOSIG
 /MISSING=PAIRWISE.
CORRELATIONS
 /VARIABLES=VAR00056 VAR00058 VAR00057
 /PRINT=TWOTAIL NOSIG
 /MISSING=PAIRWISE.
```

Regression Analysis

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REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
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  /NOORIGIN
  /DEPENDENT VAR00056
  /METHOD=ENTER VAR00044 VAR00045 VAR00046 VAR00047 VAR00048.
REGRESSION
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  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT VAR00056
  /METHOD=ENTER VAR00050 VAR00051 VAR00052 VAR00053 VAR00054.
REGRESSION
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  /STATISTICS COEFF OUTS R ANOVA
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  /NOORIGIN
  /DEPENDENT VAR00056
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```

Diagnostic Tests

```
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  /STATISTICS COLLIN TOL
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT VAR00056
  /METHOD=ENTER VAR00044 VAR00045 VAR00046 VAR00047 VAR00048
VAR00050 VAR00051 VAR00052 VAR00053
    VAR00054
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID).
```

Appendix III: SPSS Diagnostic Test Outputs

Model Summary[b]

Model	Durbin-Watson
1	1.587[a]

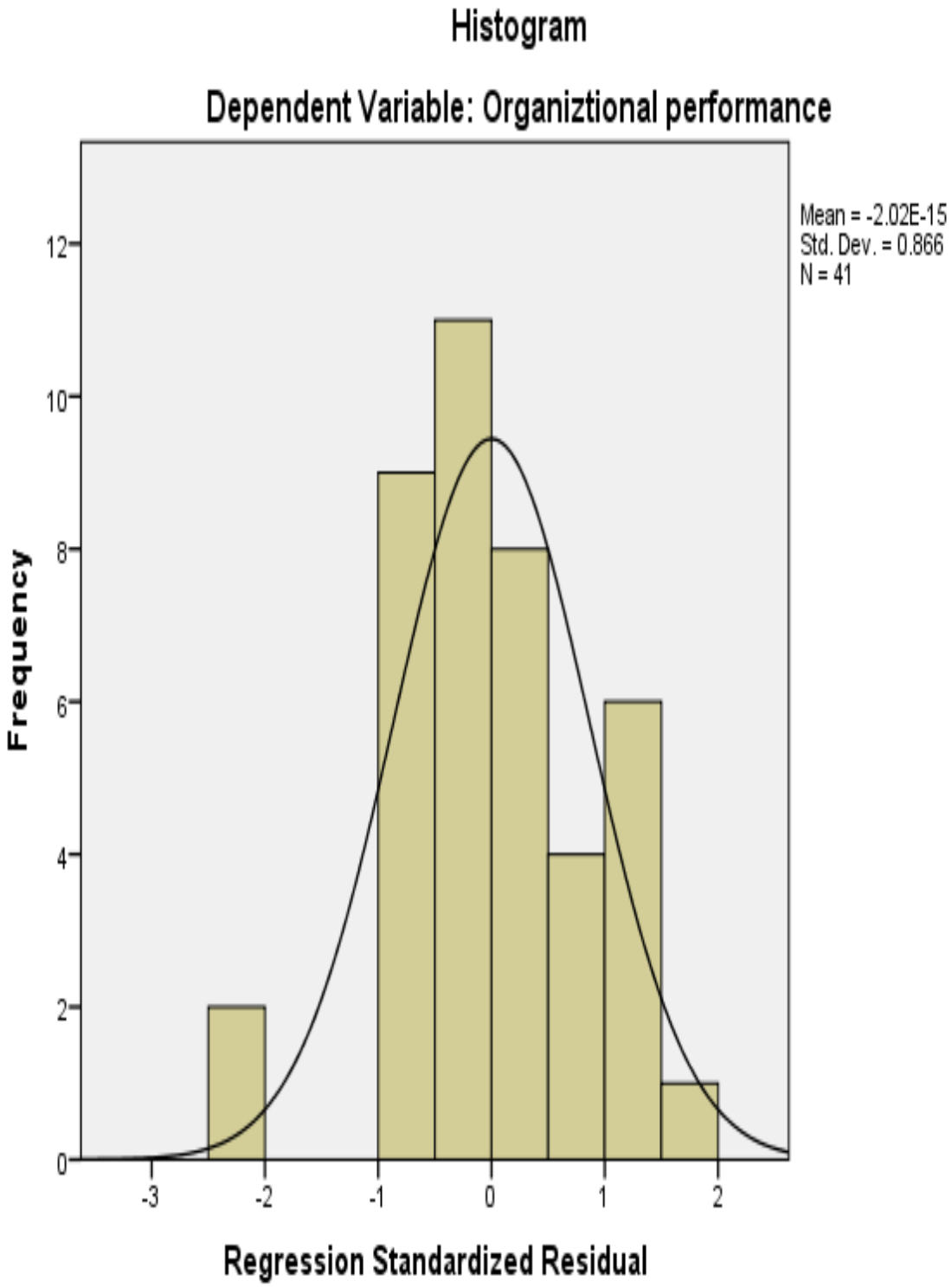
a. Predictors: (Constant), Operational risks, Incremental technological innovation, Technological knowledge management, Data breach, Cyber security risk, Data privacy, Reputation risk, information technology (IT) infrastructures, Radical technological innovation, Information sharing

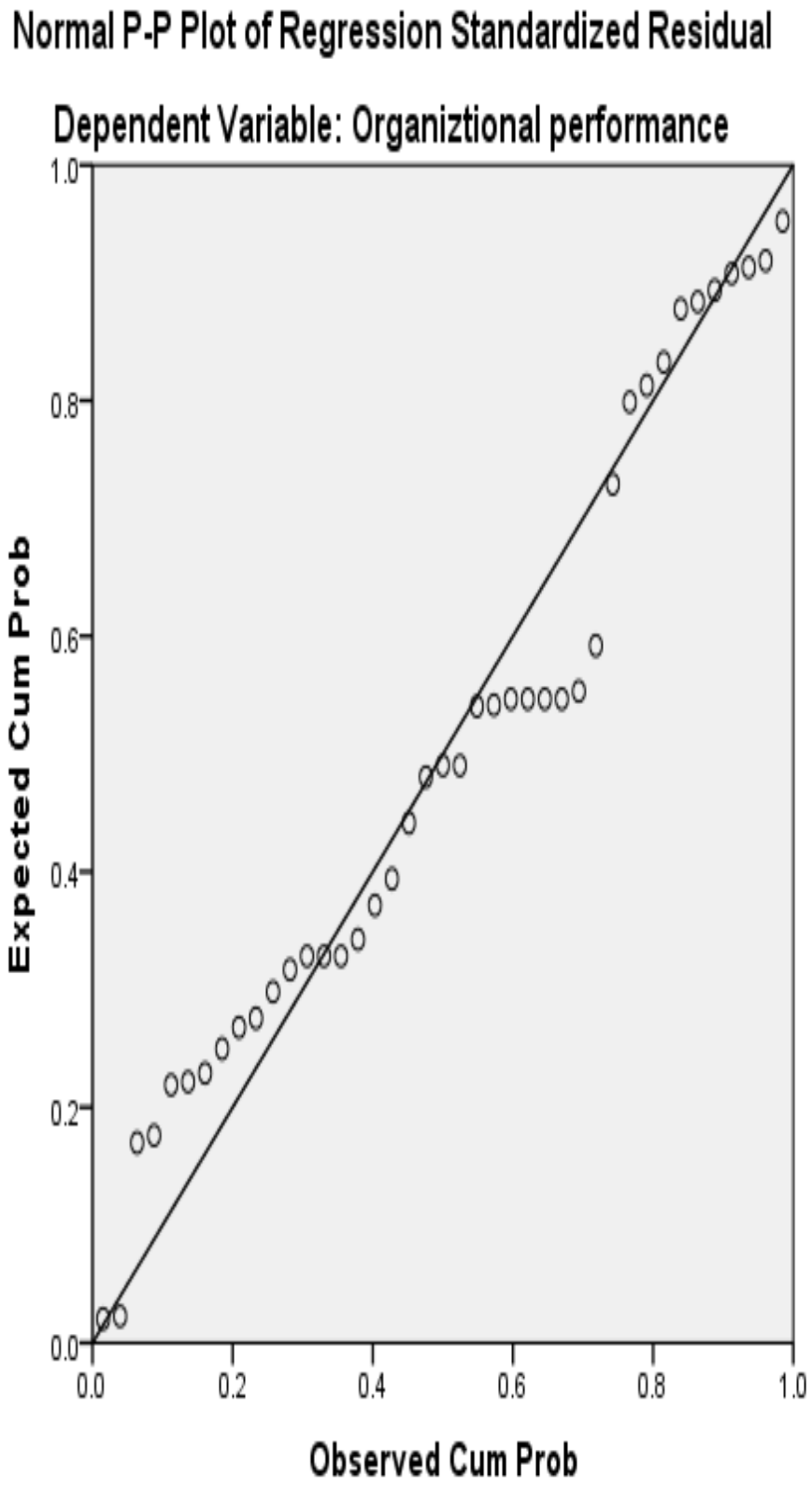
b. Dependent Variable: Organiztional performance

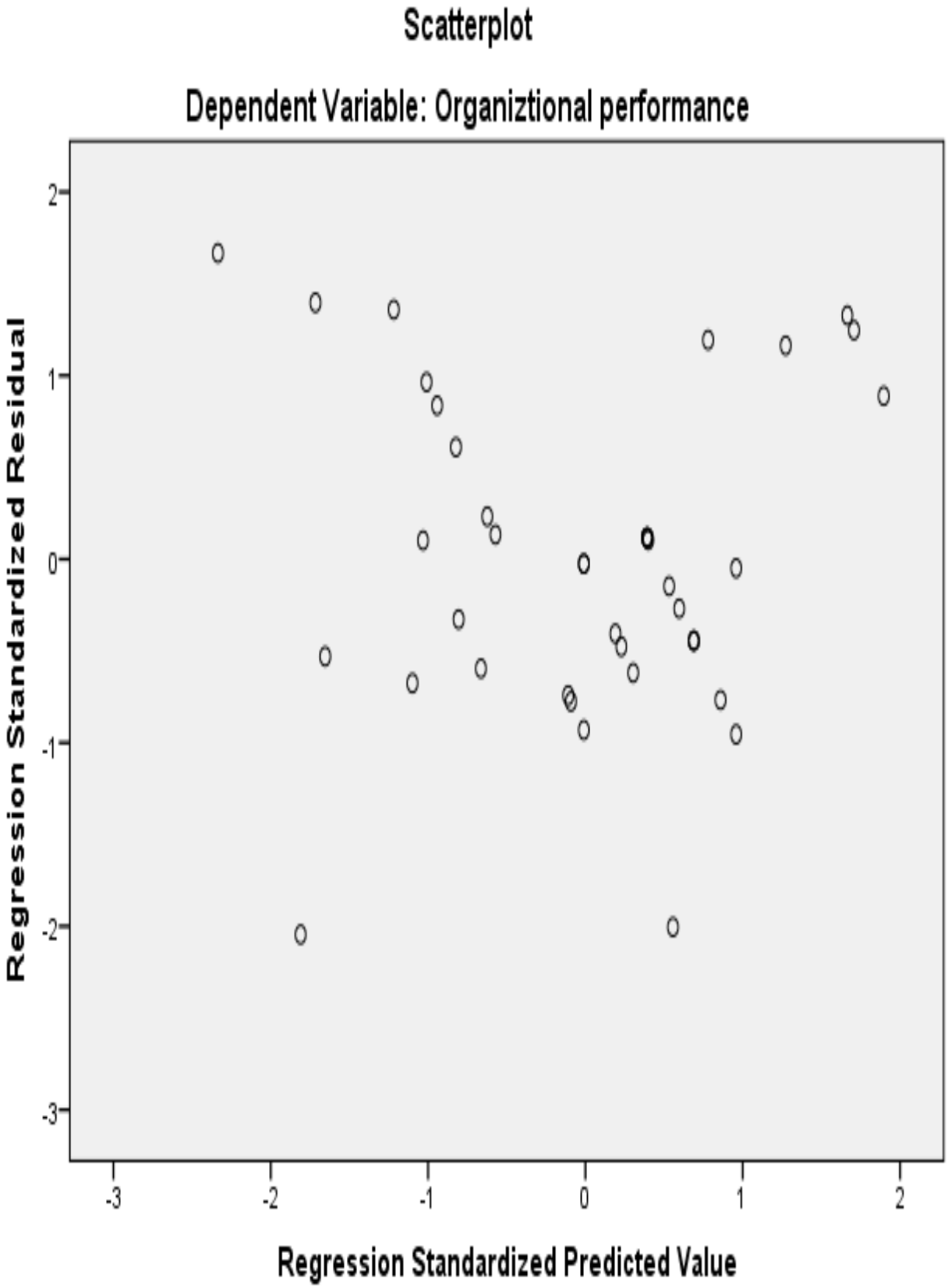
Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	Radical technological innovation	.131	7.647
	Incremental technological innovation	.608	1.645
	Technological knowledge management	.387	2.586
	information technology (IT) infrastructures	.337	2.965
	Information sharing	.121	8.276
	Data privacy	.504	1.984
	Data breach	.466	2.147
	Reputation risk	.414	2.414
	Cyber security risk	.409	2.445
	Operational risks	.358	2.794

a. Dependent Variable: Organiztional performance


Histogram
Dependent Variable: Organiztional performance
Mean = -2.02E-15
Std. Dev. = 0.866
N = 41
Frequency
0
2
4
6
8
10
12
-3
-2
-1
0
1
2
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Organiztional performance
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Scatterplot
Dependent Variable: Organiztional performance
Regression Standardized Residual
Regression Standardized Predicted Value
2
1
0
-1
-2
-3
-3
-2
-1
0
1
2