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Research Article

Business Intelligence as an ICT Tool for Financial Crime Detection in Ghana

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Abstract: This study seeks to evaluate the use of Business Intelligence for financial crime detection in financial institutions in Ghana. The financial services industry is fast developing and ICT has played a major role in this development. To meet business needs effectively, financial institutions are adopting innovative technologies that can support strategic decision-making based on improved information management-in a manner that will suppress fraud and crime, especially with the large volumes of data they process. In the area of financial crime detection, there has been a growing concern because large amounts of monies are lost to these crimes yearly. In recent years, Business Intelligence has emerged as an innovative information analysis technology for organizations. This study conducts a survey on six financial institutions in the Accra metropolis of Ghana to determine the use of Business Intelligence for financial crime detection in the country. A quantitative, exploratory and descriptive research approach was used and data was collected from both primary and secondary sources. The study population consisted of 120 ICT staff. A sample size of 90 was considered adequate and so 90 questionnaires were sent out and 75 responses received. Data analysis was with SPSS software. The results showed that the prospects of using Business Intelligence for financial crime detection in financial institutions are considerably high in Ghana.

Keywords: Business intelligence, financial crimes, financial fraud detection, financial institutions, Ghana, ICT tools

INTRODUCTION

Financial service is one fast developing industry. Financial institutions produce millions of transactions daily stored in complex Information Systems. Efficient analysis of such large volumes of data is crucial for quick and real time decision-making. Product management, loss prevention and detection and suppression of fraud are also of concern to such financial institutions. With the current global issues of financial crimes, these institutions have also become more concerned with the security of their transactions (Turban *et al*., 2011).

Financial crime is causing economies to lose huge amounts of money; The United Nations Office on Drugs and Crime (2005) has stated that $1.6 trillion 'dirty' dollars are floating around the global economy; the latest annual statistics from the UK's National Fraud Authority show that more than £38 billion has been lost over the last 12 months due to fraud (Sourcingfocus.com, 2012). Consequently, these days, financial institutions tend to seek means for secured and efficient analysis of their data (Saunders and Cornett, 2008). Adopting Business Intelligence (BI) tools can provide technological and innovative support in such cases, especially in developing countries like Ghana (Petrini and Pozzebon, 2003). This study attempts to evaluate the prospects of using Business Intelligence as an ICT tool for financial crime detection in financial institutions, in Ghana (Gyimah, 2012).

Objectives: The objectives of the study are as follows:

- To assess the effectiveness of the data analysis processes being used in financial crime detection in financial institutions in Ghana.
- To find out whether Business Intelligence is being used for financial crime detection in financial institutions.
- To identify the major benefits and challenges of Business Intelligence in financial services and banking operations.

Relevance of the study: It is believed that the study will be beneficial to the following stakeholders in Ghana**.**

- **Financial Institutions:** These will be given more insight into financial crimes and on Business Intelligence as an effective tool for data analysis and decision-making.
- **Business Users (analysts, information managers, consultants):** These will be updated on current information management practices that will help them improve the business processes of their organizations.

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- **Security Agencies (the Police and other law enforcement agencies):** They will become more informed on current developments in financial crimes in the country.
- **Academia:** Business intelligence is fairly new in Ghana. This research will benefit academia as it will add to the body of knowledge for further research.

RELATED LITERATURE

Modern corporate organizations are always under pressure to effectively manage information so as to solve complex problems. Turban *et al*. (2011) and Petrini and Pozzebon (2003) agree that managing information in organizations is a challenge that requires decision-making processes built on reliable, accurate and timely data. With rapid advances in technology, organizations today frequently search for new ways to derive value from the information they use.

Today, more and more business organizations are adopting Business Intelligence tools for making business decisions (Vodapalli, 2009) as Business Intelligence has been identified (together with analytics and performance management) as one way to filter vast and growing amounts of information. Gartner (2012) states that Business Intelligence platforms, analytic applications and performance management software ranked the second fastest growing sector in the overall worldwide enterprise software market in 2011, with its revenue reaching $12.2 billion, a 16.4% increase from 2010.

Thus, Business Intelligence technology is in demand by organizations and it is seen as the answer to the current needs in terms of information for strategic decision making. The organizational sectors that use Business Intelligence are many. Baqar and Pandey (2011) noted that those sectors include trading, insurance, banks, telecommunications, manufacturing, e-commerce, etc. They identified that the relevant capabilities of Business Intelligence include decision support, online analytical processing, statistical analysis, forecasting and data mining (Vercellis, 2009). They added that Business Intelligence is needed for customer support, market research, product profitability, inventory, distribution and statistical analyses. Olszak and Ziemba (2006) also gave a detailed outline of the most significant business analyses that Business Intelligence offers.

The globalization of markets and commerce has opened up opportunities to sophisticated financial criminals and transnational crime groups. Furthermore, the Internet and its global reach, the banking sector's growing sophistication and other advances in technology have created new opportunities for such sophisticated organized criminal groups. In the area of financial crime detection, Manjula *et al*. (2011) stated that application of Business Intelligence through data mining has helped in fraud detection in the banking and finance sector (Salwan, 2008),

Chaikin (2009) stated that governments have a limited ability to combat financial crimes, given the difficulty in detecting such crimes, the lack of resources of investigatory agencies and the obstacles in using the legal system to criminally prosecute or recover illicit monies. They indicated the need for strategic, systematic and pro-active collection, analysis and sharing of financial intelligence on areas such as cybercrime, identity thefts and computer frauds. Hence, the use of Business Intelligence has been found to be an effective approach.

Evolution and concept of business intelligence: Business Intelligence is described by Turban *et al*. (2011) to have evolved from Decision Support Systems. They outlined that the concept has its roots in Management Information Systems of the 1970s. Executive Information Systems then emerged in the 1980s and, eventually, was transformed into Business Intelligence. The term "Business Intelligence" was coined in the mid-1990s as a broad category of software tools and solutions for gathering, consolidating, analyzing and providing access to data in a way that lets enterprise users make better business decisions. By 2005, Business Intelligence systems had artificial intelligence and analytical support functions (Negash, 2004).

Business Intelligence is seen as an answer to the current needs of organizations for strategic decision-making with intensive use of Information Technology. Vitt *et al*. (2002) stated that Business Intelligence covers a broad range of technologies, software platforms, specific applications and processes. It is a multifaceted term that can refer to processes, techniques or tools to support the making of faster and better decisions (Pirttimaki and Hannula, 2003). As a multifaceted concept, Vitt *et al*. (2002) further examined Business Intelligence from three different perspectives:

- **Making better decisions faster:** This is considered the primary goal of business intelligence; to help organizations make not only better decisions, but also, better decisions faster.
- **Converting data into information:** Organizations collect large volumes of data everyday; and to make better decisions faster, management needs relevant and accurate information derived from the data. Effective Business Intelligence technology helps to convert raw data into useful information.
- **Using a rational approach to management:** Business Intelligence can be described as an effective approach to management.

Defining business intelligence: There are varied definitions of Business Intelligence (Wixom and Watson, 2010). Vercellis (2009) defines Business Intelligence as a set of mathematical models and analysis methodologies that exploit the available data to generate information and knowledge useful for complex decision-making processes. The major objective of Business Intelligence is to enable interactive access to and manipulation of data and to give business managers and analysts the ability to conduct appropriate analysis. The analysis of the data enables these managers to make effective timely decisions. The process of Business Intelligence is thus based on the transformation of data to information, then to decisions and finally to actions (Turban *et al*., 2011).

Although Business Intelligence is relatively new, its underlying concepts have been there for at least a decade. Data warehousing, data mining, the internet and the World Wide Web are some of such tools that have revolutionized the ability of decision makers to find, collect, organize and access Business Intelligence. Business Intelligence systems, the latest trends in Information Systems, are thus capable of leveraging an organization's assets to optimize their value and provide a good return on investment (Vodapalli, 2009).

Advantages of business intelligence: Business Intelligence presents many intangible benefits to organizations that use it (Gibson *et al*., 2004). These include the facts that the quality of strategic and operative decision-making is improved; there is more systematic information need analysis; we have faster decision-making processes; it eliminates a lot of guesswork within the organization; it enhances communication among departments while coordinating activities and enables companies to respond quickly to changes in financial conditions and customer preferences (Ranjan, 2009).

Pirttimaki and Hannula (2003) rated as important, the facts that Business Intelligence harmonizes the ways of thinking of company personnel; broadens understanding of business in general; strengthens strategic planning; increases professionalism in acquisition and analysis of information; and enhances the understanding of information. Turban *et al*. (2011) also stated the major benefits of Business Intelligence as giving faster and more accurate reporting; improved decision making; improved customer service; and increased revenue. Furthermore, Business Intelligence gives improved business efficiency and productivity; enhances business relationships, increases business value generation and reduces costs.

Disadvantages of business intelligence: The Business Intelligence Guide (2012) stated that the main disadvantages of Business Intelligence are cost and complexity. Business Intelligence system capabilities such as customer scoring, operational analysis and predictive analytics are the cutting edge but these require organizations to spend millions of dollars on data warehousing and software for moving and analyzing data.

Business intelligence in financial institutions: Business Intelligence has become an integral part of financial institutions for performance measurement, profitability analysis and enabling intelligent business decision-making (Kannan *et al*., 2012). One of the primary concerns of such institutions is customer management. Business Intelligence centralizes customer information and provides valuable insight throughout the organization for improved efficiency and better customer support. Business Intelligence can collect and transform millions of records for comprehensive analysis to help financial institutions understand the behavior of their customers, to better satisfy their needs and provide better customer support for competitive advantage (Radonic and Curko, 2007; Rao and Dey, 2012)

Financial crime: Financial systems coupled with facilitating electronic commerce have allowed criminal activities to thrive in financial institutions. Financial crime has increased internationally, due to the rapid advances in technology and globalization of the financial industry. Criminals are able to transfer large sums of monies; private banking facilities, wire systems and various technologies are able to mask such illegal activities. Gottschalk (2010) said that financial crime refers broadly to any non-violent crime that results in a financial loss. These crimes comprise a broad range of illegal activities, including fraud, tax evasion and money-laundering.

Financial crimes are often carried out via cheque and credit card fraud, corporate fraud, bank account fraud, payment fraud, currency fraud, etc. and they involve acts such as insider trading, tax violations, kickbacks, embezzlement, identity theft, cyber attacks and money laundering (Interpol, 2012). Closely connected to cybercrime, financial crimes are often committed via the Internet and have a major impact on the international banking and financial sectors (Pickett and Pickett, 2002).

Financial crime types: Four main categories of financial crimes have been identified (Gottschalk, 2010).

- **Corruption:** The giving, requesting, receiving or accepting of an improper advantage related to a position or office, e.g., kickbacks, bribery, organizational or public corruption.
- **Fraud:** An intentional perversion of truth for the purpose of inducing another in reliance upon it to

part with some valuable thing belonging to him or to surrender a legal right, e.g., bank fraud, consumer fraud, credit card fraud.

- **Theft:** The illegal taking of another person's property without the victim's consent, e.g., cash theft, inventory theft.
- **Manipulation:** A means of gaining illegal control or influence over others' activities, means and results, e.g., bankruptcy crime, bid rigging, competition crime, computer crime, counterfeit currency, cyber crime, ghost employees, inflated invoices and income tax crime.

Business intelligence and financial crime detection: Every year, there are huge losses to businesses, financial institutions and to consumers due to continual increase in financial crimes; and detecting these crimes is a constant challenge for any business. Apparao *et al*. (2009) stated that the limitations of standard financial auditing procedures suggest the need for more analytical processes. Statistics and data mining methods have been applied successfully to detect financial crime activities such as money laundering, e-commerce credit card fraud, insurance fraud, etc. The data mining detection techniques include data collection, data integration, data pre-processing, data mining and pattern evaluation (Moin and Ahmed, 2012). Implementation of these techniques has shown to be cost effective in many business applications. It is evident therefore that Business Intelligence applications can be successfully applied in the area of financial crime detection in financial institutions (Wang and Yang, 2009).

Business intelligence in Ghana: In the past few years, developments in ICT have radically changed the way organizations in Ghana do business. Technological innovation has transformed the Ghanaian economy, especially the financial industry; many banks are making huge investments in technology to maintain and upgrade their infrastructure, in order to provide new electronic information-based services (Abor, 2004). However, innovations in strategic decision-making for organizations in Ghana have been slow and very few institutions in Ghana have adopted Business Intelligence systems to enhance decision-making.

Financial crimes are also known to exist. Ghana Business News (2012a) reports that the Financial Intelligence Centre of the (central) Bank of Ghana has received a total of 206 Suspicious Transaction Reports which it has forwarded to law enforcement agencies to investigate. Also, the Criminal Investigations Department of the Ghana Police Service has launched the E-Crime Project to build the capacity of detectives in cybercrime investigation and intelligence gathering (Ghana Business News, 2012b). With these two preliminary instances, one can say that a few organizations in Ghana are taking steps to use the Business Intelligence technology and that the country still has a long way to go with Business Intelligence developments.

METHODOLOGY

Research approach: A quantitative research approach was used in this study. According to Dawson (2009), quantitative research generates statistics through the use of large-scale survey research, using methods such as questionnaires or structured interviews. The research method used was self-administered questionnaires. The research also employed a cross-sectional design. According to Bryman and Bell (2007), research designs are classified as experimental, cross-sectional, longitudinal, case study and comparative. Cross-sectional research design involves a collection of quantitative data. It is suited for research that involves looking into a phenomenon, for example, a technology, at a particular time from different perspectives. Business Intelligence concerns a technological phenomenon, a cross-sectional research design was therefore considered appropriate for the study.

The purpose of the study suggests that it is both exploratory and descriptive. Research involves three kinds: exploratory, descriptive and explanatory. Exploratory is valuable when the research is to study a new area and/or test methods, such as surveys and survey questions, for investigating that area. A descriptive study is used when an issue needs to be explained in more detail. Surveys rely on description and involve questioning individuals on topics and then describing their responses (Jackson, 2011). The strategy used in this research was that of a survey, as surveys often test results, self-completion questionnaires and attitude scales. A survey is used to scan a wide field of issues, in order to measure or describe any generalized features.

Population and sample selection: Evaluating the prospects of Business Intelligence as an ICT tool for financial crime detection in financial institutions in Ghana, this study sampled the views of 120 ICT staff at the headquarters branches of six financial institutions in the Accra Metropolis and generalized it to the entire population of financial institutions in Ghana. A probability sampling technique was ideal for the study because every ICT staff in a financial institution in the study population had an equal likelihood of participating in the survey.

Sample size: A sample size of 90 ICT professionals was considered adequate and representative enough of the population size of 120. Ninety questionnaires were sent out to the participants of the study and a total of 75 received.

Table 1: Types of financial institutions

Type of financial institution	Frequency
Bank	57 (76%)
Insurance	7 (9.3%)
Mutual funds	8 (10.7%)
Credit union	3 (4.0%)
Total	75 (100.0%)

Table 2: Most common financial crimes

Financial crimes	Frequency
Payment card crimes	22 (30.99%)
Counterfeit currency and security documents	10 (14.08%)
Money laundering	18 (25.35%)
Fraud	21 (29.58%)
Response Total	71 (100.0%)
Missing Data	4
Total	75

Table 3: Effectiveness of data analysis processes used

Level of effectiveness	Frequency
Very effective	30 (47.62%)
Effective	23 (36.51%)
Quite effective	9 (14.29%)
Not effective	1 (1.59%)
Response total	63 (100.0%)
Missing data	12
Total	75

Table 4: Have data analysis processes reduced financial crimes?

Response	Frequency
Yes	47 (62.7%)
No	2 (2.7%)
Can't tell	13 (17.3%)
Response total	62 (82.7%)
Missing data	13
Total	75

Table 5: Number of financial crimes detected in the last two years

Number of financial crimes	Frequency
1-20	54 (81.82%)
21-30	4 (6.06%)
31-40	2 (3.03%)
41-50	1 (1.52%)
Over 50	5 (7.58%)
Response total	66 (100%)
Missing data	9
Total	75

Data collection: The study made use of primary and secondary data. Primary data was gathered through the use of questionnaires and secondary data was obtained from journals, textbooks, organizational research and published studies. It was impossible to get organizational documents as privacy of data was an important issue for the financial institutions. Data collection was done over a period of 2 weeks using closed-ended questionnaires to evaluate views on Business Intelligence and financial crime detection.

Data processing and analysis: The data collected was then organized and analyzed. The responses to the questions were analyzed with SPSS (Statistical Package for Social Sciences) software. The data was analyzed using descriptive statistics, summarized and presented in frequency tables and percentage counts and the results presented using tables, bar charts, pie charts and graphs (Beins and McCarthy, 2012).

ANALYSIS OF DATA

Presentation and analysis: A total of 75 responses were realized out of a sample size of 90 respondents of the study. We asked the respondents as to the types of financial institutions they belonged to. Majority of them were from Banks, representing 57 (76.0%); then Mutual funds, which accounted for 8 (10.7%) responses, followed by Insurance with 7 (9.3%) respondents and Credit Union contributing 3 (4.0%) to the number of responses.

From the results in Table 1 and Fig. 1, it can be concluded that financial institutions in Ghana are dominated more by Banks.

The respondents were asked to tell us what the most common financial crimes were in their financial institutions. The results from Table 2 and Fig. 2 indicate that the most common financial crimes to were Payment Card Crimes; followed closely by Fraud, both representing 22 (31.0%) and 21 (29.6%) of the responses respectively. A significant number of 18 (25.4%) respondents said that Money Laundering was the most common to their financial institutions. Counterfeit Currency and Security Documents turned out to be the least at 10 (14.1%). Payment card crimes are shown to be the most common probably due to the fact that payment cards have become widely used with more payments done online these days and so have become targets for criminals.

We also tried to find out from the respondents the effectiveness of the data analysis processes used in their institutions. Table 3 and Fig. 3 report respondents' views. Thirty responses, representing 47.6%, accounted for the highest effectiveness level. A significant number of 23 (36.5%) respondents said that their data analysis processes were effective. Few responses went for quite effective and not effective data analysis processes, representing 9 (14.3%) and 1(1.6%) respectively. The data analysis processes were thus found to be very effective. It can be concluded that improved data analysis will enable more informed decision-making for competitive advantage. We asked the respondents as to whether the data analysis processes used in their institutions have actually reduced financial crimes. From Table 4 and Fig. 4, 47 (62.7%) respondents said that the data analysis processes used have reduced financial crimes in their institutions. An insignificant number of 2 (2.7%) respondents said that their data analysis processes had not reduced financial crimes in their institutions. 13 responses representing 17.3% accounted for those respondents who could not tell whether or not financial crimes had reduced in their

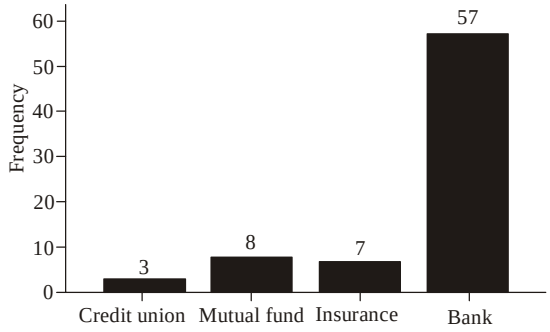

Fig.1: Types of financial institutions

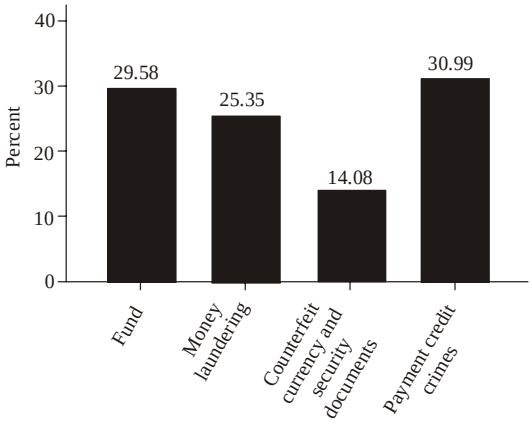

Fig. 2: Most common financial crimes

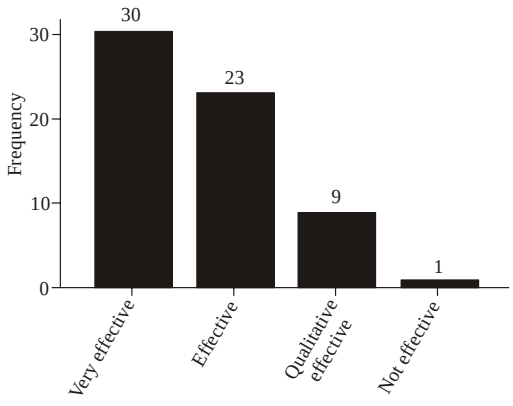

Fig.3: Effectiveness of data analysis processes used

institutions. The results prove that financial institutions, to a great extent, have effective data analysis processes that have helped reduce financial crimes.

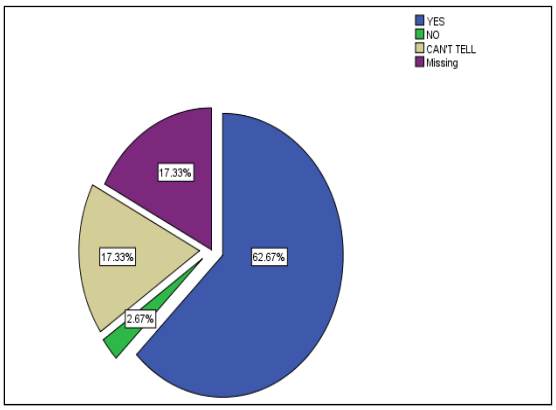

Fig.4: Have data analysis processes reduced financial crimes?

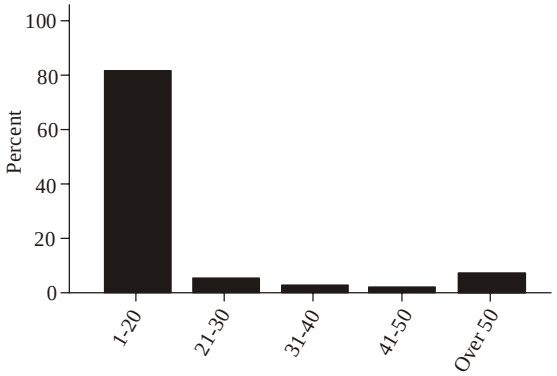

Fig. 5: Number of financial crimes detected in the last two years

The respondents were asked on the number of financial crimes detected in their institutions during the last two years. As illustrated in Table 5 and Fig. 5, majority of the respondents, representing 54 (81.8%) indicated that their financial institutions have detected 1-20 number of financial crimes in the last two years. 5 (7.6%) respondents mentioned that they have detected over 50 crimes in the last two years. It can be deduced that there have been less financial crimes detected over the last two years and this is probably because the current data analysis processes of the majority of financial institutions are effective.

We tried to find out if the respondents know about Business Intelligence. In Table 6 and Fig. 6, forty-one respondents representing 54.7% affirmed that they knew about Business Intelligence, but 11 (14.7%) respondents said they had no knowledge of Business Intelligence. A significant number of respondents, representing 21 (28.0%) said that they somehow knew about the technology. It can be concluded from the results that majority of the respondents are aware of the

Table 5: Number of financial crimes detected in the last two years

Number of financial crimes	Frequency
1-20	54 (81.82%)
21-30	4 (6.06%)
31-40	2 (3.03%)
41-50	1 (1.52%)
Over 50	5 (7.58%)
Response total	66 (100%)
Missing data	9
Total	75

Table 6: Do you know about business intelligence?

Response	Frequency
Yes	41 (54.7%)
No	11 (14.7%)
Somehow	21 (28.0%)
Response total	73 (97.3%)
Missing data	2
Total	75

Table 7: Is your organization using business intelligence?

Response On BI Use	Frequency
Yes	39 (52.0%)
No	10 (13.3%)
Can't tell	25 (33.3%)
Response total	74 (98.7%)
Missing data	1
Total	75

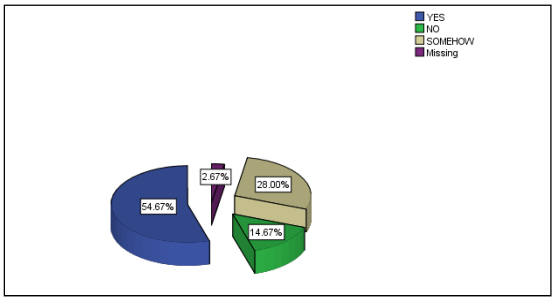

Fig.6: Do you know about business intelligence?

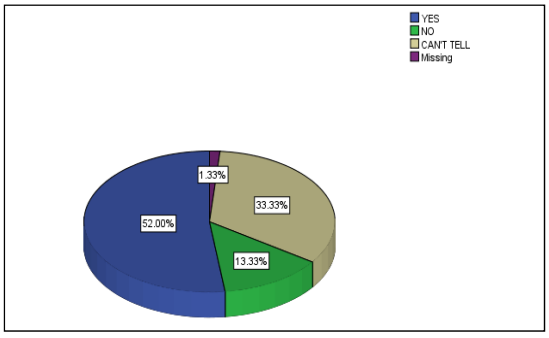

Fig.7: Is your organization using business intelligence?

technology and are abreast with new technologies such as Business Intelligence.

We asked the respondents on the use of Business Intelligence in their financial institutions. The use of

Table 8: Business intelligence applications used

Business Intelligence Applications	Frequency
ETL (Extract, Transform, Load)	6 (8.0%)
EAI (Enterprise Application Integration)	6 (8.0%)
OLAP (On-Line Analytical Processing)	8 (10.7%)
Data mining	10 (13.3%)
Data warehousing	16 (21.3%)
None of the above	16 (21.3%)
Response total	62 (82.7%)
Missing data	13
Total	75

Table 9: Data analysis offered by business intelligence for financial crime detection

Data analyses offered by BI	Frequency
Customer profiling	19 (30.6%)
Financial crime detection	17 (27.4%)
Predictive analysis and forecasting	11 (17.7%)
Credit scoring	4 (6.5%)
Other	11 (17.7%)
Response total	62 (100.0%)
Missing data	13
Total	75

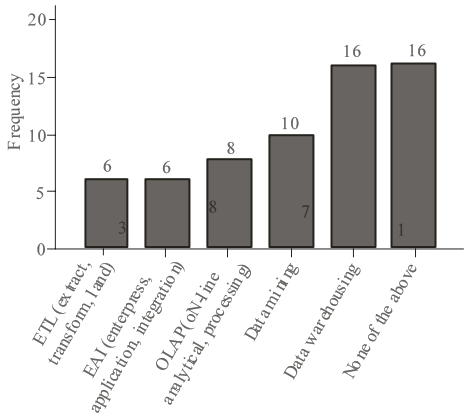

Fig.8: Business intelligence applications used

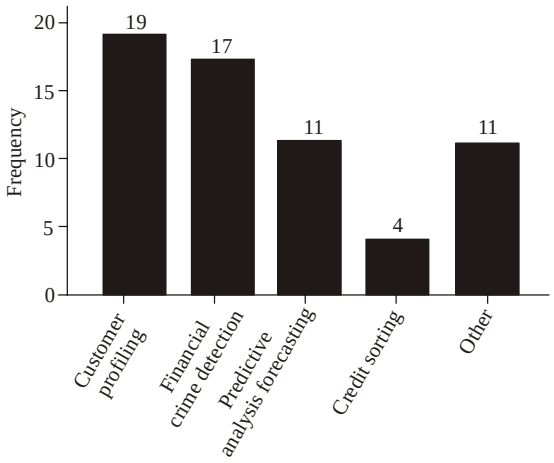

Fig.9: Data analysis offered by business intelligence for financial crime detection

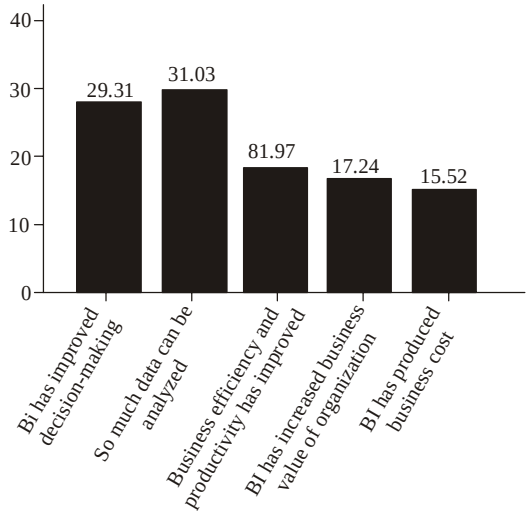

Fig.10: Benefits of business intelligence to Ghanaian financial institutions

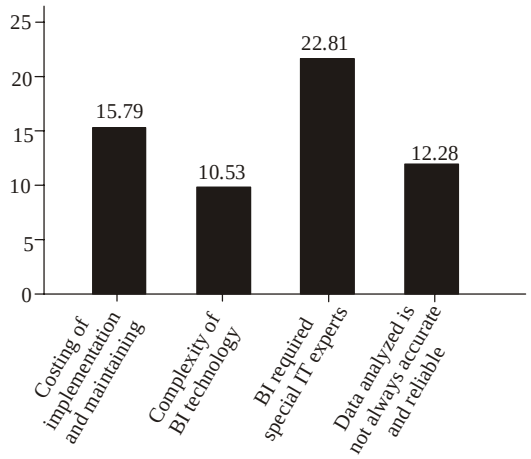

Fig. 11: Challenges of business intelligence to Ghanaian financial institutions

Business Intelligence is shown to be high in financial institutions based on the results presented in Table 7 and Fig. 7. Fifty-two percent, representing 39 respondents said that they use Business Intelligence technology in their financial institutions. A significant number of 25 (33.3%) respondents could not tell whether their financial institutions use Business Intelligence. Ten (13.3%) of the respondents stated that their financial institutions do not use Business Intelligence at all. The results tell that, to some great extent, financial institutions use Business Intelligence and so it can be inferred that financial institutions in Ghana are putting to efficient use much of the data they gather from their operations.

The respondents were asked as to which Business Intelligence applications they use in their operations. The results are shown in Table 8 and pictorially in Fig. 8. Data Warehousing accounted for the highest Business Intelligence application used in financial institutions with 16 responses. An equal number of 16 responses represented financial institutions that did not use any of these Business Intelligence applications in their operations. Ten respondents stated that they used Data Mining techniques in their operations. OLAP, EAI and ETL applications represented 10, 6 and 6 responses respectively. These applications constitute what Business Intelligence is; and it can be deduced from the results that Business Intelligence use is considerably high as the majority of financial institutions are using the aforementioned applications in their operations.

We asked the respondents as to what data analysis is offered by Business Intelligence for financial crime detection in their institutions. The results are shown in Table 9 and Fig. 9. The majority of the respondents stated that Business Intelligence offered to their financial institutions data analysis on customer profiling and financial crime detection. This represented 19 (30.6%) and 17 (27.4%) of the responses respectively. The least data analysis was credit scoring, accounting for 4 (6.5%) responses. From the results, it can be deduced that Business Intelligence offers effective analysis for financial crime detection for financial institutions and this has helped reduce financial crime in these institutions as presented in earlier statistics.

The respondents were asked as to what benefits they feel Business Intelligence has offered their financial institutions. The graph in Fig. 10 shows the results. The major benefits to the financial institutions were the fact that so much data could be analyzed and that Business Intelligence had improved decision-making; representing 31.03% and 29.31% of the responses respectively. This means that the financial institutions are not only looking to being able to analyze much of the data they gather, but also that the analyzed data can become actionable information that can improve decision-making for them.

We finally asked the respondents on the challenges that their financial institutions have with the practice of Business Intelligence. The graph in Fig. 11 reports that the major challenges that Business Intelligence posed to financial institutions were that Business Intelligence required specialized Information Technology experts and that the cost of implementing and maintaining Business Intelligence was high. This accounted for 22.81% and 15.79% of the responses respectively.

It can thus be inferred that although to a great extent technology is being adopted in financial institutions in Ghana, Business Intelligence is a combination of technologies and processes that makes it complex and so requires experts to handle it. Also, the complexity of the technology makes it expensive to implement and maintain. Investments in Business Intelligence technology are expensive because

implementation of the technology requires substantial costs, time and skilled effort.

CONCLUSION

In a fast evolving business world, financial institutions nowadays are tasked with making effective decisions by being able to turn relevant data gathered from all their transactions into actionable information or knowledge by means of efficient analysis of the vast amount of data they use. The increasing need for information technologies that can improve the effectiveness of managerial decision-making and add significant business value has forced many financial institutions to re-think their business strategies. Business Intelligence has been identified to provide such support for decision-making in financial institutions and help them achieve competitive advantage.

More crucial is the issue of the huge losses to financial crime for financial institutions. Although globalization and electronic commerce has allowed financial institutions to reach many more customers and do business across many jurisdictions, it has also increased the activities of financial criminals. Financial crimes have been identified as causing financial institutions the world over huge financial losses; and there is the need for effective analysis of data from financial transactions especially with customers.

This study was to evaluate the use of Business Intelligence as an ICT tool for financial crime detection in financial institutions in Ghana. We can conclude that Business Intelligence offers effective analysis for detecting financial crimes in financial institutions. Therefore, the prospects of Business Intelligence for financial crime detection are high for financial institutions in Ghana.

RECOMMENDATIONS

In the study, many of the respondents stated that Business Intelligence is a good technology which can help improve strategic decision-making in their financial institutions. Yet, some challenges were identified. It is necessary to discuss some recommendations that can help address these challenges.

- The cost of implementing and maintaining the Business Intelligence technology was a major challenge. It is recommended that financial institutions that cannot afford the Business Intelligence technology outsource the technology. Business Intelligence vendors may be able to offer the technology and support tailored to suit the business needs of such organizations.
- From the respondents, we identified inadequate training and education on Business Intelligence in Ghana. It is recommended that organizations invest more in training their staff (both IT staff and others) on how to use the Business Intelligence technology.
- In Ghana, there seems to be very little awareness on the Business Intelligence technology, probably because the concept is relatively new and software vendors are not quite familiar with it. It is recommended that intensive awareness is created by software specialists and vendors on Business Intelligence.

It is hoped that with these, Business Intelligence would be adopted as an ICT tool for financial crime detection in Ghana.

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