

Chapter 2

Research Data Management (RDM) in the Fourth Industrial Revolution (4IR) Era: The Case for Academic Libraries

Nse Emmanuel Akwang

Akwa Ibom State University, Nigeria

Jonathan Ndubuisi Chimah

Ebonyi State University, Nigeria

ABSTRACT

The emergence of the 4IR has brought new opportunities and possibilities for effective management of research data. Despite the positive impacts and effectiveness of this technological advancement, most academic libraries especially in Africa are not taking advantage of this reality. As a result of this, many libraries in the developing countries are struggling to satisfy the present and future information needs of researchers. Building on the 4IR, sustainable RDM practices in academic libraries become necessary and urgent. The observation led to the decision to address issues related to RDM practices and the 4IR. The authors present the conceptual considerations of RDM, the roles of academic libraries in RDM, and the 4IR technologies as well as strategic actions for academic libraries towards the 4IR. The authors conclude by affirming that the adoption of 4IR will not only connect librarians with machines for “smart” performance, but will expand the scope, visibility, and access to research data, among others.

INTRODUCTION

The shifts in industrial revolution can be traced from the first industrial revolution in 1720-1840, the second industrial revolution in 1850-1914, and the third industrial revolution in 1960, to the fourth industrial revolution (4IR) (Hussain, 2019). The 4IR is building on the third industrial revolution with the aim of blurring the lines between the physical, digital, and biological spheres with robust technolo-

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gies (Xu, David, & Kim 2018). It is an advanced and higher level technological intelligence whereby everything is connected through a web based operating system such as Internet of Things (IoT). By implication, the 4IR is regarded as new level of organization and control over the entire value chain of information products and services using digitalization, automation, cloud computing, robotic system, Radio Frequency Identification (RFID) technology and other technological advances. Recently, the 4IR received much attention in intellectual discourse across disciplines as it is changing how we live, work, and communicate. Hussain (2019) in assertion argues that the previous revolutions succeeded in solving problems related to library data storage through global library cooperative or networking but the 4IR has more interesting opportunities for the library community. It is introducing smarter ways of managing information resources to satisfy users' information needs and to maintain relevance in contemporary climes. It could be rightly claimed that the 4IR enables libraries to become a virtual space connecting people to information globally through machines.

Many researchers, Xu, David, & Kim (2018); Hussain (2019) among others, argue that the 4IR presents a wide range of emerging technologies and innovations to transform everything, everywhere, including research and libraries. The breadth and depth of changes in information landscape brought by this revolution herald the transformation of research data management practices in terms of collection, preservation, storage, organization, and sharing of research data among interested users. The management of research data remains a strategic priority for academic institutions. They are trying to figure out the ways that research data should be supported, in terms of advice and training, infrastructure for storage, sharing, and curation among other aspects. It is pertinent that libraries as key stakeholders and librarians as key players acknowledge and embrace the benefits that come with the 4IR in order to enhance research data retrieval and dissemination.

The technological transition and implementation usually come with a lot of challenges and the case of 4IR is not different. The challenges cause a slowdown and unplanned process which make the adoption of technologies unachievable. This is common in most developing countries especially the African nations like Nigeria as Baro & Godfrey (2015); Akwang (2019) and others have confirmed. The situation is threatening the place of academic libraries as a system of knowledge in support of intensive and valued research activity, especially with the 4IR. A lot of factors could contribute to the situation including knowledge gap. Hence, this chapter seeks to bridge the gap by providing a systematic and content-centric review on the concept of Research Data Management; explaining the roles of academic libraries in RDM practices; identifying the technologies of the Fourth Industrial Revolution (4IR); explaining the requirements supporting 4IR in academic libraries with emphasis on library physical environment, facilities, skills, policy, among others.

RESEARCH DATA

Research, as contained in the literature, is the core function of academic institutions besides teaching and learning. It implies a search for new knowledge; an inquiry to the unknown; a scientific approach to solving problems; and an empirical investigation into issues that have educational and informational implications. Research is an activity that involves a planned and systematic collection, analysis, and interpretation of data to arrive at new knowledge capable of driving both intellectual and economic growth of the institutions as well as personal and professional growth of staff members (Uhegbu, 2009). Research is adopted as a strategic priority among academic institutions and there is mounting pressure

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