RADemics

Human Resource Planning and Competency Mapping for Agribusiness Ventures Using Data-Driven Workforce Analytics

Hrutuparna Bhalchandra Kamble,
R.Vijaya Srinivas
PVG'S COLLEGE OF ENGINEERING AND TECHNOLOGY, KONERU LAKSHMAIAH EDUCATION FOUNDATION

Human Resource Planning and Competency Mapping for Agribusiness Ventures Using Data-Driven Workforce Analytics

[1]Hrutuparna Bhalchandra Kamble, Assistant Professor, MBA, PVG's College of Engineering and Technology and G K Pate (Wani) Institute of Management, Pune, Maharashtra, India. hrutuparna.k@gmail.com

[2]R.Vijaya Srinivas, Assistant Professor, Department of BBA, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Andhra Pradesh, India. romala.vijay@gmail.com

Abstract

The evolving landscape of agribusiness demands transformative approaches to human resource planning and competency mapping, particularly as global agricultural systems face increasing pressures for efficiency, sustainability, and inclusivity. This book chapter explores an integrated framework that bridges algorithmic intelligence with social pedagogy to enhance workforce analytics in agribusiness ventures. The deployment of artificial intelligence in competency mapping offers substantial potential for identifying skill gaps, optimizing talent allocation, and driving evidence-based human resource strategies. However, challenges such as algorithmic bias, data privacy concerns, and socio-technical disparities in rural labor markets pose significant obstacles to equitable adoption. Through a comprehensive examination of ethical frameworks, participatory design methodologies, and bias mitigation strategies, this chapter highlights pathways for developing competency mapping systems that are both technologically advanced and socially responsive. Special emphasis is placed on fostering equity and inclusion for marginalized agricultural communities, ensuring that workforce analytics respects indigenous knowledge systems, informal skillsets, and local expertise. The discussion also addresses the critical role of policy frameworks in establishing accountability, transparency, and data governance standards essential for sustaining ethical AI-driven HR planning.

Keywords: Agribusiness, Workforce Analytics, Competency Mapping, Algorithmic Intelligence, Data Ethics, Social Pedagogy

Introduction

Agribusiness ventures have increasingly become pivotal players in shaping rural economies, contributing to both national development goals and global food security agendas [1]. As these enterprises expand, the complexity of managing human resources in agricultural environments has intensified, demanding strategic workforce planning methodologies [2]. Traditional approaches to human resource management in agribusiness often rely on manual processes, informal recruitment channels, and subjective assessments of worker competencies. These conventional models frequently fail to capture the dynamic skill sets required for modern agricultural production

systems [3]. The transition to digital technologies and data-driven decision-making offers an unprecedented opportunity to address these limitations by introducing structured, predictive, and transparent mechanisms for human resource development. Integrating advanced analytics into workforce planning can help agribusiness ventures identify current skill gaps, forecast future labor needs, and align employee competencies with technological advancements in agricultural production and supply chains [4]. However, for such systems to function effectively, they must consider the socio-economic diversity of rural workforces and be anchored in socially inclusive frameworks [5].

The application of algorithmic intelligence in competency mapping is emerging as a transformative solution for agribusiness human resource challenges [6]. Artificial intelligence (AI) and machine learning (ML) algorithms can systematically process vast datasets, identifying nuanced patterns in workforce skills, productivity trends, and labor allocation efficiency. Through predictive modeling, these technologies facilitate proactive workforce planning by aligning recruitment strategies with anticipated agronomic cycles, climate patterns, and market demands [7]. However, while algorithmic intelligence introduces analytical precision, it also brings forth challenges related to fairness, transparency, and interpretability [8]. Algorithms are only as unbiased as the data they are trained on, making historical data biases a critical issue for rural agricultural applications. Data-driven workforce analytics must, therefore, be designed with safeguards that mitigate risks of reinforcing systemic inequalities, particularly for marginalized and informal labor groups within agribusiness ecosystems [9]. Addressing these challenges requires the integration of algorithmic intelligence with contextual knowledge systems derived from local agricultural communities to ensure that technological interventions remain relevant and equitable [10].