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ARTICLES

21 articles

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Peer-Review Statements

Keni Keni, Teoh Ai Ping, Hetty Karunia Tunjungsari

All of the articles in this proceedings volume have been presented at the Fourteenth International Conference on Entrepreneurship and Business Management 2025 during November 11-12, 2025 in Ngee Ann Polytechnics,

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This study examines the impact of global and domestic factors—namely the Volatility Index (VIX), crude oil prices, and the exchange rate—on Indonesia's stock market performance (IHSG) during the 2021–2024 period. Using monthly time-series data and the Ordinary Least Squares (OLS) method, this research...

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The Influence of Innovation, Creativity, and Digitalization on The Competitive Advantage of Women-Owned Msme's in West Jakarta

Dova Ariella Sareal, Marcello Marcello, Oey Hannes Widjaja

The purpose of this study is to examine the influence of innovation, creativity and digitalization on the competitive advantage of women-owned MSMEs in West Jakarta. The sample size for this study consists of 160 respondents, all of whom are female MSME owners located in West Jakarta. The research employed...

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This study investigates the influence of Financial Literacy, Materialism, and Lifestyle on Financial Behaviour among Generation Z in Indonesia, a demographic highly engaged in digital finance yet vulnerable to impulsive “doom spending.” Using a quantitative approach with purposive sampling, data were...

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Andreas Wijaya, Tannia Tannia, Marison Darmansyah, Agustinus Saputra

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For artificial intelligence (AI) to work well in education, it needs high-quality datasets that accurately reflect how people interact in the classroom. This study describes a community service project at SDN 129 Rancasawo Bandung that aims to create a high-quality conversational dataset between teachers...

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Yang Jia Shan, Hetty Karunia Tunjungsari, Septihani Michella Wijaya, Vincent Samuel Surya

This study aims to analyze the influence of promotion, product quality, and online customer reviews on the purchase decisions of AQUA bottled water products, with brand image serving as a mediating variable among students of the University of Nottingham Ningbo China (UNNC). The research background highlights...

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The Impact of Consumer Values on Repurchase Intention: A Cross-Cultural Comparison Between China and Indonesia on the TikTok Platform

Septihani Michella Wijaya, Hetty Karunia Tunjungsari, Yang Jia Shan

This paper explores the consumer values that motivate Chinese and Indonesian consumers to make repeat purchases on mobile commerce platforms, especially TikTok. A quantitative research design was used to collect data through a questionnaire survey, and the subjects were Generation Z and Millennials in...

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Steffany Chintia, Nur Hidayah

By 2025, Indonesia recorded over one million jobless individuals holding university degrees, marking the worst unemployment spike for this demographic in the last four years [4]. Such an alarming figure highlights a severe mismatch: fresh graduates often lack the practical and technical competencies...

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Human Capital in the Digital Transformation Era

Yusi Yusianto

This article discusses the role of human capital in economic analysis amid the digital transformation era. It begins by discussing the history of thinking about human capital, from classical economists to its formalization in the mid-1960s. Next, it discusses the relationship between human capital and...

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HUMAN CAPITAL IN THE DIGITAL TRANSFORMATION ERA

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Human Capital in the Digital Transformation Era

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Human Capital; Digital Transformation; Artificial Intelligence; Human Ca
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Abstract

This article discusses the role of human capital in economic analysis amid the digital transformation era. It begins by discussing the history of thinking about human capital, from classical economists to its formalization in the mid-1960s. Next, it discusses the relationship between human capital and training, social capital, innovation, and digital transformation. This discussion shows that human capital does not stand alone because it is influenced by many factors. In the digital era, technologies such as artificial intelligence (AI) provide opportunities, as well as serious threats to knowledge development. Therefore, the transformation of human capabilities is an absolute requirement so that digitization does not widen the social inequality gap. Finally, this paper describes the Human Capital Index Plus (HCI+), which was recently introduced by the World Bank in 2026. HCI+ data shows that there are significant disparities in human capital, especially between low-income and high-income countries.

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Human Capital in the Digital Transformation Era

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Abstract. This article discusses the role of human capital in economic analysis amid the digital transformation era. It begins by discussing the history of thinking about human capital, from classical economists to its formalization in the mid-1960s. Next, it discusses the relationship between human capital and training, social capital, innovation, and digital transformation. This discussion shows that human capital does not stand alone because it is influenced by many factors. In the digital era, technologies such as artificial intelligence (AI) provide opportunities, as well as serious threats to knowledge development. Therefore, the transformation of human capabilities is an absolute requirement so that digitization does not widen the social inequality gap. Finally, this paper describes the Human Capital Index Plus (HCI+), which was recently introduced by the World Bank in 2026. HCI+ data shows that there are significant disparities in human capital, especially between low-income and high-income countries.

Keywords: Human Capital, Digital Transformation, Artificial Intelligence, Human Capital Index Plus

1 Introduction

Human capital has become one of the fundamental pillars of modern economic analysis, particularly in explaining differences in productivity, economic growth, and welfare between countries. Human capital theory states that investment in people will provide significant economic benefits for individuals and society (Sweetland, 1996). In essence, the origins of the concept of human capital emerged from classical economic thinking, such as that of Adam Smith, John Stuart Mill, Alfred Marshall, and Irving Fisher [1]. However, the institutionalization of human capital as an official field of study occurred in the 1960s.

However, human capital has recently faced unprecedented challenges. Rapid advances in artificial intelligence (AI) technology since 2022 have raised fundamental questions about human learning and the accumulation of collective knowledge [2]. At the same time, digital transformation can create opportunities and, at the same time, threats. On the one hand, digital technology can empower marginalized communities. However, on the other hand, without the transformation of human capabilities, digitalization will further increase inequality [3].

This article aims to discuss the development of human capital in this era of digital transformation and its relevant aspects. It will begin with a discussion of the conceptual

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evolution of human capital; the relationship between human capital and social capital with innovation; the role of culture and institutions in shaping an environment conducive to human capital development; the implications of digital transformation; and the threat of knowledge collapse posed by AI to human learning.

2 History of Human Capital Thought

The history of human capital thinking has been going on for a long time, especially through the thinking of Adam Smith [1]. Adam Smith [1] stated that productive labor is comparable to the capital stock used to employ them. The abilities of the workforce obtained from education or apprenticeships are fixed capital realized in individuals. Furthermore, Irving Fisher as cited in Sweetland [1] broadened the definition of wealth by stating that humans are "human machines" that are an integral part of the productive process and national wealth stock.

However, the formalization of human capital as a new economic concept occurred in the mid-20th century [1]. Among the pioneers whose ideas stood out were Theodore W. Schultz and Gary S. Becker [1] [4]. According to Schultz as cited in Perepelkin et al. and Sweetland [4] [1], education is not a consumer good, but rather an investment. Furthermore, he stated that the ownership of human capital can exceed the role of physical capital. Becker as cited in Teixeira [5] expanded the concept of human capital by linking it to investment in education, nutrition, and other factors that affect physical, financial, and emotional well-being. Furthermore, Becker [4] [5] argues that human capital differs from financial capital because capital owners cannot be separated from their capital, and individuals act rationally by investing in themselves as long as the anticipated future returns are higher than the acquisition costs. Finally, Bowen as cited in Perepelkin et al. [4] formulated a definition of human capital consisting of the knowledge, skills, motivation, and energy possessed by humans that are used to produce goods and services within a certain period.

3 Training

One important contribution in human capital literature is the distinction between general training and firm-specific training. Becker as cited in Kessler & Lulfesmann [6] argues that in a competitive labor market, companies are unwilling to pay for general training because workers can take those skills to other companies and demand full wages. Conversely, companies are willing to pay for specific training because these skills are only valuable within that company. However, the division of the returns from specific training creates a bilateral monopoly position that triggers a hold-up problem, where one party exploits the other in wage negotiations.

Kessler and Lulfesmann [6] revised Becker's theory by pointing out the existence of "incentive complementarity." They found that general training can actually reduce hold-up problems in specific training. By improving workers' general skills, their market wages become higher, so companies offer competitive wages while still allowing them to obtain marginal returns on their investments.

4 Social Capital and Innovation

Dakhli and De Clercq [7] developed and empirically tested a model linking human capital and social capital with innovation at the community level across 59 countries. Their findings show that the success of human capital in driving economic growth is highly dependent on its interaction with social capital, which includes trust, associational activities, and civil behavior norms. In addition, their findings also show that the level of human capital is positively correlated with innovation, but social capital plays a crucial mediating role [7]. Interpersonal trust (general trust) reduces the need for costly monitoring systems, while institutional trust in the legal system ensures the protection of intellectual property, which is essential for high-tech exports [7].

Associational activities facilitate the exchange of ideas across backgrounds, which triggers innovation [7]. However, there is a paradoxical finding that overly rigid adherence to civil norms is sometimes negatively correlated with radical innovation. Innovation often requires proactive behavior that challenges traditional competition rules and established norms [7].

Acemoglu and Robinson [8] interpret culture as a repertoire (tool kit) consisting of cultural attributes that enable cultural responses to political change. This approach has several implications for human capital analysis. First, the system approach states that culture cannot be measured or understood by looking at a single attribute. Social meaning and justification are achieved through a combination of different attributes. Second, saltational (discontinuous) cultural change can occur because the social meaning and justification implied by a configuration can change rapidly along with a combination of attributes that are formed in new ways. Third, this approach introduces the concept of cultural fluidity, which is the extent to which a culture allows for the formation of diverse cultural configurations. Cultural fluidity determines a society's ability to adapt to changing circumstances.

Acemoglu and Robinson [8] remind us that human capital development is embedded in cultural and institutional configurations, which contain social meaning, coordination, and justification. Cultural configurations that support social mobility, meritocracy, and investment in education are prerequisites for effective human capital accumulation. This implication is reinforced by the findings of [7] that the relationship between trust and innovation is weakened by income inequality. These findings show that a more egalitarian institutional environment is more conducive to the conversion of human capital into innovative output.

5 Digital Transformation.

Qureshi [3] argues that human capital is key to effective digital transformation. Digital transformation, which changes organizational models and social structures, requires people with the knowledge, skills, and motivation to use information and communication technology (ICT) to be able to carry out this transformation. Without a transformation of capabilities, including access to ICT, the necessary skills and knowledge, digital transformation will only exacerbate existing inequalities.

Qureshi [3] reveals the dark side of digital transformation. For marginalized populations, digital technology is a double-edged sword. On the one hand, the use of mobile technology and digital identities supports their livelihoods. On the other hand, their data is harvested and used to create digital products that corporations sell to governments. Governments can use this data to track and monitor their citizens, which poses challenges to human rights.

Acemoglu, et al. [2] construct a dynamic model of how generative AI, particularly agentic AI, shapes human learning incentives and the long-term evolution of societal information ecosystems. There is debate over whether AI will be a complement that expands human knowledge or a substitute that weakens cognition. Agentic AI, which is capable of providing context-specific recommendations and executing tasks autonomously, tends to be a substitute for human learning. When AI provides solutions, individuals have less incentive to expend cognitive effort to understand the mechanisms behind those solutions. This problem can create a "knowledge collapse" [2].

In collective learning models, human learning efforts produce learning externalities. Individuals who learn for their own interests inadvertently increase the general knowledge stock of society. However, with the existence of agentic AI, humans reduce their learning efforts, thereby decreasing the amount of new information entering the collective system. In the long term, this trend can cause general knowledge to disappear completely [2].

6 Human Capital Index

The World Bank launched the Human Capital Index (HCI) in October 2018 [9]. The HCI is an international index that measures the amount of human capital that a child born today can expect to achieve by the age of 18, taking into account the health and education conditions prevailing in the country where they live. The HCI value (scale 0–1) reflects the productivity of the next generation's workforce against a benchmark of complete education and perfect health. For example, a country with an HCI score of around 0.54 means that a child born there will only be 54% as productive as if they had received a full education and perfect health. The HCI is forward-looking; it does not measure the human capital stock that exists in the current workforce, which reflects past policies. The HCI measures the human capital that children born today are expected to have.

Recently, the World Bank [10] introduced a broader version of the HCI, called the Human Capital Index Plus (HCI+). The HCI+ measures how effectively a country builds human capital, tracking the likelihood that it will grow up healthy, educated, and productive. This index integrates measurements from three dimensions of human capital, consisting of health, education, and employment, into a single index using evidence-based weights. The index value ranges from 0 to 325, which is the sum of the values for health (maximum value of 50), education (maximum value of 188), and employment (maximum value of 87). The units on this scale correspond to the percentage increase in labor income.

Table 1 shows HCI+ data by country income group. The global average HCI+ is 186 points. Global data shows that the potential income loss is 47%. This figure can be interpreted to mean that a child born today could earn 47% more income over their lifetime if their country had human capital equivalent to that of top-performing countries at the same income level. HCI+ data also shows that in addition to significant disparities, especially between low-income and high-income countries, there is also a considerable loss of income potential, around 51% in low- and middle-income countries.

Table 1. HCI+ by country income group

Group of Countries	HCI+ (average)	Percentage of Future Earnings Lost
Low Income	114	53%
Lower middle income	153	62%
Upper middle income	205	38%
Low- and middle income	173	51%
High income	252	32%
Global	186	47%

Source: [10]

7 Conclusion

Thoughts on the role of human capital in economic growth and national welfare have been around since Adam Smith. However, human capital was only formalized as a new economic concept in the 1960s.

One means of developing human capital is through training, both in the form of general training and firm-specific training. Companies are willing to finance general training because it can reduce hold-up problems in specific training.

In order for human capital to develop further and sustainably, it requires the support of social capital. This support takes the form of interpersonal trust, institutional trust, and a culture that is adaptive to change. In situations and conditions such as these, accompanied by associational activities, an innovation ecosystem will be formed.

The advancement of agentic AI poses new challenges in the form of the risk of losing general knowledge. Over-reliance on automated solutions can weaken human learning efforts and, in turn, eliminate general knowledge. In addition, the development of digital technology that is not accompanied by adequate skills transformation can exacerbate economic inequality.

HCI+ data shows that human capital development experiences significant disparities between country groups. The data also shows that the world faces a potential loss of income of around 47%. Therefore, the world must prioritize investment in the dimensions of health, education, and the employment ecosystem to ensure the productivity of future generations.

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