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Desktop Publishing Systems in Nigerian Media Production: A Study of Vanguard Newspapers

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Abstract:

Desktop publishing technology has not only enabled people with requisite computer application skills to produce documents ranging from layout design to typography, but has also, indeed, revolutionized the newspaper publishing business. Newspapers adopt the desktop publishing processes not only in pre-press page designs but also in satellite printing of their titles. The study is anchored on Technological Determinism Theory, and examines the application of desktop publishing processes in Nigerian newspapers, with focus on Vanguard Media titles. Findings revealed that all titles in the newspaper group adapted to full desktop publishing since 2002 and have continued to apply the technology in all aspects of publishing. Based on these findings, suggestions were made including retraining of all journalists in various computer application skills to enable them to effectively apply the technology in their professional practice.

Keywords: News production, pre-press, satellite printing, software

1. Introduction

DESKTOP publishing refers to the application of the computer and its associated software to create documents for publishing. It is a technology that allows people with requisite training in computer application skills to self-publish a range of printed matter ranging from layout design to typography, photographs and word processing. Merriam Webster dictionary defines it as 'the production of printed matter by means of a desktop computer having a layout programme that integrates text and graphics.' Bowman and Renshaw (1989) are, however, of the view that the term 'desktop publishing' is a misnomer because although the computer system is often placed on desktops, it does not actually publish from the desktops. They argue that documents produced through desktop publishing equipment are often set in type for printing while everyone with the requisite skill is guaranteed access. Stoney and Herrington (1997) attribute the desktop publishing revolution to the advent of the Apple Macintosh computer along with the Laser Writer printer, the mouse, scanner and other associated software. They argue that with this advent, it is now possible for virtually every personal computer to produce typeset quality documents.

Desktop publishing apparently began with the use of Pagemaker software manufactured by Aldus Corporation. In its early days, text-based programmes such as Word Perfect and Word Star were in vogue, but the Microsoft Word software that was introduced later seems not only to have become dominant but has also provided layout and linking between documents. The creation of WYSIWYG (What You See Is What You Get) page layouts on screen and having them printed on pages with crisp resolution which the desktop revolution brought about was awe-inspiring. The desktop publishing system operates on three types of software. These are the systems software, programming software and the application software. The system software is the tool that directs the computer hardware to provide not only basic functions but also a platform for running of the application software. It comprises the basic input/output system (BIOS) which starts the computer system after it has been switched on, turns it on and ensures that the data flow is managed between the hard disk, adapter, keyboard, mouse and printer.

On its part, programming software comprises tools that are used to create, maintain or support other programmes and applications, while application software are programmes that allow end users to perform some specific non-computer related tasks. These tasks include word processing, spreadsheet, presentation software, database management, desktop publishing, graphic editing or web browsing. Bear (2018) describes application software as tools that graphic designers and non-designers use to create visual communications and even online or non-screen electronic publishing. Four major types of application software are in use in desktop publishing. These are word processing, page layout, graphics designs and web publishing software. Though each of the software can be applied in desktop publishing, each carries a distinctive characteristic that marks out its core suitability. Page layout functions are easily carried out on the Adobe software, although the brand is also involved in provision of software for creating and working with the portable document format (PDF). CorelDRAW and Corel Photo-Paint are software from the Corel platform and are described as software for production of graphics for printing or home publishing programmes. From the Microsoft stable are products such as Microsoft Word, Excel, Power Point and other consumer graphics and creative printing programmes. These can either be used alone or in conjunction with other applications.

1.1. Evolution of Desktop Publishing Systems

Moorthy and Pant (2006) describe the desktop publishing system as a process through which an author or user can produce a full document or camera-ready originals without the need for successive intermediary prepress operations. This concept of desktop publishing system apparently emerged from the convergence which advances in computer programming brought along with information and printing technologies. The convergence resulted in the production of a document within a minimum space environment instead of in a larger and full publishing environment. They assert that this breakthrough has brought about a new information revolution not only because of its versatility but also because of its low cost. Thus, the desktop computer has been able to penetrate all fields of human knowledge including publishing. Thompson and Craig (1991) remark, however, that it was the interrelationships between the United States Defence Department and the Advanced Research Projects Agency between 1957 and 1969 that eventually resulted in the development of the desktop publishing technology. Noteworthy, therefore, is the fact that though introduced by Apple in 1984, the Macintosh desktop computer was a product of the research efforts carried out by scientists at the Palo Alto Research Centre (PARC) which spanned 15 years. Davis et al (1986, p. 79) identify the personal computer as the primary component of desktop publishing and list three types of computers that can be applied to create the desktop publishing system. These are the Macintosh family from Apple Computers, the IBM (International Business Machines) personal computer from Compaq and the UNIX based systems from several manufacturers. Thus, while the Macintosh and IBM computers can safely be described as desktop publishing systems, the UNIX systems are 'single-user computers or, more often, multiuser host computers'. Apart from this, the UNIX systems require considerable investment in training as well as hardware and software to function optimally compared to IBM personal computers that cost only a fraction to achieve such results.

The concept of desktop publishing developed in the 1960s following the desire of business organizations to control their document production processes. Apart from this, the emergence of the 'computer age' which came with the cliché, the 'paperless society' also hastened the adaptability of the desktop publishing systems. Spring (1991) observes that the term 'electronic publishing' was expressed to mean that the future will be dominated by computers so that books, magazines and newspapers would become museum pieces. In that expected future, it was assumed that everyone would be carrying portable video tape recorders (VTRs) in his or her pocket and be able to access libraries of information from his/her mini terminals. Although the computer has not totally overtaken all aspects of the society, it is evident that it has penetrated virtually all aspects of the publishing business. It performs functions in the typesetting processes and indeed all the aspects of any publications' pre-press up to plate making, press run and even in circulation of the published products. It has, therefore, redefined the role of printer, publisher, editor and writer simultaneously to the extent that the influence of this technology is being felt by everyone. Although Atkinson (2006) traces the history of modern computing to the 1940s when a number of keyboard designs of varying forms - mechanical, electrical, electronic, keyboard layout and characters were introduced for use, he is of the view that the first patent for typewriters was issued in 1713 with the first workable model attributed to Pellegrino Turri in 1808. Furthermore, he remarks that a Danish pastor, Malling Hansen produced the first commercial typewriter in 1870 while the Sholes and Glidden Typewriter was produced by E. Remington & Sons for use in 1874.

The second version of the Remington typewriters that was introduced in 1878 with additional features such as upper- and lower-case keys had a 'shift' key which was able to mechanically shift the carriage up and down to align other sets of type. As Atkinson (2006) observes, the Remington typewriters had a layout that featured similar punctuation marks, alphabetic and numeric keys which had been in use for more than 135 years. The keyboard layout was named QWERTY, after the first six keys of the upper row of the alphabetic section of the keyboard. It is to be noted, however, that other keyboard layouts had been proposed in the last century with Prof. August Dvorak introducing a brand in 1932, but the QWERTY still remains as the dominant feature. Furthermore, although Yasuoka and Yasuoka (2011) agree that Christopher Sholes and his colleagues were responsible for the introduction of the modern typewriter, they debunk the claim that he should have the credit for the arrangement of the QWERTY type bars. It is their view that typewriters of the time had keyboards that were arranged in an alphabetical order of A to N in a left to right form and O to Z in right to left form. Yasuoka and Yasuoka (2011) remark that following cursory examination, they found that the type bar basket of the Sholes & Glidden Typewriters made in the 1870s did not mathematically align with the keyboard arrangements but that the numerals 3 and 4 were next to or adjacent to each other. Lee (2014) asserts that a programmer, Shai Coleman, in 2006 released a portmanteau like keyboard layout which he named Colemak, an apparent abbreviation to accommodate Coleman and Dvorak, and indicates that this might simply be a compromise version. Noteworthy also is the fact that this version which sought to ensure efficiency and speed still retained the QWERTY format.

1.2. Theoretical Framework

This paper is anchored on the theory of technological determinism. The concept of technological determinism draws from the view that whatever technology or innovation we adopt is fashioned by existing technological culture and this determines its contemporary or future use. The concept was coined by an American sociologist and economist, Thorstein Veblen (1857-1929) to refer to the notion that a society's available technology drives the development of such society's social structure and cultural values. Marx and Smith (1994) define technological determinism as the human tendency to create the kind of society that invests technologies with enough power to drive history. They observed that though the intellectual heritage can be traced to the 18th century Enlightenment Era, it should be viewed from two perspectives. These are the 'soft view' and the 'hard view'. While the soft view postulates that technological change drives social change but at the same time responds in a discriminatory manner to social pressures, the hard view regards

technological developments as independent forces which are autonomous of social constraints. The key issue in the determinism discourse, however, is the understanding that technical knowledge or development, media or technology as a whole directs or moves any society or its culture. From the perspective of the mass media, this would mean that changes in its operational dynamics would in turn have corresponding effects in the culture of its audience. McQuail (2012) aligns with this argument but argues that labeling of the body of thinking as 'determinist' is shallow or inadequate. He, however, remarks that the concept of determinism does not seem to do justice to its many differences and nuances.

One of the earliest theorists of technological determinism was Adam Smith (1723-1790). As Anthony Brewer (2008) explains, Smith in his works divided history into four ages of hunters, shepherds, agriculture and commerce. He observes that the dominant technology in Smith's first age of hunting had deterministic technology of implements for plucking of fruits and killing of wild animals. Technology determined the society's domestication of wild animals in the second age, and engagement in agriculture that was synonymous with the third age. In the contemporary or fourth age which is that of commerce, technology has not only brought division of labour but also exchange of products across nations and environments. Marshal McLuhan (1964) builds on this body of knowledge when he argues in his work *Understanding Media: The Extensions of Man* that through technology human beings are in effect extending themselves and these extensions are affecting their relationships with one another. McLuhan explains that one of the core tenets of technological determinism is the fact that the medium is the message. By this he means that the social and personal consequences of any medium result from the new scale that is introduced into individual affairs by each technological development. Each of such new technological developments invariably leads to the extension of the affected individuals. Inherent in this explanation is the view that technology has the capacity to transform society.

McLuhan uses the electric light to illustrate the concept of the medium and explains that a medium without a message has no potential of eliciting any effect. But where the electric light is switched on, the bulb has content which in effect produces another medium. Arguing from the extension's perspective, Kappelman (2001) remarks that the printing machine is an extension of the hand while the motor vehicles that carry printed papers to the consumers represents an extension of the feet of the journalists. Moreover, Griffin (2003, p.344) observes that though McLuhan was concerned with the way technological tools shaped the process of communication, he actually believed that just as humans shaped the tools, these tools in turn also shaped the lifestyles of humans. This in essence affirms the expressed view that 'the way people live is largely a function of the way they process information,' with the primary channel of communication changing the way we perceive the world because the dominant medium of any age has the tendency to dominate people. Though Chandler (2000) argues that technological determinism is a reductionist theory because it focuses on causality or the cause-and-effect relationship, he, however, contrasts 'reductionism' with 'holism' on the grounds that it seeks to reduce a complex whole to the effects of one part over another.

A proper understanding of the concept of technological determinism seems to have been offered by Hauer (2017) who argues that the concept is associated with the notion that the society is influenced and shaped by technological development which, in turn, compels society to adapt to the new technologies or innovations. From this perspective, it can be argued that technology or technical innovation is not only a product of a society or economic system but also that it is equally adaptable to external transformations. This position is supported by Reed (2004) who argues that humans created machines to assist in simplifying and or improving their quality of lives and to be served by them. The theory is suitable for the objective of this paper which is to examine the impact of the use of desktop publishing technology in newspaper production. The understanding of the 'medium is the message' is particularly useful because it enables us to observe how the desktop publishing processes have extended our abilities to typeset texts, design infographics and other furniture on newspaper pages and deliver such pages electronically through the computer network system for filming and plate making and ultimately to produce newspaper copies that everyone reads.

1.3. Empirical Studies on Desktop Applications

A number of researchers have examined concepts such as the impact of desktop publishing technology on production time and cost of production, problems, benefits and prospects of desktop publishing in newspaper production in Nigeria. One of these studies carried out by Nwogwugwu (2015) examined the problems and prospects of newspaper publishing in Nigeria with *Christian Voice* newspaper in Owerri as case study. He adopted the survey research method and employed purposive sampling technique for the study. Questionnaires and interviews served as his instruments for data collection. Findings were that infrastructural problems which involved installation of desktop publishing technology and professional problems which included lack of qualified personnel to operate the publishing equipment were among the core problems that militated against effective and efficient publishing of newspapers in the country. Olokun (1990) studied the impact of desktop publishing on the time and cost required to complete a printing publication in Kansas, USA. Objective of the study was to examine the turn-around time and cost involved in application of desktop publishing as it related to traditional pre-press printing methods. He sent out mail survey questionnaires to fifty industries in Kansas and compiled data from the questionnaires. His major finding was that 53 per cent of the respondents reported that desktop publishing system had reduced the time involved in their pre-press work and saved information on their computer disks, while 47 per cent claimed that desktop publishing reduced their cost of preparing pre-press work. Jatula (2017) studied factors that shaped news production in the Nigerian Press since the return to democratic rule from military dictatorship in 1999. He adopted mixed methods in data gathering comprising semi structured interviews with few participants to collect detailed opinions and commentaries especially on the main issues, and data gathering from large number of participants for an overall view. His findings included the shortage of critical skills that can integrate multimedia knowledge and information technology. Another major challenge was the overwhelming lack of infrastructure such as desktop computers,

dicta-phones, digital recorders and cameras, mobile internet, limited access to online resources and inadequate in-house training opportunities for journalists.

Ekhareaf, Asemah and Edegoh (2013) examined challenges of newspaper management in the area of information and communication technology. Their objectives were four-fold: to find out challenges of newspaper managements in a digital age, determine regularity of change of ICT facilities in selected newspapers, determine the impact of ICT adoption in operating cost and revenues of these newspapers and explore ways of handling ICT challenges. The researchers adopted survey method and purposively selected five newspapers for the study. These were *Vanguard*, *The Guardian*, *The Nation*, *Compass* and *National Mirror*, based on their perceived levels of circulation, readership and years of publication. Their findings were that though use of desktop publishing may have enhanced the practice of journalism, it has also brought about several challenges to management of these media organizations. These include pressure on maintenance of the equipment which often runs into millions of naira, and that of training of professionals to operate these publishing systems. They recommended that newspaper managers should consider the knowledge base of their professional journalists in making purchases of desktop publishing facilities, while governments should reduce the burden of these media organizations by ensuring regular supply of electricity to keep the equipment in good working order.

1.4. Application of Desktop Publishing in News Production Processes

Desktop publishing is applied in all aspects of pre-press or pre-media operations in news production. Prepress or pre-media is described as the processes that occur before printing and finishing of publications. These functions include typesetting of materials or texts, design of the page, often with desktop as well as preparation of data or editorial materials to be published. Functions at this stage include editing of texts and cropping of photographic or infographic materials and news page layout designs. Creation of a page layout for the material is also considered as a prepress function. In the manual age, layout sheets were drawn with pens or pencils, but in the electronic age, the desktop computer, using appropriate software such as Adobe PageMaker or Adobe InDesign already has formatted layouts to adopt or apply. With the editorial content already designed, the final prepress functions include proof reading and image retouching where necessary, after which the designed page(s) would be sent for filming and or processing through the computer to plate technology for printing.

Prepress.Com (1960-65) in its review of the development of pre-press and publishing processes explains that the first set of typesetting equipment applied tapes punching to drive the Linotype machines used in the newspaper industry at the time. Before then, however, Stevens and Little (1967) observe that investigation and studies were in progress towards production of a graphic semantic technique that could provide good quality lexical composition. Galleys produced from such processes were often used for paste-up by the up-making paste-up artists. In the desktop publishing era, computer graphics in newspaper page designs are usually examined along two dimensions. These are either as vectors or bitmaps. Omojola (2012) describes vectors as graphic primitives which come in the form of shapes generated from lines, rectangles or circles, while bitmaps, which are often called rasterised images, consist of tiny elements called pixels that map a location in an image that a computer recognises. A photograph or an infographic material is an example of a bitmap image, so are scanned images that can be imported into a computer programme. A number of bitmap file formats are available for graphic design. These include the JPEG, TIFF and PSD. The JPEG is defined as Joint Photographic Experts Group with its use cutting across several platforms. It is realizable on any colour mode, from the eight-bit grayscale to the 32-bit CMYK (cyan, yellow, magenta and black). Omojola asserts that the JPEG system can compress an image from the low compression to high and still retains an appreciable amount of quality colour that is useful for publishing. In the case of TIFF (Tagged Image File Formats), this is said to have good compression ratio which is slightly lower than those of JPEG, but can support up to seven encoding schedules in grayscale and colour applications. Other disadvantages of the TIFF format include the fact it has no capacity to save information for duotone colour and also takes time to load when compressed. The PSD is the Adobe Photoshop graphic application format. It is described as applicable to Adobe Photoshop and as a result may have difficulty working on other applications. On its part, the PDF (Portable Document Format) is described as a file compression format that derives its popularity from its flexibility and cross platform features. The system is based on the PostScript imaging system that is able to capture both the vector and bitmap image layouts for display and printing purposes.

A good newspaper layout is described as one that involves the arrangement of design items such as texts, images, colours and lines to create readable materials. A good layout is judged, therefore, on the basis of the creative combination of stories, photographs and captions, headlines, types, pull-quotes, sidebars, crossheads and other elements that make the page to be not only appealing but also visually attractive to the reader. Layout designs are examined along three perspectives which are dependent on the placement of texts and images on the page. These forms are described as text dominant, image dominant and image and text dominant. A page with excessive or too large amount of text is said to be text dominant, while a page that places an image or photograph as centre of attraction is said to be image dominant. In image and text dominant layouts, equal measure is found to have been offered to both the texts and images on the page so that none is said to have the upper hand. This is often called the balanced design page. These processes are efficiently carried out on desktop publishing platforms.

1.5. Case Study of Use of Desktop Publishing in Vanguard Newspapers

Nigerian newspapers have invested extensively in desktop publishing systems in the last three decades and virtually all the major newspaper organizations in the country have computerized their news production operations. As a result, there is hardly any newspaper organization in Lagos, which serves as the hub of the newspaper publishing business

in Nigeria that has not adopted desktop publishing processes in its news production. Vanguard Media Limited which was established by a Senior Journalist, Mr. Sam Amuka, in 1984, currently publishes three national titles in its stable. These titles are *Vanguard*, a daily; *Saturday Vanguard* and *Sunday Vanguard*. Until 1999, newspapers in the stable were produced with a combination of manual layout design sheets and desktop publishing processes. During that period, manuscripts were typed on typewriters, edited manually by the editors and delivered to the sub editors who planned the news and other pages on layout sheets. These layout sheets were in turn delivered to the typesetting unit which produced bromides that were cut and paste by the graphic and up-making artists. Edited manuscripts were initially typeset on compugraphic machines and later the desktop publishing computers, after which the paste-up pages were filmed on lithographic equipment where plates were also processed. These manual processes ended in 2002 when Vanguard Media Limited reorganized its news production processes. Oladejo (2007) explains in an interview that the organization installed 40 desktop computers in its newsroom for news production purposes. The systems that were installed by Zinox Computers Limited, connects all the systems in the organization to a network that is managed by the Domain Network Controller. As a result, journalists on the stable can access any document, whether it is text based or photographic based on their individual workstations at any time. The result of this connection to the desktop is that reporters or news photographers are trained to process and assign file names to their news stories or photographs, and these can be viewed and selected as needed for use on any determined pages. A sub editor who plans news or features page is given relevant file names of stories and photographs to pick from. He downloads these materials to his/her page(s), edits them, casts headline and displays them on such pages. In the case of news photographs, he/she opens the Photoshop software to examine the photographs, selects those he/she considers as newsworthy and imports them to the Pagemaker software page for display. His job is concluded with the writing of caption and cutline to the photograph, after which he saves the page and prints same for delivery to the proof-reading unit to go through the copy and okay such a page for publication.

The Image Setting unit, thereafter, electronically adopts such designed and okayed pages for processing. At the image setting terminals, the designed pages made up of texts and images are converted to the acetate coated and light sensitive film after which they are processed into the computer to film (CTF) format. Omoregbe (2007) explains in an interview that the computer to plate (CTP) operates along similar processes, with the main difference being that CTP processes contents of four films to a plate while the CTF processes images and texts on a page to a film. The computer to plate technology requires charting, which translates to arrangement of four pages of films on a form for a plate. A typical example is that on a 48-page newspaper, pages 1, 24, 25 and 48 films would be arranged to form a plate, while on the 56-page newspaper, pages 1, 28, 29 and 56 films would be arranged to form a plate. Another vital function of desktop publishing that has been effectively adopted in Vanguard Media is that of satellite printing. This is an area where combination of technology and mutual business relationships are aggregated to achieve enhanced circulation of newspapers. From the point of view of technology, this means the uploading of designed *Vanguard* newspapers pages online for downloading by an external printing press and processing of such films into plates for printing at the new press. The technology adopted for the uploading is the Portable Document Format (PDF) that is described by Omojola (2012) as a format based on the postscript imaging system with capacity to capture both the vector and bitmap image locations for display and printing processes. Ejokpagu (2007) explains in an interview that the organization's initial experiments on satellite printing began in June 2007 when Vanguard Media entered into a mutual business arrangement with publishers of *Daily Trust* newspapers in Abuja for initial printing of *Vanguard* titles between *Daily Trust* schedules and vice versa. The arrangement provided for Vanguard Media to print Trust Media titles in Lagos for circulation in the South-west, South-south and South-east geopolitical zones. In turn, Trust Media was to print Vanguard Media titles in its Abuja press for circulation in the North-central, North-west and North-east geopolitical zones respectively. Later, *Vanguard* entered into a unilateral arrangement for satellite printing of its titles at the *Niger Delta Standard's* press in Port Harcourt for circulation in the South-south and South-east markets. *Vanguard* later had a mutual arrangement with *Leadership* newspapers in Abuja for the satellite printing of its titles in Abuja and printing of *Leadership* titles in its Lagos press. At the moment, following *Vanguard's* establishment of a press at Asaba, Delta State to serve the South-south, South-east and a part of the North-central markets, the organization uploads its news pages at its Lagos headquarters, to the Asaba plant where these pages are printed for circulation, while its Lagos press serves Lagos and the South-west markets. Vanguard Media currently prints *The Guardian* newspapers titles at its Asaba press for the South-south and South-east markets while *The Guardian* prints *Vanguard* titles at its Abuja press for circulation in the North-central, North-west and North-east markets. Benefits of satellite printing include the fact that newspaper organizations are able to penetrate hitherto unreachable zones with the latest news stories. This means that all parts of the country, irrespective of their locations, are able to read current news as they break and are no longer served with stale news as was the practice in the past.

Application of satellite printing technology has also led to the maximization of installed equipment in media organizations. Machinery and staff that would have been under-employed are constantly put to work, and this has meant an increase not only in profit takings for the organizations involved but also efficiency and maximum capacity utilization of the workforce. Another major benefit that accrues to use of satellite printing is the reduction in rate of vehicular accidents on Nigerian roads and loss of precious lives of drivers who hitherto used to crisscross the country in their bid to deliver the newspapers to all the cities and towns. As a corollary of this, it is also observed that the wear and tear of circulation vehicles have reduced as these vehicles now run a few hundred kilometers each day instead of thousands of kilometers they used to cover in the past. The adoption of satellite printing technology has, therefore, led to improvement in the quality of lives of the circulation truck drivers while the organization's expenditures on health and maintenance of these vehicles have also reduced considerably.

2. Conclusion

In this paper, we have offered an explanation on the origins of the desktop publishing equipment for media production from the advent of Apple Macintosh computers along with associated software such as Laser Writer printer, the mouse, scanner and other software used in creating documents for publishing. The misnomer in the term 'desktop publishing' was also explained, as flowing from the fact that though placed on desktops, the system does not publish from desktops. Apart from this, we described the desktop publishing system as a process through which an author or user can produce a full document or camera-ready original pages without the need for successive intermediary prepress operations. We also examined the use of the compugraphic machine for typesetting of texts for newspaper design, which was the immediate predecessor of the desktop and prepress publishing technology. The era of compugraphic machinery featured the drudgery of cut and paste of bromides from galleys by the up-making graphic artists. Such paste-up pages were subsequently filmed into plates for printing by the photolithographic units. Equally examined was the distinction between the three types of desktop software. These are the systems software, programming software and the application software. While the systems software was described as the software that directs the computer hardware to provide basic functions such as switching on and off or sending document to the printer, the programming software are tools that are used to create, maintain or support other programmes. The application software is regarded as those tools that allow computer users to perform such tasks as word processing, desktop publishing, graphic editing, web-browsing or spreadsheet management. The use of desktop publishing processes in Vanguard Media was examined in the directions of newspaper production and satellite printing to ensure steady supply of current news to readers in all parts of the country. It was found that satellite printing technology propelled through uploading of rasterised pages through the PDF has led to enhancements in the simultaneous delivery of news to readers in all parts of the country. Given the myriad of functions that are performed on the desktop publishing, the technology has indeed, revolutionized the production processes of the mass media. It has not only eliminated the waste of valuable production time which was the bane of the manual cut and paste newspaper artwork design processes, but has also enhanced quality of such productions.

3. Recommendations

In the light of the findings in this study, we make the following recommendations: The first is that managers of newspaper organizations should embark on regular training of media professionals on the use of desktop publishing software to enable them to apply the equipment effectively to produce efficient pages. This is because a number of media professionals can only process text-based information but do not have the skills to apply the image-based data for wholistic publishing purposes. Apart from this, newspaper managers should be careful to purchase desktop equipment that they have capacity for maintenance. In a digital age, use of desktop publishing enhances efficiency and enables quality performance to be attained. It is, therefore, vital that any publisher that has not installed desktop publishing equipment should make the investment urgently to be able to square up with challenges posed by other quality publications.

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