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EFFECT OF INSURANCE MANAGEMENT INFORMATION SYSTEM ON DEEPENING INSURANCE SERVICES IN NIGERIA

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A B S T R A C T

This study was conducted to examine the effect of insurance management information system on deepening insurance services in Nigeria. The researcher employed the use of survey research design in which primary data was obtained through questionnaire administration. Data for this study was obtained from both primary and secondary sources. Primary data was obtained through a structured questionnaire. The questions were closed-ended, and directed to collect relevant data from the staff of insurance companies. Secondary sources were information from existing literatures such as relevant textbooks, journals and periodicals, and library source. The researcher employed tables and simple percentage method to analyse the research questions. However, the regression technique was used to test hypotheses. The finding was that there is a significant effect of the application of transaction processing system on deepening of insurance services in Nigeria. There is a significant influence of the use of decision support system on deepening of insurance services in Nigeria. There is a significant influence of the adoption of office automation system on deepening of insurance services in Nigeria. There is a significant effect of expert system by insurance firms on deepening of insurance services in Nigeria. There is a significant influence of personal/work group information system on deepening of insurance services in Nigeria. There are significant joint effects of transaction processing system, decision support system, office automation system and personal/work group information system on the deepening of insurance services in Nigeria. It was concluded that there is positive and significant effect of insurance management information system on deepening insurance services in Nigeria. Recommendations were that Insurance companies operating in Nigeria should adopt a transaction processing system-based application for efficient service delivery. There is need for the use of Decision Support System (DSS) in the Nigerian insurance industry. Insurance companies need to upgrade their Office Automation Systems. Insurance firms in Nigeria should create their Expert System database. Personal/Work Group Information System should be promoted by insurance firms in Nigeria. Synergy in the adoption of MIS should be created for effective and efficient service delivery and by extension deepening insurance services.

1. INTRODUCTION

The role of insurance management information system in deepening insurance services in Nigeria cannot be overemphasized; and efficient insurance services demand accurate, timely and relevant information. As the numbers of employees, customers and transaction increases in Nigerian insurance industry the more it become multifaceted, and the information needed for effective management, planning, decision-making and control invariably becomes more complex. Deepening insurance services in Nigeria is the task of every top management in the Nigerian insurance industry and other stakeholders and they need relevant and timely information to assist in taking decisions. According to Lucey (2005), relevant information increases knowledge, reduces uncertainty and is usable for the intended purpose. However, there are difficulties in producing relevant and timely information, but with the advent of management information systems most organizations in Nigeria especially the insurance corporations collect data which are raw facts to produce useful and meaningful information which can be used for decision-making which affects the current and future operations of the organization. Although, information does not serve as an alternative for good management but conversely management cannot be good without adequate information. Laudon and Laudon (2001) defined management information systems as a set of interrelated components that collect, process, store, and distribute information to support decision-making, coordination, and control in an organization. In addition to supporting decision-making, coordination, and control, management information systems may also

help managers and workers analyze problems, visualize complex subjects, and create new products. The evolution of high computer technology plays significant role in implementing and developing the use of management information systems which transforms raw data into useful information through the three basic activities, input, processing and output. In today's' insurance business, there is growing need for information. The information requirement increases on daily basis and thus become more complex in nature. The implication of this is that the manual method of processing data becomes inadequate; hence the global business seeks a better way of accomplishing this goal and this lead to the development of computerized systems which is management information systems that will satisfy the needs of the management.

A modern day insurance services cannot be effectively and efficiently delivered without the use of information by deploying systems such as Transaction Processing System, Management Information System, Decision Support System, Expert System, Office Automation System and Personal/Work Group Information Systems in the Nigerian insurance industry. These systems can be use when establishing contact with the potential or existing insured by the company agent, issuing proposal forms, policy documentation, underwriting process, premium payment, investment projects appraisal, investment evaluation techniques, claims reporting, identifying genuine or fraudulent claims, claims payment or denials, maintaining contact with the potential or existing policyholders. The collated data using these systems become database information for internal and external stakeholders in the insurance industry for informed decision making. According to Umoren and Joseph (2016), these collated data from the external stakeholders would then be sent to the data warehouse. Umoren and Joseph (2016) further added that the data warehouse consists of integrated data, extracted from various data sources (e.g., operational database tables) both internally and externally. Data warehousing involves consolidating data from disparate sources into a consistent format. The quality of data in a data warehouse in terms of validity, availability, level of detail, accessibility, completeness and consistency is superior to the quality of data found in the collective set of functionally oriented data sources. It provides the infrastructure for supporting a wide variety of data analysis and information needs. For example, different business functional areas such as financial accounting systems, materials resource planning, and customer relationship management may use the integrated data to support the formulation and revision of strategic initiatives.

By deploying these information systems, they would aid in deepening insurance services in Nigeria. Hence, deepening insurance services in Nigeria leads to deepening insurance penetration and density rates (Ward & Zurbruegg, 2000). Insurance penetration rate is the amount of insurance premium in a country expressed as a percentage of the Gross Domestic Product (GDP). The insurance penetration rate is expressed as the ratio between insurance premium volume and GDP. The higher the penetration rate, the more developed and deep the insurance services and market (Alhassan & Fiador, 2014). In other words, insurance penetration rate measures the growth of insurance premium vis-à-vis the growth in the GDP. Insurance density rate is arrived when total premiums of insurance firms are divided by the total population, which measures the number of insurance policyholders from the total population. It also measures the deepness of insurance services. It is on this background that this study seeks to examine the role of insurance management information system in deepening insurance services in Nigeria.It seems that the main problem that affects the role of insurance management information system in deepening insurance services in Nigeria is weak set of Transaction Processing System, Management Information System, Decision Support System, Expert System, Office Automation System and Personal/Work Group Information Systems in the Nigerian insurance industry. Additionally, weak MIS infrastructure among insurance firms in Nigeria seems not to contribute to deepening insurance services in Nigeria. Some insurance firms in Nigeria are still using obsolete technological interrelated components thereby rendering the efforts in information collection, process, storing and supporting decision-making, coordination, and control highly bureaucratic. These seemed to have resulted in inefficient insurance services delivery, low insurance services deepening, low insurance penetration and density rates.

Also, computer systems and other ICT peripherals and devices of these firms that supposed to enhance effective and efficient MIS seemed to be nonfunctional due to epileptic power supply and the obsolescence. In spite of the relevance of MIS in deepening insurance services in Nigeria, the adoption it merits in Nigeria has not been given. Hence, certain factors seemed to be accountable for this, which include concentration of MIS in the insurance companies' headquarters while MIS at insurance companies' branches remains infeasible. This development seemed to have made the deepening of insurance services in Nigeria over the years abysmal as compared to organizations like banks and stock markets (Philip, 2011).

Existing literature also shows that researches in this field of study are commonly carried out in advance countries and scarcely in Nigeria with varied discoveries (Aduloju, 2014; Olumoye, 2013; Alhabri and Sonawane, 2016; Oladipo, 2012; Munirat, 2014). It is necessary therefore to carry out this research, with the central objective that seeks to examine the effect of insurance management information system on deepening insurance services in Nigeria. Specific objectives are to: examine the extent to which the application of Transaction Processing System has affected the deepening of insurance services in Nigeria; determine the extent to which the use of Decision Support System has influenced the deepening of insurance services in Nigeria; investigate the extent to which the adoption of Office Automation System has influenced the deepening of insurance services in Nigeria; examine the degree to which Expert System by insurance firms has affected the deepening of insurance services in Nigeria; examine the extent to which Personal/Work Group Information System has influenced the deepening of insurance services in Nigeria; and examine the joint effects of Transaction Processing System, Decision Support System, Office Automation System, Expert System and Personal/Work Group Information System on the deepening of insurance services in Nigeria. Rooted on the above objectives, the hypotheses were formulated thus: **Ho₁**: There is no significant effect of the application of Transaction Processing System on deepening of insurance services in Nigeria; **Ho₂**:   There   is   no significant influence of the use of Decision Support System on deepening of insurance services in Nigeria**; Ho₃**:There is no significant influence of the adoption of Office Automation System on deepening of insurance services in Nigeria; **Ho₄**: There is no significant effect of Expert System by insurance firms on deepening of insurance services in Nigeria; **Ho₅**: There is no significant influence of Personal/Work Group Information System on deepening of insurance services in Nigeria; and **Ho₆**: There are no significant joint effects of Transaction Processing System, Decision Support System, Office Automation System, Expert System and Personal/Work Group Information System on the deepening of insurance services in Nigeria.

2. LITERATURE REVIEW

2.1 Concept of Management Information Systems

In Comptroller's Handbook of Management information systems by Administrator of National banks (1995), MIS has been defined as a system or process that provides the information necessary to manage an organization effectively. Risk reflects the expectation of events that could adversely affect earrings or capital. In any organization management implement MIS for assessment of risk and MIS may increase risk in some areas. A flowed MIS causes operational risk and can extend to all levels of operations when poor programmed or non-secure systems are used. To effectively provide feedback tool for management and staff MIS must use the elements of usability: timeliness, accuracy, consistency, completeness and relevance and to achieve sound MIS organizations should take into consideration MIS at both the tactical and strategic levels (Nowduri, 2011). Ajayi, Omirin and Fadekemi (2007) defined MIS has as an integrated system of man and machine for providing the information to support the operations, the management and the decision making in the organization. Management information system plays very important role in organizations by ensuring that an appropriate data is collected from various resources, processed and provide it to all levels of management in the form of information. It creates an impact on the organization's functions, performance and productivity. Management information system also have impact on society, quality life and impact on privacy, ethical issues, intellectual property, copy right and patents. Management needs to ensure that MIS systems are developed according to a sound methodology obtaining the phases of system analysis, designing, programming, development of user instructions, training and testing of system, system installation and maintenance. It was also indicated that examiners should base MIS reviews on an evaluation of whether the systems provide management with information necessary to guide operation, support timely decision making, help management monitor progress toward reaching institutional goals and objectives (Rhodes, 2012).

According to Safari (2011), there are different types of information systems are transaction processing system, office automation system, knowledge work system, management information system, decision support system, expert system, executive support system and group decision support system. The decision making process has been divided into two basic types: Programmed decisions and Non–programmed decisions. There are six-steps for decision making process: situation analysis, alternative search, alternative evaluation, objectives and criteria setting, making decision and decision review. All those process increase the quality of decision. The purpose of the MIS is to provide information to all managers in a particular organization and that can lead to an effective decision. In MIS model, database contains the data provided by accounting information system and both data and information are entered from the environment. Decision support system is also selected. It is a computer based system intended for use by a particular or usually a group of mangers at any organizational level in making a decision in the process of solving a semi structured decision. A Decision support system model includes four parts; data, paper writing software, mathematical model and groupware. MIS is a best suited in identifying problems and helping managers understanding them to make suitable and correct decision and decision support system is aimed at the specific need of the individual and group decision maker (Alhabri and Sonawane, 2016). The objective of information systems in an organization is to provide the management, managers and stakeholders with information for more precise planning, foresting, monitoring and controlling of business. More so, the use of powerful computer software and network information systems have helped insurance companies to become more flexible, removing layers of redundant management functions, separate work from location and also restraining work flows. In order to maximize the benefits of information systems in today's highly globalized and information based economy, there is a greater need to plan the information architecture and infrastructure.

Olumoye (2013) pointed out that with the emergence of smart phones, tablets, and other computer-based mobile devices, all of which are connected by wireless communication networks, information systems have been extended to support mobility as the natural human condition. It also stated that information systems has enabled more diverse human activities, they have exerted a profound influence on the demand for insurance services in Nigeria. These have quickened the pace of daily activities, affected the structure and mix of organizations, changed the type of insurance services bought and influenced the nature of work; although, the dependence on information systems has also brought new threats. Management information systems as described by Yongmei Hongjian andd Junhua (2008) is an arrangement of people, data, process and interface that interacts to support and improve day-to-day operations in a business as well as support the problem-solving and decision-making needs of the management and users. This can also be described as all equipment and methods that provide information to managers to support their operations and decision-making within an organization. This development has helped insurance companies increase sale volumes of insurance policies thereby assist in deepening their services in the Nigerian economy (Oladipo, 2012).

2.1.1 *Transaction Processing System (TPS)*

This is also referred to as data processing system. It performs the essential role of collecting and processing the daily transactions of the organization. They serve at operational levels of the organization. Examples of transactions include purchase payroll, reservation, invoices, payments, shipping, registrations, orders and sales (Oladipo, Fashagba and Olanrewaju, 2012). Today's business environment is very dynamic and undergoes rapid changes as a result of technological innovation, increased awareness and demands from customers. Business organizations, especially the insurance industry of the 21st century operates in a complex and competitive environment characterized by these changing conditions and highly unpredictable economic climate. Transaction Processing System (TPS) is at the center of this global change curve. Laudon and Laudon, (1991) contend that managers cannot ignore Transaction Processing Systems because they play a critical role in contemporary organization. They point out that the entire cash flow of most fortune 500 companies is linked to Transaction Processing System. The application of Transaction Processing System technology concepts, techniques, policies and implementation strategies to insurance services has become a subject of fundamental importance and concerns to most insurance firms across Nigeria and indeed a prerequisite for local and global competitiveness.

Transaction Processing System (TPS) directly affects how managers decide, how they plan and what transaction services are offered in the insurance industry. It has continued to change the way insurers and their corporate relationships

are organized worldwide and the variety of innovative devices available to enhance the speed and quality of transaction service delivery. The processing of transaction data into information and communicating the resulting information to the user are the very essence of the Transaction Processing System (TPS) (Oladipo, *et al.*, 2012).

2.1.2 Management Information System (MIS)

This is an application of information systems that provides management oriented report in predetermined fixed format. MIS help managers on planning, monitoring and controlling business operations by providing weekly, monthly or yearly results and not daily activities. Examples of MIS are budget fore-casting and analysis, financial reporting, inventory reporting, production scheduling, salary analyses, sales forecasting and sales reporting (Olumoye, 2013). As mentioned above the MIS design for a digital firm has to focus on business strategy. Focusing on the strategy, Management Information Systems along with E-business enterprises aims at paradigm shift to e-enterprise. The difference between Conventional organization and e-enterprise and strategic Management of Business helps to understand the corporate planning, business analysis for strategy Development and various business strategies. The information Security Challenges in E-enterprises give insight about the factors affecting the security of information, scope and objective, security threats, utility of Firewall, Encryption and Authorization. In Strategic management of business performance, aspects such as corporate planning, strategic planning, business analysis and types of business strategies should be clear for any organization to perform the business in an effective way. To manage information systems efficiently Information security challenges in E-Enterprises should be defined for avoiding risks. Managers need to understand some aspects when developing the MIS in organization, those aspects are: System analysis and design are the basic things in The MIS development, understanding of decision making processes, quality of information and its support to decision making and understanding of MIS development methodology is important for using structured system analysis and design (SSAD) and objected system analysis and design (OOSAD). A rational decision making is the one which effectively and efficiently ensures the achievement of the goal for which the decision is made (Alhabri and Sonawane, 2016).

Herbert Simon in Alhabri and Sonawane (2016) describes decision making processes as intelligence, design and choice, the MIS follows those processes in its developing. There are important factors on the relevance on the concepts of decision making and MIS. The MIS takes into consideration those factors to turn out the best design that can make the decision making more effective. In MIS information is valuable for taking the decision because it creates an intelligent human response in mind and gathering useful information can build the knowledge and this knowledge has to be managed in proper way by knowledge management system. In Organizations information is considered as one of the major resources and it has to be managed well. The advancement of computer technology makes the information precious and from that point the MIS is needed. Any system has three parts, input, process and output, concepts like OOA, OOSAD, and its diagrams lead to an effective system analysis and design. To develop MIS for better business, organizations must associate the business goals and MIS goals to make the relationship between those goals and business strategy. Strategic management process is very complex and needs strong information to enable organization to achieve its long term goal and objectives and to fulfil that, implementing and designing of MIS is highly required and that is called a strategic design of MIS.

2.1.3 Decision Support System (DSS)

It is an application of information system that help users to make decisions by providing useful information that supports unstructured decisions (i.e. decision-making situations that cannot predicted) whenever a decision-making situation arises. DSS also serve at the management level of the organization. When it is applied to executive managers, these systems are sometimes called executive information system (EIS). Decision support system does not actually make decision or solve problems but people do. It is only concerned with the provision of useful information to support the decision process. Users and Managers use DSS tools to access data warehouse to get relevant information. A data warehouse is a read-only informational database that contains detailed information generated by other transaction and management information systems (Aduloju, 2014). Business and industry is divided into two sectors, manufacturing and services, MIS can support both with different applications and decision support system (DSS) plays very important role in both sectors. Personal, financial, production and raw materials managements are the areas where we can find MIS application in manufacturing sectors. Query, analysis, decision making and controls are the applications needed under those managements. The data processing applications like payroll, accounting and inventory are required in both sector but they may not be all necessary to the service industry. DSS helps in making a decision as well as in its performance evaluation. It provides additional information to support complex decision making (Alhabri and Sonawane, 2016).

2.1.4 Expert System (ES)

This is an extension of the decision support system. It is a programmed decision-making information system that captures and reproduces the knowledge and expertise of experts and then simulates the thinking or actions of that expert to help users with less expertise. These applications are implemented with Artificial Intelligence (AI) technology. Artificial intelligence is a computer-based technology that has the ability to behave like humans, learn languages and emulate human expertise and decision-making (Bharadwaj, 2000). According to Giarratano and Riley (2004), Expert systems (ES) are knowledge-based systems that were one of the earlier research fields in Artificial Intelligence (AI) and can be defined as knowledge intensive software that can perform some tasks normally requiring human expertise. Expert systems are used to solve specific domain problems and each step of reasoning for a specific problem is determined by the human expert professionally. So, they behave as an artificial advisory system for a particular problem domain. Although AI is used in various commercial applications today, an expert system application is sometimes regarded as "AI" too. After expert systems have moved out of research laboratories during early 1980s, they became more popular and found several application fields such as engineering, chemistry, medicine, industry, and many others. The construction process of expert systems with specialized domain knowledge is defined as knowledge engineering. Knowledge-based expert systems contain knowledge acquired from periodicals, books, or from domain interviews with human experts. Expert systems are mostly preferred as they produce reasonable solutions for even

some ill-structured problems that have no efficient algorithmic solution (1). In addition to classical expert systems, there are hybrid expert systems today using techniques such as artificial neural networks and genetic algorithms (Abraham, 2005).

The first expert systems were built by interviewing an expert and attempting to capture the knowledge, hence the term "expert systems." An ES is a computer program, which is constructed by utilizing the experience of a domain expert. It performs functions like asking questions and explaining its reasoning. The users interface of this kind of system proceeds with the question and answer manner by the end user. The kernel of an expert system has two main components, namely the knowledge base and the inference engine. The knowledge base contains knowledge about the expert's domain. It may be represented by simple facts, or by more complex representations like frames. There are also rules that explicitly represent the expert's skills or knowledge about the domain under consideration. The expert system uses this knowledge by exploiting the second main component, that is the inference engine that has several roles including determining how the system reasons using the IF−THEN rules in the knowledge base. Once the knowledge base is built, the ES can begin making inferences. The most common forms of inferencing are forward and backward chaining. The process of moving forward from known facts to conclusions that follow them is called forward chaining. Alternatively, the process of working backward from a hypothesis to known facts that support it, is called backward chaining (Leondes, 2002).

2.1.5 Office Automation System (OAS)

This system supports a wide range of business activities. Office systems are applications designed to improve workflow and communicate among workers regardless of their physical locations. Typical office system handles and manages document (through word processing, desktop publishing, document imaging and digital filings), scheduling (through electronic calendars) and communication (through electronic mail, voice mail and video conferencing). Computer, electronic, communication, video and audio technologies have brought a new aspect of business performance, all technology tools support all needs of the business. Integrated solution and the systems offering an enterprise wide management support, this integrated solution is called as the enterprise management system (EMS) (Posu, 2006).

2.1.6 Personal and Work Group Information Systems

Personal information system is the system designed to meet the needs of a single user while work group system is designed to meet the needs of a workgroup and to increase the productivity of the group. MIS managers should understand technologies tools for selection to drive the information system in the right way. Technologies such as database and client, server architecture, communication network, E-business data warehouse and business intelligence are very important for managing the information system in organizations. The choice of information technology is a backbone of MIS and reaching the degree of success in the MIS depends on how information technology is implemented. The E-business uses networking, communication, internet and computing technologies to change the business scenario, it has moved from regional to global level and getting more knowledge. The nature of management information system has completely changed, reporting has become more online and real time is linked to business at point in time and this has improved personal and work group interactions. Currently the MIS is customer and performance focused and MIS in E-business talks more in trends analysis, causes and effects (Alhabri and Sonawane, 2016).

2.1.7 Insurance Services

There are two categories of insurance services that are ubiquitous in countries around the globe. According to Goacher (2006), they are non-life insurance and life insurance services. Non-life insurance services encompass services aimed at providing coverage for objects like buildings, vehicles, ships, aircraft, etc. Insured perils such as theft, fire, accident, liabilities etc are also covered under this policy. In Nigeria, according to Adekunle (2009), the above classification is in line with the Insurance Act of 2003 provision, which is the main tool regulating insurance business service in Nigeria. Insurance services are featured primarily by intangible products. Insurance firms are seen as contractual financial firms (Ubom, 2014). The services of insurance are introduced and legally obligatory on the purchase of suitable policy of insurance and the payment of agreed premium. Also, the premium paid by non-life insurance customers creates the main source of income to insurance firms. The incomes are used by the insurance firms to reimburse the unfortunate few who suffered losses from the insured perils. Also, the operation of insurance business depends on the large numbers law. This law says that there is need for a large group to be randomly alike but not essentially equal exposures parts that are subject to similar peril or collection of perils as opined by Adekunle (2009). Hence, this will help insurance firms forecast losses, which probably happen within the covered group at a particular time frame. Fundamental principles of insurable interest, subrogation, utmost good faith, indemnification, etc are the pillars upon which insurance services stand. When insurance policies are sold, premiums are collected in return. Insurance firms mobilize the idle funds after claims and other administrative expenses. Insurance service is regarded as a social arrangement service that provides monetary reimbursement for the effects of unfortunate events (Isimoya, 2014). According to Edward (2007), insurance service is defined as a social scheme service for reducing uncertainty risk concerning loss by scattering the risk over a large number of same exposures to forecast the loss chance of the individual that offers reimbursement for identified loss exposures in exchange for premium fee to be made periodically.

According to Zouhaier (2014), the penetration rate of insurance is measured by insurance net premiums written divided by RGDP of the country while insurance density rate is measured dividing insurance net premiums written by the total population of the country. Deepening insurance density indicates deepening the number of customers that purchased insurance by geographic area – a state or country, etc. Deepening insurance density furthermore reflects deepening the level of development of the insurance subsector. It compares insurance sales volume of a customer group to another. Low insurance penetration and density growth rate is not only applicable to Nigeria alone but also ubiquitous in Africa apart from South Africa. Despite this challenge, Nigeria presently has the second biggest insurance subsector in Africa followed by South Africa (NAICOM, 2017). The insurance is expected to improve additional growth and that the rate of insurance penetration is anticipated to increase correspondingly. An instance of what means this growth will be attained is the implementation of compulsory insurance policies in the country with motor vehicles. There are over 7 million motor vehicles in the country but

less than fourteen percent of these are insured. However, the regulator, NAICOM is hopeful to reach coverage of twenty five percent in the future. This would denote growth of eleven percent for insurance subsector and aids in deepening insurance services (NAICOM, 2017). Based on the opinions of Kwon and Wolfrom (2016), two indicators of deepening insurance services of any nation are commonly used. These indicators are density and penetration rates of insurance.

2.2 Theoretical Review

This study is guided by Innovation Diffusion Theory and Technology Acceptance Model because of their relevance to the study.

2.2.1 *Innovation Diffusion Theory (IDT)*

This theory was developed by Everett Roger in 1995 who argues that diffusion is the process by which an innovation is communicated through certain channels over time among the participants in a social system (Uche, Charles and Peter, 2018) stated that not all innovations are adopted, even if they are good, it may take a long time for an innovation to be adopted. Rogers proposes that there are four main elements which influence the spread of a new idea which are the innovation itself, communication channels, time and a social system. Innovation is an idea, practice or project that is perceived as new by an individual or other unit of adoption. Uche, Charles and Peter (2018) described the innovation-decision process as an information seeking and information processing activity where an individual is motivated to reduce the uncertainty about the advantages and disadvantages of an innovation. He explains that the innovation-decision process has five steps which include: knowledge, persuasion, decision, implementation and confirmation. Uche, Charles and Peter (2018) described the innovation diffusion as an uncertainty reduction process. He has also proposed attributes that can help reduce uncertainty regarding the innovation which are relative advantage, compatibility, complexity, triability and observability. Relative advantage must do with the idea giving an organization an edge while compatibility has to do with the degree to which the innovation is seen to be consistent with the values of the organization and the needs of the potential adopters. Triability is the degree to which an innovation may be experimented on with a limited basis. Observability relates to the degree to which the innovation is observable by others. This theory relates to the study because bringing innovations via effective and efficient use of MIS would deepen insurance services in Nigeria.

2.2.2 *Technology Acceptance Model (TAM)*

The technology Acceptance Model was developed in 1989 by Fred Davis (Uche, Charles and Peter, 2018). The model was originally designed to predict user's acceptance of Information Technology and usage in an organizational context. The model posits that user acceptance is determined by two key beliefs, namely perceived usefulness and perceived ease of use. Perceived usefulness (U) is defined as the extent to which a person believes that using a particular technology will enhance her/his job performance, while perceived ease of use (EOU) is defined as the degree to which a person believes that using a technology will be free from effort, Davis, (1989) (Uche, Charles and Peter, 2018). The theory argues that the staff's attitude towards using modern technology is influenced by perceived usefulness and perceived ease of use. The theory uses psychometric scales to measure usefulness and ease of use. Perceived usefulness is measured on scales of whether work is done more quickly, job performance, increased productivity, effectiveness and usefulness. Perceived ease of use scales included whether the technology is easy to learn, clear and understandable, easy to become skillful, easy to use, controllable and easy to remember. TAM also proposes that external factors affect intention and actual use through mediated effects on perceived usefulness and perceived ease of use. TAM has been criticized for its failure to take to account the costs involved in acquiring a modern technology. The organization may be willing to adopt a modern technology but may not have the necessary resources (financial or human) to do so. Despite this short coming, TAM is still one of the most useful models in explaining the adoption of technology in the organizational context. This theory is relevant in the adoption of MIS in deepening insurance services in Nigeria.

2.3 Empirical Review

Kaur (2015) studied the relationship between Insurance Penetration and Density in India. The study was based upon secondary data which were collected from annual reports of IRDA, IRDA journal. Besides, a few websites have also been consulted. The data used in the paper covered the period from 2009-2010 to 2013-14. Finding showed that the insurance sector acts as a mobiliser of savings and a financial intermediary and is also a promoter of investment activities. After the deregulation of insurance business in India there is a significant change in the industry both in the products as well as the services offered to the customers. Okonkwo and Eche (2019) examined Insurance Penetration Rate and Economic Growth in Nigeria: 1981-2017. Data were sourced from the Central Bank of Nigeria statistical bulletin and using regression techniques. Finding revealed that there is no significant relationship between insurance penetration rate and economic growth of Nigeria; and that the insurance industry in Nigeria did not respond favourably to government financial systems reforms and policies. Umoren and Joseph (2016) examined the development of insurance firms in Nigeria: A case of Strategic Management Architecture Model. The study adopted a survey research design. A total of 100 questionnaires were administered to employees of ten insurance firms operating in Nigeria with branch offices in Uyo, Akwa Ibom State. Stepwise regression analysis method was adopted to test the research hypotheses. Findings showed that there is a negative and insignificant relationship existing between strategic management architecture model and the development of insurance firms in Nigeria. There is also a positive and significant relationship between strategic management performance index and the development of insurance firms in Nigeria. Olumoye (2013) studied the impact of information systems and decision making in Nigerian insurance sector. This study field survey Reponses from senior management staff in five insurance companies to test how information systems use for decision making. The findings from the study revealed that information systems produces meaningful information for insurance companies, support the problem solving and decision making and helps the industry to perform calculations and process their works fast.

Aduloju (2014) examined the relationship between information technology managerial capabilities and customer service performance among insurance firms in Nigeria. Using survey research design, the three formulated hypotheses were tested with data gathered from 402 staff at the managerial level drawn from the selected insurance companies in Nigeria, which have

been among the largest investors in IT, and where customer service is widely perceived as strategically important. Responses were analyzed using linear regression. A major finding of the study was that IT is a necessary, but not sufficient, condition for sustainable competitive advantage in customer service. Results show that the interaction of IT investments and tacit, path-dependent, and firm-specific IT managerial capabilities significantly explains variations in customer service performance.

Alhabri and Sonawane (2016) studied the relationship between creating awareness of Management Information System and its advantages in business performance based on review of literature. The study explored four literature reviews that attempt to demonstrate the management information system concept and its impact on business performance. The findings showed that information is a very important resource in organizations and MIS provides this information for decision making, which means there is a significant relation between MIS and decision making. The MIS also helps in risk assessment at all levels of operations in companies. The Decision support system provides additional information for analyzing complex decisions and that makes it different to management information system. The E-business enterprises have become completely digital and the role of MIS in the digital firms is to focus on strategies, performances, and customer satisfaction and information security. Oladipo (2012) examined the impact of the Information System on Insurance Business in Nigeria. The study collected data from Royal Exchange Insurance Nigeria plc using primary sources of Questionnaire and Interview methods. 50 copies of questionnaire were administered among the staff of the Kano branch of the insurance company. The study used the 30 copies of the questionnaire that were valid. Simple percentage descriptive statist tics method was used for data presentation. The study used Chi Square method to analyze the data and test the hypothesis. The study concludes from the test that information system has a significant impact on insurance business. Munirat, *et al.* (2014) studied the impact of management information system in Nigeria Business Organization. It intends to determine how the information system helps an organization to perform effectively. This study looks at various challenges and prospect of MIS in Nigeria. The study was conducted in Federal Capital Territory, Abuja, North-Central Nigeria with the use of questionnaire and interview to collect data that was statistically analyzed using the Z-test. The findings show that there are other major barriers other than financing that hinders the effective development and growth of management information system in Nigeria. The lack of management skill affects the performance of management information system in Nigeria. Conclusively, lack of management skills on MIS process by most business organization in Nigeria does not only affect the effective performance of MIS but also reduce their ability to compete favorably in the market with their large scale industrialist counterpart which has been a major stumbling block for the development and growth of business organizations in Nigeria.

3. METHODOLOGY

3.1 Research design

This study employed the use of survey research design. The choice of this research design was considered appropriate because of its advantages of identifying attributes of a large population from a group of individuals and the fact that the primary data were obtained through questionnaire administration. The design was suitable for the study as the study sought to examine the effect of insurance management information system on deepening insurance services in Nigeria.

3.2 Study area and population

The study area was the Nigerian insurance industry with focus on management information system. The population of this study was infinite (unknown), hence the researchers decided how many total people fit the research demographic. The population size was the total number of employees of insurance companies operating in Nigeria, which was unknown.

3.3 Sampling size and technique

Since the population was unknown, there was need to calculate a sample size. A need arose to decide how much error to allow. The confidence intervals determines how much higher or lower than the population mean that will let the research sample mean fall, with a margin of error of +/- 5%. The actual mean fail within the confidence interval was 95% while the variance expected in the research responses was set at 0.5. Therefore, in calculating the needed sample size, for determining a sample size from unknown population, the fomular was adopted thus:

$$n = \frac{Z^2 pq}{e^2}$$

wh*ere;*

n = Sample Size
Z = Z-score
p = Std. Dev.
q = confidence interval
e = margin of error

$$n = \frac{(1.96)^2 \times 0.5(0.5)}{(0.05)^2}$$

$$n = \frac{3.8416 \times .25}{0.0025}$$

$$n = \frac{0.9604}{0.0025}$$

n = 384.16. The sample size was respondents.

Three hundred and eighty four respondents were purposively selected for the purpose of this study. The purposive technique was adopted because of the benefits of insurance management information system the respondents are currently or likely to enjoy as the result of their involvement in deepening insurance services in Nigeria. Locations and number of respondents served with the questionnaire were the staff of insurance companies operating in six geopolitical zones in Nigeria.

3.4 Sources of data collection and instrument for data collection

Data for this study were obtained from both primary and secondary sources. Primary data was obtained through a structured questionnaire. The questions are closed-ended, and directed to collect relevant data from the staff of insurance companies. The questionnaire is preferable because it is convenient for respondents to fill during their spare time. Secondary sources were information from existing literatures such as relevant textbooks, journals and periodicals, and library source. The questionnaire was the main instrument used for the study. The questionnaire used captures all the variables of study and to provide relevant answers to the research questions. The instrument comprise of sections A, which covers general information about the employees, and section B, which addressed the effect of insurance management information system on deepening insurance services in Nigeria. The five-point Linkert type of rating scale was adopted as follows: strongly agree = 5, agree = 4; undecided= 3; disagree = 2; strongly disagree = 1.

3.5 Test of validity and reliability of research instrument

The validity of the instrument is based on the evident that the questions are related to the research topic and measures what it ought to measure. On the other hand, the reliability of the instrument is based on the premise that the measuring instrument would produce similar result when repeated over and again. The internal consistency of the instrument was determined by Cronbach's Alpha (CA). The CA values for all variables were above the threshold of 50% and were considered to be appropriate to adjudge the variables as being reliable.

3.6 Method of data analysis

Analysis of Variance (ANOVA) regression technique was used to test the hypotheses. The regressions equations were linearized in the study objectives as:

$$DIS = \beta_0 + \beta_1 TPS + u_t \qquad \text{(equation 1)}$$
$$DIS = \beta_0 + \beta_1 DSS + u_t \qquad \text{(equation 2)}$$
$$DIS = \beta_0 + \beta_1 AOS + u_t \qquad \text{(equation 3)}$$
$$DIS = \beta_0 + \beta_1 EXS + u_t \qquad \text{(equation 4)}$$
$$DIS = \beta_0 + \beta_1 PIS + u_t \qquad \text{(equation 5)}$$
$$DIS = \beta_0 + \beta_1 TPS + \beta_2 DSS + \beta_3 AOS + \beta_4 EXS + \beta_5 PIS + u_t \qquad \text{(equation 6)}$$

Where;
DIS = Deepening insurance services in Nigeria (Dependent Variable)
TPS = Transaction Processing System (Independent Variable)
DSS = Decision Support System (Independent Variable)
EXS = Expert System (Independent Variable)
AOS = Office Automation System (Independent Variable)
PIS = Personal/Work Group Information Systems (Independent Variable)
u_t = the stochastic error term. β_0 is a regression constant while β_{1-5} are the coefficients of the independent variables.

4. RESULTS AND ANALYSIS

4.1 Distribution of questionnaires

The distribution of questionnaires to guide the study is shown in the table 1.

Table 1
Summary of Questionnaire Administered and Retrieved

Questionnaires	Number of questionnaires	Percentage (%)
Total questionnaires served	384	100
Total questionnaires returned	350	91.15
Total not returned	30	7.81
Total useful	300	78.13
Total discarded	4	1.04

Source: Field Survey Data, 2022

4.2 Hypotheses Testing

The first hypothesis was that: *There is no significant effect of the application of Transaction Processing System (TPS) on deepening of insurance services in Nigeria.*

Table 2
Results of TPS Regression on DIS

Dependent Variable DIS	Coef.	Std. Error	t-stat	p-value
Model Parameters				
Const.	4.075	.154	26.502	.000
TPS	.230	.041	5.660	.000
Model Characteristics				
F-Stat	32.031			
R-Square	.097			
Adj. R^2	.094			
D-W Stat.	2.054			

Source: Researcher's Computation (2022) from SPSS Output

The test of the null hypothesis (H$_0$) against the alternate hypothesis (H$_1$) is that H$_0$ is rejected if the calculated statistical probability is less than the p-value of 0.05. Since the calculated p-value of 0.000 is less than the p-value of 0.05, we reject the null hypothesis and accept the alternate hypothesis, which states that there is a significant effect of the application of Transaction Processing System (TPS) on deepening of insurance services in Nigeria. This implies that the application of Transaction Processing System (TPS) positively and significantly affect the deepening of insurance services in Nigeria.

The second hypothesis was that: *There is no significant influence of the use of Decision Support System (DSS) on deepening of insurance services in Nigeria.*

Table 3

Results of DSS Regression on DIS

Dependent Variable DIS	Coef.	Std. Error	t-stat	p-value
Model Parameters				
Const.	2.786	.200	13.947	.000
DSS	.188	.053	3.575	.000
Model Characteristics				
F-Stat	12.778			
R-Square	.041			
Adj. R^2	.038			
D-W Stat.	1.853			

Source: Researcher's Computation (2022) from SPSS Output

The test of the null hypothesis against the alternate hypothesis is that H$_0$ is rejected if the calculated statistical probability is less than the p-value of 0.05. Since the calculated p-value of 0.000 is less than the p-value of 0.05, we reject the null hypothesis and accept the alternate hypothesis, which states that there is a significant influence of the use of Decision Support System (DSS) on deepening of insurance services in Nigeria. The third hypothesis was that: *There is no significant influence of the adoption of Office Automation System on deepening of insurance services in Nigeria.*

Table 4

Results of OAS Regression on DIS

Dependent Variable DIS	Coef.	Std. Error	t-stat	p-value
Model Parameters				
Const.	2.956	.250	11.826	.000
OAS	.172	.067	2.564	.011
Model Characteristics				
F-Stat	6.575			
R-Square	.022			
Adj. R^2	.018			
D-W Stat.	1.891			

Source: Researcher's Computation (2022) from SPSS Output

The test of the null hypothesis (H$_0$) against the alternate hypothesis (H$_1$) is that H$_0$ is rejected if the calculated statistical probability is less than the p-value of 0.05. Since the calculated p-value of 0.011 is less than the p-value of 0.05, we reject the null hypothesis and accept the alternate hypothesis, which states that there is a significant influence of the adoption of Office Automation System on deepening of insurance services in Nigeria. The fourth hypothesis was that: *There is no significant effect of Expert System by insurance firms on deepening of insurance services in Nigeria.*

Table 5

Results of EXS Regression on DIS

Dependent Variable DIS	Coef.	Std. Error	t-stat	p-value
Model Parameters				
Const.	2.766	.179	15.485	.000
EXS	.166	.054	3.061	.002
Model Characteristics				
F-Stat	9.369			
R-Square	.030			
Adj. R^2	.027			
D-W Stat.	1.902			

Source: Researcher's Computation (2022) from SPSS Output

The test of the null hypothesis (H$_0$) against the alternate hypothesis (H$_1$) is that H$_0$ is rejected if the calculated statistical probability is less than the p-value of 0.05. Since the calculated p-value of 0.002 is less than the p-value of 0.05, we reject the null hypothesis and accept the alternate hypothesis, which states that there is a significant effect of Expert System by insurance firms on deepening of insurance services in Nigeria. The fifth hypothesis was that: *There is no significant influence of Personal/Work Group Information System on deepening of insurance services in Nigeria.*

Table 6

Results of PIS Regression on DIS

Dependent Variable DIS	Coef.	Std. Error	t-stat	p-value
Model Parameters				
Const.	2.524	.168	15.003	.000
PIS	.243	.051	4.811	.000
Model Characteristics				
F-Stat	23.143			
R-Square	.072			
Adj. R^2	.069			
D-W Stat.	1.957			

Source: Researcher's Computation (2022) from SPSS Output

The test of the null hypothesis (H_0) against the alternate hypothesis (H_1) is that H_0 is rejected if the calculated statistical probability is less than the p-value of 0.05. Since the calculated p-value of 0.000 is less than the p-value of 0.05, we reject the null hypothesis and accept the alternate hypothesis, which states that there is a significant influence of Personal/Work Group Information System on deepening of insurance services in Nigeria. The sixth hypothesis was that: *There are no significant joint effects of Transaction Processing System (TPS), Decision Support System (DSS), Office Automation System, Expert System and Personal/Work Group Information System on the deepening of insurance services in Nigeria.*

Table 7

Results of TPS, DSS, EXS, OAS and PIS Regression on DIS

Dependent Variable DIS	Coef.	Std. Error	t-stat	p-value
Model Parameters				
Const.	2.403	.347	6.919	.000
TPS	.172	.040	-4.265	.000
DSS	.135	.057	2.378	.018
OAS	.152	.060	2.509	.013
EXS	.029	.054	.543	.587
PIS	.139	.052	2.652	.008
Model Characteristics				
F-Stat	13.212			
R-Square	.183			
Adj. R^2	.170			
D-W Stat.	2.178			

Source: Researcher's Computation (2022) from SPSS Output

The test of the null hypothesis (H_0) against the alternate hypothesis (H_1) is that H_0 is rejected if the calculated statistical probability is less than the p-value of 0.05. Since the calculated p-values w less than the p-value of 0.05, we reject the null hypothesis and accept the alternate hypothesis, which states that there is a significant joint effect of Transaction Processing System (TPS), Decision Support System (DSS), Office Automation System and Personal/Work Group Information System on the deepening of insurance services in Nigeria. However, Expert System maintained insignificant effect on the deepening of insurance services in Nigeria.

5. DISCUSSION

5.1 Effect of the application of Transaction Processing System (TPS) on deepening of insurance services (DIS) in Nigeria

The results of the regression analysis were presented in Table 2. From the results, the regression co-efficient value of 4.075, showed that there is a positive relationship between TPS and DIS. Also, a regression co-efficient of 0.230 implies that a percentage increase in TPS causes about 0.23% increase in DIS. From the results, the R^2 value is 0.097. This indicates that TPS explained only about 9.7% variations in deepening of insurance services (DIS) in Nigeria, while the remaining 90.3% may be explained by variables outside the regression model. Since the calculated p-value of 0.000 was less than the p-value of 0.05, the finding was that that there is a significant effect of the application of Transaction Processing System (TPS) on deepening of insurance services in Nigeria. This implies that the application of Transaction Processing System (TPS) positively and significantly affect the deepening of insurance services in Nigeria. This finding is consistent with the finding of Alhabri and Sonawane (2016) that information is a very important resource in organizations and MIS provides this information for decision making, which means there is a significant relation between MIS and decision making when there is an effective Transaction Processing System (TPS).

5.2 Influence of the use of Decision Support System (DSS) on deepening of insurance services in Nigeria

The results of the regression analysis were presented in Table 3. From the results, the regression co-efficient value of 2.786, shows there is a positive relationship between DSS and DIS. Also, a regression co-efficient of 0.188 implies that a percentage increase in DSS causes about 18.8% increase in DIS. From the results, the R^2 value is 0. 041. This indicates that DSS explained only about 4.1% variations in deepening of insurance services (DIS) in Nigeria, while the remaining 95.9% may be explained by variables outside the regression model. Since the calculated p-value of 0.000 was less than the p-value of 0.05, the finding was that that there is a significant influence of the use of Decision Support System (DSS) on deepening of insurance services in Nigeria**.** This implies that the application of Decision Support System (DSS) positively and significantly affect the deepening of insurance services in Nigeria. This finding is consistent with the finding of Aduloju (2014) that an application of information system help users to make decisions by providing useful information that supports unstructured decisions (i.e. decision-making situations that cannot be predicted) whenever a decision-making situation arises.

5.3   Influence of the adoption of Office Automation System on deepening of insurance services in Nigeria

The results of the regression analysis were presented in Table 4. From the results, the regression co-efficient value of 2.956, revealed that there is a positive relationship between OAS and DIS. Also, a regression co-efficient of 0.172 implies that a percentage increase in OAS causes about 17.2% increase in DIS. From the results, the R^2 value is 0. 022. This indicates that OAS explained only about 2.2% variations in deepening of insurance services (DIS) in Nigeria, while the remaining 97.8% may be explained by variables outside the regression model. Since the calculated p-value of 0.000 was less than the p-value of 0.05, the finding was that that there is a significant influence of the adoption of Office Automation System on deepening of insurance services in Nigeria. This implies that the application of Office Automation System (OAS) positively and significantly affect the deepening of insurance services in Nigeria. This finding is consistent with the finding of Posu (2006) that office systems are applications significantly influences workflow and communicate among workers regardless of their physical locations thereby helping in efficient service delivery.

5.4   Effect of Expert System by insurance firms on deepening of insurance services in Nigeria

The results of the regression analysis were presented in Table 5. From the results, the regression co-efficient value of 2.766, indicated that there is a positive relationship between EXS and DIS. Also, a regression co-efficient of 0.166 implies that a percentage increase in EXS causes about 16.6% increase in DIS. From the results, the R^2 value is 0. 030. This indicates that EXS explained only about 3% variations in deepening of insurance services (DIS) in Nigeria, while the remaining 97% may be explained by variables outside the regression model. Since the calculated p-value of 0.002 was less than the p-value of 0.05, the finding was that that there is a significant effect of Expert System by insurance firms on deepening of insurance services in Nigeria. This implies that the application of Expert System by insurance firms (EXS) positively and significantly affects the deepening of insurance services in Nigeria. This finding is consistent with the finding of Bharadwaj (2000) that a programmed decision-making information system that captures and reproduces the knowledge and expertise of experts and then simulates the thinking or actions of that expert to help users with less expertise normally add value to service delivery.

5.5   Influence of Personal/Work Group Information System on deepening of insurance services in Nigeria

The results of the regression analysis were presented in Table 6. From the results, the regression co-efficient value of 2.524, showed that there is a positive relationship between PIS and DIS. Also, a regression co-efficient of 0.243 implies that a percentage increase in PIS causes about 24.3% increase in DIS. From the results, the R^2 value is 0. 072. This indicates that PIS explained only about 7.2% variations in deepening of insurance services (DIS) in Nigeria, while the remaining 92.8% may be explained by variables outside the regression model. Since the calculated p-value of 0.000 was less than the p-value of 0.05, the finding was that that there is a significant influence of Personal/Work Group Information System. This implies that the application of Personal/Work Group Information System by insurance firms (PIS) positively and significantly affects the deepening of insurance services in Nigeria. This finding is consistent with the finding of Alhabri and Sonawane (2016) that information is a very important resource in organizations and MIS provides this information for decision making, which means there is a significant relation between MIS and decision making when there is an effective Personal/Work Group Information System.

5.6   Joint effects of Transaction Processing System (TPS), Decision Support System (DSS), Office Automation System, Expert System and Personal/Work Group Information System on the deepening of insurance services in Nigeria

The results of the regression analysis were presented in Table 7. Since the calculated p-values w less than the p-value of 0.05, the finding was that there is a significant joint effect of Transaction Processing System (TPS), Decision Support System (DSS), Office Automation System and Personal/Work Group Information System on the deepening of insurance services in Nigeria. However, Expert System maintained insignificant effect on the deepening of insurance services in Nigeria.

6. CONCLUSION

This study examined the effect of insurance management information system on deepening insurance services in Nigeria. It was found that all the independent variables significantly influenced the dependent variable. It is a truism that in any organization management implement MIS for assessment of risk and MIS may increase risk in some areas. A flowed MIS causes operational risk and can extend to all levels of operations when poor programmed or non-secure systems are used. To effectively provide feedback tool for management and staff MIS must use the elements of usability: timeliness, accuracy, consistency, completeness and relevance and to achieve sound MIS organizations should take into consideration MIS at both the tactical and strategic levels Based on the findings, the conclusion was that there is significant effect of insurance management information system on deepening insurance services in Nigeria.

7. RECOMMENDATIONS

i)   Insurance companies operating in Nigeria should adopt a transaction processing system-based application for efficient service delivery.
ii)   There is need for the use of Decision Support System (DSS) in the Nigerian insurance industry.
iii)   Insurance companies need to upgrade their Office Automation Systems.
iv)   Insurance firms in Nigeria should create their Expert System database.
v)   Personal/Work Group Information System should be promoted by insurance firms in Nigeria.
vi)   Synergy in the adoption of MIS should be created for effective and efficient service delivery and by extension deepening insurance services.

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