


Chapter 11

Leveraging AI for Sustainable Drug Commercialization and Advanced Therapy Management in TVET Innovations in Cell and Gene Therapy and Patient Support

Pradeep Reddy Guttha


 <https://orcid.org/0009-0000-5962-3155>

Vertex Pharmaceuticals Inc., USA

Anumaan Whig

Delhi Technological University, India

Pawan Whig

 <https://orcid.org/0000-0003-1863-1591>

VIPS-TC, India

ABSTRACT

The integration of Artificial Intelligence (AI) in Technical and Vocational Education and Training (TVET) is transforming the landscape of drug commercialization, advanced therapy management, and patient support services. This chapter explores how AI-driven solutions are enhancing the development, production, and distribution of cell and gene therapies, ensuring sustainability and efficiency in the healthcare sector. It delves into the role of AI in optimizing clinical trials, regulatory compliance, and supply chain logistics, addressing challenges in cost, accessibility, and scalability. Additionally, the chapter examines how AI-powered patient support services, such as predictive analytics, personalized treatment monitoring, and virtual healthcare assistance, are improving patient adherence and outcomes. By integrating AI within TVET curricula, future professionals can gain the necessary skills to navigate the evolving pharmaceutical and biotechnology industries, fostering a sustainable and innovative healthcare ecosystem.

DOI: 10.4018/979-8-3373-1142-5.ch011

INTRODUCTION

Overview of Drug Commercialization and Advanced Therapy Management

Drug commercialization is a complex and multifaceted process that involves bringing a pharmaceutical product from research and development (R&D) to market availability. It includes several critical stages such as preclinical research, clinical trials, regulatory approvals, manufacturing, distribution, and post-market monitoring. The commercialization of drugs, especially in advanced therapies like cell and gene therapy, requires meticulous planning and execution due to the intricate nature of these treatments. Unlike traditional pharmaceuticals, advanced therapies involve highly personalized approaches that leverage genetic and cellular modifications to treat diseases at their root cause. This necessitates robust infrastructure, specialized workforce training, and stringent compliance with evolving regulatory frameworks.

Advanced Therapy Management (ATM) plays a crucial role in ensuring the safe, effective, and sustainable use of these cutting-edge treatments. It encompasses patient selection, treatment administration, post-treatment monitoring, and long-term follow-up to assess therapeutic efficacy and adverse effects. Managing these therapies also requires close coordination between healthcare providers, regulatory bodies, pharmaceutical companies, and patient support services. Given the high costs and logistical challenges associated with cell and gene therapies, innovative solutions are required to optimize the commercialization and management of these treatments while ensuring accessibility and affordability.

ROLE OF AI IN HEALTHCARE AND TVET

Artificial Intelligence (AI) is revolutionizing healthcare by streamlining processes, enhancing decision-making, and improving patient outcomes. In drug commercialization, AI-driven tools are being utilized for drug discovery, optimizing clinical trials, predicting patient responses, and ensuring regulatory compliance. AI-powered data analytics enables pharmaceutical companies to analyze vast datasets for identifying potential drug candidates, reducing the time and cost associated with traditional drug development. Additionally, machine learning models help in predicting drug efficacy and safety profiles, minimizing risks and improving regulatory approvals.

Beyond commercialization, AI is transforming patient care through predictive analytics, precision medicine, and remote monitoring solutions. AI-driven algorithms help in identifying patient eligibility for advanced therapies, customizing treatment plans, and predicting disease progression. In ATM, AI facilitates automated patient monitoring, early detection of side effects, and personalized recommendations for post-treatment care. Virtual assistants and AI-powered chatbots further enhance patient support services by providing real-time assistance, medication reminders, and guidance on therapy adherence.

Technical and Vocational Education and Training (TVET) plays a pivotal role in preparing healthcare professionals, technicians, and regulatory experts for AI-driven innovations in the pharmaceutical and biotechnology sectors. Integrating AI into TVET curricula equips learners with the necessary skills to navigate AI-powered healthcare ecosystems, manage complex therapies, and ensure sustainable healthcare practices. By incorporating AI literacy, digital health technologies, and data-driven decision-making into vocational training, TVET institutions can bridge the gap between industry needs and workforce readiness.

18 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/leveraging-ai-for-sustainable-drug-commercialization-and-advanced-therapy-management-in-tvet-innovations-in-cell-and-gene-therapy-and-patient-support/377120

Related Content

Reasons Behind a Career Change Through Vocational Education and Training: A Case of Pakistan

kinza Yousfani, Thembisile Ernest Gweyiand Khair un Nisa Noonari (2021). *New Models for Technical and Vocational Education and Training* (pp. 244-259).

www.irma-international.org/chapter/reasons-behind-a-career-change-through-vocational-education-and-training/268450

Youth Participation in the National Development Plan Through Technical and Vocational Education and Training: The Case of Young Black Women in South Africa

Johannes Ntshilagane Mampane (2022). *Research Anthology on Vocational Education and Preparing Future Workers* (pp. 869-882).

www.irma-international.org/chapter/youth-participation-in-the-national-development-plan-through-technical-and-vocational-education-and-training/304523

A Case Study in Micro-Learning and Alternate Credentials Before Their Time: Cardiac Care on the Web

Bettina Brockerhoff-Macdonald and Lorraine Mary Carter (2022). *Innovations in the Design and Application of Alternative Digital Credentials* (pp. 1-29).

www.irma-international.org/chapter/a-case-study-in-micro-learning-and-alternate-credentials-before-their-time/292658

Theoretical Foundations of AI and Sustainability in TV

Poornima Mahesh (2025). *Integrating AI and Sustainability in Technical and Vocational Education and Training (TVET)* (pp. 61-82).

www.irma-international.org/chapter/theoretical-foundations-of-ai-and-sustainability-in-tv/377112

Transforming Vocational Education through LLM Innovations

Madhu Chavva (2025). *Integrating AI and Sustainability in Technical and Vocational Education and Training (TVET)* (pp. 207-224).

www.irma-international.org/chapter/transforming-vocational-education-through-llm-innovations/377119