



EXAMINING THE IMPACT OF INDUSTRY 4.0 ON ACADEMIC LIBRARIES

Edited by

Josiline Phiri Chigwada
Ngozi Maria Nwaohiri

Examining the Impact of Industry 4.0 on Academic Libraries

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JOSILINE PHIRI CHIGWADA

Bindura University of Science Education, Zimbabwe

NGOZI MARIA NWAOHIRI

Federal University of Technology, Owerri, Nigeria



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INVESTOR IN PEOPLE

Dedication

I dedicate this book to my beloved husband Isaya Chigwada who is also dealing with the effects of the industry 4.0 at his work place, my son Nathaniel Takudzwa Chigwada whose wish is to be an engineer, and my daughter Joanna Thandaza Chigwada who wants to be a doctor. These people have been my pillar of strength and give me the zeal to write academic articles for publication.

*Josiline Phiri Chigwada
Bindura University of Science Education, Zimbabwe*

I dedicate this book to Udodiri, my loving husband and our children Chijindu, Ucheomachi and Jachimma Nwaohiri with heartfelt thanks for their loving support and constant inspiration.

*Ngozi Maria Nwaohiri
Federal University of Technology, Owerri, Nigeria*

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List of Abbreviations

| | |
|---------|---|
| 4IR | Fourth Industrial Revolution |
| AFLIA | Africa Library and Information Associations and Institutions |
| AI | Artificial Intelligence |
| ALA | American Library Association |
| AR | Augmented Reality |
| AT | Assistive Technology |
| CAS | Current Awareness Service |
| CDP | Collection Development Policy |
| CD-ROM | Compact Disk-Read Only Memory |
| CPD | Continuous Professional Development |
| CPS | Cyber Physical System |
| DaMaHub | Data Management Hub |
| FOSS | Free Open Source Software |
| HEI | Higher Education Institutions |
| HIB | Human Information Behaviour |
| ICT | Information and Communication Technologies |
| IFLA | International Federation of Library Associations and Institutions |
| IM | Instant Messaging |
| IoT | Internet of Things |
| ISO | International Standards Organisation |
| JAWS | Job Access With Speech |
| LCoNZ | Library Consortium of New Zealand |
| LIASA | Library and Information Association of South Africa |
| LIAZ | Library and Information Association of Zambia |
| LIS | Library and Information Science |
| MARC | Machine Readable Catalogue |
| MAS | Minimum Academic Standards |
| MOOC | Massive Open Online Course |
| ODDS | Online Document Delivery Service |
| OPAC | Online Public Access Catalogue |
| RCZ | Research Council of Zimbabwe |
| RDA | Resource Description and Access |
| RDM | Research Data Management |
| RFID | Radio Frequency Identification |

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| | |
|---------|---|
| SCARLET | Special Collections Using Augmented Reality to Enhance Learning and Teaching |
| SCECSAL | Standing Conference of the Eastern, Central, and Southern Africa Library Information and Associations |
| SDG | Sustainable Development Goals |
| SDI | Selective Dissemination of Information |
| UN | United Nations |
| UNESCO | United Nations Educational Scientific and Cultural Organisation |
| VIAF | Virtual International Authority Files |
| VRS | Virtual Reference Service |
| ZIMCHE | Zimbabwe Council for Higher Education |
| ZIMLA | Zimbabwe Library Association |
| ZULC | Zimbabwe University Libraries Consortium |

List of Contributors

Nneka Chinaemerem Agim, Federal University of Technology, Owerri, Nigeria

Chidimma Agunwamba, Nnamdi Azikiwe Library, University of Nigeria, Nigeria

Josiline Phiri Chigwada, Bindura University of Science Education, Zimbabwe

Collence Takaingehamo Chisita, Department of Information Sciences, University of South Africa, South Africa

Egbert de Smet, University of Antwerp, Belgium

Mercy Ekenma Echem, Department of Library and Information Science, Rivers State University, Nigeria

Viviana Fernández-Marcial, University of A Coruña, Spain

Llarina González-Solar, University of A Coruña, Spain; General Secretariat of the Council of the European Union, Belgium

Shahajada Masud Anowarul Haque, Ayesha Abed Library, Brac University, Bangladesh

Thembelihle Hwalima, Gwanda State University Library, Gwanda State University, Zimbabwe

Md. Nazmul Islam, Department of Information Science and Library Management, University of Rajshahi, Bangladesh

Md. Nurul Islam, School of Information Management, Nanjing University, China

Anna Kaushik, University of Kota, India

Nqobulwazi Khanye, Lupane State University Library, Lupane State University, Zimbabwe

Ebisemen Patience Lulu-Pokubo, Department of Library and Information Science, Captain Elechi Amadi Polytechnic, Nigeria

Rosemary Maturure, Africa University Library, Africa University, Zimbabwe

Grace Msauki, Zimbabwe Economic Policy Analysis Research Unit, Zimbabwe

Ngozi Maria Nwaohiri, University Library, Federal University of Technology, Owerri, Nigeria

Moses C. Nwosu, Department of Library and Information Science, Akanu Ibiam Federal Polytechnic, Nigeria

xvi List of Contributors

Austin Tonderai Nyakurerwa, Midlands State University Library, Midlands State University, Zimbabwe

Comfort N. Owate, Donald Ekong Library, University of Port Harcourt, Nigeria

Shweta Pandey, LNM Institute of Information Technology, India

Pauline Iroeze, Federal University of Technology Owerri, Nigeria

Donald Rakemane, Office of District Commissioner, Botswana

Stephen Tsekea, Bindura University of Science Education Library, Bindura University of Science Education, Zimbabwe

Janet Onomeh Ubogu, Delta State University Library, Delta State University, Nigeria

Delight Promise Udochukwu, Nnamdi Azikiwe Library, University of Nigeria Nigeria

Foreword

History has it that industrial revolutions have had tolls or impact on organisations and most of the time very catastrophic. Libraries whether big or small have also experienced the impact of industrial revolution at one time or the other. This book entitled *Examining the Impact of Industry 4.0 on Libraries* is a well-articulated attempt to capture the impact of the Industrial Revolution on libraries generally. There is no doubt that industrial revolutions have in one way or the other affected library functions, services or even the activities.

The publication of this book is very auspicious and timely considering the paucity of books in librarianship particularly the one that delved into this ugly experience on librarianship. The efforts expended on the production of this book by these seasoned library scholars assembled around the globe is highly commended.

The book is divided into six sections each with corresponding chapter. Section one deals with “The Fourth Industrial Revolution and Libraries.” This section has three chapters, namely:

1. Introduction to the Fourth Industrial Revolution and Libraries
2. The Fourth Industrial Revolution and Libraries
3. Library 4.0 and Sustainable Development: Challenges and Opportunities.

Section two which is entitled “Redesigning Library Space” has five chapters, namely:

1. Understanding the Information User in the Electronic Age
2. Application of Industry 4.0 in Delivering Library Services to Special Need Library Users
3. Compatibility Analysis of Virtual Reference Services in ABCD Software-based Website
4. Packaging and Repackaging of Information Products and Services for Effective Service Delivery
5. The Role of Librarian in the Twenty-first Century.

Section three entitled “Research Support Services in the Fourth Industrial Revolution” covers two chapters, namely:

1. Academic Library Research Support Services in the Maker Culture Era
2. Research Support Services in Academic Libraries in the Digital Environment in Zimbabwe.

Section four is broadly entitled “Quality Assurance of Library and Information Services” has two chapters, namely:

1. Quality Assurance of Library and Information Services in the Fourth Industrial Revolution to Achieve the Sustainable Development Goals
2. Quality Assurance and Marketing of Library Services and Products: The Case of Midlands State University.

Section five is entitled “Marketing of Library and Information Services” has two chapters, namely:

1. Marketing of Library Collections and Services in the Twenty-first Century Environment: The Use of Social Media Technologies
2. Do Libraries Need to Market Their Services and Resources?

Section six which is the last section is entitled “Capacity Building of Librarians in the Fourth Industrial Revolution” and it has two chapters, namely:

1. Capacity Building for Library and Information Science Professionals in University Libraries
2. Reskilling the Library Workforce for the Fourth Industrial Revolution.

The writers assembled different countries of the world here in their respective chapter presentations rolled out well researched papers for the benefit of librarians, educators, students of library and information science and the general public. I have no reservation in recommending this enviable text for all seekers of knowledge in librarianship and other related disciplines around the globe.

Dr Basil Onyeoziri Edom – Associate Professor of
Library and Information Science
Imo State University, Owerri, Nigeria.
April, 2020

Preface

The Fourth Industrial Revolution (4IR) also known as the industry 4.0 is defined as the bringing together of economies, scale and economies of scope to produce new technologies, which will in turn adopt the use of computers, Internet of Things (IoTs) and cloud computing to monitor production processes (Postelnicu, & Calea 2019). It is changing how people live, work and communicate and many trades have been highly affected by the 4IR, libraries included.

This technological revolution called the 4IR is changing industries and the jobs within them and is described as a journey that industrial companies are taking towards a complete value chain transformation. Introducing connectivity, artificial intelligence, robotics and machine learning into the workplace has meant that employers no longer rely on their teams having a static set of skills, but instead, requires adaptable, digitally-minded workers that are committed to lifelong learning. This book therefore X-rays the ways and to what extent computers, IoTs, social media, artificial intelligence, data mining, robotics and machine learning has affected information acquisition, packaging, storage, and delivery. It would be sufficient to say that the above-mentioned technologies are just emerging and as such require up-to-date knowledge and skills fit for their use, as this will without doubt bring about enhanced information service delivery even to remote areas regardless of time and geographical location.

An informed society is healthy, knowledgeable and a literate society. Information and research findings are the hubs around which institutions, organizations and industries revolve for their existence and competitive advantage. Twenty-first century libraries must employ the main areas of Industry 4.0 such as IoT, artificial intelligence, big data and computers in information products, services and marketing which are in turn given out to institutions, organizations and industries for health services and economic growth. Hence, Hang, Thuy, & Tam (2018) report that

the industry 4.0 is breaking the structure of almost every industry, foreshadowing the transformation of the entire production, management system and training. The industry 4.0 will be the foundation for a dramatic transition from a resource-based, low-cost to knowledgebase economy.

So long as universities and academic institutions are striving to boost their research and academic productivity through the development and implementation

of digital technologies in research, teaching and learning, the issue of reskilling and upskilling of these library staff cannot be over emphasized. Thus, Ntlotlang (2019) and Cardwell (2009) advised that libraries should conduct library staff skills audit exercise in order to identify each individual's strength, ability and skills gap so as to have in-depth understanding of library staff competencies in regarding of their role of the demands brought about by technological revolution.

The book comprises 16 chapters which serve as guide and information resource to library and information professionals. Library managers, heads of institutions and government policy makers can also benefit from the contents of the book to make available adequate funds and resources that will bring about technological revolution in libraries and the reskilling and upskilling of these information service providers who will make use of these technologies.

Organization of the Book

The book is organized into 16 chapters. Chapter 1 introduces the Fourth Industrial Revolution and libraries and how it is affecting the operations and services of all types of libraries. It also states that librarians should have the needed competencies and skills in the Fourth Industrial Revolution in order to remain relevant.

Chapter 2 showcases the changes that have been brought about by the Fourth Industrial Revolution and point out that librarians should not overlook those changes. It states that libraries should adapt and embrace the changes brought about by industry 4.0 to meet the needs of the different types of patrons that they serve.

Chapter 3 points out the challenges and opportunities of library 4.0 on sustainable development due to the Fourth Industrial Revolution. It highlights how libraries can take advantage of the disruptive technologies to meet the sustainable development goals. The challenges that are affecting libraries in embracing industry 4.0 are also explained.

Chapter 4 discusses the information users of all categories and the challenges they encounter in their search for information in this electronic age. The study went further to bring to light the concept of digital literacy, classification of understanding the information user in electronic age, studies dealing with Information need and challenges of the information user in the electronic age. Suggestions on how to reach out efficiently and effectively to users was made.

Chapter 5 addresses the problem of how industry 4.0 can support the special need library users in accessing and utilizing information services effortlessly, by combining theories, proposing strategic models, and articulating its opportunities for the special need users. The chapter concludes by providing an overview for librarians, library educators, students and researchers of how special need library users can be supported to access and utilize information services effortlessly using industry 4.0 components

Chapter 6 documents how reference services can be enhanced in the Fourth Industrial Revolution using ABCD library management software to create an online live chat called Zoho chat. This is a virtual reference service which is used to provide feedback to patrons in real time. The chapter is a step by step guide of

the customization process of Zoho chat via the library website using the ABCD site module.

Chapter 7 deals with how information can be repackaged in the Fourth Industrial Revolution so as to meet the needs of various users who use the library. These users have different needs and various backgrounds and some are techno savvy while others are advanced in the use of technology. This chapter unpacks the concept of information packaging and repackaging and the strategies that are used in providing library services and products to patrons.

Chapter 8 discusses the changing roles of librarians in the Fourth Industrial Revolution due to the rapid technological changes that are taking place. The challenges that are faced by librarians as a result of these technological changes are stated in the chapter as well as the need to build capacity among librarians to ensure that they are able to deliver their new roles.

Chapter 9 explains the maker culture where there are changes in space, infrastructure and service organization. This also affects research support and academic libraries should create research support services which suit the maker culture. It points out the importance of research in higher education institutions and how the researcher can relate to librarians in the maker culture era.

Chapter 10 documents the research support services in academic libraries in the Fourth Industrial Revolution. Libraries are obliged to be innovative in delivering research support services due to the changes that are brought about by the industry 4.0 era. The issues that are discussed in the chapter involve the relationship between librarians and researchers, challenges experienced by librarians when offering research support services, role played by the librarians, and a framework that can be used to render the research support services. The importance of a national policy and the need to train librarians in emerging issues was highlighted in the chapter to ensure effective services are rendered to the research community.

Chapter 11 deals with quality assurance in libraries so as to achieve the sustainable development goals. Libraries are regarded as the information hub of any institutions and patrons access such information as a way of understanding how they can contribute to the attainment of the sustainable development goals. In order to achieve that, there are standards which should be adhered to in order to offer efficient and effective services. All facets of the library including the library building, collection, human resources, service provision, qualification, library schools among others should meet these minimum standards that are laid down in various policy and procedures documents.

Chapter 12 is related to the previous chapter and this documents the quality assurance and marketing of library services at Midlands State University in Zimbabwe. This is a case study of what is being done at the institution in all service areas to offer efficient services to the clientele. An element of continuous professional development came out to ensure that librarians are able to move along with the changes that are brought about by the Fourth Industrial Revolution.

Chapters 13 and 14 document the marketing of library services and products in the Fourth Industrial Revolution. Marketing is regarded as an essential

component in the industry 4.0 era and libraries should seriously consider this in delivering services and products. Chapter 13 points out the importance of using social media technologies in marketing library services and products in the twenty-first century. This is another way of meeting the users where they are since most library patrons are now utilizing social media platforms to meet their academic needs. As a result, libraries now have official social media platforms that they use to communicate with patrons. The next chapter showcases the 7Ps of marketing library services which should be applied by librarians in the Fourth Industrial Revolution.

Chapter 15 discusses the need for capacity building among university librarians to meet the needs of the Fourth Industrial Revolution. This is caused by the changes in higher education and information technology as well as the learning landscape which is demanding new skills and competencies from library and information professionals.

Chapter 16 reviews the industrial revolution phases down to the 4th industrial era or the Fourth Industrial Revolution (4IR) with the resultant effects of upskilling and re-skilling the workforce for future fits of the industry 4.0 era. The chapter also provided answers to what skills today's workforce need to develop as their roles evolve, what reskilling, cross-skilling, upskilling is all about and the various strategies through which library managers can adopt to encourage their workforce to re-skill, cross-skill and upskill.

Josiline Phiri Chigwada
Bindura University of Science Education
Ngozi Maria Nwaohiri
Federal University of Technology, Owerri, Nigeria

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Introduction

Examining the impact of industry 4.0 on academic libraries is a book that showcases the emerging issues in the Fourth Industrial Revolution. The industry 4.0 era has affected all types of organisations and libraries were not spared in the process. This book provides answers to questions on how academic libraries can adapt to the emerging technologies so as to remain relevant in the institutions of higher learning where they are regarded as the hub of learning, teaching and research. Academic librarians should understand the new services and products that were brought about by the Fourth Industrial Revolution which is also regarded as 4IR or industry 4.0. Therefore, this book documents original research on the issues, opportunities, challenges and the effects of industry 4.0 on academic libraries.

The target audience of this book are professionals, librarians, students, lecturers and researchers working in the field of library and information science, archives and records management, communication sciences, education, and information technology. The publication documents the changes that are taking place in the 4IR and what librarians should do to move along with those changes. The book summarizes the emerging trends and contemporary issues in academic librarianship. The impact of the book would be in providing reference information to students in the library and information science (LIS) schools in institutions of higher learning with the information sources required to gain knowledge and skills of twenty-first century librarianship. Lecturers would also benefit since they would have a reference source in contemporary issues in LIS. Academic librarians would gain the skills and knowledge that are required in offering services in the 4IR.

The areas that are covered in the book include the 4IR and libraries, redesigning library spaces such as maker space, learning commons, research commons, etc., reference services in the 4IR, electronic information services in the 4IR, research support services, information seeking behaviour in the 4IR, marketing of library services in the 4IR, and capacity building in the 4IR.

The editors of the book wish you well and hope that you will enjoy the book as you come to terms with the impact of the 4IR on academic libraries and how you can enhance your competencies and skills to continue offering relevant services.

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Josiline Phiri Chigwada
Bindura University of Science Education, Zimbabwe
Ngozi Maria Nwaohiri
Federal University of Technology, Owerri, Nigeria