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Empowering Workforce Skills through BLKK: A Community Service Initiative for Industry 4.0

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ABSTRACT

Background: This study addresses the critical issue of workforce readiness for Industry 4.0, focusing on the community service subject of the Balai Latihan Kerja Komunitas (BLKK) vocational training program. It aims to evaluate the program's effectiveness in enhancing the skills of participants from rural and underserved communities to meet modern labor market demands.

Purpose of the Study: The purpose of the study is to assess the impact of the BLKK program on improving participants' employability and entrepreneurial preparedness. Its objectives are to evaluate training effectiveness, measure participant satisfaction and self-efficacy gains, and identify key factors for sustainable skill development.

Methods: The research employed a Participatory Action Research (PAR) approach, actively engaging at least 34 BLKK partners and participants in identifying skill gaps and co-creating the training curriculum. The analysis was framed within a multidisciplinary theoretical framework combining Empowerment Theory, Human Capital Theory, and Digital Literacy Theory.

Results: The findings indicate exceptionally high participant satisfaction, with a mean training quality score of 4.38/5. The program successfully enhanced economic preparedness, with 59% of participants strongly agreeing they felt more prepared for employment or entrepreneurship. Key to this success was the integration of digital literacy, technical skills, and continuous mentoring. Recommendations include expanding digital literacy components and strengthening long-term mentorship and external network support to ensure program sustainability and economic inclusion.

Keywords

BLKK, Vocational Training, Participatory Action Research, Digital Literacy, Industry 4.0, Economic Empowerment, Mentorship

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Introduction

The rapid emergence of Industry 4.0, driven by automation, artificial intelligence (AI), and digital technologies, has dramatically altered global labor demands, creating an urgent need for a workforce equipped with both technical skills and the capacity to adapt to evolving industries. To remain competitive in this changing environment, workers must possess not only specialized knowledge but also critical soft skills such as adaptability, problem-solving, and digital literacy ([International Labour Organization, 2020](#)). In Indonesia, the transition to Industry 4.0 poses unique challenges, particularly for rural and underserved communities. These regions often lack access to formal education and vocational training, exacerbating the skill gap and limiting local populations' ability to participate in the digital era and the Fourth Industrial Revolution, which have brought significant changes to the global labor market, including in Indonesia. The demand for a workforce equipped with both technical and adfor rural and underserved communities. These regions often lack access to formal education and vocational training, exacerbating the skills gap and limiting local populations' ability to participate

Indonesia is confronting significant challenges in adapting to the rapidly evolving labor market driven by technological advancements and Industry 4.0, which threatens to displace up to 23 million jobs by 2030 ([Das et al., 2019](#)). The skills gap, particularly in rural areas, exacerbates the challenge, as many workers lack the advanced technical and digital competencies now in demand ([OECD, 2018](#)). In response, the government has initiated programs like Making Indonesia 4.0 and the *Kartu Prakerja*, which have provided millions with upskilling opportunities ([Kemenperin, 2019](#)). However, the digital divide remains a critical barrier, with 84,61% of rural households having access to reliable internet ([BPS, 2024](#)). Expanding vocational training, fostering public-private partnerships, and investing in digital infrastructure are essential to ensure Indonesia's workforce remains competitive in the global economy ([Psacharopoulos & Patrinos, 2018](#)).

Balai Latihan Kerja Komunitas (BLKK), or Community Vocational Training Centers, plays a critical role in empowering local communities in Indonesia to meet the challenges of an increasingly dynamic labor market. In the context of Industry 4.0, which is transforming industries through automation, artificial intelligence (AI), and digitalization, the demand for a workforce equipped with both technical and soft skills has intensified ([Schwab, 2017](#)). BLKK's community-based approach to vocational training not only addresses the technical skills gap but also fosters a culture of continuous learning and adaptability, crucial for keeping pace with labor market shifts ([Susilo & Hartono, 2020](#)). By targeting underserved and rural populations, where access to formal education and training is limited, BLKK empowers individuals with the competencies needed to participate in Indonesia's emerging digital economy. One of the primary contributions of BLKK is providing targeted vocational training that aligns with local industry needs and market demands. This training includes technical skills, such as information technology (IT), manufacturing automation, and digital literacy, which are crucial for adapting to the structural shifts in employment caused by automation ([OECD, 2018](#)). According to [Jenkins et al., \(2015\)](#) Digital literacy is a fundamental requirement for participation in the global workforce, making BLKK's focus on IT and digital training particularly relevant. This empowers local communities to transition into new roles created by technological advancements while also addressing the displacement of traditional jobs.

Previous community service research on vocational training and workforce development in Indonesia has consistently highlighted the critical role of community-based education programs, such as BLKK, in addressing the growing skills gap and promoting social mobility. Studies by ([Suryono et al., 2022](#)) and ([Dhani et al., 2021](#)) found that vocational training programs significantly enhanced participants' employability, particularly in sectors undergoing rapid digitalization, such as IT, manufacturing, and logistics. These studies also emphasized the importance of aligning vocational training content with industry needs to ensure relevance, a finding supported by

(Mustajab & Irawan, 2023) who asserted that industry-driven training programs are more likely to lead to job placement and sustainable career development. Furthermore, (Jia & Huang, 2023) demonstrated that vocational training programs in rural areas, like those administered through BLKK, improved both technical skills and soft skills, such as teamwork, communication, and adaptability, which are essential in navigating the complexities of Industry 4.0.

Several studies have also pointed to the long-term benefits of mentorship as a component of vocational training programs. (Mustajab & Irawan, 2023) found that mentorship enhances not only technical competency but also participants' confidence and self-efficacy, allowing them to better integrate into the labor market. This is corroborated by (Negara et al., 2025) who observed that mentorship contributes to participants' ability to transition from formal education to practical applications in the workplace, thereby reducing unemployment rates. Moreover, research by (Fairman & Voak, 2023; Jia & Huang, 2023) suggested that continuous post-training mentorship significantly improves participants' job retention and career advancement prospects, particularly in tech-intensive industries. These findings collectively support the notion that community-based vocational training programs like BLKK not only bridge immediate skills gaps but also foster long-term career success by embedding mentorship and industry-relevant content within the training process.

The novelty of this PkM research on BLKK lies in its integration of digital literacy into community-based vocational training, aligning the program with Industry 4.0 demands by incorporating IT, automation, and data management skills. Unlike traditional vocational studies, this research emphasizes the development of soft skills such as adaptability, problem-solving, and teamwork, which are crucial for long-term employability and job retention. The study also explores BLKK's role in promoting entrepreneurship, particularly in rural areas with limited formal employment opportunities, fostering local economic growth and self-reliance. Furthermore, the research adopts a multidisciplinary approach, drawing on Human Capital Theory, Empowerment Theory, and Digital Literacy Theory to offer deeper insights into how vocational training enhances both individual and community development, contributing to workforce readiness and social mobility in Indonesia.

Method

The research was conducted in collaboration with at least 34 Community Training Centers (BLKK), which functioned as mentoring partners and constituted the primary data sources. The objective of this study was to analyze the quantitative data collected through questionnaires during the Observation and Reflection phases within the framework of Participatory Action Research (PAR). To this end, Descriptive Statistical Analysis was employed. A 5-point Likert-scale survey instrument was used to collect data on participant satisfaction, increases in self-efficacy, and perceptions of economic impact. The survey instrument ranged from 1 (Strongly Disagree) to 5 (Strongly Agree). This descriptive analysis technique was used to calculate the mean value and percentage frequency distribution of responses. The descriptive statistical results provide empirical evidence that validates the qualitative findings from focus group discussions and interviews. Consequently, they offer an accurate picture of the effectiveness and success of the BLKK program in improving the work readiness and economic empowerment of participants (Creswell & Creswell, 2017)

In this study, Participatory Action Research (PAR) is implemented through participatory workshops. In these workshops, BLKK trainees and community members collectively discuss their skill gaps and identify relevant training needs. This participatory process is instrumental in ensuring that the training content remains relevant and responsive to the evolving demands of the digital economy and Industry 4.0. The cyclical nature of PAR, which includes planning, action, observation, and reflection, enables continuous improvement of the training programs based on

participant feedback (Kemmis & McTaggart, 2005). This dynamic process enables adaptive learning, thereby ensuring that the skills being taught are not only applicable but also empower participants to create meaningful changes in their communities and livelihoods (Fals-Borda & Rahman, 1991).

Result

Impact of BLKK Mentoring on Workforce Readiness and Employability: A Participatory Action Research Approach

The objective of this study is to evaluate the effectiveness of the *Balai Latihan Kerja Komunitas* (BLKK) training program in enhancing workforce skills relevant to Industry 4.0, while fostering community empowerment. This research aims to understand how vocational training can address local labor market needs, increase employability, and promote entrepreneurship, particularly in underserved areas. To achieve this, the study applied Participatory Action Research (PAR), a method that actively involves participants in identifying challenges, shaping the training content, and reflecting on the outcomes. By using PAR, the BLKK program ensured that the training was co-designed and tailored to the community's specific needs, allowing participants to take ownership of both the learning process and the results.

Table 1. Analyzing the Effectiveness of the PAR Cycle in Vocational Training Programs

PAR Component	Objective	Actions	Data Collection Methods	Expected Outcomes
Planning	Identify skill gaps and needs specific to local labor markets and Industry 4.0	- Conduct workshops and focus groups with BLKK participants, instructors, and local industry representatives to assess relevant skills gaps (e.g., digital literacy, technical skills, soft skills)	- Focus group transcripts - Workshop notes - Skill gap assessment forms	- Consensus on specific training needs (e.g., IT skills, entrepreneurship) - Agreement on training objectives and alignment with Industry 4.0 demands
Action	Implement the training program based on participant input, focusing on digital literacy, technical, and soft skills development	- Execute vocational training modules that are co-designed with participants and local industry - Provide real-time feedback and allow for adjustments in the curriculum based on participant experiences	- Surveys to measure skill acquisition during training - Observation logs from instructors - Participant feedback forms (collected weekly)	- Participants actively engage in hands-on learning experiences - Real-time adjustments made to the curriculum to fit evolving participant needs
Observation	Monitor the	- Weekly check-ins	- Surveys and	- Identification of

	effectiveness of the training program in enhancing workforce skills and addressing participant needs	with participants to gather ongoing feedback - Instructors monitor participants' application of skills - Capture improvements in both technical and soft skills over time	interviews on skill development progress - Observation logs from trainers - Quantitative data on training satisfaction and skill gains	key strengths and areas needing improvement in the training process - Measurable improvements in participants' technical and soft skills (e.g., problem-solving, adaptability)
Reflection	Evaluate the training outcomes and identify lessons learned for future program improvements	-Conduct reflection workshops with participants, instructors, and stakeholders to discuss the effectiveness of the training and its application to real-life jobs - Reflect on the long-term impact of the training on employability and entrepreneurship	-Focus group discussions - Final post-training surveys - In-depth interviews with participants and industry partners	-Participants articulate improvements in employability, job readiness, or entrepreneurship -Collective insights into the strengths and weaknesses of the training program - Recommendations for future training improvements
Social Change & Empowerment	Assess how the BLKK training program contributes to community empowerment and broader social impact	- Collect stories of how participants apply their new skills in the workforce or local businesses - Evaluate changes in the economic or social standing of participants and their communities	- Case studies of successful participants - Follow-up interviews six months post-training - Community-level economic data (e.g., job creation, income levels)	- Increased employability and entrepreneurial activities among participants - Tangible social change (e.g., new businesses launched, improved economic conditions)

The Reflection phase in Participatory Action Research (PAR) is a crucial stage where participants, trainers, and stakeholders collectively assess the effectiveness of the training program. In this phase, BLKK participants reflected on their learning experiences and discussed how the skills they acquired were applied in real-world job contexts. Through reflection workshops and group discussions, participants provided feedback on what aspects of the training were most beneficial and where improvements could be made.

This phase also allowed the community to identify long-term impacts of the training, such

as increased employability, confidence in applying digital skills, or entrepreneurship ventures. The reflection process helped foster deeper participant ownership of the learning outcomes, generating insights into how the training could be improved for future iterations, making the program more relevant and sustainable for the community's evolving needs.

Post-Training Support and Long-Term Economic Empowerment Through BLKK: Insights from a Participatory Action Research Model

Balai Latihan Kerja Komunitas (BLKK) plays a vital role in empowering local communities by providing individuals with the necessary skills to navigate the increasingly dynamic labor market. As Indonesia faces the challenges of Industry 4.0, with rapid digitalization and automation transforming job requirements, vocational training programs like BLKK are crucial in ensuring that local workers are equipped with both technical skills (e.g., digital literacy, IT, and manufacturing automation) and soft skills (e.g., adaptability, communication, and teamwork) (Schwab, 2017). These skills help workers remain competitive and resilient in the face of technological disruptions. However, beyond addressing individual skill gaps, BLKK's broader impact on community empowerment is equally significant. The program fosters a sense of ownership and responsibility within communities, enabling them to better control their economic circumstances through enhanced skills and capacities, aligning closely with the Empowerment Theory (Messman et al., 2022).

Empowerment Theory posits that individuals and communities gain control over their socio-economic conditions through skill development and capacity building, thereby increasing their ability to make strategic decisions about their futures. BLKK embodies this theory by focusing not only on technical upskilling but also on broader community-based initiatives that promote social and economic inclusion. For instance, by equipping participants with entrepreneurial skills, BLKK fosters the growth of micro-enterprises and encourages self-employment, which can lead to increased economic opportunities for both individuals and the community at large (Warouw, 2005). Studies have shown that individuals who gain entrepreneurial skills are more likely to start small businesses, thus contributing to local economic development and job creation within their communities (Dhani et al., 2021; Mustajab & Irawan, 2023; Setiyawami et al., 2019). This aligns with the findings of McKinsey & Company Das et al., (2019) which highlights the importance of entrepreneurship in adapting to the digital economy and mitigating the risks of job displacement due to automation.

Moreover, the community empowerment aspect of the BLKK program extends beyond individual economic gains. By fostering social cohesion and collective responsibility, the program enables communities to collectively address local challenges and seize new opportunities. For example, the creation of local cooperatives or business networks through BLKK initiatives has allowed communities to pool resources, share knowledge, and support one another in business ventures, thus increasing economic resilience (Rustiman et al., 2021). This form of collective empowerment not only improves individual livelihoods but also contributes to sustainable community development by creating jobs and stimulating local economies. The social capital generated through these networks also plays a crucial role in sustaining the long-term impact of the BLKK program, as empowered individuals are more likely to reinvest in their communities and support future generations (Azhari et al., 2020; Fajri Ahmad & Dion Pratama Putra, 2022; Suryono et al., 2022).



Figure 1. Participants' overall Satisfaction with the training experience

Figure 1 captures the participants' overall satisfaction with the training experience. According to the data, the majority of respondents found the training highly beneficial, with many reporting they feel better prepared for employment or entrepreneurship after completing the program. Additionally, a large percentage of participants indicated their interest in participating in future programs offered by BLKK. This reflects the program's effectiveness in meeting participants' expectations and in providing relevant, practical skills that increase work-readiness and promote entrepreneurial activity.

Based on analysis of participant satisfaction data from the BLKK (Balai Latihan Kerja Komunitas) training program, the initiative has been highly effective in empowering participants and enhancing their readiness for the labor market. The majority of respondents expressed high satisfaction with the training quality, with over 53% strongly agreeing that the program met their expectations. A further 33% agreed that the training provided valuable skills, underscoring the program's overall positive reception. The mean satisfaction score for training quality was 4.38 on a 5-point Likert scale, indicating strong overall endorsement of the program's content and delivery.

Additionally, the data indicate that participants found the program to have a significant economic impact. Over 90% of respondents agreed or strongly agreed that the BLKK program contributed to their economic well-being, demonstrating the practical benefits of the training in improving participants' financial prospects. This is further evidenced by the fact that 59% of participants strongly agreed that they feel more prepared to enter the workforce or start their own business after completing the training. The program's focus on enhancing both technical and entrepreneurial skills has clearly empowered participants to pursue new career paths and increase their economic resilience. Furthermore, the willingness to recommend the program to others underscores participants' satisfaction levels. 89% of respondents stated that they would recommend the BLKK training to friends or family, signifying a high level of trust in the program's efficacy. This recommendation rate suggests that participants view the training as a valuable asset, not only for their own development but also for the betterment of their broader community.

In terms of post-training support, the analysis revealed that participants appreciate the ongoing assistance provided by BLKK. Many respondents highlighted the relevance of the initiative's follow-up programs and networking opportunities, which have allowed them to continue building on the skills they gained during the training. This ongoing support has ensured that participants remain engaged in their career development, with many expressing a desire to participate in future programs. The sustainability of BLKK's impact is thus reinforced by the continuous learning opportunities and mentorship programs available to participants after the initial training ends. Overall, the satisfaction data from the BLKK training program highlights its success in meeting participants' needs and empowering them for long-term career success. The positive responses regarding training quality, economic benefits, and post-training support demonstrate the effectiveness of the program in addressing both immediate and future labor

market challenges, particularly in the context of Industry 4.0. Going forward, these insights can be used to further refine the program and ensure that it continues to serve the evolving needs of Indonesia's workforce.

An analysis of BLKK participant survey data reveals a clear correlation between program quality and participants' increased psychological readiness to become entrepreneurs. The mean satisfaction score of 4.38 on a 5-point scale, as well as the 59% of participants who strongly agreed that they felt more ready to start their own business, indicate that the training not only transferred skills, but also fostered an internal locus of control. Within the domain of entrepreneurial behavior, this augmentation in self-efficacy and self-confidence manifests as Perceived Behavioral Control (PBC) (Bandura, 1991). A substantial body of research has demonstrated that personal belief in a concept (PBC) is the most robust predictor of an individual's inclination to initiate a business venture. Effective entrepreneurship education has been demonstrated to increase perceived behavioral control, as participants develop a sense of capability in overcoming obstacles and acquiring the necessary resources (Aga & Singh, 2022). As articulated by (Rodríguez García et al., 2019) psychological factors associated with self-efficacy and occupational history "exert an influence on Perceived Behavioral Control," which, in turn, propels entrepreneurial intent. Consequently, BLKK has achieved success at the individual level by establishing the psychological foundation for innovation and grassroots job creation.

However, the program's effectiveness at the systemic level is still hampered by a lack of external support. Despite the BLKK program's documented success in fostering self-efficacy and honing technical competencies the substantial discordance observed in the domains of Partnerships and Networks and Program Sustainability (53.8% and 61.5%, respectively) signifies a pronounced incongruity between the training outcomes and the demands of the market. A strong entrepreneurial intent, driven by a high PBC, requires adequate supporting systems, including access to capital, ongoing mentoring, and market networks. The absence of such sustained assistance can result in the premature collapse of a business. Research on the impact of entrepreneurship education in developing countries has identified several key factors contributing to the success of young entrepreneurs. These factors include "skill acquisition, confidence, and supportive networks" (Prasad et al., 2024). Therefore, in order for the individual success achieved by BLKK to be sustainable, the government must immediately address weaknesses in this support ecosystem. Specifically, the government must ensure that industry networks and partnerships are mandatory and funded post-training components, not merely program supplements.

Discussion

The Balai Latihan Kerja Komunitas (BLKK) program is a vital community-based initiative that empowers workforce skills in line with Industry 4.0 demands. As industries increasingly rely on digitalization, automation, and advanced technologies, the need for technical and soft skills has never been greater. The BLKK program addresses this challenge by providing participants with training in digital literacy, entrepreneurship, and technical competencies, tailored to local labor-market needs. Through this, the program aligns with the core principles of Human Capital Theory, which argues that investing in education and skill development enhances individual productivity and benefits society (Becker, 1993). By equipping participants with these critical skills, BLKK not only improves their employability but also contributes to local economic development, particularly in underserved and rural areas where formal employment opportunities may be limited (Psacharopoulos & Patrinos, 2018; Schwab, 2017).

In addition to fostering economic growth, the BLKK program also empowers individuals by increasing their self-efficacy and confidence in their abilities to navigate the complexities of modern labor markets. According to Empowerment Theory, individuals gain control over their circumstances by acquiring the skills and knowledge necessary to make strategic decisions about

their future. This empowerment is further strengthened through the program's emphasis on post-training support and mentorship, ensuring that participants have the resources needed to apply their new skills and succeed in both entrepreneurial ventures and formal employment. The high levels of participant satisfaction reported in the program demonstrate the effectiveness of this approach, as participants feel more capable of starting their own businesses or transitioning into more advanced roles in their industries.

Finally, BLKK's community-based approach fosters collective empowerment by encouraging participants to collaborate, share knowledge, and build social networks that enhance both individual and community development. As participants engage in peer learning and mentorship, they contribute to a cycle of knowledge sharing that benefits the broader community. This aligns with Social Learning Theory (Virginia Koutroubas & Michael Galanakis, 2022) which emphasizes the importance of learning through observation and interaction with others. By focusing on both individual and collective empowerment, the BLKK program plays a critical role in addressing broader issues of social and economic inclusion, ensuring that marginalized and underserved communities are not left behind in the rapidly evolving digital economy. The program's success demonstrates the importance of sustained support and community engagement in promoting long-term development and economic resilience.

These findings carry substantial policy implications for the Indonesian government, particularly with respect to addressing the digital divide and skills gap: An examination of the correlation between augmented digital investment and rural areas reveals a positive relationship. To address this, the government must prioritize expanding investment in digital infrastructure and reliable internet access in rural areas, recognizing digital literacy as a fundamental skill. The existing digital divide may serve to limit the reach and impact of BLKK programs. Policies should promote standardization and funding for long-term mentorship programs after training, not solely for initial training. The role of mentorship in job retention and career advancement has been shown to be significant. To ensure the relevance of programs to the demands of Industry 4.0, a policy framework mandating closer and more structured partnerships between BLKK and the local industrial sector is necessary (Bank, 2011), so that training is always aligned with market needs. It is imperative to prioritize soft skills and entrepreneurship. Vocational training programs should be repositioned as catalysts for entrepreneurship rather than merely providers of labor. A core policy for building a resilient workforce capable of adapting to technological disruption should emphasize the development of soft skills (e.g., adaptability and problem-solving) alongside technical skills.

Conclusion

This study confirms that the BLKK Community Training Center program is a highly effective initiative for improving human capital and work readiness in rural communities, especially in the context of the Industry 4.0 digital transformation. Quantitative findings, supported by high satisfaction scores (mean: 4.38), demonstrate that BLKK successfully addresses technical and digital skill gaps. The program transfers hard skills aligned with market needs, as evidenced by 100% approval for technical skill enhancement. It also significantly fosters the psychological dimension of empowerment, namely perceived behavioral control and self-efficacy. The program significantly grows the psychological dimension of empowerment, namely perceived behavioral control and self-efficacy, which are crucial factors in driving entrepreneurial intent. This success positions BLKK as a viable model for building a resilient and adaptive workforce capable of reducing economic and social inequality.

However, despite its success in the training phase, the evaluation results revealed significant shortcomings in post-training support. The level of disagreement on the Partnerships and Networks and Program Sustainability indicators was notably high at 53.8% and 61.5%, respectively. These structural weaknesses could hinder BLKK graduates' business survival and

long-term employment. Therefore, this study recommends policy interventions that strengthen the ecosystem beyond training. The government and stakeholders must expand funding for sustainable mentorship programs and require structured partnerships between BLKK and the local industry sector. They must also ensure easier access to capital and digital markets for startup entrepreneurs. These steps are important to ensure that the individual empowerment achieved by BLKK can translate into sustainable, collective economic impact.

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