



Digital Literacy Mastery and its Role in Human Resource Competitiveness

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Abstract. This study analyses the 2022 Human Development Index development in Central Java Province, exploring its correlation with challenges and opportunities in the education sector, particularly digital literacy. The primary goal is to assess the HDI trends and identify areas for improvement, focusing on the education sector's influence on digital literacy. The study utilizes HDI reports and examines the components contributing to the overall score, including health, education, and per capita expenditure. Emphasis is placed on children's average years of schooling and education expectancy. Central Java's HDI improved by 0.87%, reaching a score of 72.79, showcasing growth in health, education, and per capita expenditure. The average years of schooling (12.81 years) signal opportunities for enhancing digital literacy, crucial for workforce competitiveness in the technological era. However, challenges persist at the senior high school level, particularly low enrolment rates. To address challenges, proposed solutions include policy evaluations, adjustments to Law No 23/2014, and the optimization of traditional arts as part of cultural education. Strategies for equitable regional development, enhancement of Information and Communication Technology infrastructure and skills, and improving local-level education quality are recommended to support human development goals and enhance human resource competitiveness in Central Java.

Keywords: Human Resource Competitiveness, Cognitive Improvement Strategies, Digital Literacy, Character Development, Policy Research.

1 Introduction

Indonesia is currently experiencing a demographic bonus until 2030, when the dependency ratio reaches its lowest point of 44%-46%. While the potential demographic bonus [1], [2], [3] provides a large population, the challenges of the national economy, especially in the declining role of exports, investment, and public consumption due to the global financial crisis, point to the need to focus on developing quality human resources (HR) [4], [5], [6]. The importance of science and technology is increasingly felt in the face of economic growth [7], [8] and technological development [9], [10]. The development of science and technology is regarded as an important necessity to improve the competitiveness of the national economy in the era of globalization. Five key factors,

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Z. B. Pambuko et al. (eds.), *Proceedings of 5th Borobudur International Symposium on Humanities and Social Science (BISHSS 2023)*, Advances in Social Science, Education and Humanities Research 856,

https://doi.org/10.2991/978-2-38476-273-6_16

such as intensive systems, improving the quality of HR, information technology [11], [12], availability of funds, and sharp science and technology policies [13], are the focus to improve national competitiveness. In the context of Central Java, a province with a population of around 36.52 million people, economic and technological developments bring new challenges for HR. In-depth evaluation is needed to identify the potential that needs to be improved, especially in cognitive abilities [14], [15], [16], [17], digital literacy [18], [19], [20], character development, and skills, to ensure that HR in Central Java can compete globally. The urgency of improving the quality of HR in Central Java is not only a response to economic and technological changes, but also a strategy to optimize the demographic bonus [2], [3]. The hope from this background is to create a generation that not only excels in cognitive aspects, but also has the character, adaptability, innovation [10], [21], [22], and skills needed to support the region's growth and competitiveness [23], [24] at the global level.

This research faces several gaps that need to be addressed. First, there is a lack of clarification of evaluation methods to measure cognitive ability, digital literacy, character development, and human resource skills [25], [26] in Central Java Province. Secondly, there is a need to expand the analysis of the impact of Indonesia's demographic bonus until 2030 on human resource development (HRD) in the region. Third, social and cultural aspects specific to Central Java need to be considered to understand the implementation of HRD policies. Finally, the research can provide a more detailed picture of the inhibiting and supporting factors of HRD [27], [28], [29], to formulate more targeted policy recommendations. By addressing these gaps, the research is expected to make a more substantial contribution to understanding the relationship between national economic conditions, the demographic bonus, and HRD in Central Java Province. This research aims to evaluate and analyse the competitiveness of HR in Central Java Province, focusing on cognitive ability, digital literacy, character development, and skills as key indicators. Considering Indonesia's demographic bonus until 2030, this research also aims to analyse its impact on HR development, especially amidst economic challenges and technological developments. In addition, this research will explore the factors that hinder and support HRD development and provide policy recommendations that can improve the quality and competitiveness of HRD in Central Java. The goal is to support the understanding of the linkages between national economic conditions, the demographic bonus, and human capital development at the regional level to contribute to the region's sustainable growth and competitiveness.

The novelty of this research lies in its focus on Central Java Province as a case study, which allows for a more in-depth understanding of the challenges and potentials of HRD at the regional level. In addition, this research emphasises the importance of integrating contextual analysis that considers the unique social [30], cultural [31], and local values [32] of Central Java. By detailing the impact of the demographic dividend until 2030, this research seeks to contribute to the understanding of how national demographic dynamics can affect human capital development efforts. Furthermore, it seeks to provide concrete solutions by exploring the inhibiting and supporting factors of HRD development and presenting policy recommendations that can improve the quality and competitiveness of HRD at the regional level. This enriches the literature on demographic bonus and HRD with a special focus on the context of Central Java.

2 Methods

This research can be classified as policy research that aims to map, compare, and analyse policy approaches that are often different and have varying assumptions. Policy research predominantly uses qualitative approaches compared to quantitative approaches, as is the case in other social sciences [33], [34]. Although various interpretive approaches focus on the meanings that shape action, they differ in the way they understand and explain meaning, the position of the subject in the analysis, philosophical assumptions, and the way they explain the role of policy analysts. This research focuses on the policy evaluation stage to develop a competitive HRD strategy. The rational normative reasoning that policymaking should ultimately be implemented is evaluated based on its objectives and expected impacts, which become the starting point for policy evaluation. Meanwhile, evaluation research forms a distinct subdiscipline within policy science that focuses on the intended outcomes and unintended consequences of policies. Evaluation studies are not limited to a particular stage in the policy cycle; instead, this perspective is applied to the entire policy-making process and from various time perspectives (*ex-ante*, *ex post*).

3 Result and discussion

Based on the 2022 Human Development Index (HDI) report, Central Java showed a significant increase in HRD compared to the previous year. Central Java's HDI [35], [36] reached 72.79, an increase of 0.87 per cent from 2021. This increase was influenced by gains in all HDI components, including health, education, and adjusted per capita expenditure. Specifically in education, children in Central Java who are 7 years old in 2022 are expected to enjoy 12.81 years of education, almost equivalent to the duration of education up to secondary school or Diploma I level. This is an increase of 0.04 years compared to 2021. The average years of schooling for the population aged 25 years and above also increased by 0.18 years, from 7.75 years to 7.93 years in 2022 [37].

The increase in Central Java's HDI in 2022 was also driven by growth in per capita expenditure of 3.11 per cent, overcoming the slowdown in growth in 2021 due to the COVID-19 pandemic [38], [39]. In this context, the education aspect is crucial as growth in this component can contribute to improving digital literacy and strengthening the competitiveness of HR. With the average years of schooling increasing and children expecting to enjoy 12.81 years of education, there is an opportunity to strengthen digital literacy [18], [19] among Central Java residents. Digital literacy is considered important in facing the era of technology and globalization, enabling adaptation to technological change, contribution to innovation, and increased productivity.

However, there are inequalities in secondary education or Senior High School and Vocational High School (SHS and VHS) in Indonesia, including in Central Java. While there has been an increase in the average years of schooling, the Net Enrolment Rate (NER) ratio of females compared to males, and the percentage of education completion at the SHS/VHS equivalent level in Central Java Province, it is still below the national

average. HDI achievement at the district/city level in Central Java varies, with three cities achieving very high levels of human development, while several districts still have moderate human development status. There are still several problems that need to be solved, especially related to programs to improve HDI, especially in the aspects of Expected Years of Schooling (HLS) of 12.81 and Average Years of Schooling (RLS) of 7.93 in 2022 [37].

In this context, the role of the Central Java Provincial government in addressing education challenges [40], [41] is crucial. Evaluation of education strategies, especially in secondary and vocational schools, is necessary to improve the competitiveness of HR and achieve the Sustainable Development Goals (SDGs). Equity in the education sector is considered key to improving social, economic, and environmental competitiveness. An integrated and comprehensive strategy is needed to address this issue, including improving access and quality of education, and adapting to technological developments through strengthening digital literacy.

The increase in the HDI in Central Java, particularly in the education sector, provides an important foundation for analysing the relationship between this development and the mastery of digital literacy and its impact on human resource competitiveness. The growth in HDI, especially in average years of schooling and children's expectation of 12.81 years of education, provides an opportunity to strengthen digital literacy among Central Java residents. Digital literacy is a crucial aspect in facing the era of technology and globalisation, enabling HR to adapt to technological change, contribute to innovation, and increase productivity. Improving digital literacy in Central Java can have positive impacts, including better adaptation to technological change, contribution to innovation, increased individual and organisational productivity, and improved global competitiveness of HR. In addition, digital literacy opens job opportunities in sectors that require technological expertise, career diversification and the possibility of professional development in digital-related fields. Therefore, the development of digital literacy is not only a response to HDI growth but is also considered a strategic investment to improve the competitiveness of HR at the regional level. Strong digital literacy skills are considered an essential foundation in optimizing the potential of HR [4], [27] and ensuring their readiness to face the dynamics of an increasingly digitalised world of work.

The study brings several significant findings related to human development in Central Java in 2022. A notable improvement was seen in the province's HDI, reaching 72.79, representing a growth of 0.87 per cent over the previous year. The education component is the focus with the average years of schooling increasing, reaching 12.81 years, as well as children's expectations to enjoy education for longer. In this context, digital literacy is identified as a crucial aspect to improve the competitiveness of HR, and there is an opportunity to strengthen digital literacy among Central Java residents. Despite issues such as low school enrolment rates at the SHS/VHS level, the improvement in HDI provides a strong foundation for more effective policy development. Varying HDI achievements at the district/city level indicate differences in local development. The challenge of declining traditional arts is a concern, creating a need for understanding and preserving the arts in the context of education and human development. The findings of this study provide a holistic view, showing inter-connections between HDI development, education, digital literacy, and specific challenges at the local level,

providing a foundation for the formulation of holistic and sustainable policies [42], [43] and strategies.

This discussion reveals several significant findings related to the development of the Human Development Index (HDI) in Central Java Province in 2022. Central Java's HDI experienced an increase of 0.87%, reaching a score of 72.79, supported by growth in all HDI components. Education emerged as the primary focus, with the average years of schooling increasing, reaching 12.81 years, and children expected to enjoy education for a longer duration. This growth creates opportunities to strengthen digital literacy within the Central Java community. Despite improvements, challenges such as low enrollment rates at the senior high school level persist. The role of the provincial government is considered crucial, with an emphasis on evaluating education strategies to enhance human resource competitiveness and achieve Sustainable Development Goals (SDGs). Variations in HDI achievements at the local level indicate differences in regional development, while the decline of traditional arts raises concerns, calling for understanding and preservation of arts in the context of education and human development. These findings lay the groundwork for the formulation of holistic and sustainable policies.

4 Conclusion

In conclusion, the study highlights the noteworthy improvement in Central Java's Human Development Index (HDI) in 2022, marked by a 0.87% increase to a score of 72.79. The surge is attributed to advancements in all HDI components, particularly in education. The average years of schooling reached 12.81 years, providing an opportunity to enhance digital literacy within the Central Java community. However, challenges persist, such as low enrollment rates at the senior high school level. The provincial government plays a pivotal role, necessitating an evaluation of education strategies to boost human resource competitiveness and achieve Sustainable Development Goals (SDGs). Disparities in HDI achievements at the local level underscore diverse regional development statuses. Additionally, the decline of traditional arts raises concerns, urging a focused effort to understand and preserve these arts in the context of education and human development. These findings offer valuable insights for crafting comprehensive and sustainable policies to further enhance Central Java's human development.

This is relevant as digital literacy plays an important role in improving the competitiveness of HR in the era of technology and globalisation. Despite the improvement in the HDI, challenges in the education sector, especially at the SHS/VHS level, are still evident with low school enrolment rates. Therefore, efforts need to be made to increase access to and participation in education, along with the evaluation and adjustment of education policies after the change in governance based on Law No 23/2014. Optimization of traditional arts is also proposed as an effort to enrich education and maintain cultural heritage. In addition, an emphasis on equitable development across the province, improved ICT infrastructure and skills, and improved education quality at the local level, can support the achievement of human development goals and better competitiveness of HR in Central Java.

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