Journal of Industrial Policy and Technology Management, 6(2), 2023, 229-248

Technological Innovations and Brand Performance

Jawhara Cherradi
İstanbul Commerce University, Türkiye
cherradij705@gmail.com

Received: Dec 28, 2022 Accepted: May 03, 2023 Published: Dec 30, 2023

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 as well as analyze the risks presented by technological innovations among Moroccan brands and their effect on organizational performance. 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). 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.

Keyword: Technological Innovation, Organizational Performance, Technology Brands

JEL Classification: O32

1. Introduction

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 agencyprincipal 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 cybersecurity, 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.

1.1 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.

1.2 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.

1.3 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?

2. 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.

2.1 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 nonofficial 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).

2.2. 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).

3. Methods and Instruments

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.

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.

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.

4. Analyses Results

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 1 provides a breakdown on how the study objective will be analyzed:

Table 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 $Y= \beta 0 +\beta 1X1+\beta 2X2 +\beta 3X3 +\beta 4X4+\beta 5X5 +\epsilon$ Where; Y-is the dependent variable organizational performance ϵ is the error term β_0 is the regression beta coefficient 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
To analyze the risks presented by technological innovations among Moroccan brands and their effect on performance	Percentages, means, correlation and regression $Y= \beta 0 +\beta 1X1+\beta 2X2 +\beta 3X3 +\beta 4X4+\beta 5X5 +\epsilon$ Where; Y-is the dependent variable organizational performance ϵ is the error term β_0 is the regression beta coefficient X_1 = Data privacy X_2 = Data breach X_3 = Reputation risk X_4= Cyber security risk X_5= Operational risks

5. Discussions

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%.

5.1. Technological Innovation Practices Among Moroccan Brands and Their Effect on Organizational Performance Technological Innovation Practices Among Moroccan Brands

The ranking of the indicators of technological innovation practices was done guided by the values of averages and a breakdown shown in Table 3.

The findings in Table 2 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).

Table 2. 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

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 3 is a breakdown of the findings.

Table 3. Relationship between technological innovation practices and organizational performance

		Organizational performance	Radical technological innovation	Incremental Technological innovation	Technological Knowledge management	Information Technology (IT) infrastructures	Infor mation sharig
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 3 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.

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 is the result of the model summary.

Table 4. 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, 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 5 is a breakdown of the coefficients and significance.

Table 5. 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 5 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.

5.4. 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.

Risks presented by technological innovations

The findings in Table 6 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.

Table 6. 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

5.5. 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 7.

Table 7. 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 7 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.

5.6. 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 8.

Table 8. 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 8 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 9. Regression Coefficients of Effect of Risks presented by technological innovations on organizational performance

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(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 9, the following equation is predicted between risks presented by technological innovations and organizational performance:

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

Where;

Y-is the dependent variable organizational performance

X_1 = Data privacy

X_2 = Data breach

X_3 = Reputation risk
X_4= Cyber security risk
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.

6. Conclusion and Recommendations

6.1. Conclusion 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.

6.2. 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.

6.3. 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.

References

Akinde, M. A., & Bako, Y. A. (2020). Technological Innovation and Organizational Performance. International Journal of Innovative Research in Education, Technology & Social Strategies, 7(1), 155-166.

Al-Khatib, A. W., & al-Ghanem, E. M. (2021). Radical innovation, incremental innovation, and competitive advantage, the moderating role of technological intensity: evidence from the manufacturing sector in Jordan. European Business Review.

Alraja, M. N., Imran, R., Khashab, B. M., & Shah, M. (2022). Technological innovation, sustainable green practices and SMEs sustainable performance in times of crisis (COVID19 pandemic). Information Systems Frontiers, 1-25.

Anadon, L. D., Chan, G., Harley, A. G., Matus, K., Moon, S., Murthy, S. L., & Clark, W. C. (2016). Making technological innovation work for sustainable development. Proceedings of the National Academy of Sciences, 113(35), 9682-9690.

Anzola-Roman, P., Bayona-Saez, C., & Garcia-Marco, T. (2018). Organizational innovation, internal R&D and externally sourced innovation practices: Effects on technological innovation outcomes. Journal of Business Research, 91, 233-247.

Atandi, F. G., Bwisa, H. M., & Sakwa, M. (2016). Technological Innovation as entrepreneurial Determinant affecting Savings Mobilization among Micro and Small Enterprises in Kenya. International Journal of Academic Research in Business and Social Sciences, 6(3), 22226990.

Azar, G., & Ciabuschi, F. (2017). Organizational innovation, technological innovation, and export performance: The effects of innovation radicalness and extensiveness. *International Business Review,* 26(2), 324-336.

Bearth, A., & Siegrist, M. (2016). Are risk or benefit perceptions more important for public acceptance of innovative food technologies: A meta-analysis. Trends in Food Science & Technology, 49, 14-23.

Brown, L., & Osborne, S. P. (2013). Risk and innovation: Towards a framework for risk governance in public services. Public Management Review, 15(2), 186-208.

Carleton, T. L. (2010). The value of vision in radical technological innovation. Stanford University.

Chege, S. M., Wang, D., & Suntu, S. L. (2019). Impact of information technology innovation on firm performance in Kenya. Information Technology for Development. http://doi.org/10.1080/02681102.2019.1573717

Chege, S. M., & Wang, D. (2020). The influence of technology innovation on SME performance through environmental sustainability practices in Kenya. Technology in Society, 60, 101210.

Chege, S. M., Wang, D., & Suntu, S. L. (2020). Impact of information technology innovation on firm performance in Kenya. Information Technology for Development, 26(2), 316-345.

Coccia, M. (2017). Sources of technological innovation: Radical and incremental innovation problem-driven to support competitive advantage of firms. Technology Analysis & Strategic Management, 29(9), 1048-1061.

Cusick, J. J. (2013). Technology Innovation Methods and Processes for Business Results. Advancing IT and Software Engineering, 1-5.

Dastane, O. (2020). The impact of technology adoption on organizational productivity. Journal of Industrial Distribution & Business, 11(4), 7-18.

El-Chaarani, H., & El-Abiad, Z. (2018). The impact of technological innovation on bank performance. Journal of Internet Banking and Commerce.

Ferreira, F. A., Jalali, M. S., Meidutė-Kavaliauskienė, I., & Viana, B. A. (2015). A metacognitive decision making based-framework for bank customer loyalty measurement and management. Technological and Economic Development of Economy, 21(2), 280300.

Gichohi, P. M. (2022). How Technological Innovation is Influencing Performance of the Cement Manufacturing Firms in Kenya. International Journal of Professional Practice, 10(1), 114129.

Hellström, T. (2003). Systemic innovation and risk: technology assessment and the challenge of responsible innovation. Technology in Society, 25(3), 369-384.

Johnson, T., & Owens, L. (2003). Survey response rate reporting in the professional literature. In 58th Annual Meeting of the American Association for Public Opinion Research, Nashville (Vol. 2003). Journal of Management and Commerce Innovations, 5(1), 761-766

Kamau, G. K. E. (2019). Effect of Technological Innovations on Performance of Real Estate Firms in Kenya: The Case of Real Estate in Nairobi County (Doctoral dissertation, United States International University-Africa).

Kandiri, J. M. (2014). Effective implementation of technology innovations in higher education institutions: A survey of selected projects in universities in Africa. Kenyatta University.

Keitany, B., Chepkilot, R., & Tanui, J. K. Influence of Technological Innovation on Competitiveness of Universities in Nakuru Town, Kenya. World Journal of Innovative Research 7(6), 01-11.

Letangule, S. L., & Letting, N. K. (2012). Technological Innovation and Corporate Performance. International Journal of Management & Business Studies, 2(3), 66-72

Littler, D., & Melanthiou, D. (2006). Consumer perceptions of risk and uncertainty and the implications for behavior towards innovative retail services: The case of internet banking. Journal of Retailing and Consumer Services, 13(6), 431-443.

Mbogori, M.K., & Moguche, A. (2021). Effect of technological innovation on performance of the cement manufacturing firms in Kenya. Journal of Strategic Management, 1(1), 1-13.

Mohammed, L. H. (2021). The effect of technological innovation on economic growth: Empirical evidence from Kenya.

Mutie, A. (2018). Effect of Technological Innovations on Organizational Performance of Government Agencies in Kenya (Doctoral Dissertation, University of Nairobi).

Mwangi, P. M. (2021). Influence of Technological Innovation on Financial Performance of Deposit Taking Microfinance Institutions in Nairobi County. Impact: Journal of Transformation, 4(1), 9-15.

Ni, H. (2018). Study on the role of technological innovation in business administration. Modern Economy, 9(10), 1619.

Njiraini, P., Omolo, J., & Gachanja, P. (2018). Drivers of technological innovations: evidence from kenya's micro and small enterprises. *International Journal of Current Research* 10, (5), 69942-69946.

Nyamai, S. (2017). The Impact of Technological Innovation on a Country's Development: A Case of Listed Companies in Kenya (Doctoral Dissertation, United States International University-Africa).

Otii, L. O., Lawrence, K., & Omondi, H. (2020). Technological innovation promoters, service quality practices and performance of SACCOs in Kenya: An integrative model. International Journal of Research in Business and Social Science (2147- 4478), 9(4), 392- 403

Owuor, E. (2018). Impact of Disruptive Technology on the Performance of Insurance Firms in Kenya. Journal of Strategic Management, 3(1), 72 - 82

Pomaquero, J. C., Lopez, J. F., & Lopez, J. L. (2019). Technological management and innovation in organizations: A systematic review of the literature.

Samuel, W. W., & Kepha, O. (2021). Effects of Technological Innovation Strategy in Performance of Commercial Banks in Kenya. International Journal of Entrepreneurship and Innovation, 5(2), 69-79.

Stella, L., García-Morales, V. J., Martín-Rojas, R., Pavaloaia, D., & Popescul, D. (2018). Radical technological innovations and their impact on society. Informatics in Economy (IE 2018) Education, Research & Business Technologies. Strategy on Performance of Savings and Credit Co-Operatives in Kenya, International.

Subrahmanya, M. H. (2011). Technological Innovations and Firm Performance of Manufacturing SMEs: Determinants and Outcomes. ASCI Journal of Management, 41(1).

Wachira, E. W. (2013). The effect of technological innovation on the financial performance of commercial banks in Kenya (Doctoral dissertation, University of Nairobi).

Wambua, P., Muturi, W., Rotich, G., & Ogollah, K. (2017). Effect of Technological Innovation.

Wang, D. S. (2019). Association between technological innovation and firm performance in small and medium-sized enterprises: The moderating effect of environmental factors. International Journal of Innovation Science.

Wangila, F. (2018). Influence of innovation practices on the public sector performance in Nairobi city county government-Kenya (Doctoral Dissertation, JKUAT-COHRED).

Wasike, M. N. (2016). Effect of technological innovations on customer loyalty among commercial banks in Eldoret Town (Doctoral Dissertation, Kisii University).

Xiao, D., & Su, J. (2022). Role of Technological Innovation in Achieving Social and Environmental Sustainability: Mediating Roles of Organizational Innovation and Digital Entrepreneurship. Frontiers in Public Health, 10.

Zerzan, A. (2009). New technologies, new risks?: innovation and countering the financing of terrorism, 174. World Bank Publications.

Zhang, P., Zhou, E., Lei, Y., & Bian, J. (2021). Technological innovation and value creation of enterprise innovation ecosystem based on system dynamics modeling. Mathematical Problems in Engineering, 2021.

Zhang, Y., Khan, U., Lee, S., & Salik, M. (2019). The influence of management innovation and technological innovation on organization performance. A mediating role of sustainability. Sustainability, 11(2), 495.