



**TECHNOLOGICAL INNOVATION AND
SUSTAINABILITY FOR BUSINESS
COMPETITIVE ADVANTAGE**

**TECHNOLOGICAL
INNOVATIONS
FOR BUSINESS,
EDUCATION AND
SUSTAINABILITY**

**EDITED BY
ALLAM HAMDAN**

**SERIES EDITORS
ALLAM HAMDAN | REEM KHAMIS**

Technological Innovations for Business, Education and Sustainability

TECHNOLOGICAL INNOVATION AND SUSTAINABILITY FOR BUSINESS COMPETITIVE ADVANTAGE

Series Editors: Allam Hamdan and Reem Khamis

Innovation and sustainability are broad terms that describe many interdisciplinary sciences – business success and competitiveness may not be separated from social and cultural aspects that interfere with any future development prospects. Research in across areas would provide a better understanding of international experiences, bridging the gap between developing and developed nations. This series promotes new visions for business research prospects that work in favor of innovation and sustainability in terms of governance, environment, and ethics.

Technological Innovation and Sustainability for Business Competitive Advantage highlights business problems faced by institutions in a scientific way, finding possible practical solutions. Contributing to setting and improving business theories and practices and encouraging scientific research in technological innovation and sustainability, volumes activate dialogue between academics, practitioners, and individuals and provide recommendations to improve institutions.

Technological Innovations for Business, Education and Sustainability

EDITED BY

ALLAM HAMDAN

Ahlia University, Bahrain



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Foreword

Technology innovation became essential in day-to-day operations; post COVID-19 governmental and organizational strategies have shifted toward digital transformation and green processes including education sector. The role of Business Education is crucial; business schools mission statements aim to produce graduates equipped with sustainable skills that could lead organizations from a technological aspect including digital transformation and use of technology innovation. International Accreditation Bodies including to Association to Advance Collegiate Schools of Business (AACSB) revised their standards with more emphasis on technology innovation to allow graduates to have the appropriate competency level to support business sustainability and impact. Technology Innovation including the use of Artificial Intelligence (AI), Big Data, and Data analytics supports various ways the businesses in terms of facilitating operational or strategic decision-making with a level of rationality, and evidence based on several studies highlighted the need to effectively utilize the technology for sustainable business operations including identification of risks and forecasting. In terms of business education, studies highlighted that 83 jobs will no longer be valid in the future due to technology innovation; therefore, education section must transform its teaching and learning methods to maintain the expedition of innovation and produce graduates with key competency in terms of ICT and digitalization. The question is “Technology Innovation” is it a blessing or a curse?

The answer is found in this book; a careful selection of the book chapters assures providing an insight for the readers that could be used by authors and policymakers. This book covers several chapters which highlight different innovative technology tools, education and teaching practices, and sustainability actions toward impact from multiple contexts. This book contributes to the United Nations Sustainable Development Goals (UNSDGs), particularly Education Quality (SDG4), Sustainable Cities and Communities (SDG11), and Partnership for the Goals (SDG17).

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Preface

The world is rapidly changing, and technology is at the forefront of this transformation. Technological innovations have revolutionized every aspect of our lives, from the way we communicate, to how we learn, work, and do business. The impact of technology on business, education, and sustainability cannot be overstated, and this book serves as a testament to the crucial role of technology in shaping the future of these fields. The era of digital economy is no longer anticipated since we are currently living in it. Several frameworks are needed to be discussed to better understand how business, education, and technology could enable people contribute positively to the global digital transformation. Business and business education needs to beat the contradictory that always existed between the needs of labor market and outputs of universities. Educators need and employers should have some kind of similar perception for the skills needed to enhance employability. This book will clearly contribute to the growing need of aligning business strategy and educational curriculums with the changing needs and skills needed for business workplaces in different fields such as marketing, management information systems, and data analytics along with other business applications of AI.

The book's focus on sustainability is particularly relevant as it aligns with the United Nations' sustainable development goals (SDGs). The SDGs aim to create a better and more sustainable future for all, and technology is a key enabler in achieving these goals. This book's chapters explore the role of technology in promoting sustainable development and offer insights into how technology can be used to address the challenges facing the world today.

This book, entitled "Technological Innovations for Business, Education, and Sustainability," is a compilation of 19 chapters that have undergone rigorous double-blind peer review to ensure quality and accuracy. The chapters cover a range of topics that explore the intersection of technology, business, education, and sustainability.

This book is divided into three sections, each focusing on a different area of technology's impact on business, education, and sustainability. The sections are as follows:

Section I. Business Intelligence, Technology for Sustainability.

Section II. Technological Education and Skills Development for Sustainable Practices.

Section III. Digital technologies, Economic Diversification, Entrepreneurial Capacities, and Sustainability.

This book's chapters explore a range of topics within these sections, including the impact of digital transformation on business practices, the role of emotional intelligence in job satisfaction, and the relationship between board structure and financial performance. The chapters offer practical insights and solutions for leveraging technology to achieve sustainable development goals, improve business practices, and enhance the quality of education.

We hope that this book will inspire further research and innovation in this exciting and rapidly evolving field.

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Part I

**Business Intelligence, Technology for
Sustainability**

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Chapter 1

Artificial Intelligence and Marketing: Challenges and Opportunities

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Abstract

It is important to implement artificial intelligence (AI) because it can simplify and solve complex problems faster than humans. Because AI learns about people and their behavior from the first purchase, AI marketing can boost marketing efforts by leveraging data to target extremely precise consumer groups. There is a debate about the efficacy of AI marketing due to the constraints and limits imposed by the system's nature. This chapter presents insights from published studies regarding the relationship of AI with marketing and how AI can affect marketing. A real-world example of Netflix's usage of AI in marketing has been demonstrated. Then, consumer attitudes regarding AI were revealed. Then, several ethical considerations concerning AI were highlighted. Finally, the anticipated future of AI marketing was addressed. This chapter demonstrated the significance of firms implementing AI marketing to get a competitive advantage. Although some of the difficulties mentioned in this study need to be resolved, AI marketing has a bright future. There are ethical concerns about bias and privacy that should be addressed further. This chapter will encourage firms to use AI systems in marketing, and it will open the door to concerns that will need to be investigated academically in the future.

Keywords: Marketing; artificial intelligence; marketing strategy; big data; machine learning; business technology

1. Introduction

The last few decades have seen great technological development, which has altered the course of human life. This technological advancement has helped in the betterment of human life by lowering borders between individuals and countries and making life easier. When talking about technological development, artificial intelligence (AI) must be mentioned as the basis for many developments in this era. The intelligence displayed by computers is known as AI. It is a branch of study concerned with competing with the ability of highly powered contemporary computer systems to handle difficulties by employing complicated competencies like as reasoning, learning, and self-correction. The concept of AI varies, but all center on the system's capacity to accurately read external input, learn from that data, and apply that knowledge to achieve specified objectives and activities through flexible adaptation.

From a marketing standpoint, AI can be defined as the development of AI that uses information available in the system about the company itself, consumers, and competitors to enable the organization to take or recommend marketing actions to achieve the best marketing result. Many businesses utilize AI to learn about people's preferences and inclinations in order to promote their products. Amazon, for example, use algorithms to understand what customers want and provide recommendations based on previously viewed and purchased things on their website.

1.1 The Relationship Between Marketing and AI

Marketing used to be restricted to marketing and advertising the products (such as placing advertisements in newspapers), but then a new marketing approach arose, focused on the consumer and creating a connection for long-term gain (through email communication or periodic visits to the customer). Currently, marketing is more reliant on technology and AI. As a result, new factors joined the competition, as well as tools that businesses should acquire. The quality of AI in data collection and analysis has become critical in the competition. Marketing with AI enables business owners and marketers to assess marketing data received via social media and the web in a reasonably short period of time. As a result, AI marketing is critical for all firms to be able to assess and address the demands of their clients. There are several areas where AI could aid enhanced marketing operations, such as:

- Automations, where AI assists in making marketing automation smarter, it may collaborate with marketing automation to translate data into meaningful choices and interactions, which benefits the organization.
- Reducing errors and boosting speed, as people are naturally prone to making mistakes, yet there is ongoing dispute regarding whether AI is a solution for human faults. There is consensus, however, that the purpose of creating AI is to enhance speed and minimize mistakes.

- Reducing expenses since AI can help reduce many of the resources that drain organizations' funds because it works faster and more efficiently. As a result, expenditures are reduced, and income is increased.
- Increasing the return on investment by targeting marketing to each consumer uniquely based on his preferences and orientation. This is accomplished by in-depth examination of client insights and requirements, as well as knowing what customers truly desire.

Social computing technology-based AI systems can be used to comprehend social networks on the internet. Different sorts of social networks can be analyzed using data mining techniques. This study assists the marketer in finding the prominent people or nodes inside the networks, which can then be used to adopt a civilized social marketing strategy. Based on the available data, customer behavior can be predicted when AI is used. When you anticipate the customer's behavior and vision, you may assess the market fit of the product and so aid in the choice to introduce or adjust the product. Marketers and salesmen do not need to comprehend how AI works because it is not their primary field. They are, however, expected to comprehend its mechanics and how they might use it in marketing for its greatest benefit.

1.2 Research Problem

The current state of AI technology is confined to intellectual domains such as picture recognition, speech recognition, and conversation response. In other words, AI has yet to collaborate with entire human brain functions such as self-awareness, self-control, self-consciousness, and self-motivation. As a result, while applying AI technology, there is a claim that there are various constraints for AI. Although recently created AI technology excels at extracting certain patterns, it has significant limits. Most models of information and communications technology are unduly reliant on big data, lack a self-idea function, and are complex. As a result, the computer or system is unable to read and evaluate data to make or assist in making a decision which led to a debate about the efficacy of AI marketing (Lu, Li, Chen, Kim, & Serikawa, 2017).

1.3 Contributions

There is a lack of study on the topic of marketing and its link to AI and how it will reflect on organizations, as there is a need to study to motivate organizations to modify their marketing strategy, how customer behaviors will be influenced, and policymaker difficulties (Davenport, Guha, Grewal, & Bressgott, 2019). The purpose of this study is to provide an update on the literature reviews about AI from the perspective of marketing and to discuss some of the challenges such as the ethical issues and the future of AI marketing. Certain expert-classified research may have some bias in some explanatory and descriptive respects. This study adds expert opinions to the published viewpoints, increasing the

knowledge balance in this field. To update research on this topic, this study gathers, analyzes, and infers expert opinions.

1.4 Research Methodology

The research investigates some elements associated with the notion of AI marketing, which include limitations and opportunities. This chapter is a theoretical study in which instances are referenced based on citations from literature reviews and some from the author's individual opinions.

2. Literature Review

There are study articles that explore the limitations and opportunities of AI marketing. The goal of this literature review is to compile and discuss recent research on this issue.

2.1 AI Overview

As previously specified, AI is an area of computer science concerned with creating intelligent computers capable of thinking and responding in the same way as people do.

When we talk about AI, we should talk about machine learning (ML), which is a branch of AI that allows machines to automatically enhance and develop from practice. Customized systems are designed for this purpose, and no explicit programming is required to add new concepts to the system database. Deep learning is a branch of ML that consists of very large neural networks and a massive number of algorithms capable of simulating human intellect. Google, for example, is continually learning and mimicking human intellect without requiring people to enter all of the answers into its vast database (Villaronga, Kieseberg, & Li, 2018).

Algorithms, which are a collection of principles employed in problem-solving procedures, are at the heart of AI systems. When digital marketers hear the term “artificial intelligence,” the first concept and term that comes to mind is “Rank Brain” Rank Brain is an ML -based search engine algorithm launched by Google in 2015 that assists Google in processing search results and providing more appropriate results to consumers. It makes use of AI to comprehend and answer to user enquiries in the same way that a human would. Furthermore, it offers a list of comparable inquiries that users frequently enter into Google. The precise findings of the answer, as well as a comparable set of questions, are backed by AI (Thiraviyam, 2018).

Because of their close relationship, two concepts are frequently associated with AI: big data and ML. These two terms can be defined as following:

- Big data is defined as data with greater variety that arrives in greater volumes and with higher velocity. This is also referred to as the three Vs (volume,

velocity, and variety). Big data refers to greater, more complicated data volumes, particularly from new data sources. These data sets are so large that typical data processing technologies cannot handle them. However, these huge amounts of data may be leveraged to address business challenges that were previously unsolvable. The three Vs are defined in [Table 1.1](#).

- ML is used to produce predictions or estimated solutions based on the study of massive volumes of data. The clearest illustrations are Netflix’s algorithms, which recommend movies and series to customers based on previous viewings, and Amazon’s algorithms, which propose products based on previous purchases or products whose pages have been recently viewed. ML is a branch of AI that allows programs to ingest enormous quantities of data and generate predictable algorithms that improve over time. Marketers may use ML to give consumers with personalized information as well as product ideas. When marketers have a vast database of data, ML has a better chance of delivering what customers want to buy. ML is multidisciplinary in nature, encompassing technology from a variety of disciplines such as computer science, statistics, mathematics, AI, and information systems. The fundamental benefit of ML is that it allows you to collect important data that was inferred from prior data by using algorithms based on computer vision, AI, and data mining.

Table 1.1. The 3 Vs Definiens.

The 3 Vs	Definition
Volume	It refers to the volume of data produced. By utilizing big data, the affiliate will be required to analyze massive volumes of unstructured data that is low in density. This might be unvalued data, such as a Netflix data stream, or the amount of hits on a certain web page. This might be dozens of terabytes of data for some corporations and tens of petabytes for others.
Velocity	It refers to the rate at which data is received and processed. Data often flows faster into memory versus slower rates when writing to hard drives. Some internet-enabled smart gadgets function in real time or near real time, necessitating real-time reaction and assessment.
Variety	The term “variety” refers to the number of different data kinds that have been entered. The data in big data stems from a number of sources, including new and unstructured data. Text, audio, and video are examples of unstructured and semi-structured data formats that require further preprocessing to get value from it.

Source: Authors’ work.

2.2 AI and Marketing Strategy

In the past, a robot was created and tried to teach it certain fundamentals so that the robot could not comprehend anything you said or did, but with ML, the robot can learn on its own from people's actions and words. Like a tiny kid, this robot is still in the learning stage, but it can learn millions of pieces of information in a short period of time, and the more knowledge it learns, the stronger it grows and the closer it gets to the truth. This is something that large corporations are focusing on. A robot is being constructed to collect data on people's behavior. For example, Google can predict what a person will write in a Gmail message because other people have previously written the same sentence that you are attempting to write, and this is how the robot knows what you will write, and other people have purchased the same thing you purchased from Amazon, and then added another product, so Amazon displays related products that you are likely to purchase (Kumar, 2016).

The capacity to foresee what customers desire is aided by AI. One of the functions of AI is to assist in predicting what customers will purchase. The application of AI should result in significant gains in prediction capacity. Companies may radically adjust their business models based on degrees of predicted accuracy and outcomes, continually supplying goods and services to clients based on data and forecasts about their demands. As a result, several study possibilities on various client purchasing patterns and marketing methods emerge. AI may potentially play a larger part in anticipating not just what consumers want to buy but also what price they are willing to pay and whether price discounts should be made to entice the buyer. Because promotional pricing and discounts are significant marketing parts, it is one of the most important areas of future study to determine how to effectively utilize AI to anticipate ideal prices and whether price promotions should be provided (Davenport et al., 2019).

AI must comprehend the character of the consumer and what he desires. They have a part in deciding what a person can target in marketing, in addition to demographic criteria such as age, gender, and residential location. What appeals to the consumer in the Arab Gulf, for example, may not appeal to the individual in the United States. When addressing the phases of sales, AI may alter the traditional strategy used from the first stage, which is the search for a possible client, through follow-up, and the conclusion of delivering the product or service and collecting the customer's evaluation. Thus, there are components of AI that must be developed, such as the analysis of customer communications and customer information in order to make more compelling future messages or improve customer involvement, and thus boost sales volume. Another component is delivering real-time feedback to marketers to assist them enhance their sales offerings depending on customer replies. In addition to being an important component, it is the integration of many inputs such as client queries, comments, and real purchase orders. These present difficulties for AI in marketing and sales. According to Shankar (2018), although these issues necessitate massive technical advancements, AI can be considered to bring evolutionary benefits in the short term, but they will be large and revolutionary in the long run.