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Abdalmuttaleb M. A. Musleh Al-Sartawi
Editor

The Big Data-Driven Digital Economy: Artificial and Computational Intelligence

 Springer

Editor

Abdalmuttaleb M. A. Musleh Al-Sartawi 
Accounting Finance and Banking
Ahlia University
Manama, Bahrain

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Preface

This book presents chapters that discuss contemporary issues related to the digital economy, mainly in relation to the challenges and opportunities by artificial intelligence and computational intelligence in big data-driven digital economies. The main theme of the book arises from the dynamic relationship between the advancement in information and communication technologies and the development of real-world issues that has been continuously accelerating the progress of the digital economy. As such, data has become an increasingly valuable driver transitioning societies to post-Fordist data-driven economies characterized by rapid innovation and the high value placed on education. Today, big data is an economic resource not unlike oil; those who are able to collect, retain, transform and use data are in power. Therefore, intelligence gathered by the process of analysing and learning from data improves our knowledge through artificial intelligence (AI) and computational intelligence (CI). CI systems form a set of human information processing methodologies which have been developed to address complex real-world big data-driven problems which can no longer be solved and optimized using traditional techniques. It a major role in developing successful intelligent systems, including games and cognitive developmental systems. Recently, there more attention has been given to issues such as convolutional neural networks as it has become the fundamental basis of AI, where nearly most successful AI systems are based on CI.

In lieu of the United Nation's efforts to spread the benefits of the digital economy globally, this book discusses and debates the implications of both AI and CI in the era of the digital economy and provides a holistic perspective on a wide range of topics including intelligence education, economics, finance, sustainability, ethics, governance, cybersecurity and knowledge management. Moreover, the chapters investigate various computational intelligence concepts which are currently shaping the digital economy such as artificial intelligence and blockchain. These complex and multifaceted technologies have implications on businesses as well as engineering in the wave of the Fourth Industrial Revolution, whereby the combination of the two provides the depth and breadth of the digital economy. In addition, due to the high premium placed on education, the book looks into AI and CI approaches

and algorithms for developing the digital learning and intelligent pedagogical systems.

Due to the holistic nature of the topics, this book is of interest to economists, financial managers, engineers, ICT specialists, digital managers, data managers, policymakers, regulators, researchers, academics and students. What differentiates this book from others is that it brings together two important areas, intelligence systems and big data in the digital economy, with special attention given to the opportunities, challenges and threats for education, business growth and economic progression of nations. It hereby focuses on how societies can take advantage and manage data, as well as the limitations they face due to the complexity of resources in the form of digital data and intelligence. Unlike other books, the chapters offer an in-depth insight into approaches which will support economic development strategies and add to the efforts made by the UN towards achieving their goal.

Organization of the Book:

The Call for Papers asked for submissions in one main category, i.e. full research papers, and accordingly attracted many submissions from around the world. Submissions were reviewed in a double-blind process by academics in the relevant fields.

The book is organized into thirty-four chapters and covers various topics as follows. Chapter 1 evaluates how big data advancements could positively impact the supply chain inefficiencies. It also discusses what challenges organizations have to face for implementing big data framework in their organization structure. The chapter takes into consideration the issues of global supply chain vis-à-vis the Indian Supply Chain Industry.

Chapter 2 aims to critically present a comprehensive literature to review the mobile computing for enhanced living environments and mobile health applications published from 2016 to 2020. The main contribution of this paper is to present a comprehensive literature review on mobile computing technology applicability to support older adults and to promote the overall public health and well-being.

Additionally, Chapter 3 discusses an approach based on the genetic folding (GF) algorithm to discriminate between positive and negative Arabic reviews in social media. Sentiment analysis is a set of techniques for collecting subjective opinions from a document.

On the other hand, Chapter 4 examines the e-learning system, Moodle, adoption by the students in three Gulf universities “Saudi Arabia, United Arab Emirates and Kingdom of Bahrain” and examines the students’ perceptions towards this system from the framework of two theories: the theory of reasoned action (TRA) and the theory of planned behaviour (TPB).

Chapter 5 gives us another perspective on a company’s earnings per share in the digital economy in a developing country. Accordingly, the chapter examines whether relational capital (RC) affects the relationship between intellectual capital (IC) and earnings per share (EPS), for 50 industrial companies on the Amman Stock Exchange (ASE).

Along similar lines, Chapter 6 discusses earnings management practices and then rereviews the previous studies that discussed the role of machine learning in uncovering earnings management practices. The study also suggests future research directions.

Chapter 7 was able to critique literature and blend two schools of thoughts: artificial intelligence and IT governance to comprehend the role of one over the other. Seldomly, these two research domains have been addressed in the literature: through an important area of discussion. Also, implications and future research agendas are also depicted in this paper. Such a research topic is unique and significant since this opens the doors to a new phenomenon in financial performance.

Moreover, Chapter 8 presents a literature review paper which proposes a conceptual framework for decision-making style within virtual platforms for improving service quality. Thus, making one proposition viable for future quantitative empirical evidencing, bearing theoretical and managerial implications.

Similarly, Chapter 9 aims to express a review of current literature revealing a want to know the impact of participants' social capital for enhancing their virtually shared knowledge, in turn for improving their readiness to learn as they participate in an online (virtual) community. Furthermore, there is further elaboration on the theoretical and practical implications.

In line with the educational topics in the digital economy, Chapter 10 critically reviews some of the recently published articles tackling the concept and the importance of game-based learning to come up with some practical recommendation that can be used in developing the mechanism of applying the concept and how we can use it during the COVID-19. The study recommends that to develop teaching methods and students' skills as well by investing more in AI techniques which will create more usable games in teaching and learnings during and after COVID-19.

Furthermore, in the digital economy blockchain is a public ledger that is secured and trusted and automatically records and verifies huge number of digital transactions. While paper 11 highlights the importance of blockchain technology and provides an overview on how blockchain can be implemented in the healthcare sector, paper 12 examines how the digitization of financial services can play a major role in increasing inclusive growth and entrepreneurship with a special emphasis on the Indian and Egyptian cases.

Likewise, financial sectors use artificial intelligence (AI) nowadays to manage transactions, invest in capitals and manage housing to achieve well-being. Chapter 13 gives an overview of artificial intelligence during the coronavirus, also known as the COVID-19 pandemic.

On the other hand, Chapter 14 explores the advanced technology of augmented reality (AR) as a digital tool of Industry 4.0. As such, it investigates the potential use of AR for the on-board training of seafarers, as a new technological tool aiming to increase their safety and operational effectiveness.

Moreover, with regard to the gaming industry in the digital economy, Chapter 15 identifies the extent of emotion impact on the consumer electronic game procurement decision. Qualitative research method has been followed in this research via

case study strategy. Interviews were conducted with a group of respondents who are used to play electronic games in Omani malls.

Chapter 16 throws light on another study conducted in Oman, where it analyses the role of Higher Education Institutions (HEIs) on the E-Innovation of Oman. It was found that there are several conditions for the expansion of the contribution of universities to regional development of E-Innovation system. These conditions are predominantly related to a broad set of factors that relate to characteristics of HEIs, characteristics of the regional firms, aspects of the collaborative relationship and characteristics of environmental context in which HEIs and firms are embedded.

In the light of the advancements in technology, Chapter 17 aims to predict the foreign currency exchange rate over twenty-two different currencies based on the US dollar. This chapter proposes three machine learning algorithms, such as ridge regression, lasso regression, decision tree and a deep learning algorithm named bidirectional long short-term memory (Bi-LSTM) to predict the foreign currency exchange rate.

With regard to corporate governance issues in the digital economy, Chapter 18 provides a new perspective to social media disclosure. The chapter addresses several research questions, mainly the association between boards of directors' composition: board diversity and board independence, and the level of social media financial disclosure in the UAE.

Chapter 19 explores organizational strategies for the development of digital skills. It analyses the manager's DS perception of a multinational firm present in 18 countries and operating in a manufacturing sector.

Chapter 20 brings to the attention of readers the importance of sustainable development. It discusses the concept of citizen science which refers to a scientific project, managed by researchers, where volunteers are involved in studying and acquiring data related to a natural phenomenon. The chapter contributes to the literature discussing three topics related to citizen science and proposing recommendations to address these actions, based on a literature review. The study has certain implications for practitioners and researchers. In the same vein, Chapter 21 explores the outcomes of smart tourism on-site applications for sustainable tourism.

Similarly, Chapter 21 presents the conceptual framework of financial inclusion with linking to individuals, SMEs and banks as these entities considering as demand and supply sides of financial inclusion. The chapter addresses the definition and main factors of financial inclusion, and also the importance and influence of financial inclusion in economic development and sustainability.

Chapter 23 continues the exploration of the theme of sustainability in relation to smart cities. The chapter determines the various vital functions concerning mobility, water and energy supply, transport networks and waste management are reviewed to respond to new ecological issues and the comfort requirements of city dwellers.

Chapter 24, however, illustrates the issues and opportunities for accounting in the digital economy, whereby it proposes how to use the artificial intelligence practically to automate removing the audit weaknesses. This, in turn, leads to earnings manipulation detection, reduces detection risk and control risk and

enhances audit quality by minimizing the risk accounting information and earnings manipulation detection.

Chapter 25 identifies the role of digital transformation in increasing the efficiency of the performance of banks listed on the Palestine Stock Exchange, identifying the digital transformation in banks and the role of digital transformation in increasing the efficiency of bank performance to enhance competitive advantage and achieve a stable financial situation. Meanwhile, Chapter 26 investigates the impact of financial technology on the performance of Bahraini banks.

Moreover, Chapter 27 is a conceptual paper which investigates the effect of behavioural factors on job performance and the mediating effect of employee engagement between behavioural factors and job performance in Jordanian commercial banks.

Chapter 28 combines the two important topics of education and social media. It investigates the effect of WhatsApp on the academic performance of mass communication education students.

Chapter 29 analyses the expected effect of using big data technology on the performance of human resources management in Jordanian universities.

For business growth, it is essential for companies to manage knowledge and integrate external information in individual innovation capacity. As such, paper 30 provides an evaluation of the capacity of individual innovation in the literature of information systems. This chapter reviews the individual innovation framework to reduce any uncertainties by enhancing awareness of individual innovation.

Chapter 31 explores broadband marketing strategy mainly buzz marketing to build customers' relationship management (CRM). The chapter analyses the marketing strategy of virgin, the case study, vis-à-vis university student's needs and requirements.

In the digital economy, the advent of the Internet has revolutionized the procurement's sourcing processes in firms among multiple sectors and industries. It has stimulated cost-effective ways besides various innovative applications that enterprises could leverage from it. Chapter 32 investigates the main factors which are impacting the supply chain performance. These factors are E-procurement, supplier relationship and supplier integration.

Chapter 33 explores virtual reality (VR) in education, particularly in relation to disciplines such as Science, Technology, Engineering and Mathematics (STEM) fields. This chapter critically compares educational VR methods and discusses some challenges of the use of VR in education.

Finally, Chapter 34 investigates the role of artificial intelligence and digital economy tools in developing electronic human resource management systems. This chapter discusses the capabilities and the features of the electronic human resource management systems and the difficulties which can be addressed by adopting artificial intelligence tools.

Acknowledgements

This book discusses a very important issue that links the importance of artificial and computational intelligence with big data in the transformation of economies towards digitalization. This is in line with the sustainable developed goals of nations.

This book would not have been written if not for our inspiration, **Prof. Abdulla Yusuf Al Hawaj**, the Founding President of Ahlia University, the Kingdom of Bahrain. He is the biggest advocate of economic diversification in the digital economy and sustainable technology in education in the Arabian Gulf.

First, I would like to thank all contributing authors for their strong chapter submissions on the increasingly critical topics discussed throughout the book. Their dedication to join the conversation on educational sustainable development is appreciated.

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Abdalmuttaleb M. A. Musleh Al-Sartawi

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