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Challenges in Human Capital Development in Indonesia: Bridging the Gap Between Education and Industry Needs In Yogyakarta

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Master in International Management

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BUSINESS
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Department of Marketing, Operations and General Management

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DEDICATION AND ACKNOWLEDGMENT

This thesis is dedicated to those who have been my pillars of strength throughout this journey.

To Professor Renato Pereira, whose guidance, wisdom, and support as my supervisor have been invaluable in shaping this work.

To my beloved parents, Danang Pantja Sudibja and Wahyu Widaningrum, thank you for your unconditional love, sacrifices, and constant encouragement. Your belief in me has been my greatest motivation.

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To all of my friends who i can't mention each one of them for always help me grow through this academic journey.

This work is as much yours as it is mine.

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ABSTRACT

This study examines the challenges of human capital development in Indonesia, focusing on the mismatch between education and industry needs in Yogyakarta. Indonesia's economic growth, driven by industries such as manufacturing, mining, and technology, has heightened the demand for skilled labor. However, a persistent skills gap, despite educational reforms, limits the workforce's ability to meet these demands. Yogyakarta, known for its numerous universities, faces unique challenges in aligning higher education with industrial needs, compounded by its status as a region with one of the lowest minimum wages in the country. The study investigates factors contributing to this skills mismatch and how regional wage policies affect labor market efficiency. It also explores the impact of educational reforms and human capital investment on labor productivity in Yogyakarta. The research findings aim to inform policy-makers, educators, and industries on strategies to bridge the gap between education outcomes and market needs, thereby fostering sustainable economic growth.

JEL Classification Codes:

- I25 (Education and Economic Development)
- J24 (Human Capital; Skills; Occupational Choice; Labor Productivity)
- O15 (Human Resources; Human Development; Income Distribution; Migration)
- J31 (Wage Level and Structure; Wage Differentials)
- R11 (Regional Economic Activity: Growth, Development, Environmental Issues, and Changes)

RESUMO

Este estudo analisa os desafios do desenvolvimento do capital humano na Indonésia, com foco no desajuste entre a educação e as necessidades da indústria em Yogyakarta. O crescimento económico da Indonésia, impulsionado por indústrias como a manufatura, mineração e tecnologia, aumentou a procura por mão-de-obra qualificada. No entanto, um persistente défice de competências, apesar das reformas educacionais, limita a capacidade da força de trabalho de atender a essas demandas. Yogyakarta, conhecida por suas numerosas universidades, enfrenta desafios únicos na tentativa de alinhar o ensino superior com as necessidades industriais, agravados pelo facto de ser uma das regiões com o salário mínimo mais baixo do país. O estudo investiga os fatores que contribuem para este desajuste de competências e como as políticas salariais regionais afetam a eficiência do mercado de trabalho. Explora-se também o impacto das reformas educacionais e do investimento em capital humano na produtividade laboral em Yogyakarta. Os resultados da pesquisa visam informar os responsáveis pelas políticas, educadores e indústrias sobre estratégias para colmatar a lacuna entre os resultados educacionais e as necessidades do mercado, promovendo assim um crescimento económico sustentável.

Códigos de Classificação JEL:

- I25 (Educação e Desenvolvimento Económico)
- J24 (Capital Humano; Competências; Escolha Ocupacional; Produtividade do Trabalho)
- O15 (Recursos Humanos; Desenvolvimento Humano; Distribuição de Renda; Migração)
- J31 (Nível Salarial e Estrutura; Diferenças Salariais)
- R11 (Atividade Económica Regional: Crescimento, Desenvolvimento, Questões Ambientais e Mudanças)

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CHAPTER 1
INTRODUCTION

In the past few years Indonesia has had significant economic growth, according to the World Bank and Indonesian Statistic Centre (*Badan Pusat Statistik/ BPS*) Indonesia gross domestic product (GDP) forecasted to grow 5,1% per year from 2024-2026 driven by the diverse range of industry such us manufacturing, mining, and technology. This economic growth has highlighted the need for a skilled workforce that can fulfill the need and requirement of the industries. Human capital development is essential to maintain this growth to ensure the labor that is available in the market meet the demands of each industry.

However Indonesia has a big problem despite this growth, a skill gap between the available workforce and the industry needs. Over the last decade economic growth in Indonesia has been associated with industries that require higher skill levels that made the demand for a high skilled labor increasing. Although the Indonesian Ministry of Education is making efforts to reform the education system, many industries continue to report a significant skills gap (Allen; 2016). This problem may occur because of several factors such as different education levels of each university, lack of additional skills needed in the industry, and skill mismatch between the university graduate and the industry (Allen; 2016).

The fast-paced urbanization in Indonesia challenges conventional educational programs and pathways, as they strive to meet the present and future demands of a built environment that must integrate new knowledge and professional practices, while being mindful of the environmental, social, and economic consequences (Raniga & Dalton; 2021). There is a present lack of coordination between the different sectors involved in education in Indonesia, particularly in built environment education, which needs to be developed and implemented to address both current and future challenges (Raniga & Dalton; 2021). Yogyakarta is a city known as “The Student City” because there are many universities in this region currently there are 4 state owned universities, 16 private owned universities and many institutes and academies that specialize in specific subjects. Having this many higher education industries will also be a challenge for the regional government in Yogyakarta. The challenge for regional governments lies in leveraging the potential of existing higher education institutions to speed up economic transformation, there is a mismatch between the industrial sector and higher education at both national and regional (provincial) levels. Nationally, there is a gap where the industrial sector is not sufficiently backed by relevant academic programs and fields of study. Regionally, it was found that local resources and potential need to be aligned with supporting study programs (Yudhoyono et al; 2024). Incorporating education into human resource (HR) development is a

crucial strategic move in reshaping the HR management framework. Education is key to providing individuals with technical expertise and skills while also fostering critical thinking, creativity, and problem-solving abilities essential for thriving in a fast-changing and complex workplace (Alam & Dewi; 2024).

Yogyakarta also has another problem. Based on the data from Indonesian Statistic Center, with Rp2.125.897 (€125.35) Yogyakarta sits among the lowest region/province with the lowest regional minimum wage among all the provinces in Indonesia. In a model where labor is homogeneous and fully covered, the initial employment equilibrium is determined by supply and demand forces. When a binding minimum wage is introduced, employers decrease the amount of labor they require. The degree to which a minimum wage increase reduces employment depends on how well firms can replace the more expensive labor with other production factors, as well as the negative effect this change in relative input prices has on the total output of the firm and industry (Edagbami; 2006). In a labor market dominated by monopolies, it was argued that the competitive environment of low-wage industries made the displacement of low-wage workers a more probable outcome (Neumark & Wascher; 2006). based on this literature the minimum wages of a region will have an impact on the workforce market. With a lower minimum wage the probability of a company to hire less-skilled labor is higher because the more-skilled labor tends to find work in a region with a higher monthly minimum wage.

While Indonesia's economy continues to grow and shows promising opportunities, it also brings some challenges, particularly in terms of human capital development especially in some part of the country where the minimum wages is relatively low. The mismatch between the skills provided by higher education and the demands of industries highlights the urgent need to address the skill gap, which is further compounded by regional disparities, such as Yogyakarta's low minimum wage. This gap has implications for employment dynamics, as regions with lower wages tend to attract more less-skilled labor, further limiting economic potential. Therefore, aligning education programs with industry needs and addressing regional wage disparities are critical to ensuring that Indonesia's economic growth remains sustainable in the future.

1.1 Problem Statement

The gap between the skill taught in Indonesian universities and the demands from the labor market bring a challenge for recent graduates and the industry. The advancement of industry makes the operations of the industry to be more complex that require the workforce to possess not only technical skill but also soft skill such as critical thinking ability, communication skill,

and adaptability skill. The mismatch between education and employment hinders graduates' ability to find suitable jobs, while the industries struggle to fill key positions with suitable trained workers especially in Yogyakarta where the wages are low thus make the jobs availability less interesting for a higher education graduate.

1.2 Research Objectives

This research aims to identify and analyze the factors contributing to the skills mismatch in Indonesia's labor market specificly in Yogyakarta and propose potential solutions for better alignment between educational outcomes and industry needs. The specific objectives of this study are:

i) To assess the relationship between human capital development and labor productivity in Yogyakarta, with a focus on education and public health investments.
ii) To evaluate the effectiveness of educational reforms and curriculum development in bridging the skills gap and enhancing workforce outcomes.
iii) To analyze the extent to which skills mismatch contributes to employment outcomes and to explore the implications of regional wage policies on labor market efficiency.

1.3 Research Question

This study seeks to answer the following research questions:

i) How does human capital development influence workforce outcomes in emerging markets like Indonesia specifically in Yogyakarta?
ii) What impact do educational reforms and curriculum development have on aligning skills with labor market needs?
iii) How does skills mismatch affect employment outcomes and labor market dynamics in regions with varying minimum wage levels?

1.4 Research Contribution

Contextual Contribution
This study will provide a focused examination of the Yogyakarta region. It will deliver a region specific insights into the missmatch between education output and industry needs. This will help to fill a gap in region specific studies on human capital development in Indonesia

Practical Contribution
This study will provide a practical recommendations for the stakeholder, particularly the need for a stronger collaboration between educational institutions, government bodies, and industries, which can guide to improve the quality of higher education.

1.5 Significant of The Study

This study holds significant value for multiple stakeholders—particularly educational institutions, policy-makers, and industry leaders—by offering evidence-based insights into the challenges and potential solutions related to graduate employability and skill mismatches in Indonesia, with a focus on the Yogyakarta region. The research investigates the underlying factors contributing to the gap between the skills possessed by graduates and the expectations of employers in the labor market. By identifying these root causes, the study not only highlights the limitations in the current educational and workforce development systems but also offers strategic recommendations to bridge this gap.

For educational institutions, the findings can guide curriculum reform, promote competency-based learning, and foster stronger collaborations with the industry to ensure that graduates are equipped with both technical and soft skills required in today's job market demands. For policy-makers, the research provides an empirical basis for designing and implementing policies that encourage partnerships between educational institutions and the industry and addressing the regional wage disparities problems hence will help creating a better work opportunity in Yogyakarta.

In conclusion, the study contributes to the broader goal of enhancing the competitiveness of Indonesia's workforce specificly in Yogyakarta. A better-skilled labor force not only supports business productivity and innovation but also promotes equitable economic development by enabling workers to access fair wages and sustainable career opportunities. In the long term, addressing these workforce challenges is essential to support Indonesia's national growth agenda, reduce unemployment and underemployment, and strengthen its position in the regional and global economy.

1.6 Research Scope

This research will focus on a specific region in Indonesia specificly in Yogyakarta region. It would examine the direct relationship between human capital development, education curricula, and skill mismatch towards workforce outcome with the mediating role of workforce competency. The sample of this research will be 200 graduates who study or works in Yogyakarta.

CHAPTER 2

LITERATURE REVIEW

The literature review section will explain its importance in providing the theoretical and empirical foundation of the research. In this part we will review existing studies on human capital development, and industry collaboration.

2.1 Human Capital Development

i) **Human Capital**

Human capital refers to the collection of skills held by the workforce, these skills are developed when the returns on investment surpass the associated direct and indirect costs (Goldin; 2014). Human capital is essential for economic growth and reducing poverty, on a macroeconomic level, increasing human capital boosts labor productivity (Son; 2010). Human capital can be defined as the total of an individual's innate abilities, learned skills, knowledge, and personal experiences (Kucharčíková; 2011). In other words Human capital is the set of skills possessed by the workforce, developed when investment returns exceed costs. It plays a crucial role for economic growth and poverty reduction, as increased human capital enhances labor productivity. It includes innate abilities, learned skills, knowledge, and experiences.

ii) **Human Capital in Emerging Market**

Human capital is considered the cornerstone of any progress in economic growth and development for any country, with no exception in emerging markets (Tran & Vo; 2020). The growth of the economy in emerging markets also has an impact of improvement in industry operations. Many factors contribute to human capital quality in emerging markets such as household income and development of its educational sector (Lee & Francisco; 2010). Study has been conducted from the data from 83 emerging countries shows that human capital have a positive impact to the economic growth of emerging market (Sarwar, et al., ; 2021). Sarwar, et all., (2021) also stated that development of human capital positevly impact the financial development which further help the economic growth of an emerging countries. Companies in emerging economies are encouraged to invest in human capital by building a highly educated workforce, employing experienced managers, and implementing strategic human

resource practices that enhance employees' technical skills and capabilities (Capozza & Divella; 2018).

From this literature, human capital is a fundamental driver of economic and industrial development in emerging countries or market. Its shaped by education, income levels, and strategic workforce development that positively influences both economic and financial growth. To sustain this progress, firms must prioritize investments in education, skilled management, and effective HR practices.

iii) **Human Capital in Indonesia**

The economic development of a country is largely influenced by the quality of its human capital, which is shaped by factors such as education and public health (Wibowo; 2019). According to the World Bank In 2020, Indonesia's Human Capital Index rose to 0.54 from 0.53 in 2018. This indicates that a child born in Indonesia today is expected to reach only 54% of their potential productivity if they had access to complete education. In the long term, human capital has a significant positive effect on economic growth in Indonesia, indicating that participation in education and the quality of educational services contribute positively to long-term development. However, in the short term, human capital shows a negative and insignificant effect, as investments in human capital take time to enhance workforce performance (Widarni & Bawono; 2021).

Human capital plays a significant role in driving a country's long-term economic development, as seen in Indonesia’s modest improvement in its Human Capital Index. While investments in education and public health contribute significantly to productivity and over time growth, their short-term impact remains limited. This highlights the need for more sustained commitment to human capital development to help unlocking country future economic potential.

The reviewed literature reinforces the human capital have an important role on economic growth, labor productivity, and poverty reduction. In both general and emerging market contexts, investments in education, public health, and workforce skills have been shown to bring a long-term economic benefits. In the case of Indonesia, although the Human Capital Index has seen slight improvement, the country's workforce still operates below its full potential. This is may happen because there are a lag between educational investment and measurable workforce outcomes. The need for strategic, long-term commitment to human capital development is especially critical in regions like Yogyakarta, where labor market inefficiencies and regional disparities are more pronounced.

These findings shows that Human Capital Development has a positive impact on Workforce Outcome, by enhancing the quality and relevance of human capital through education, health, and continuous skills development will leads to improved labor market performance, increased employability, and sustainable economic growth.

2.2 Educational Reforms and Curriculum Development

Education is a fundamental aspect of human capital theory, as it is regarded as the main method for cultivating knowledge and skills (Crocker; 2006). Educational reforms in general are intended to improve education and schools, and to make them more effective (Aksit; 2006).Human capital theory suggests that the prosperity of a society depends not only on its conventional resources like financial capital, labor, and natural assets, but also on the knowledge and skills of its people (Crocker; 2006). Quality workforce and human capital are considered to be the driving force to ensure economic growth and its sustainability (Şişman & Karssantik; 2021). According to Şişman & Karssantik (2021) Improving the quality of education may require focusing on curriculum development through both administrative restructuring and educational reforms.

Higher education undoubtedly holds a vital and prominent position in building a nation's capacity and fostering knowledge creation. However, for this role to be fully realized, it is essential to expand access to higher education, address the issue of underfunding within the system, and resolve the complex challenges arising from the disparity between graduate output and labor market needs (Adedeji & Campbell; 2013).

In conclusion, this literature review underscores the critical role of education in human capital theory as a primary means of developing knowledge and essential skills. Educational reforms aim to enhance the effectiveness of educational institutions, aligning them with the principles of human capital theory, which posits that a society's wealth is intrinsically linked to the capabilities of its workforce. A high-quality workforce is crucial for sustainable economic growth, necessitating a focus on curriculum development and improvements. Moreover, expanding access to higher education, addressing funding issues, and bridging the gap between graduate skills and labor market needs are vital steps to fully unlock the potential of higher education in fostering national capacity and knowledge creation also minimizing the disparity between private and government owned higher education institutions to ensure that the outcome will be the same regardles the ownership of the higher education institute.

2.3 Skill Mismatch & Skill-Biased Technical Change

i). **Skill Mismatch**

Even though companies frequently list clear requirements for job openings, many employees end up in positions where they seem to be a poor fit for the role. The term "skills mismatch" refers to scenarios where workers possess either more or fewer skills than those required by employers. In fact, social scientists' perspectives on the labor market have transitioned between these two extremes in a relatively short period (Handel; 2003). The term "labor market mismatch" refers to a situation where employers struggle to find workers with the specific skills or qualifications they require. In other words, the demand for certain skills surpasses the available supply of those skills among the workforce (Holzer; 2013). Mismatch refers to the disconnect between outcomes and an individual's abilities, where the two are not aligned effectively (Cervantes & Cooper; 2021).

Skills in the labor market can be divided into general and specific categories. General skills refer to a set of worker attributes that are broadly valued by a wide range of employers, while specific skills are more tailored to particular jobs or industries. General skills often encompass basic abilities, such as cognitive skills and job-readiness (Holzer; 2013). When considering job placements, having a college degree does not necessarily ensure a skilled position in any country, workers without a degree, including those who are overqualified for their jobs, are often placed in unskilled roles. However, in Germany, Italy, and the US, 60 to 70% of overqualified individuals find themselves in skilled jobs, partly due to additional training (Cervantes & Cooper; 2021).

ii). **Skill Biased Changes**

Skill-Biased Technical Change refers to a change in production technology that enhances the productivity of skilled labor more than that of unskilled labor (Violante; 2008). This increases the demand of skilled labor in order to increase productivity driven by technology enhancement. Many authors have attributed the deterioration of low-skilled workers' prospects to the impact of new technologies, leading to skill-biased technical change (SBTC) (Sanders; 2000). The increasing gross domestic product (GDP) per capita are associated with a changes in value added to sectors with high-skilled labor, leading to an the increasing demand for skilled labour (Buera, et al,. 2015). SBTC plays a key role in increasing both employment and wages for high and low-skilled workers, but it does not have a significant effect on the employment

or wages of medium-skilled workers (Wang, et al., 2021). The productivity of skilled workers increase by approximately 11.5% more than that of unskilled workers, mostly driven by skill-biased technical change (13.7%) (Batisti, et al,. 2022). An increase in the skill-biased technological change further increasing skilled-unskilled wage disparity in developing countries if the labor's distributive share in the skilled sector is large enough relative to that in the unskilled sector (Pi & Zhang; 2017).

In conclusion Skill-Biased Technical Change (SBTC) gave a significant influences to the labor market dynamics by favoring skilled workers over unskilled workers and medium-skilled workers. While it boosts productivity and drives economic growth, it also widens wage disparities, particularly in developing countries. As economies shift toward skill-intensive sectors, addressing the challenges of SBTC requires targeted investment in education and workforce development to ensure inclusive growth and reduce labor market polarization.

The literature reveals that skill mismatch remains a major challenge in labor markets, particularly in developing countries. Mismatch may happen when workers possess either more or fewer skills than required for their roles, resulting in inefficiencies in job placement and workforce utilization. Despite holding academic qualifications, many graduates especially in contexts like Indonesia still struggle to secure roles that match their expertise due to gaps between educational outputs and evolving job market needs. This problem is compounded by Skill-Biased Technical Change (SBTC), where technology-driven shifts in production favor highly skilled workers, further marginalizing those with outdated or insufficient competencies. As a result, both overqualified and underqualified individuals experience reduced job satisfaction, underemployment, and wage disparities.

From this literature review it shows that Skill Mismatch significantly impacts Workforce Outcome. The growing disconnect between available skills and industry needs, aggravated by technological change.

2.4 Workforce Competencies

For the past four decades, competencies have been recognized as reliable indicators of exceptional job performance within business organizations (Wong, 2020). McClelland's (1973) quoted from Wong (2020) concept of competencies significantly influenced HRM practices by introducing a new perspective and driving the development of more accurate and reliable tools to predict individual job performance. Leading businesses began incorporating competencies into their processes for recruitment, selection, employee development, and the management of

high-performing individuals. In the era of industry 4.0 there are a several changes regarding workforce competencies. Industry 4.0 refers to the profound transformation of the industrial sector driven by the integration of advanced and emerging technologies (Hernandez-de-Menendez, et al,. 2020). A proposed competency model for Industry 4.0 seeks to improve the understanding and implementation of future skills by outlining how each competence contributes to Industry 4.0 efforts, identifying key skills widely recognized by literature and industry, categorizing these competencies into five distinct groups, clarifying overlaps between types of skills (e.g., technical vs. digital), and applying widely accepted industrial terminology for easier comprehension (Flores, et al,. 2019). Organizations use a variety of methods to assess whether their workforce possesses the necessary skills, such as learning and competency management systems, certifications, self-assessments, direct observations, surveys, and monitoring employee activities and performance through testing (Hernandez-de-Menendez, et al,. 2020).

In conclusion, workforce competencies have emerged as a critical mediating variable in determining job performance within organizations. Over the past four decades, the concept of competencies, introduced by McClelland (1973), has revolutionized human resource management practices. By focusing on the development of reliable tools for assessing and predicting individual performance, businesses have increasingly leveraged competencies to enhance workforce effectiveness. The integration of competencies into HRM practices not only reflects a shift in evaluating employee potential but also highlights the role of these competencies as central to driving organizational success. As such, competencies act as a key factor linking employee capabilities to exceptional job performance, making them essential in modern HRM strategies.

CHAPTER 3

RESEARCH METHOD

3 Hypothesis

3.1 Human Capital Development impact on the workforce outcome

Human capital refers to the accumulated knowledge, skills, experiences, and personal attributes possessed by individuals that contribute to their productivity in the labor market. These capabilities are developed through investments in education, training, and public health, which yield returns when the resulting competencies enhance labor productivity (Goldin, 2014; Son, 2010). On a macroeconomic scale, human capital plays a critical role in fostering economic growth and reducing poverty by enabling a more competent and adaptable workforce (Kucharčíková, 2011).

In the context of emerging markets, including Indonesia, the role of human capital becomes even more pronounced. As noted by Tran & Vo (2020), the development of human capital is foundational to sustained industrial and economic progress. Empirical studies across 83 emerging countries (Sarwar et al., 2021) confirm that improvements in human capital have a significant positive effect on both economic performance and financial development. Key contributing factors include rising household incomes and the expansion and modernization of educational systems (Lee & Francisco, 2010). Furthermore, strategic investment in highly educated talent, skilled management, and effective HR practices enhances the operational effectiveness of firms in these markets (Capozza & Divella, 2018).

In Indonesia, although recent data from the World Bank indicates a gradual improvement in the Human Capital Index—from 0.53 in 2018 to 0.54 in 2020—this still reflects that individuals are only expected to reach 54% of their full productivity potential under optimal conditions (Wibowo, 2019). The modest increase illustrates both progress and the existing gaps in translating education and health investment into measurable workforce outcomes. Widarni & Bawono (2021) argue that while the long-term effects of human capital development are clearly positive, its short-term impact tends to be limited due to the time it takes for investments to manifest in the labor market.

This study posits that in regions like Yogyakarta, where industrial demand for skilled labor is increasing, the strategic development of human capital is essential to improving workforce outcomes such as job readiness, employability, and labor productivity. The city's large number of universities offers an opportunity to maximize the function of educational institutions for greater human capital formation.

Therefore, this research formulates Hypothesis 1 as follows:.

H1 : Human Capital Development has a positive impact on workforce outcome.

3.2 Educational Reforms and Curriculum Development impact on workforce outcome

Education is a fundamental aspect of human capital theory, serving as the primary method for cultivating knowledge and skills (Crocker, 2006). This theory posits that a society's prosperity is not solely dependent on conventional resources such as financial capital and labor, but also on the knowledge and skills of its populace (Crocker, 2006). Consequently, educational reforms are essential to improve educational institutions and enhance their effectiveness (Aksit, 2006). A quality workforce, characterized by strong human capital, is considered a crucial driver of economic growth and sustainability (Şişman & Karssantik, 2021). Enhancing the quality of education requires targeted efforts in curriculum development, alongside administrative restructuring and educational reforms (Şişman & Karssantik, 2021). Moreover, higher education plays a vital role in building national capacity and fostering knowledge creation. To realize this potential, it is essential to expand access to higher education, address funding deficiencies, and tackle the disparities between graduate output and labor market needs (Adedeji & Campbell, 2013). Thus, the literature suggests that effective educational reforms that align with human capital theory can bridge the skills gap, improve labor market outcomes, and support sustainable economic development.

H2 : Education Curricula has an positive impact on Workforce Outcome

3.3 Skill Mismatch and Skill-Biased Technical Change

Skill mismatch refers to a misalignment between the qualifications or competencies possessed by workers and the actual requirements of the industry. This phenomenon manifests in two primary forms: underqualification, where individuals lack the necessary skills for their roles, and overqualification, where workers possess more skills than their positions demand. Despite employers frequently stating specific job requirements, a substantial number of employees end up in roles where their capabilities are either underutilized or insufficient, leading to inefficiencies in labor market functioning (Handel, 2003; Holzer, 2013).

The mismatch is not merely a matter of educational attainment but also of relevance and adaptability. Possessing a college degree does not necessarily guarantee employment especially if graduates lack practical or industry-specific competencies. Workers who are overqualified are often found in unskilled or unrelated jobs, particularly in countries where industry-academia collaboration is weak. In contrast, nations like Germany, Italy, and the United States mitigate this issue through stronger vocational training and continuous skill development, which help place 60–70% of overqualified individuals into suitable positions (Cervantes & Cooper, 2021).

Compounding this issue is the rise of Skill-Biased Technical Change (SBTC)—technological advancements that disproportionately benefit high-skilled workers. SBTC has intensified the demand for technically competent labor while reducing the opportunities and relevance of low- and medium-skilled roles. Research shows that technological change can increase productivity by over 11% for skilled workers, further widening the productivity and wage gap between skill levels (Batisti et al., 2022). As economies become more technology-driven, this shift creates an even greater challenge for those whose education or experience fails to match the evolving needs of the labor market (Violante, 2008; Wang et al., 2021).

In the context of Indonesia, rapid industrial growth and evolving labor demands have outpaced the educational system's ability to adapt, leading to widespread mismatches. In regions like Yogyakarta, where wage levels are low and graduate oversupply is common, the inability to connect the workforce with appropriately matched roles results in underemployment, stagnated career development, and reduced productivity at both the individual and organizational levels.

Therefore, this study proposes Hypothesis 3:.

H3 : Skills mismatch in the labor market significantly impacts Workforce Outcome

3.4 The mediating role in the relationship between Human Capital Development and Workforce Outcome

Workforce outcome is not only directly linked to human capital development, there are suggestion that workforce outcome is also affected through the mediating role of Workforce Competencies (M). According to Ma'dan et all (2009) providing the workforce with additional competencies through human capital development may enhance the quality of workforce outcome. Aji et all (2024) providing workforce with additional competencies may help the human capital within the company may help them addapt to the change of industry.

Based on the literature from Ma'dan et all (2009) and Aji et all (2024) the mediating role of Workforce competencies positively impacting the relationship between Human Capital Development and Workforce outcome.

H4 : Workforce competencies positively impact the relationship between Human Capital Development and Workforce outcome

3.5 The mediating role in relationship between Education Curricula and Workforce outcome

According to Yahya et all (2015) The creation of skilled and competitive human capital relies on the quality of a country's education and training systems. To achieve the goal of producing knowledgeable and capable graduates, all entities involved in education, training, and skill development such as policymakers, industry leaders, and educational institutions must prioritize three essential criteria. These include equipping graduates with technical expertise, fostering self-management through lifelong learning, and developing social skills for effective collaboration with others. In developing countries the quality of workforce rely heavily on the education (Misni et al, 2020). According to Misni et al (2020) Universities should adopt a more practical approach, promote analytical discussions, and integrate interactive learning methods into their curriculum to equip students with the skills required by employers.

Based on this previous literature, the mediating role of Workforce competencies has an impact on the relationship between workforce outcome and education curricula.

H5 : Workforce competencies positively impact the relationship between Education Curricula and Workforce outcome

3.6 The mediating role in relationship between Skill Mismatch and Workforce outcome

According to Sala (2011) Skill mismatch, characterized by a misalignment between individuals' skills and job requirements, can lead to underutilization of workers' capabilities or overeducation, where qualifications exceed job needs. At the macroeconomic level, such mismatches result in productivity losses and inefficient resource allocation. A competence-based approach offers an alternative perspective, focusing on aligning workers' abilities with job requirements through tailored education and training programs. This method emphasizes the importance of unique pairings between individual skills and occupational demands. Enhancing workforce competencies is crucial for addressing skill mismatches, improving labor market efficiency, and fostering sustainable economic growth.

Skill mismatch significantly impacts employment outcomes, with mismatched workers being 20% less likely to be retained compared to well-matched employees, and high-aptitude workers experiencing the most pronounced effects. This highlights the economic costs of poor job-skill alignment, which can lead to reduced retention and productivity. Addressing these challenges requires improved skill evaluation and alignment, leveraging technological innovations such as online learning platforms and strategic partnerships. Enhancing workforce competencies to better match job requirements is crucial for optimizing labor market efficiency and improving overall employment outcomes (Mihaylova, 2019).

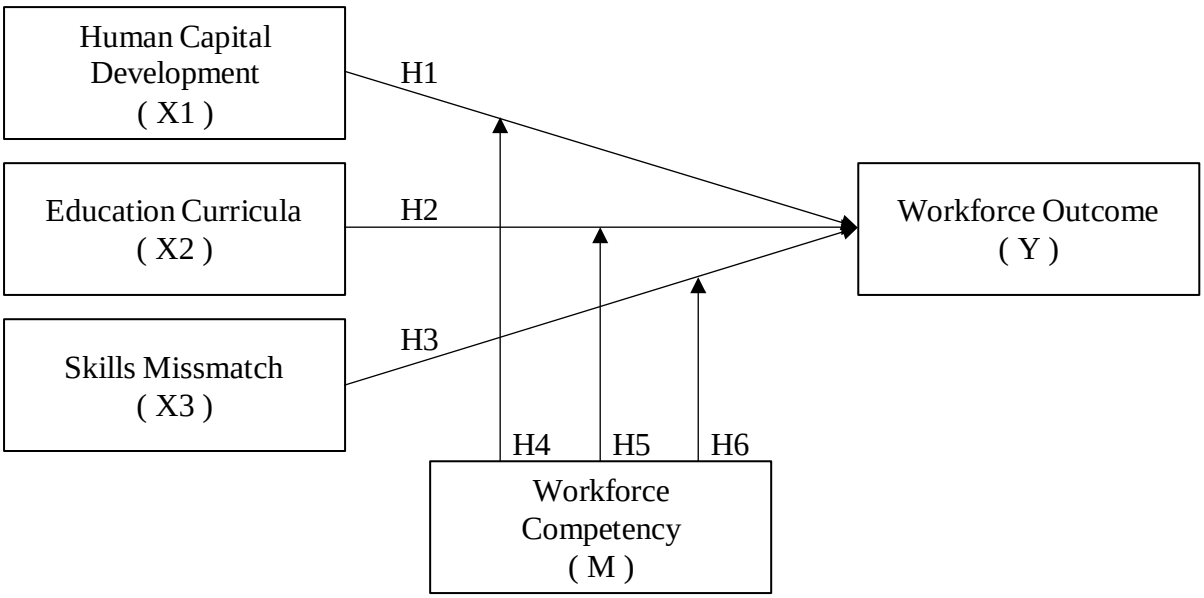
Based from this finding it shows that workforce competencies have an impact towards the relationship between Skill mismatch and workforce outcome.

H6 : Workforce competencies positively impact the relationship between Skill Mismatch and Workforce outcome

3.7 Research Model

Based on the findings from the literature review, the conceptual framework of this thesis will be formulated to Human Capital Development, Education Curricula, and Skills Mismatch as the Independent Variable and Workforce Outcome as the Dependent Varaible with Workforce Competency as a Mediating Variable.

Figure 3.1 Research Framework



3.8 Research Method

This survey intended to analyze the relationship between human capital development, educational reforms, skill mismatch, and workforce outcomes with mediating role of workforce competency and its impact on the Skill Gap between university graduates and industry needs in Yogyakarta.

This research will use primary data. Primary data is the data that was collected first hand by the researcher (Ayaji; 2017). According to Ayaji (2017) Primary data could be gathered through various methods like surveys, observations, experiments, questionnaires, personal interviews etc. in this research the researcher will gather the data using questionnaires. A questionnaire, as a primary data collection method, is an observational tool consisting of a set of questions presented to a respondent in written form. The respondent is expected to provide written answers, often by selecting or marking the options they believe are most suitable (Ayaji; 2017).

the researcher will choose the respondent of the questionnaire using purposive sampling. Purposive sampling refers to a collection of non-probability sampling methods or also called judgmental, selective, or subjective sampling, it depends on the researcher's discretion in choosing the units (such as individuals, organizations, cases, events, or data) that will be included in the study (Rai & Thapa; 2015). Purposive sampling is ideal for this research because it allows us to focus specifically on Yogyakarta university graduatewho are employed or have work experience. This Questionnaire will use likert scale 1-5 where 1 represents strong disagreement and 5 represents strong agreement.

i) **Sample and Population**

According to Banerjee & Chaudhury (2010) A population refers to a complete group from which certain information is sought. It doesn't have to consist solely of individuals; a statistical population can include various elements. It is essential to clearly define the population to specify who is included and who is not. The population of this research will be an University graduate who work in Yogyakarta. A sample is a small portion of the population selected by the researcher, expected to represent the population's information in the study (Bougie & Sekaran; 2020). The sample of this research will be 200 univeristy graduate who already have a job or once worked.

3.9 Operational Definition

This research will have 3 variable which is (1) Human Capital Development, (2) Education Curricula, (3) Skill Mismatch and (4) Workforce competencies

i) **Human Capital Development**

Human capital development refers to the process of enhancing individuals' skills, knowledge, and competencies through education, training, and experiences that increase their productivity and employability in the labor market. It encompasses investments in education and public health that lead to improved capabilities of the workforce, ultimately contributing to economic growth and poverty reduction (Widarni & Bawono, 2021; Tran & Vo, 2020). The questionnaire will be adopted from Vidotto et al. (2017), Pasban et al. (2016) and Siegel (1999):

Table 3.1 Human Capital Development Question

No.	List of Question
1.	You feel that your competence is at suitable level
2.	You learn from felow student to increase your skill
3.	Did you have all the skills needed to work in your desired company
4.	The accumulation of knowledge and human capital has a direct effect on efficiency
5.	Advances in technology have increased the demand for high-skilled workers in my organization/industry?
6.	Technology has created opportunities to acquire new skills relevant to my job/field?
7.	Low-skilled jobs are becoming less available due to technological advancements?
8.	How important is the implementation of new technology on your job?

This questionnaire will be using Likert scale with 1-5 scale where 5 indicate strongly agree and 1 indicate strongly disagree.

ii) **Education Curricula**

Education curricula refer to the structured set of courses and content offered by educational institutions, designed to equip students with the necessary knowledge, skills, and competencies for their future careers. Effective curricula are aligned with industry requirements, facilitating the development of relevant skills and competencies among students, thereby addressing the skills gap in the labor market (Crocker, 2006; Şişman & Karssantik, 2021). The questionnaire of this variable will be adopted from Egan (2003):

Table 3.2 Education Curricula Question

No.	List of Question
1.	Core subjects in the curriculum are aligned with the demands of today's job market
2.	Curriculum design should primarily focus on preparing students for future societal roles.
3.	Education systems must emphasize lifelong learning in curriculum design
4.	Company expectations are not adequately considered during curriculum development.
5.	Curriculum design should consider the diversity of learners' individual needs and abilities
6.	The curriculum often struggles to keep up with the rapidly changing job market
7.	The curriculum lacks flexibility to address diverse career paths and individual student goals
8.	Greater collaboration between educators and companies can improve curriculum relevance to work readiness.
9.	The curriculum should emphasize lifelong learning to prepare students for evolving careers.
10.	Continuous curriculum evaluation and updates are essential to maintain its alignment with workforce requirements.

This questionnaire will be using Likert scale with 1-5 scale where 5 indicate strongly agree and 1 indicate strongly disagree.

iii) **Skill Mismatch**

Skills mismatch refers to the disparity between the skills possessed by workers and the skills required by employers in the labor market. It manifests in two forms: overqualification, where individuals possess more skills than necessary for their jobs, and underqualification, where individuals lack the requisite skills for the positions they occupy. Skills mismatch can hinder workforce efficiency and economic growth by limiting the optimal allocation of human resources (Holzer, 2013; Cervantes & Cooper, 2021). This variable will use questionnaire base from Desjardins & Rubenson (2011):

Table 3.3 Skill Missmatch Question

No.	List of Question
1.	The foundation skill that you have does not match the skill requirement for your jobs
2.	Technologies have an impact on skill mismatch
3.	Skills needed by the company change overtime
4.	Education curriculum have an impact on the skill mismatch problems
5.	Skill mismatch happened because of lack of skill needed learnt in the education level

No.	List of Question
6.	Cultural background have an impact on skill mismatch (e.g communication skills)
7.	Skill mismatch happened because of uneven supply and demand of workforce and jobs
8.	Skill mismatch in fresh graduate might occur because of lack of work related experience
9.	The skill set you already have is not used in your jobs.

This questionnaire will be using Likert scale with 1-5 scale where 5 indicate strongly agree and 1 indicate strongly disagree.

iv) **Workforce Outcome**

The term 'competency' is closely related to the Latin word 'competentia,' which translates to "authorized to judge" or "entitled to speak" (Caupin et al., 2006). McClelland's (1973) quoted from Wong (2020) concept of competencies significantly influenced HRM practices by introducing a new perspective and driving the development of more accurate and reliable tools to predict individual job performance. Leading businesses began incorporating competencies into their processes for recruitment, selection, employee development, and the management of high-performing individuals. The questionnaire will be adopted from Jackson et al,. (2013).

Table 3.4 Workforce Outcome Question

No.	List of Question
1.	I feel my educational background is adequate for the requirements of my job.
2.	The tasks that i need to perform in the company align closely with my area of expertise
3.	My current role fully utilizes my professional skills and knowledge.
4.	The technical skills required for my job align with my qualifications.
5.	Job requirement matches the skills I acquired during my education or training.

This questionnaire will be using Likert scale with 1-5 scale where 5 indicate strongly agree and 1 indicate strongly disagree.

3.10 Statistical Test

i) **Validity Test**

Validity asseses whether the research truly measures that which it was designed to measure how truthful the research results are (Golafshani; 2003). According to Tjahjono et al. (2021), the validity test results can be assessed based on loading

estimates or the instrument's convergent validity. A variable is considered valid if it has a high standard loading, specifically 0.50 or higher.

ii) **Reliability Test**

Golafshani (2003) defines reliability as "the extent to which results are consistent over time and an accurate representation of the total population under study. If the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable. In this study, normality testing is assessed based on the critical ratio of skewness and kurtosis. According to Tjahjono et al. (2021), the range of critical ratio values considered indicative of normally distributed data is from -2.58 to 2.58. Meanwhile, Hair et al. (2014) state that data is considered normally distributed if the skewness critical ratio is less than 2.0 and the kurtosis critical ratio is less than 1.96.

iii) **Model Test**

Structural Equation Modeling (SEM) is a statistical technique used to develop and test statistical models, typically in the form of cause-and-effect relationships (Sarwono; 2010). According to Sarwono (2010) SEM has characteristics that serve more as an analytical technique for confirmation rather than for explanation. The Structural Equation Modeling (SEM) test will be conducted using AMOS software.

iv) **Hypothesis Test**

The purpose of hypothesis testing is to match the theoretically formulated hypotheses with the results obtained from the application of the AMOS and SPSS program used for explanation. In this study, multiple statistical analyses will be utilized to assess the relationships among human capital development, educational reforms, skill mismatch, and workforce outcomes in Indonesia’s labor market. To evaluate the first two hypotheses—H1 (Human Capital Development positively impacts workforce outcomes) and H2 (Educational Curricula positively impact workforce outcomes)—multiple regression analysis will be employed. The regression model can be formulated as follows:

Hypothesis 1 (H1):

Human Capital Development has a positive impact on Workforce Outcome.

$$Y = \beta 0 + \beta 1 X1 + \epsilon Y$$

Explanation:

Y = Workforce Outcome

X1 = Human Capital Development

$\beta 0$ = Intercept

$\beta 1$ = Human Capital Development coeficient

ϵ = Error term

Hipotesis 2 (H2):

Education Curricula has a positive impact on Workforce Outcome.

$$Y = \beta 0 + \beta 2X2 + \epsilon Y$$

Explanation:

Y = Workforce Outcome

X2 = Education Curricula

$\beta 0$ = Intercept

$\beta 2$ = Education Curricula coeficient ϵ

= Error term

Hypothesis 3 (H3):

Skills Mismatch significantly impacts Workforce Outcome.

$$Y = \beta 0 + \beta 3X3 + \epsilon Y$$

Explanation:

Y = Workforce Outcome

X = Skills Mismatch

$\beta 0$ = Intercept

$\beta 3$ = Skills Mismatch coeficient

ϵ = Error term

Hypothesis 4 (H4):

Workforce Competencies mediate the relationship between Human Capital Development and Workforce Outcome.

Mediating model using two path:

a. Path a:

$$M = \alpha 0 + \alpha 1X1 + \epsilon M$$

(Human Capital Development → Workforce Competencies)

b. Path b and c':

$$Y = \beta 0 + \beta 1X1 + \beta 4M + \epsilon$$

(Human Capital Development + Workforce Competencies → Workforce Outcome)

Explanation:

M = Workforce Competencies (mediator)

X1 = Human Capital Development

Y = Workforce Outcome

Hipotesis 5 (H5):

Workforce Competencies mediate the relationship between Education Curricula and Workforce Outcome.

Mediating Model:

a. Path a:

$$M = \alpha 0 + \alpha 2X2 + \epsilon$$

(Education Curricula → Workforce Competencies)

b. Path b and c':

$$Y = \beta 0 + \beta 2X2 + \beta 4M + \epsilon Y$$

(Education Curricula + Workforce Competencies → Workforce Outcome)

Hipotesis 6 (H6):

Workforce Competencies mediate the relationship between Skills Mismatch and Workforce Outcome.

Mediating Model:

a. Path a:

$$M = \alpha 0 + \alpha 3X3 + \epsilon$$

(Skills Mismatch → Workforce Competencies)

b. Path b and c':

$$Y = \beta 0 + \beta 3X3 + \beta 4M + \epsilon$$

(Skills Mismatch + Workforce Competencies → Workforce Outcome)

Data will be collected through a structured questionnaire distributed to approximately 200 university graduates in Yogyakarta, employing a Likert scale to quantify responses. The findings from these analyses will offer valuable insights into the implications of human capital and educational policies for workforce development in Indonesia.

CHAPTER 4

RESULT AND ANALYSIS

4. Statistic Results

4.1 Descriptive Statistic

Descriptive statistics provide an overview of the distribution and central tendencies of all variables involved in this research. This includes information on the minimum, maximum, mean, and standard deviation for each construct measured.

Table 4.1 Descriptive Statistics of Research Variables

	N	Minimum	Maximum	Mean	Std. Deviation
Human Capital Development (X1)	200	9	40	29.16	6.705
Education Curricula (H2)	200	15	49	33.93	6.643
Skill Mismatch (H3)	200	15	45	31.41	6.672
Workforce Competencies (M)	200	7	25	17.15	3.754
Workforce Outcome (Y)	200	6	24	14.71	3.664

The sample consisted of 200 respondents. Human Capital Development had a mean score of 29.16, indicating a relatively high perception of capital investment in the workforce. Education Curricula and Skill Mismatch scored mean values of 33.93 and 31.41, respectively, suggesting moderate agreement on these issues. Workforce Competencies and Workforce Outcome had lower mean values, possibly reflecting areas where improvements are needed.

4.2 Normality Test

Normality was tested using the Kolmogorov–Smirnov (K–S) test on the residual values.

Table 4.2 Kolmogorov-Smirnov Test for Normality

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		200
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	3.08332736
Most Extreme Differences	Absolute	.071
	Positive	.051
	Negative	-.071
Kolmogorov-Smirnov Z		1.006
Asymp. Sig. (2-tailed)		.264

The result of K-S test show value of 0.264 (> 0.05) which indicate that the residual is normally distributed which is essential for conducting linear regression analysis.

4.3 Autocorrelation test

Autocorrelation test conducted using Dublin-Watson statistics.

Table 4.3 Durbin-Watson Results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.540[a]	.292	.277	3.115	2.071

The acceptable range of 1.809 to 2.191 and the results of this test showing value of 2.071 which indicate that there is no autocorrelation in the residuals.

4.4 Multicollinearity Test

To detect multicollinearity, the Variance Inflation Factor (VIF) and Tolerance values were analyzed.

Table 4.4 Multicollinearity Statistic

Variable	Tolerance	VIF
Human Capital Development	0.423	2.367
Education Curricula	0.832	1.201
Skill Mismatch	0.643	1.555
Workforce Competencies	0.418	2.393

All VIF values are below the threshold of 5, and all tolerance values are above 0.1. This indicates the absence of multicollinearity, meaning the independent variables are not excessively correlated with each other.

4.5 Heteroscedasticity Test

The heteroscedasticity test was conducted using the Glejser method, analyzing the regression of absolute residuals.

Table 4.5 Heteroscedasticity Test

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.667	.792		4.630	.000
	Human Capital Development	-.014	.029	-.054	-.501	.617
	Education Curricula	.024	.021	.087	1.136	.257
	Skill Mismatch	-.005	.023	-.019	-.221	.825
	Workforce Competencies	-.080	.052	-.168	-1.554	.122

All independent variables showed significance values (p-values) greater than 0.05 in relation to the absolute residuals. This implies that the data does not suffer from heteroscedasticity, and the variance of residuals is constant, which validates another assumption of the linear regression model.

4.6 Hypothesis Testing – Simple Linear Regression

Hypothesis 1

H1 : Human Capital Development has a significant effect on Workforce Outcome.

Results:

R^2 = 0.213

β = 0.252

t = 7.325

$p < 0.001$

Interpretation:

Human Capital Development explains 21.3% of the variance in Workforce Outcome. The positive β value and significant p-value indicate that greater development of human capital contributes positively to workforce results. Human Capital Development significantly explains 21.3% of the variance in workforce outcomes, making it the most influential predictor among the tested variables. This aligns with economic theories that tie investment in education and skills development to higher labor productivity. In the Yogyakarta context, this emphasizes the need to scale up not just access to education but also its relevance to local industry needs.

Hypothesis 2

H2 : Education Curricula has a significant effect on Workforce Outcome.

Results:

R^2 = 0.090

β = 0.166

t = 4.438

$p < 0.001$

Interpretation:

Education Curricula contributes 9% to explaining Workforce Outcome.. Although statistically significant, Education Curricula only explain 9% of workforce outcomes. This modest impact may reflect misalignment between academic content and market needs, a recurring issue in Indonesian higher education. These findings stress the urgency of revising curricula to include more practical, industry-relevant content

Hypothesis 3

H3 : Skill Mismatch has a significant effect on Workforce Outcome.

Results:

R^2 = 0.160

β = 0.220

t = 6.148

$p < 0.001$

Interpretation:

Skill mismatch affects workforce outcomes by 16%. A significant and positive β value suggests that minimizing mismatch can improve workforce performance. This highlighting the detrimental effect of overqualification or underqualification. In Yogyakarta, where the number of university graduates often exceeds available skilled jobs, many individuals remain underemployed. Addressing this mismatch by better aligning education with labor demand is key to improving employment outcomes

4.7 Mediation Analysis – Workforce Competencies as Mediator

Mediation analysis was used to examine whether Workforce Competencies mediates the relationship between the independent variables (X1, X2, X3) and the dependent variable (Y).

Hypothesis 4

H4 : Workforce Competencies mediates the relationship between Human Capital Development and Workforce Outcome.

Direct effect : 0.113

Indirect effect : 0.414 × 0.337 = 0.139

Total effect : 0.252

Interpretation:

The indirect effect of Human Capital through Workforce Competencies (0.139) exceeds the direct effect (0.113), suggesting that human capital contributes to better employment outcomes primarily by enhancing skill sets. This underscores the importance of translating educational inputs into practical competencies

Hypothesis 5

H5 : Workforce Competencies mediates the relationship between Education Curricula and Workforce Outcome.

Direct effect : 0.079

Indirect effect : 0.198 × 0.436 = 0.087

Total effect : 0.166

Interpretation:

The mediated effect of Education Curricula via Workforce Competencies (0.087) is only slightly higher than its direct effect (0.079), indicating that while curriculum reforms have some impact, they may not fully equip students with job-ready skills. This calls for stronger integration of soft skills, internships, and industry input in curriculum design.

Hypothesis 6

H6 : Workforce Competencies mediates the relationship between Skill Mismatch and Workforce Outcome.

Direct effect : 0.101

Indirect effect : $0.306 \times 0.388 = 0.119$

Total effect : 0.220

Interpretation:

Skill mismatch negatively affects the development and application of relevant competencies, reducing workforce performance. The indirect effect (0.119) is significant, demonstrating that better job-skill alignment would not only reduce underemployment but also raise skill utility and overall job effectiveness.

Discusion

The study identifies a significant misalignment between higher education outputs and industry requirements in Yogyakarta. Key findings include:

i) Skills Gap: Graduates often lack practical skills mostly soft skills such as communication, critical thinking, and technological proficiency, which are highly demanded by employers. Normally this kind of soft skill is not taught in a formal education which made every person may have a different capability depend on their upbringing such as family and their life environment.

ii) Limited Industry Collaboration: There is insufficient collaboration between educational institutions and industries. Internship programs and industry-academia partnerships are not fully optimized. Some middle or higher education may have this kind of partnership but it usually only apply for an school with a major name since it will be hard for a middle-low tier education institution to build strategic partnership with a company.

iii) Curriculum Irrelevance: University curricula are often outdated and not tailored to the evolving needs of the labor market, especially in fast-changing sectors like digital

technology and services. The difference between private owned education institution and government owned education institution also have a slightly different curriculum. This problem may bring disparity between a government owned university graduate and private owned university graduate.

iv) Policy and Institutional Constraints: Bureaucratic hurdles and lack of incentives hinder the implementation of more adaptive educational models. Since Indonesia have many universities it might be hard to tailor a suitable curriculum that can be implemented for each universities, especially since there is many private owned universities it will make this matter more complicated hence will further bring disparity between private and government owned institutions.

v) Efforts to Bridge the Gap: Initiatives like vocational training, entrepreneurship programs, and industry-led certifications show promise but remain underutilized or poorly integrated into mainstream education. Not every educational institutions can do this kind of program especially with the limitation of their resources. Although Yogyakarta is known as a student city, the differences or gap between educational institution is still very big.

These results reflect the need for systemic change, echoing previous studies that emphasize the urgency of aligning education with labor market demands in emerging economies.

CHAPTER 5
CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study investigated the challenges of human capital development in Indonesia, particularly in the city of Yogyakarta, where the education system and labor market face alignment issues. The research focused on three main variables: Human Capital Development, Education Curricula, and Skill Mismatch, with Workforce Outcome as the dependent variable, and Workforce Competencies as a mediating variable.

The statistical analysis, based on data gathered from 200 university graduates in Yogyakarta, led to several key findings:

i) **Human Capital Development significantly influences Workforce Outcome**
The results showed that Human Capital Development explains 21.3% of the variation in workforce outcomes ($\beta = 0.252$, $p < 0.001$). This confirms that investments in human capital through education and the development of skills relevant to the labor market requirement, positively affect employment readiness and productivity. However, the mediation analysis further revealed that a significant portion of this influence occurs indirectly through Workforce Competencies.

ii) **Education Curricula has a positive but modest impact on Workforce Outcome**
Although the direct effect was significant ($\beta = 0.166$, $p < 0.001$), the contribution to explained variance was only 9.0%. This suggests that curriculum reforms in Yogyakarta's higher education institutions are necessary but not sufficient. Many students still graduate without the soft and technical skills required by the industry.

iii) **Skill Mismatch is a critical factor impacting Workforce Outcome**
A significant relationship was observed between skill mismatch and workforce outcome ($\beta = 0.220$, $p < 0.001$), contributing 16.0% to the explained variance. This shows that many graduates are either underqualified or overqualified for their roles, contributing to inefficient labor market outcomes.

iv) **Workforce Competencies serve as a significant mediator**
In all three cases Human Capital Development, Education Curricula, and Skill Mismatch with the mediating effect of Workforce Competencies was proven significant. For instance:

a. In the case of Human Capital Development, the **indirect effect** (0.139) through Workforce Competencies was larger than the **direct effect** (0.113), confirming partial mediation.
b. Similar patterns were found in the relationships involving Education Curricula and Skill Mismatch, showing that improving competencies is essential for transforming educational and developmental inputs into productive outcomes.

Overall, this research confirms that **improving workforce outcomes in Indonesia specificly in Yogyakarta is not solely about increasing investment in education or curriculum redesign**, but more importantly about ensuring that such investments result in real, practical, and industry-relevant competencies. In a region like Yogyakarta where wage levels are low and job competition is high, developing workforce competencies acts as the bridge between academic and market needs. As long as the government failed to address the issue about this minimum wages problems, the job market in Yogyakarta will not look interesting for the workforce candidates where they prefer to work in a city with a higher minimum wages such as Jakarta and Surabaya.

5.2 Recommendations

Based on the conclusions, several practical recommendations are proposed for key stakeholders:

i) **For Educational Institutions:**
   a. Revise curricula to align with real-time industry needs, including both soft and technical skills: To ensure graduates are equipped with a skillset needed for the demands of the modern workforce, educational institutions must continuously revise their curricula to reflect real-time industry need. This involves integrating both soft and technical skills that are essential across sectors. Soft skills such as communication, teamwork, critical thinking, and adaptability are increasingly valued by employers, as they enable individuals to function effectively in dynamic and collaborative environments. This sofstkill mostly not taught in a formal education, so crafting a curricula where the student can learn and train their softskills. At the same time, curricula must embed relevant technical competencies, which may include areas such as data analysis, programming, automation, or industry-specific software tools, depending on the field of study. Most of this technical competencies only taught in a certain major while the reality most of this technical competencies is needed for every major to prepare them for

a work environment. Collaboration with industry professionals and regular labor market analysis can guide the identification of these skills, enabling institutions to design educational programs that are responsive to the current and future needs of the job market.

b. Enhance partnerships with industry to offer practical training, internships, and competency-based learning models: Strong partnerships between academia and industry are essential for bridging the gap between theoretical knowledge and practical application. By collaborating with companies and professional organizations that suitable for each major, educational institutions can provide students with opportunities for experiential learning through internships, cooperative education programs, site visits, and in-work projects. These experiences allow students to apply their academic knowledge in authentic work environments and develop the practical skills required by employers. This can also eliminting the problem for a fresh graduate who are currently do job hunting but blocked because they dont have any work experience. Furthermore, implementing competency-based learning models ensures that students progress based on their ability to demonstrate mastery of specific skills and outcomes, rather than time spent in class. This approach supports more personalized and career-aligned learning, ensuring that graduates are job-ready and adaptable to industry expectations and prepare them for the challanges they may face on their jobs.

c. Regularly update educational content based on technological and market developments: Given the rapid development of technological innovation and shifting in market demands, it is important that educational institutions regularly update their teaching content to remain relevant. This involves continuously monitoring developments in technology, industry practices, and the wider economic landscape to identify emerging trends and skills. Institutions should adopt flexible curriculum structures that allow for timely revisions and the integration of new topics, such as artificial intelligence, sustainability practices, or digital transformation. Feedback from alumni, industry partners, and accreditation bodies can serve as valuable insight for identifying areas in need of revision. Additionally, faculty members must be supported through ongoing professional development to stay updated with new advancements and effectively translate them into the classroom learning materials. Regular content updates ensure that academic programs remain aligned with the realities of the job market

and prepare students for the advancement on the technological advancement in work.

ii) **For Government and Policy-Makers:**

a. Formulate policies that incentivize universities and industries to collaborate on workforce development programs: To strengthen the alignment between higher education and labor market needs, it is essential for governments and regulatory bodies to formulate policies that actively encourage collaboration between universities and industries. These policies can include financial incentives such as grants, education tuition or funding for joint training programs, research initiatives, and curriculum co-development. By fostering such collaboration, universities can gain insights into current industry demands, while companies benefit from a workforce candidates of graduates equipped with relevant skills that needed by the industry. Additionally, policy frameworks can support the establishment of shared innovation hubs, incubators, and training centers, which further facilitate knowledge exchange and practical learning between companies and educational institutions. This synergy between education institutions and industry is key to developing a workforce that is not only technically competent but also aligned with real-world requirements that are well prepared and well equipped with a competencies needed by the industry.

b. Address regional wage disparities that discourage skilled labor from working in lower-wage areas like Yogyakarta: Addressing regional wage disparities is crucial to ensuring a more equitable distribution of skilled labor across areas, particularly in regions like Yogyakarta, where wages tend to be lower than in major city like Jakarta. The wage gap often discourages highly skilled professionals from relocating to or remaining in these areas since the prospective workers feel that the ability they have are properly valued with that low minimum wages, leading to talent shortages and slower economic development. To counter this, policymakers must consider implementing wage support schemes or increase the incentive for skilled workers so they are willing to work in underdeveloped or lower-wage regions. Additionally, creating high-value job opportunities through local industry development, infrastructure investment, and support for entrepreneurship can help make these areas more attractive to talent. Bridging wage disparities not only helps balance regional development but also ensures that all parts of the country benefit from an inclusive and competent workforce.

iii) **For Industry and Employers:**

a. Provide feedback to educational institutions regarding the skills needed: For education systems to remain relevant and effective in preparing students for the workforce, it is vital that industry stakeholders actively provide feedback to educational institutions regarding the evolving skills required in the labor market. This feedback can take the form of participation in curriculum advisory boards, regular discussion between education institutions and company. By sharing insights on current job requirements, development of technologies, and future skill projections, employers can help institutions provide a curriculum that better align with their needs or in-demand competencies. This collaboration ensures that students are not only academically qualified but also equipped with technical and soft skills necessary to thrive in real life work settings. Continous feedback also enable institutions to respond more quickly to shifts in the labor market, making their graduates more adaptable and employable according to the industry needs.

b. Collaborate with universities and the government to make a curricula or education system that more adaptable to works: A robust and adaptable education system requires a coordinated effort among universities, industry, and government bodies. By working collaboratively, these stakeholders can co-develop curricula that reflect real-world demands and remain flexible in response to technological advancement and economic changes. This could involve integrating project-based learning, internships, and interdisciplinary modules that mimic real-life workplace environments and problem-solving scenarios. The government can play a facilitative role by setting adaptive education policies, providing funding for innovation in teaching, and encouraging pilot programs that bridge academic learning with workforce readiness. Such collaboration ensures that education is not siloed from industry but functions as a dynamic system that prepares students for diverse and rapidly evolving career paths.

5.3 Limitations and Suggestions for Future Research

This study offers important findings on the relationship between graduate skills and labor market needs in Yogyakarta; however, it also has certain limitations that future research should address to enhance the depth and applicability of its conclusions.

i) Work on a wider sample: The study was based on a relatively small sample size of 200 respondents, which may limit the robustness and generalizability of the findings. Although efforts were made to ensure diversity within the sample, a larger and more representative population would strengthen the validity of the results. Future research should aim to include a broader respondent base across various disciplines, universities, and regions. A wider sample would provide more comprehensive insights into patterns of skill development, regional disparities, and sector-specific employability challenges. Also if we want to improve the curriculum work on a broader region may be better since the difference challanges between each regions may vary.

ii) Adopt a longitudinal approach to track the evolution of skills and outcomes over time: This research employed a cross-sectional design, capturing data at a single point in time. While effective for identifying current trends, it does not allow for observation of how graduates skills and career outcomes change over time. Future studies could adopt a longitudinal approach to monitor the growth and application of skills throughout different stages of graduates careers. This would provide valuable information on how educational experiences impact long-term employability, how graduates adapt to workplace demands, and how external factors such as technology or policy changes influence career progression.

iii) Incorporate qualitative interviews to capture deeper insights into the nature of skill mismatch and competency development: The quantitative design of this study provided broad trends, but may not fully capture the complex, subjective experiences of graduates facing skill mismatches. Future research could incorporate qualitative methods such as in-depth interviews or focus groups to explore these issues more thoroughly. Such approaches would allow researchers to understand the nuances of how graduates perceive their competencies, the relevance of their education to their jobs, and the specific challenges they encounter in adapting to labor market demands. These richer insights can inform more targeted interventions in curriculum development and career support services.

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ANNEXES

Annex A : Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Human Capital Development	200	9	40	29.16	6.705
Education Curricula	200	15	49	33.93	6.643
Skill Mismatch	200	15	45	31.41	6.672
Workforce Competencies	200	7	25	17.15	3.754
Workforce Outcome	200	6	24	14.71	3.664

Annex B : Statistical Assumptions Tests

1. Normality Test (K-S): $p = 0.264 > 0.05 \rightarrow$ Residuals are normally distributed.
2. Autocorrelation Test (Durbin-Watson): $DW = 2.071 \rightarrow$ No autocorrelation.
3. Multicollinearity: VIF values < 5, Tolerance > 0.1 → No multicollinearity detected.
4. Heteroscedasticity: All variables $p > 0.05 \rightarrow$ No heteroscedasticity.

Annex C : Regression Results

Hypothesis 1: $Y = 7.353 + 0.252X1$ (Human Capital Development)

$R^2 = 0.213$, $\beta = 0.252$, $t = 7.325$, $p < 0.001$

Hypothesis 2: $Y = 9.082 + 0.166X2$ (Education Curricula)

$R^2 = 0.090$, $\beta = 0.166$, $t = 4.438$, $p < 0.001$

Hypothesis 3: $Y = 7.806 + 0.220X3$ (Skill Mismatch)

$R^2 = 0.160$, $\beta = 0.220$, $t = 6.148$, $p < 0.001$

Annex D : Mediation Analysis (Workforce Competencies as Mediator)

Hypothesis 4 (X1 → Z → Y): Direct Effect = 0.113, Indirect = 0.139, Total = 0.252

Hypothesis 5 (X2 → Z → Y): Direct Effect = 0.079, Indirect = 0.087, Total = 0.166

Hypothesis 6 (X3 → Z → Y): Direct Effect = 0.101, Indirect = 0.119, Total = 0.220

Annex E : Questionnaire Items

Human Capital Development (Adopted from Vidotto et al., Pasban et al., Siegel) using 5 point Likert scale where 5 indicate strongly agree and 1 indicate steongly disagree :

1. You feel that your competence is at suitable level.
2. You learn from fellow students to increase your skill.

3. Did you have all the skills needed to work in your desired company?
4. The accumulation of knowledge and human capital has a direct effect on efficiency.
5. Advances in technology have increased the demand for high-skilled workers in my organization/industry.
6. Technology has created opportunities to acquire new skills relevant to my job/field.
7. Low-skilled jobs are becoming less available due to technological advancements.
8. How important is the implementation of new technology on your job?

Education Curricula (Adopted from Egan) using 5 point Likert scale where 5 indicate strongly agree and 1 indicate steongly disagree:

1. Core subjects in the curriculum are aligned with the demands of today's job market.
2. Curriculum design should primarily focus on preparing students for future societal roles.
3. Education systems must emphasize lifelong learning in curriculum design.
4. Company expectations are not adequately considered during curriculum development.
5. Curriculum design should consider the diversity of learners' individual needs and abilities.
6. The curriculum often struggles to keep up with the rapidly changing job market.
7. The curriculum lacks flexibility to address diverse career paths and individual student goals.
8. Greater collaboration between educators and companies can improve curriculum relevance to work readiness.
9. The curriculum should emphasize lifelong learning to prepare students for evolving careers.
10. Continuous curriculum evaluation and updates are essential to maintain its alignment with workforce requirements.

Skill Mismatch (Adapted from Desjardins & Rubenson) using 5 point Likert scale where 5 indicate strongly agree and 1 indicate steongly disagree:

1. The foundation skill that you have does not match the skill requirement for your jobs.
2. Technologies have an impact on skill mismatch.
3. Skills needed by the company change over time.
4. Education curriculum has an impact on the skill mismatch problems.
5. Skill mismatch happened because of lack of skill needed learnt in the education level.
6. Cultural background has an impact on skill mismatch (e.g. communication skills).
7. Skill mismatch happened because of uneven supply and demand of workforce and jobs.

8. Skill mismatch in fresh graduate might occur because of lack of work related experience.
9. The skill set you already have is not used in your job.

Workforce Outcome (Adopted from Jackson et al.) using 5 point Likert scale where 5 indicate strongly agree and 1 indicate steongly disagree:

1. I feel my educational background is adequate for the requirements of my job.
2. The tasks that I need to perform in the company align closely with my area of expertise.
3. My current role fully utilizes my professional skills and knowledge.
4. The technical skills required for my job align with my qualifications.
5. Job requirement matches the skills I acquired during my education or tra