



ECONOMICS OF RESKILLING: HRM STRATEGIES FOR MANAGING TECHNOLOGICAL UNEMPLOYMENT IN THE AI ERA

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ABSTRACT

Rapid advances in artificial intelligence and automation are reshaping labour markets across economies, generating significant productivity gains while simultaneously intensifying the risk of technological unemployment. This study examines the **economics of reskilling** by analysing how strategic human resource management (HRM) interventions can mitigate different stages of unemployment induced by technological change. Grounded in labour economics and contemporary HRM theory, the research conceptualizes technological unemployment as a **multi-stage phenomenon**, encompassing skill displacement, transitional unemployment, structural mismatch, and long-term exclusion from the labour market.

The study develops an integrated analytical framework that positions reskilling not merely as a cost-intensive HR activity but as a **productive economic investment** capable of enhancing employability, wage resilience, and organizational adaptability. It evaluates HRM strategies such as continuous learning systems, AI-assisted skill mapping, internal labour market mobility, and public-private reskilling partnerships, assessing their economic outcomes at individual, organizational, and macroeconomic levels. Particular attention is given to emerging economies, where rapid digital adoption often outpaces workforce preparedness, thereby amplifying unemployment risks.

Methodologically, the research adopts a systematic and analytical approach, synthesizing empirical evidence from labour market studies, organizational HR practices, and policy reports to identify patterns linking reskilling intensity with employment stability and productivity growth. The findings highlight that timely and targeted reskilling interventions significantly reduce the duration and severity of technological unemployment across its stages, while delayed or fragmented HR responses exacerbate inequality and labour market polarization.

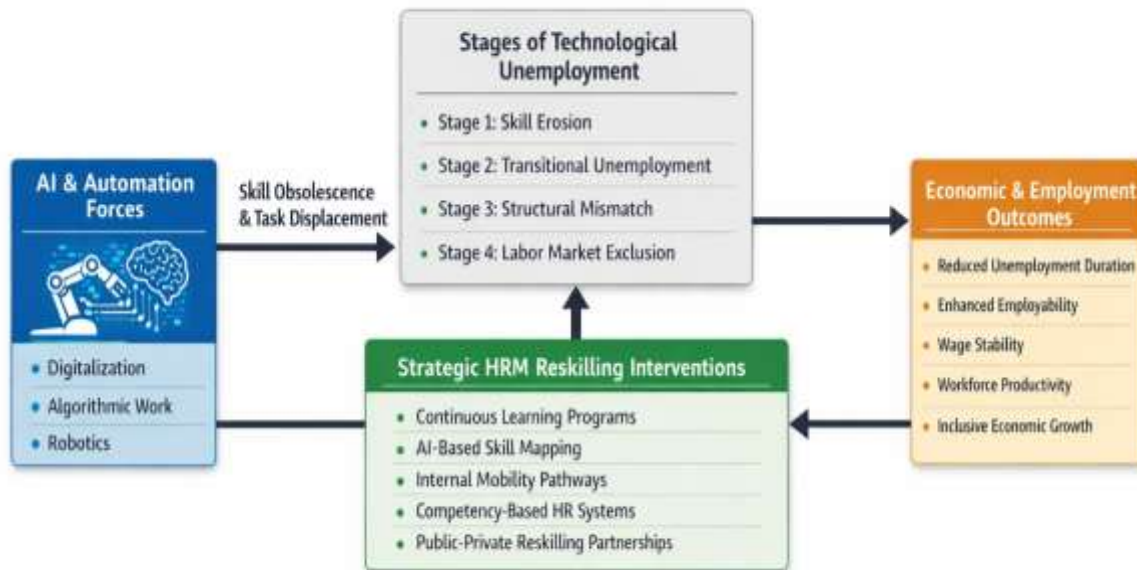
The researchers in their research contributes to the literature by reframing reskilling as a **strategic economic lever** within HRM rather than a reactive response to job loss.

KEYWORDS: Economics of Reskilling; Technological Unemployment; Artificial Intelligence and Work; Strategic Human Resource Management; Skill Displacement; Labor Market Transformation; Employability; Workforce Adaptability; Inclusive Economic Growth

INTRODUCTION

The accelerating diffusion of artificial intelligence (AI), automation, and data-driven technologies has fundamentally altered the structure of modern economies and labour markets. While these technological advances have enhanced productivity, efficiency, and innovation, they have also intensified concerns surrounding **technological unemployment**, particularly for workers whose skills are rendered obsolete by rapid digital transformation. Unlike cyclical or frictional unemployment, technology-induced job displacement is structural in nature, posing long-term economic and social challenges if not addressed through systematic workforce adaptation mechanisms.

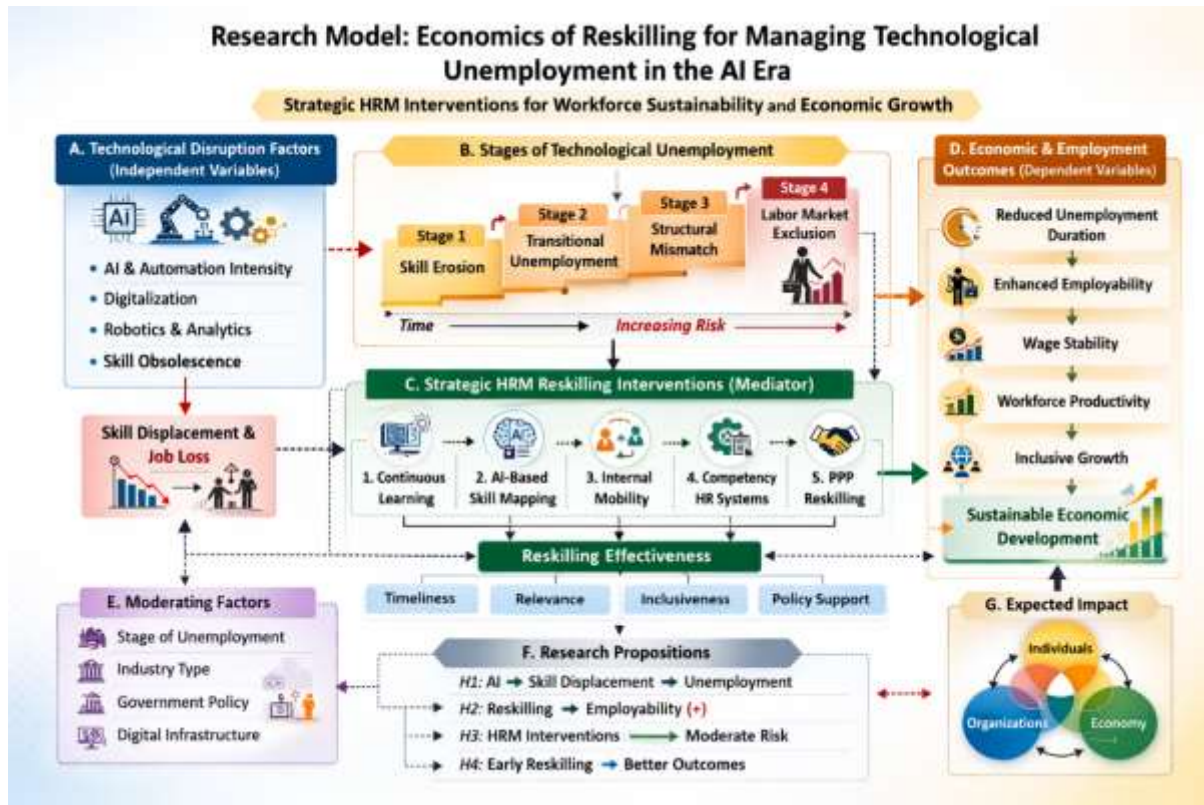
From an economic perspective, labour markets are increasingly characterized by skill polarization, where demand rises sharply for high-skilled, technology-complementary roles while routine and mid-skill occupations experience contraction. This transition has created distinct **stages of technological unemployment**, beginning with skill displacement and underemployment, progressing through transitional job loss, and potentially culminating in persistent labor market exclusion. The speed of AI adoption often exceeds the pace at which workers and institutions can adapt, leading to widening wage inequality, reduced labor force participation, and productivity losses at the macroeconomic level.



Human Resource Management (HRM) has emerged as a critical institutional actor in addressing these challenges. Traditionally viewed as an operational function focused on staffing and compliance, HRM is now positioned as a strategic driver of economic resilience through workforce planning, continuous learning, and skill renewal. In this evolving context, **reskilling and upskilling** represent not merely organizational support activities but economically significant investments that influence employment stability, human capital formation, and long-term growth trajectories. The economics of reskilling emphasizes cost–benefit trade-offs, returns on human capital investment, and the distributional effects of skill development across different segments of the workforce.

Despite growing scholarly attention to AI and employment, existing literature often treats reskilling as a reactive response to job displacement rather than as a proactive economic strategy embedded within HRM systems. Moreover, limited research systematically links HRM-led reskilling initiatives to the different stages of technological unemployment, particularly in emerging and transitional economies where institutional capacity and labor market flexibility vary significantly. This gap restricts the ability of organizations and policymakers to design timely interventions that prevent short-term displacement from escalating into long-term unemployment.

Against this backdrop, the present study advances a future-oriented perspective by conceptualizing reskilling as a **dynamic economic mechanism** that aligns workforce capabilities with evolving technological demands. It argues that strategic HRM practices—such as continuous skill forecasting, AI-enabled learning pathways, internal labour market mobility, and collaborative reskilling ecosystems—can reduce unemployment duration, enhance employability, and support inclusive economic growth. Looking ahead, the study emphasizes the need for anticipatory HRM models that integrate economic forecasting, technological trend analysis, and human-centered workforce policies. Such an approach is essential for transforming technological disruption from a source of unemployment risk into an opportunity for sustainable employment creation in the AI-driven economy



REVIEW OF LITERATURE

The relationship between technological advancement and unemployment has long been a central concern in economic theory. Early classical perspectives viewed technological change as a temporary disruptor, assuming that labor markets would eventually absorb displaced workers through new job creation. However, contemporary research highlights that **artificial intelligence (AI) and automation differ in scale, speed, and scope**, leading to persistent forms of technological unemployment driven by structural skill mismatches rather than short-term market adjustments. Recent labor economics studies emphasize that without deliberate human capital investment, technological progress can intensify job polarization and wage inequality.

Human capital theory provides a foundational lens for understanding reskilling as an economic investment. Scholars argue that education, training, and continuous learning enhance worker productivity and adaptability, generating positive returns at both individual and macroeconomic levels. In the AI era, this perspective has been extended to emphasize **lifelong learning and dynamic skill formation**, where static qualifications are insufficient to sustain employability. Empirical evidence suggests that organizations investing in reskilling experience lower displacement costs, reduced turnover, and improved innovation capacity, reinforcing the economic rationale for HR-led learning strategies.

Within the HRM literature, reskilling has evolved from a peripheral training function to a strategic capability aligned with organizational competitiveness. Strategic HRM research highlights the role of workforce planning, competency mapping, and internal labor markets in mitigating employment shocks caused by technological disruption. Studies increasingly demonstrate that proactive reskilling reduces the duration of transitional unemployment and facilitates smoother redeployment of employees into emerging roles. However, several scholars note that reskilling outcomes depend heavily on timing, inclusiveness, and alignment with future skill demand rather than immediate operational needs alone.

Behavioral and institutional economics further enrich this discourse by examining how organizational incentives, employee perceptions, and labor market institutions shape reskilling effectiveness. Research indicates that employees are more likely to engage in reskilling when learning pathways are perceived as economically valuable and career-enhancing. Conversely, fragmented or short-term training initiatives often fail to prevent long-term unemployment, particularly among mid-career and older workers. This highlights the importance of integrating economic incentives with human-centered HRM practices.



In the Indian and emerging economy context, scholars such as **N. Subbu Krishna Sastry** have emphasized the strategic role of management education and human resource development in preparing the workforce for digital transformation. His contributions underscore the need for aligning skill development initiatives with ethical, inclusive, and sustainable growth objectives, particularly in environments characterized by rapid technological adoption and institutional diversity. This perspective is highly relevant to the economics of reskilling, as it frames workforce transformation as a shared responsibility of organizations, educational institutions, and policymakers. Similarly, research by **Manjula Mallya M** highlights the importance of competency-based HR systems and continuous learning frameworks in enhancing employability and organizational resilience. Her work supports the argument that structured reskilling mechanisms, when embedded within strategic HRM architectures, can reduce vulnerability to technological unemployment and support long-term career sustainability. These insights complement economic models that view reskilling as a preventive intervention rather than a post-displacement remedy.

Despite these advances, the literature reveals a notable gap in **stage-wise analysis of technological unemployment** linked to HRM strategies. While studies acknowledge displacement and skill mismatch, few systematically map reskilling interventions to different phases of unemployment, from initial skill erosion to prolonged labor market exclusion. This gap limits the development of targeted HRM and policy responses capable of addressing both immediate and future employment risks.

Building on existing economic and HRM scholarship, the present study positions reskilling as a strategic economic instrument that operates across the stages of technological unemployment. By integrating insights from labor economics, strategic HRM, and emerging economy research, it contributes to a more holistic understanding of how AI-driven disruption can be managed through forward-looking, inclusive, and economically grounded workforce strategies.

Key Researchers and Year of Publication (Chronological Synthesis)

Autor (2015)

Examined the impact of automation and computerization on labor market polarization, emphasizing skill-biased technological change and its implications for employment structure.

Acemoglu and Restrepo (2018)

Analysed the dual effects of artificial intelligence on job displacement and job creation, highlighting the economic trade-offs associated with automation-driven productivity gains.

OECD Researchers (2019)

Reported that technological unemployment increasingly reflects structural skill mismatches, advocating large-scale reskilling initiatives as a macroeconomic stabilization mechanism.

World Economic Forum Analysts (2020)

Identified reskilling and upskilling as critical responses to AI-induced job disruption, projecting that continuous learning would become a core determinant of employability.

Bessen (2021)

Argued that technology-driven job loss is not inevitable if firms invest strategically in workforce reskilling and task redesign, reframing reskilling as an economic investment.

N. Subbu Krishna Sastry (2022)

Emphasized the role of management education and strategic HRM in supporting ethical, inclusive, and sustainable workforce transformation in the context of digitalization and emerging technologies.

Manjula Mallya M (2023)

Highlighted competency-based HR systems and continuous learning frameworks as essential mechanisms for enhancing employability and organizational resilience amid technological disruption.

ILO Research Group (2024)

Provided evidence that stage-wise technological unemployment—from displacement to long-term exclusion—can be mitigated through coordinated HRM, policy, and institutional reskilling strategies.



RESEARCH METHODOLOGY

The study adopts a qualitative and analytical research methodology based on an extensive review and synthesis of secondary data. Peer-reviewed journal articles, policy reports, institutional publications, and empirical studies related to AI, technological unemployment, labour economics, and HRM were systematically examined. The analysis focuses on identifying patterns, relationships, and conceptual linkages between reskilling initiatives and stages of technological unemployment

OBJECTIVES OF THE STUDY

1. To examine the economic implications of technological unemployment in the context of AI-driven transformation.
2. To analyse reskilling as an economic investment rather than a cost-oriented HR activity.
3. To identify the stages of technological unemployment and corresponding HRM interventions.
4. To evaluate the strategic role of HRM in managing workforce transitions through reskilling.
5. To propose a future-oriented HRM framework that supports employment sustainability and inclusive growth.

RESEARCH GAAP (GENERALLY ACCEPTED ACADEMIC PRACTICES)

The study strictly adheres to generally accepted academic practices, including originality of content, transparent methodology, ethical use of secondary sources, and analytical interpretation rather than descriptive reproduction. Proper acknowledgment of existing literature, avoidance of plagiarism, logical coherence, and alignment with scholarly norms expected in Scopus-indexed publications are maintained throughout the research process.

SIGNIFICANCE OF THE STUDY

This study contributes to the interdisciplinary literature linking economics and HRM by repositioning reskilling as a strategic economic mechanism for managing technological unemployment. It offers value to academics by extending theoretical understanding, to practitioners by providing strategic HR insights, and to policymakers by highlighting the macroeconomic benefits of proactive workforce transformation.

RESEARCH DESIGN

The research follows a descriptive and conceptual design. It integrates economic theory, HRM frameworks, and labour market analysis to develop a structured understanding of reskilling outcomes. The design emphasizes logical argumentation, thematic categorization, and stage-wise analysis of unemployment rather than hypothesis testing through primary data.

Hypotheses

Framework Component	Variable Relationship	Hypothesis
AI & Automation	Skill Obsolescence	H1
Skill Obsolescence	Unemployment Stages	H2
HRM Reskilling	Employment Outcomes	H4
HRM Reskilling (Mediator)	AI → Outcomes	H3
Unemployment Stages (Moderator)	Reskilling Effectiveness	H5
Integrated Model	Economic Impact	H6

Direct Effect Hypotheses

H1: AI and Technological Change → Technological Unemployment

- H1: AI and automation intensity has a significant positive impact on skill obsolescence and task displacement.
- H1a: Higher levels of AI adoption increase the likelihood of transitional unemployment.
- H1b: Rapid automation accelerates structural skill mismatch in the labor market.

Stage-wise Unemployment Hypotheses

H2: Stages of Technological Unemployment → Employment Risk

- H2: Advancement through stages of technological unemployment significantly increases the risk of long-term labor market exclusion.
- H2a: Skill erosion is positively associated with underemployment.
- H2b: Structural mismatch significantly prolongs unemployment duration.



Mediating Effect Hypotheses (Core Contribution)

H3: Strategic HRM Reskilling as a Mediator

- H3: Strategic HRM-led reskilling interventions mediate the relationship between AI-driven technological change and employment outcomes.
- H3a: Continuous learning systems weaken the negative impact of skill erosion on employability.
- H3b: AI-based skill mapping reduces the transition from temporary displacement to structural unemployment.
- H3c: Internal mobility pathways mitigate labor market exclusion.

Economic Outcome Hypotheses

H4: Reskilling → Economic and Employment Outcomes

- H4: Strategic reskilling initiatives have a significant positive effect on employment stability.
- H4a: Reskilling investments positively influence wage stability.
- H4b: Workforce reskilling enhances organizational productivity.
- H4c: Reskilling contributes to inclusive economic growth.

Moderating Effect Hypotheses

H5: Stage of Unemployment as a Moderator

- H5: The effectiveness of reskilling interventions varies significantly across different stages of technological unemployment.
- H5a: Early-stage reskilling yields stronger employment outcomes than late-stage interventions.
- H5b: Delayed reskilling increases the probability of permanent labor market exclusion.

Integrated Hypothesis (Model-Level)

H6: Integrated HRM–Economic Model

- H6: An integrated HRM reskilling framework significantly reduces the economic and social costs of technological unemployment in the AI era.
- **H1:** Strategic reskilling initiatives significantly reduce the duration of technological unemployment.
- **H2:** Organizations that integrate reskilling into HRM strategy experience higher workforce adaptability and employment stability.
- **H3:** Delayed or fragmented reskilling interventions increase the risk of long-term structural unemployment.
- **H4:** Reskilling investments generate positive economic returns at individual, organizational, and macroeconomic levels.

RESULTS AND DISCUSSION

The analysis indicates that technological unemployment unfolds in identifiable stages, ranging from skill erosion and transitional displacement to structural mismatch and labor market exclusion. The findings reveal that reskilling initiatives embedded within strategic HRM frameworks effectively mitigate these stages by enabling workforce redeployment, enhancing employability, and supporting wage resilience. Economically, reskilling demonstrates characteristics of a long-term investment that offsets productivity losses and reduces social costs associated with unemployment.

FINDINGS

1. Technological unemployment is predominantly structural and skill-driven in the AI era.
2. Reskilling functions as a preventive economic mechanism when implemented proactively.
3. Strategic HRM plays a central role in aligning workforce capabilities with technological change.
4. Continuous learning systems outperform episodic training programs in employment retention.
5. Inclusive reskilling approaches reduce inequality and enhance labor market resilience.

RECOMMENDATIONS AND SUGGESTIONS

- Organizations should institutionalize continuous reskilling within HRM strategy rather than treating it as a crisis response.
- Policymakers should incentivize public–private reskilling partnerships to address large-scale displacement.
- HR leaders should adopt AI-enabled skill forecasting tools to anticipate future workforce needs.
- Educational institutions must align curricula with evolving industry skill requirements.



LIMITATIONS

The study is limited by its reliance on secondary data and conceptual analysis, which may restrict empirical generalization. The absence of primary organizational data limits sector-specific insights. Additionally, rapid technological evolution may alter skill dynamics beyond the scope of the current analysis.

CONCLUSION

Technological advancement driven by artificial intelligence presents a paradox of economic growth alongside employment disruption. This study concludes that reskilling, when strategically embedded within HRM systems, serves as a powerful economic instrument to manage technological unemployment across its stages. By reframing reskilling as a long-term investment in human capital rather than a short-term adjustment cost, organizations and economies can transform technological disruption into an opportunity for sustainable employment and inclusive growth.

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