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EFFECTS OF BASEL II BUSINESS DISRUPTION AND UTILITY OUTAGES RISK MANAGEMENT ON FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN KENYA

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Abstract

This study aims at establishing the effects of Basel II business disruption and utility outages risk management on financial performance of commercial banks in Kenya. A sample of 38 was drawn using stratified random sampling from a population of 42 commercial banks operating in Kenya as at 31st June 2017. Primary data was obtained through self-designed questionnaires completed by either banks' security officers, internal auditors or operations managers depending on the bank's tier. Secondary data was obtained from Central Bank of Kenya annual reports. The study adopted descriptive research design. Data was analyzed using SPSS to obtain, percentages and correlation coefficients. Return on assets was used to measure financial performance. The findings were presented using frequency distribution tables. The results showed that business disruption and utility outages cost has negative but not significant effect on financial performance of banks. The study recommends that banks' management invests in Outage Management System that dispatches real time network information in order to locate outages faster hence

reducing outage duration and improving communication with clients and their regulators. Further the regulators should conduct regular scrutiny of the banks' IT systems to test their resiliency to ensure they are able to deal with increasing consumer demand.

Keywords: Business Disruption, Utility Outage, Basel II, Return on Assets

INTRODUCTION

This study focused on types, causes and effects of business disruption and utility outages risk management on financial performance of commercial banks in Kenya. Business disruption and utility outages refers to losses arising from disruption of business or system failures (Basel Committee on Banking Supervision, 2001).

The study looks at effects of business disruption and utility outages on financial performance of commercial banks in Kenya. Business disruption and system failure risk entails losses emanating from software, telecommunications and utility outage/disruption. The criminal hackers using their multitude of computers and malware floods the bank's website with massive amount of traffic until it is overwhelmed hence shuts down. Coordinated Denial of Service attacks had shut down the websites of Bank of America, JPMorgan Chase, Wells Fargo, U.S. Bank and PNC Bank (Rothman, 2012).. Only about 10% of downtime is usually unplanned while about 90% of downtime is planned due to system backups, maintenance and upgrades among others Arnold (2010).

Electric power disruption accounts for 93.6% reduction in Los Angeles' economic activity translating to USD 20.5B with no resilient adjustment and USD 2.8B when several types of resilience were included Rose *et al.* (2007). Physical damage to infrastructure, inventory or equipment have significant impact on business closure and relocation following major disasters and businesses are more likely to relocate if the property was leased or rented as opposed to business property that was owned and if the business was not durable masonry structure, (Wasileski *et al.,* 2011). Power outage has a negative impact on SMEs growth because they increases operation cost of SMEs as they turn to alternative power supply as well as damaging the electrical appliances resulting to heavy servicing costs and alternative power costs hence deviating the revenue meant for reinvesting (Forkuoh, 2015). The end result of downtime differs with the application and the type of business, Tina (2015). Application maintenance costs are increasing at a rate of 20% annually. 65% of downtime is due to uninterruptible power supply (UPS), 53% exceeding UPS capacity, 51% human error and 49% equipment failure (Emerson Network, 2010). Over 80% of data centre managers incurs downtime costs exceeding $50,000

per hour while over 25% exceed $500,000 per hour, (Sombers Associates, 2007). Businesses in US on average lose between $84,000 and $108,000 for every hour of IT system downtime. Top in this list are financial services, manufacturing, telecommunications and energy industries (Arnold, 2010).

Cyber threat attacks detected in the Kenyan cyberspace grew in 2013 by 108% to 5.4million attacks compared to 2.6 million attacks detected in 2012. This fastest growing cyber-threat was attributed to anonymous proxy servers located in Kenya. There were 290,000 attacks coming from anonymous proxy servers compared to 50,000 attacks in 2012. Moreover the survey also showed that Kenyan online banking portals have limited security mechanism to protect the customer's login credentials. Out of 33 banks sampled, only 2 had client side encryption implemented meaning that the end user Pc network will reveal the customers password exposing them misuse by unauthorized users, (Kigen *et al*., 2014).

Objective of the study

The objective of this study was to determine the effect of Basel II business disruption and utility outage risk management on financial performance of commercial banks in Kenya.

RESEARCH METHODOLOGY

This study adopted descriptive research because it can be used to collect information about the risk managers' attitudes, opinions, habits or any other social issues (Namusonge, 2010). To eliminate selection bias stratified random sampling was used to determine the sample size of 38 commercial banks out of 42. One respondent from each bank's head office was chosen to fill the questionnaire hence a total sample of 38 respondents were sampled. One respondent per bank who was either a security officer, the internal auditor or the operations manager was picked. This informed by the fact that the bank policies are disseminated to all its branches for compliance and all reports from all branches are sent to the head office for consolidation. The study entailed both primary data gathered by the use of structured likert scaled questionnaires and secondary data gathered from the Central Bank Kenya annual supervisory publications by use of a secondary data collection schedule.

ANALYSIS AND FINDINGS

Descriptive Statistics

Causes of Business Disruptions and Utility Outages in Commercial Bank

The respondents were required to rate some statements describing the causes of business disruption and utility outages in commercial banks in Kenya. The results were shown in table 1.

Table 1: Causes of Business Disruptions and Utility Outages in Commercial Bank

Business disruption & utility outages in my bank are caused by:	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Technical failure	30.8%	57.7%	11.5%	0.0%	0.0%
Planned maintenance and upgrading	11.5%	46.2%	26.9%	7.7%	7.7%
Huge web traffic	0.0%	15.4%	42.3%	34.6%	7.7%
Use of traditional/ old networks	3.8%	19.2%	26.9%	38.5%	11.5%
Power related outages	7.7%	30.8%	30.8%	26.9%	3.8%
Equipment failure	0.0%	38.5%	30.8%	19.2%	11.5%
Human error	3.8%	42.3%	42.3%	7.7%	3.8%
Fraud related activities	0.0%	23.1%	34.6%	38.5%	3.8%

From table 1 majority (88.5%) of the respondents agreed that business disruptions and utility outages in their banks are caused by technical failure while 11.5% were undecided. Further majority (57.7%) of the respondents agreed that planned maintenance and upgrading was a cause for business disruptions and utility outages in their banks, 42.3% disagreed while 26.9% were neutral. On the contrary for business disruptions and utility outages in the banks being caused by huge web traffic, majority (42.3%) of the respondents disagreed and a similar percentage were neutral while only 15.4% agreed. Likewise majority (50%) of the respondents disagreed that use of traditional networks was a cause for business disruptions and utility outages in their banks, 26.9% were neutral while 23% agreed. On the other had majority (38.5%) of the respondents voted power related outages as a cause for business disruptions and utility outages, 30.8% were neutral while (30.7%) disagreed. Moreover majority (38.5%) of the respondents agreed that equipment failure is a cause for business disruptions and utility outages in their banks, 30.8% were neutral while 30.7% disagreed. Further majority 46.1% of the respondents agreed that business disruptions and utility outages in their bank are caused by human error, 42.3% were neutral and 11.5% disagreed. Lastly most (42.3%) of the respondents disagreed that fraud related activities cause business disruptions and utility outages in their banks, 34.6% were neutral while 23.1% agreed.

The implication of these results is that the major causes of business disruptions and utility outages in commercial banks in Kenya are technical failure (88.5%) and planned maintenance and upgrading (57.7%). The results supports the creative destruction theory that the process of industrial transformation continuously revolutionizes the economic structures from within continuously destroy the old ones and continuously create new ones. Hence as new

technologies, new products, new methods of operation and new means of service distribution are invented by banks, it makes the old ones outdated and prone to failure, forcing the commercial banks to quickly adapt to a new technology or else fail (Sledzik, 2013). The findings also support Arnold, (2010) that 90% of downtime is usually planned due to system backups, maintenance and upgrades with about 10% unplanned.

Effects of Business Disruptions and Utility outages on Commercial Banks

The respondents were further required to state the extent to which they agreed with some statements describing the effects of business disruption and utility outages in their banks. The findings were as shown in table 2.

Table 2: Effects of Business Disruptions and Utility Outages on Commercial Banks

Utility outage and system failure in my bank has led to;	**Strongly agree**	**Agree**	**Neither agree nor disagree**	**Disagree**	**Strongly disagree**
Lost business from customers (both short term and long term)	11.5%	50.0%	34.6%	3.8%	0.0%
Employee time diverted from other tasks to get the IT systems running again	15.4%	46.2%	19.2%	3.8%	15.4%
Employee overtime expenses	7.7%	50.0%	11.5%	30.8%	0.0%
Cost on valuable lost data	11.5%	30.8%	34.6%	11.5%	11.5%
Additional repair costs that may go on even after service has been restored	11.5%	50.0%	30.8%	7.7%	0.0%
Damaged goodwill and reputation	7.7%	50.0%	26.9%	15.4%	0.0%
Marketing cost to win back customers	11.5%	53.8%	11.5%	19.2%	3.8%
Reduced return on assets	7.7%	38.5%	34.6%	11.5%	7.7%
Reduced profitability	11.5%	38.5%	19.2%	26.9%	3.8%
Reduced return on equity	11.5%	34.6%	34.6%	15.4%	3.8%

From the results in table 2, majority (61.5%) of the respondents agreed that business disruptions and utility outage in their banks led to lost business from customers, 34.6% were undecided while 3.8% disagreed. In addition many (61.6%) of the respondents agreed that business disruptions and utility outage in the bank has led to employee time diverted from other tasks to get IT systems running again, 19.2% disagreed and the same percentage was neutral. Likewise majority (57.7%) of the respondents agreed to the statement that business disruptions

and utility outage in their bank has led to employee overtime expenses, 30.8% disagreed while 11.5% were neutral. Moreover most (42.3%) of the respondents also agreed that business disruptions and utility outage in their banks has led to cost on valuable lost data, 34.6% were undecided while 23% disagreed. Similarly majority (61.5%) of the respondents agreed that business disruptions and utility outage in their banks has led to additional repair costs that may go on even after service has been restored, however 30.8% were neutral whereas 7.7% disagreed. In solidarity majority (57.7%) of the respondents agreed that business disruptions and utility outage in their bank has led to damaged goodwill and reputation compared to 26.9% who were neutral and 15.4% in disagreement. Likewise majority (65.3%) of the respondents agreed that business disruptions and utility outage in their banks has led to incurring marketing cost to win back customers, 23% disagreed while 11.5% neutral. On the other hand that most (46.2%) of the respondents agreed that business disruptions and utility outage in their bank has led to reduced return on assets, 34.6% were not sure while 19.2% disagreed. Further majority (50%) of the respondents agreed to the statement that business disruptions and utility outage in their bank has led to reduced profitability, 30.7% disagreed while 19.2% were undecided. Finally when asked of their opinion on whether business disruptions and utility outage in their bank has led to reduced return on equity, 46.1% of the respondents agreed, 34.6% were neutral while 19.2% disagreed.

It can thus be insinuated that the major effect of business disruption and utility outages in commercial banks in Kenya are; incurring marketing cost to win back customers (65.3%), employee time diverted from other tasks to get IT systems running again (61.6%), lost business from customers (61.5%), and additional repair costs that may go on even after service has been restored (61.5%). Technical failure and planned maintenance can be said to be the root cause of these effects as were rated the highest by respondents. These findings concurs with Osborne (2014) that technical failure can result to banks IT systems cutting off customers from their cash which gets worse with time as new technologies and regulation increases hence putting more strain on banks' IT systems. He also noted that banks IT system failure is not an easy problem to fix, since they have to deal with new information that is being updated throughout as the users are using internet banking, ATMs, spending money online among others which is why it may take long to fix. To make matters more complex, new functions are usually written in different programming languages, on different machines, by different teams to hinder a single person/team from ever fully understanding the entire structure of a system. That is why when the system fails it can take several hours to fix as teams scramble to identify where the trouble lies.

Cost of Business Disruptions and Utility Outages Experienced by Commercial Bank

The respondents were required to indicate the business disruption and utility outage related costs that their banks had incurred for duration of six years. The results were shown in table 3.

Table 3: Cost of Business Disruption and Utility Outage Experienced by Banks

Cost of business disruption & utility outage	2011	2012	2013	2014	2015	2016
Less than10M	65.4%	69.2%	61.5%	65.4%	53.8%	65.4%
Ksh11-20M	19.2%	0.0%	0.0%	0.0%	19.2%	0.0%
Ksh21-30M	3.8%	19.2%	0.0%	0.0%	11.5%	0.0%
Ksh31-40M	0.0%	0.0%	0.0%	19.2%	0.0%	0.0%
Ksh41-50M	0.0%	0.0%	19.2%	3.8%	3.8%	3.8%
Ksh51-60M	0.0%	0.0%	0.0%	0.0%	0.0%	19.2%
Ksh61-100M	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
More than100M	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
NIL	11.5%	11.5%	19.2%	11.5%	11.5%	11.5%

From table 3, in 2011 majority (65.4%) of the banks incurred cost of less than 10 million shillings due to business disruption and utility outage, this was followed by cost between 11 and 20 million shillings in 19.2% of the banks, 11.5% of the banks experienced nil costs while 3.8% experienced costs between 21 and 30 million shillings. In 2012, majority (69.2%) of the banks experienced cost of less than 10 million shillings to business disruption and utility outage. This was followed by cost of between 21 and 30 million shillings in 19.2% of the banks and nil costs in 11.5% of the banks. In 2013, 61.5% experienced a cost of less than 10 million, 19.2% a cost of between 41 and 50 million as well as nil cost related to business disruption and utility outage. In 2014, majority (65.4%) of the banks experienced a cost of less than 10 million shillings due to business disruption and utility outage. This was followed by 19.2% of the banks which experienced costs amounting to between 31 and 40 million shillings, 11.5% nil cost and 3.8% of the banks which experienced cost between 41 and 50 million shillings. For the year 2015, most (53.8%) experienced cost of less than 10 million shillings due to business disruption and utility outage. This was followed by banks which experienced a cost of between 11 and 20 million shillings (19.2%), a cost of between 21 and 30 million and nil cost (11.5%) then the ones which experienced a cost of between 41 and 50 million shillings (3.8%). In 2016, most (65.4%) of the banks incurred a cost of less than 10 million due to business disruption and utility outage. Next were banks which experienced a cost of between 51 and 60 million (19.2%), nil cost (11.5%) and between 41 and 50 million shillings (3.8%).

In general majority (more than 53%) of the banks experienced a cost of less than 10 million due to business disruption and utility outage in the period 2011 to 2016; 65.4% in 2011, 69.2% in 2012 61.5% in 2013, 65.4% in 2014, 53.8% in 2015 and 65.4% in 2016.

Correlation Analysis Results of the Variables

Pearson's correlation coefficient was used to measure the degree of relationship between the financial performance and business disruption and utility outage cost. P-value was used to indicate whether the relationship established was significance or not. Using the criterion that a p-value less than the 0.05 level of significance shows presence of a significance relation, the correlation results were as shown in table 4 as follows.

Table 4: Correlation Results between Variables

Research Variable	Test Type	Test Results
Financial Performance	Pearson Correlation	1
	Sig. (2-tailed)	
	N	26
Business disruption & utility outage cost	Pearson Correlation	-.043
	Sig. (2-tailed)	.836
	N	26

From table 4 financial performance and business disruption & utility outage cost had a negative relationship as inferred from the correlation coefficient of -.043. This means that as business disruption & utility outage cost increases, there is a decrease in financial performance of commercial banks. Since the p value (0.836) is greater than 0.05, the study fails to reject the null hypothesis;

H0: Business disruptions and utility outage costs do not have significant effect on financial performance of commercial banks in Kenya.

Test for mixed effects in Return on Assets

Table 5: Estimates of Mixed Effects in ROA Modelling

Parameter	Estimate	Std. Error	t	Sig.
Intercept	4.753	.869	5.473	.000
[TIME=1(Before implementation of Basel II]	-1.180	.491	-2.406	.024
Business Disruption & Utility outage Cost	.278	.127	2.188	.036
[TIME=1] * Business Disruption Cost	-.352	.107	-3.293	.003

From the results in table 5, the average ROA after the implementation of Basel II risk management operations was 4.8%. The ROA decreased by approximately 1.2% per year for the periods after the implementation of Basel II risk management operations. A unit increase in business disruption and utility outage cost would decrease the ROA by 0.28% per year for the periods after the implementation of Basel II risk management operations. ROA decreased by 1.53% (-1.18-0.35) per year per unit increase in business disruption related costs for the periods before the implementation of Basel II risk management operations. There was no enough evidence to conclude that business disruption and utility outages cost had significant effect on ROA since their p values were greater than zero. Thus the optimal model for returns on assets is:

Return on Assets=4.8-1.2*[TIME+=1]-0.35*[TIME=1]*Business disruption and utility outages…….(1)

CONCLUSION

The study findings established that the major causes of business disruptions and utility outages in commercial banks in Kenya are technical failure (88.5%) and planned maintenance and upgrading (57.7%). The effect of business disruption and utility outage on financial performance of commercial banks in Kenya as tested using Pearson correlation coefficient at 5% significance level showed a negative correlation (r=-0.043) and a significance value of p=0.836. The study thus established that business disruptions do not have significant effect on financial performance of commercial banks in Kenya as explained by the associated p value (0.836) which is greater than 0.05.This can be explained by lack of major ICT acquisition or upgrade of existing core banking systems in Kenya's banking sector in 2016 as commercial banks continued to leverage on robust ICT platforms to provide robust banking services (Central Bank of Kenya, 2017). From the findings, majority (53%) of the banks experienced a cost of less than 10 million due to business disruption and utility outage in the period 2011 to 2016.

RECOMMENDATIONS

Following the study findings that technical failure is the major cause of business disruptions and utility outages in commercial banks in Kenya, this study recommends that commercial banks management should invest in Outage Management System (OMS) that dispatches real time network information in order to locate outages faster hence reduce outage duration as well as improve communication with clients and their regulators. Further to curb the power utility outage, the commercial banks managers should invest in an online uninterruptible power supply (UPS) systems with continuous AC-to-DC-to-AC double conversion. In addition commercial

banks management should consider collaborative approaches that enables a group of banks to co-invest in a huge cash outlay banking system which is then jointly utilized by the joint banks to perform their banking activities more cost effectively and more efficiently. This will reduce the commercial banks technical failures occurring due to bank's continued bolting of new systems on old systems as it will make their systems more robust and as well as reduce on their budgetary spending as practiced by some banks in US, where they share back-office systems.

The study further recommends that commercial banks regulators should conduct regular scrutiny of the banks' IT systems to test their resiliency to ensure that they are able to deal with increasing consumer demand and that commercial banks' clients are not left financially stranded.

LIMITATIONS OF THE STUDY AND FURTHER RESEARCH

This study only concentrated on effects of business disruption and utility outages on financial performance of commercial banks in Kenya. Future studies should be carried on other financial institutions and markets such as insurance companies, investment banks, and capital markets among others to determine how business disruption and utility outages affects their financial performances.

One of the challenges experienced during this study was that it was difficult to find enough local empirical literature on business disruption and utility outages in commercial banks. This was however mitigated by reviewing literature from other disciplines and countries with a bit distantly related areas.

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