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The COVID-19 Pandemic, Structural Transformation, and Training Programme Outcomes in Indonesia**Widdi MUGIJAYANI***Svara Institute***Titik ANAS***Universitas Padjadjaran and Svara Institute***Erizqa MAHARDHIKA***Svara Institute***Yolanda ORIENT***Svara Institute*

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Abstract: *The Government of Indonesia introduced Program Kartu Prakerja to develop workforce competencies, increase workforce productivity and competitiveness, and develop entrepreneurship in the country. The programme also responded to the COVID-19 pandemic-induced increase in unemployment and other labour market consequences. This study assessed the impact of Kartu Prakerja and internet access on the improvement of perceived competencies, productivity, competitiveness, and entrepreneurial skills. It used an online survey of 2,156 individuals and a combination of econometrics methods to evaluate the impact. It found that the programme significantly improved competencies, productivity, competitiveness, and entrepreneurship skills. Some personal characteristic variables – such as age, sex, and schooling – also affected optimal outcomes. Since the programme was conducted online during the pandemic, internet access – proxied by the number of telecommunications towers in each district – was found to have played an important role. Through better internet access, competencies, productivity, and competitiveness can be improved. Thus, the government should ensure that all regions in Indonesia have good internet access and other relevant infrastructure.*

Keywords: Online training, Kartu Prakerja, internet access, perceived competencies, perceived competitiveness, perceived productivity, Indonesia

JEL classification: I250, I260, I380, J240, J680

1. Background

The COVID-19 pandemic took a toll on Indonesia's economy and affected its labour market. Statistics Indonesia (2021) stated that the pandemic caused at least 15.7 million workers to experience reduced working hours, 1.6 million workers to become unemployed, 1.1 million to be furloughed, and 0.7 million to exit the labour force in Indonesia.

Before the pandemic occurred, Indonesia's economy was transforming into a more modern, formal sector. The services sector has been the largest sector for 30 years; its share of gross domestic product (GDP) usually measures around 40%. After the 2008 global financial crisis, the manufacturing and agriculture sectors witnessed declines, and the share of the services sector in the economy increased. In line with its significant contribution to GDP, the labour share of the services sector grew.

The pandemic also accelerated digital technology adoption throughout Indonesia, although associated adjustments in education have failed to keep pace. Consequently, Indonesia has an education mismatch – regarding both undereducation and overeducation (Allen, 2016; ILO, 2017; Mugijayani, 2020), a decreasing return on education (Patrinos, Ridao-Cano, Sakellariou, 2006; Purnastuti, Miller, Salim, 2013; Mugijayani, 2020), and less competitive workers. In 2019, the country ranked 85 out of 141 countries on the Global Competitiveness Index (Schwab, 2019).

The Government of Indonesia introduced Program Kartu Prakerja to accelerate an improved labour supply by providing skilling, reskilling, and upskilling to develop workforce competencies, increase workforce productivity and competitiveness, and encourage entrepreneurship. Since its inception, Kartu Prakerja has provided online courses to its registrants. In response to the pandemic, social assistance was embedded into the programme by offering cash plus post-training transfers for beneficiaries.

Kartu Prakerja is unique in its flexibility for both beneficiaries and training providers. Beneficiaries can choose their training programmes according to their interests, talents, and future career needs – not only as workers in the formal sector but also as entrepreneurs. Similarly, training providers can offer any courses that meet the criteria determined by the Project Management Office (PMO) of Kartu Prakerja. The courses are curated based on their interactivity, module structure, quality, and relevance. There are more than 1,200 courses – covering digital marketing, languages, and entrepreneurship – from 180 training providers that

can be accessed through six digital platforms.¹ Moreover, after completing the training, participants can give feedback, testimonies, and ratings of the courses on a website that is publicly accessible.

Kartu Prakerja covers a wide range of beneficiaries. It is open to all Indonesian citizens aged 18 years and above. It is not limited to jobseekers, new graduates, or those currently unemployed; it is also open to the currently employed, entrepreneurs not currently in formal education, those not receiving other governmental assistance, and those who are not in the military or civil service. By the end of 2020, Kartu Prakerja reached 5.5 million beneficiaries from 514 cities/districts across Indonesia; it reached more than 17.0 million in 2023 (Prakerja, 2023).

Regarding digital technology adoption, infrastructure is a key factor needed to participate in the digital economy as well as to improve online learning outcomes and human capital quality; Basar et al. (2021), for example, highlighted the importance of well-equipped facilities and stable internet connections for effective learning. Yet in 2019, 94 million adults in Indonesia were unable to access the internet on a mobile device, and even fewer had access to fixed broadband internet. Nearly 80% of those not connected reside in the non-metro rural areas of Bali, Java, and Sumatra, which are the country's three most populous islands. Moreover, 60%–70% of Indonesians living in the country's eastern region are inadequately connected due to variable quality of service (Setiawan, Pape, Beschorner, 2022). According to the Indonesian Internet Service Provider Association, the internet penetration level in Indonesia in 2022 was 77%, with 89% of respondents using their mobile phones to access the internet (APJII, 2022).

The availability of base transceiver stations (BTSs) is essential to improve internet quality in certain areas in Indonesia so that connections become faster and more stable. Thus, it is the main support of Kartu Prakerja due to the programme's online format of training. As the programme has established an integrated, extensive ecosystem that includes training providers, digital platforms, payment partners, and educational institutions, most users were accessing it for an average of 6 hours per day at the beginning of the pandemic.

This study analyses the impact of the COVID-19 pandemic on Indonesia's labour market and then assesses the impact of internet access, other amenities, and infrastructure available on Kartu Prakerja. The outcomes include competencies, productivity, competitiveness, and entrepreneurial skills after approximately 1 year of the programme intervention. To assess the

¹ The number of training courses, training providers, and digital platform are based on Kartu Prakerja administrative data as of December 2022.

impact of internet access on the outcome of Kartu Prakerja, this study includes the BTS variable in the equation.

The next section discusses relevant literature on urban amenities and is followed by a discussion of the data and then methods employed in this study. The last two sections present the results and analyses and provide relevant recommendations.

2. Literature Review

Becker (1962) defined human capital investment as activities that influence future real income by embedding resources in people. Meanwhile, Weisbrod (1966) defined human capital investment as spending on education, training, health, information, and labour mobility. Human capital is accumulated in three ways: (i) formal schooling, in which an individual devotes his/her entire time to learning; (ii) on-the-job training, in which an employer provides post-school training; and (iii) off-the-job training, in which for-profit proprietary institutions provide post-school training (Lynch, 1991).

Training considerably affects employee competence (Badriyah and Muhtarom, 2020). It contributes to as much as 45.5% of competency-based work, while the remaining percentage is composed of other factors, such as the working environment, leaders' support, reward systems, and support infrastructure (Budinarsih, Soehari, Ahmad, 2017). The job-specific model of competency focusses on developing specific skills in certain workplaces, such as knowledge of the product, administrative and technical fields in the company, and training and qualification-building skills during training. Despite specific competencies needed for each job, there are some shared core competencies, including entrepreneurial competencies, self-expression, interpersonal competencies, and leadership competencies (Shum, Gatling, Shoemaker, 2018). The general model of competency pays more attention to business, personal, and management competencies; it does not focus on technical skills.

Good training procedures are closely related to enhanced productivity. Colombo and Stanca (2008) posited that training has a considerable and favourable impact on productivity; a 1% increase in training is connected with a 0.07% increase in value added per worker. In line with this finding, Dearden, Reed, and Van Reenen (2006) found that an increase in employee training by 1 percentage point increases productivity by 0.6% and earnings by 0.3%. Traditionally, productivity measures are based on the quantities of outputs produced as well as the production process. Productivity may be assessed from an output approach; from there, it can be measured by quality (Drucker, 1999), such as the ability to complete work more

precisely, fulfil customer expectations (Kaplan and Norton, 1996), and be time efficient (Reichelt and Lyneis, 1999).

Meanwhile, Padilla and Juárez (2006) demonstrated that training improves competitiveness by enhancing product quality, efficiency (i.e. less rework and rejection), flexibility, and the ability to develop innovative products and processes. Previous studies documented competitiveness in several spectrums, such as general competitiveness, dominance, competitive effectiveness, and personal enhancement (e.g. Newby and Klein, 2014). In general, competitiveness is defined as the desire to excel compared to others and the enjoyment of competition (Spence and Helmreich, 1978).

Training is also related to the improvement of entrepreneurial skills. A previous study by Presisi Indonesia (2022) found that those who joined Kartu Prakerja training gained confidence in starting or expanding businesses. They were encouraged to form new ideas and strategies that enable innovation. Lyons, Lynn, and mac an Bhaird (2015) assessed entrepreneurship skills through several aspects – an individual's performance (i.e. whether he/she started a new venture or improved an existing venture through innovative action); individual's behaviour (e.g. the need for achievement, motivation to accomplish a task to a certain standard of excellence, or ability to take a risk to make a profit based on market demands); individual's intention (i.e. his/her state of mind that directs his/her actions towards the development and implementation of a business concept); and individual's self-efficacy (i.e. his/her ability to execute a particular behaviour pattern, such as effort, persistence, and engagement with a project). Al-Awlaqi, Aamer, and Habtoor (2021) focussed on other sub-dimensions, such as proactiveness, innovativeness, and risk-taking.

The development of technology has made it easier for people to perform better due to the broader range of information that they can access (Amponsah et al., 2022). There are more opportunities to learn new skills with the support of external factors, such as internet access, device availability, and information and communications technology infrastructure. These factors indirectly affect intentions to study, as learning something online can be simpler (Kaur and Gopal, 2021). Moreover, digital infrastructure is associated with learning outcomes, as it increases the effectiveness of e-learning and contributes to human capital development (Aldashev and Batkeyev, 2021).

According to Paechter and Maier (2010), several aspects must be considered for online learning, including the quality of the learning environment, ease of using the learning platform, learning outcomes to be achieved, and interactions with instructors or peers. The availability of infrastructure – especially internet accessibility – also plays an essential role in this activity.

Internet connections are crucial in enhancing the effectiveness of online learning; they must be at a moderate or good level (Najib et al., 2017). Giatman, Siswati, and Basri (2020) found that 82% of students faced difficulties related to internet access during online learning, which affected their readiness and quality of learning outcomes. Chisadza et al. (2021) found that poor internet access contributed to lower learning performance and led to difficulty adapting to online learning for some.

3. Data

To assess the impact of internet access and other amenities available on the outcome of Kartu Prakerja, this study used survey data from two different sources. First, amenity variables were obtained from recent Village Potential Statistics (PODES) data. Second, the study used online survey data collected by the Svara Institute (formerly Presisi Indonesia) with the cooperation and support of the PMO of Kartu Prakerja; Fiscal Policy Agency, Ministry of Finance, Government of Indonesia; Government of Japan; and United Nations Development Programme. This online survey of 2,156 individuals was conducted from 24 September to 1 November 2021. The response rate was 11%, with a margin of error of around 3% and a confidence level of 95%. Data comprised a control or non-beneficiary group and the main group of beneficiaries to act as a benchmark. There were 1,078 respondents for each group.

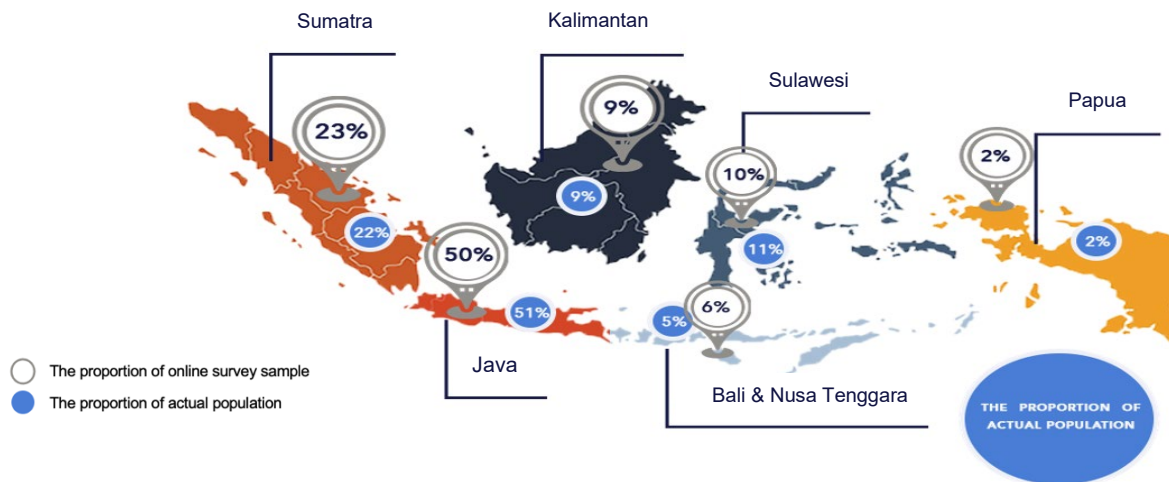
To gain insights from these respondents, phone interviews and virtual in-depth interviews were also conducted amongst 188 beneficiaries and non-beneficiaries, 5 training providers, 3 digital platforms, and 2 payment partners – all of whom are part of Kartu Prakerja's ecosystem.

This study then used a sub-population of Kartu Prakerja – applicants in September 2020 (i.e. Batches 7–10). These batches were selected because the period between the programme intervention and the online survey was exactly 1 year, and the number of beneficiaries was large (i.e. around half of the total beneficiaries in 2020). The control group included individuals who applied and did not receive Kartu Prakerja until Batch 20 in 2021. This ensured that the control group is clear from the programme intervention.

Based on the region (Figure 1), the proportion of respondents in Java was around 50%, which is very close to the actual population distribution (i.e. 51%). This difference arises because the online survey and self-assessment surveys followed a first-come-first-served system. Moreover, the distribution of the sample size that lives in other regions was lower than that of Java. Of the total sample size, 23% of respondents resided in Sumatra, while 9% and 10% came from Kalimantan and Sulawesi, respectively. The proportions of respondents that lived in Papua-Maluku and Bali-Nusa Tenggara were the lowest due to population size. Those

proportions are in line with the Kartu Prakerja beneficiary quota that considers unemployment rate, COVID-19 cases, and job vacancies (Government of Indonesia, Coordinating Ministry for Economic Affairs, 2021).

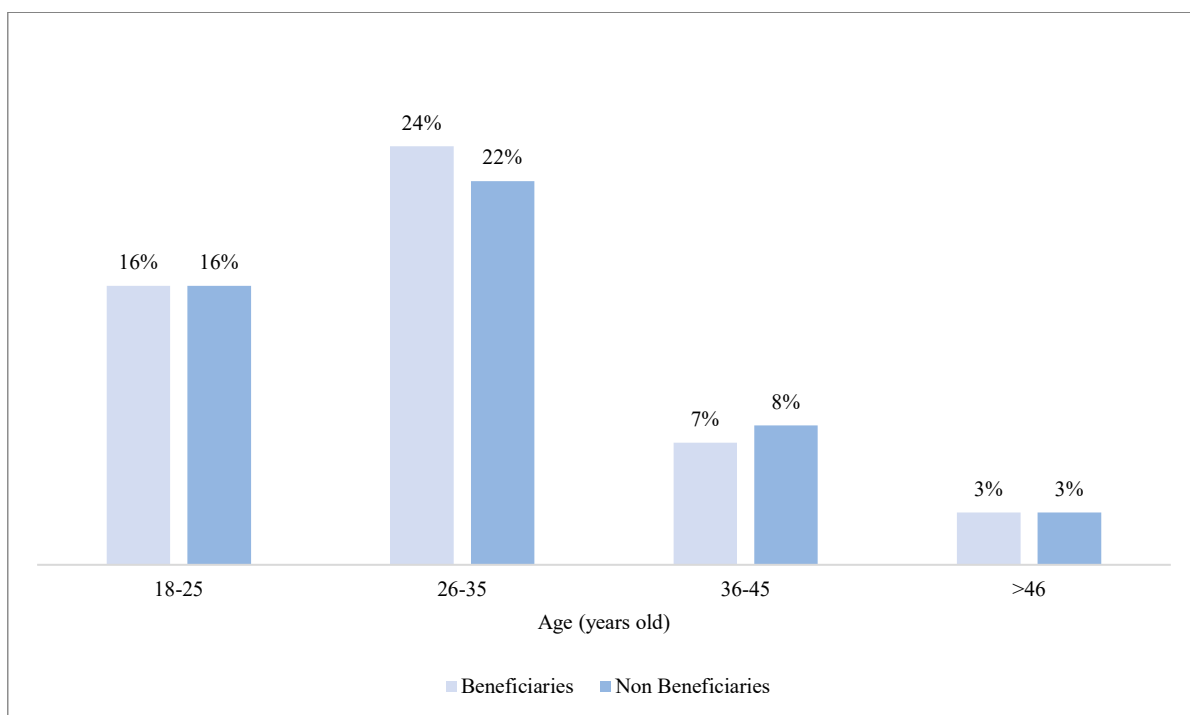
Figure 1: Distribution of Sample and Population of Kartu Prakerja Beneficiaries



Source: Authors.

According to the age group (Figure 2), most beneficiaries and non-beneficiaries were 26–35 years old (of these, 24% were beneficiaries and 22% were non-beneficiaries), followed by those aged 18–25 years. This demonstrates that most beneficiaries were part of the young and productive group, in line with the fact that more than 50% of Indonesia’s population is young – born between the 1980s and 2010s (Statistics Indonesia, 2022). In terms of the employment status of beneficiaries, around 33.8% of respondents were unemployed, 32.6% were employed, 14.2% were freelancers, 10.6% were unpaid or family workers, and 8.9% were entrepreneurs. Meanwhile, the proportion of non-beneficiaries who were unemployed was slightly higher at 37.8%, and entrepreneurs represented 6.3%.

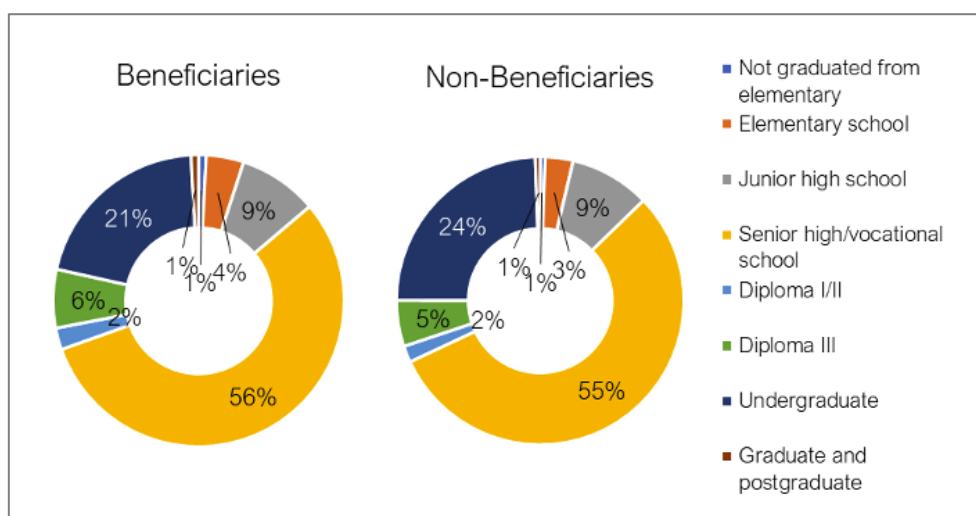
Figure 2: Respondent Characteristics by Age Group



Source: Authors.

In terms of educational attainment levels (Figure 3), the majority of both beneficiaries and non-beneficiaries (i.e. 55%–56%) had high school diplomas. Beneficiaries with a university degree accounted for about 21% of the total, slightly lower than the proportion of non-beneficiaries.

Figure 3: Respondent Characteristics by Education Attainment

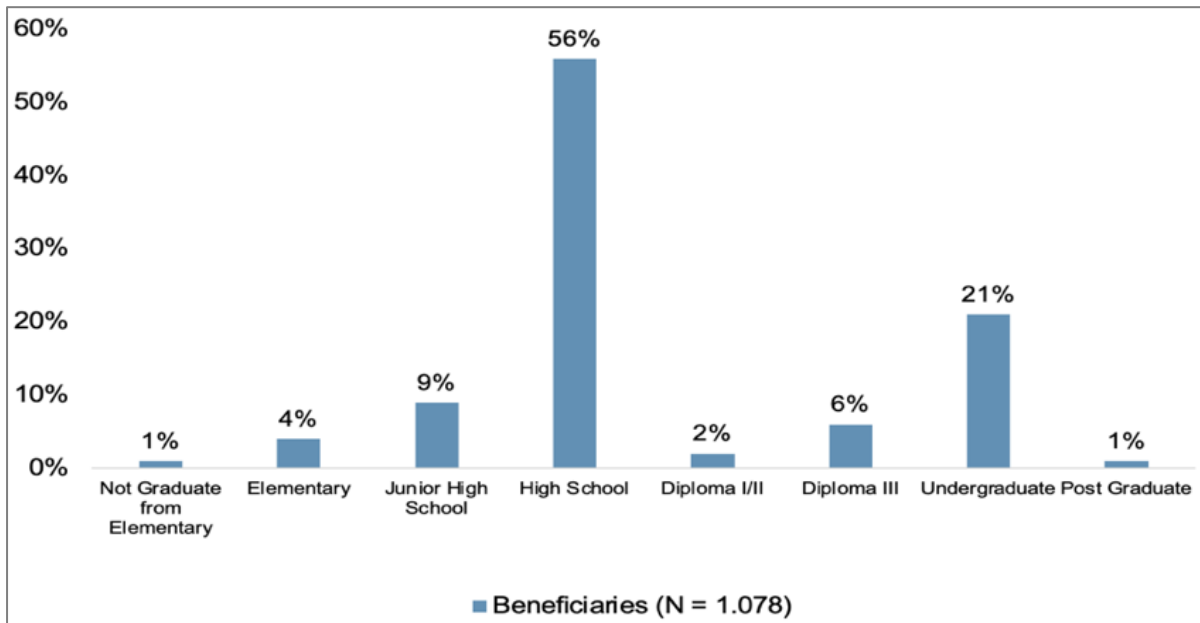


Source: Authors.

Based on PMO administrative data, most beneficiaries took around 1–2 Kartu Prakerja courses on average.² Beneficiaries usually undertook three kinds of training, while non-beneficiaries took two. This number is slightly higher than PMO data because all kinds of certified courses were identified in the survey – meaning not only Kartu Prakerja courses but also self-funded courses and on-the-job training.

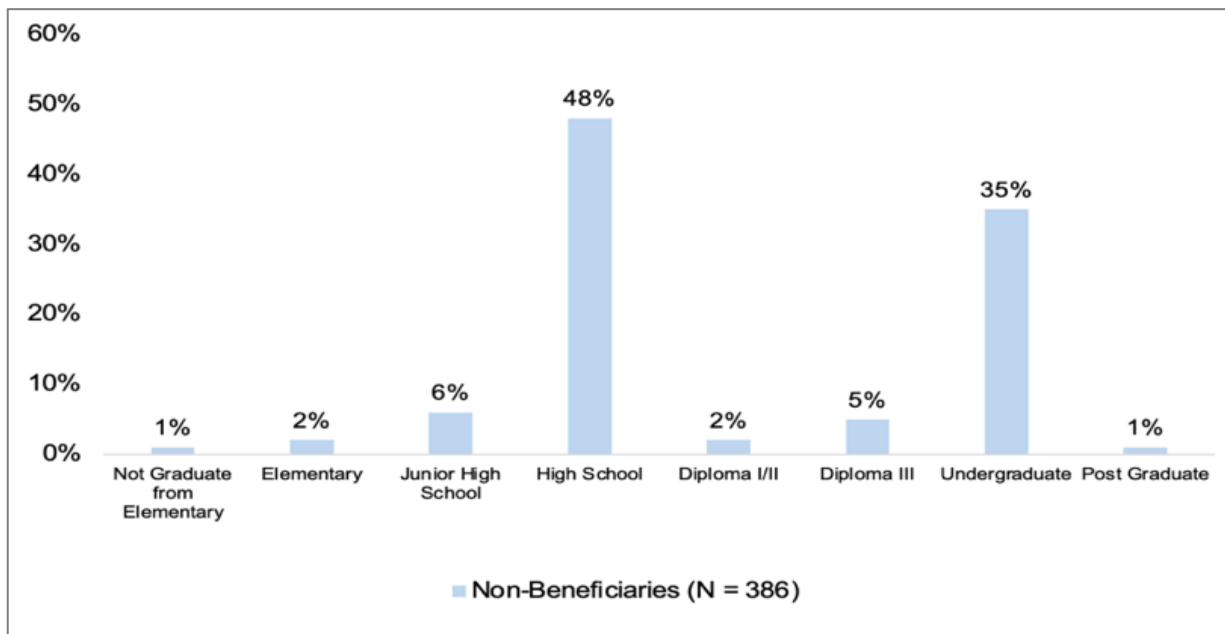
Regarding non-beneficiaries, this study found only around 386 respondents (18% of the total sample) undertook training(s) before, and most of them had at least graduated from high school (48%) or university (35%). Meanwhile, the proportion of beneficiaries with high school or lower education backgrounds was consistently higher than that of non-beneficiaries (Figure 4). This aligns with Kartu Prakerja’s skilling, upskilling, and reskilling aim. Moreover, most respondents claimed that the three most in-demand course categories were sales marketing, lifestyle, and foreign languages. This is in line with PMO data from 2021.

Figure 4: Respondents Who Undertook Training by Educational Background



² The average number of one to two courses taken by beneficiaries is a general estimation and does not explain details related to educational backgrounds.

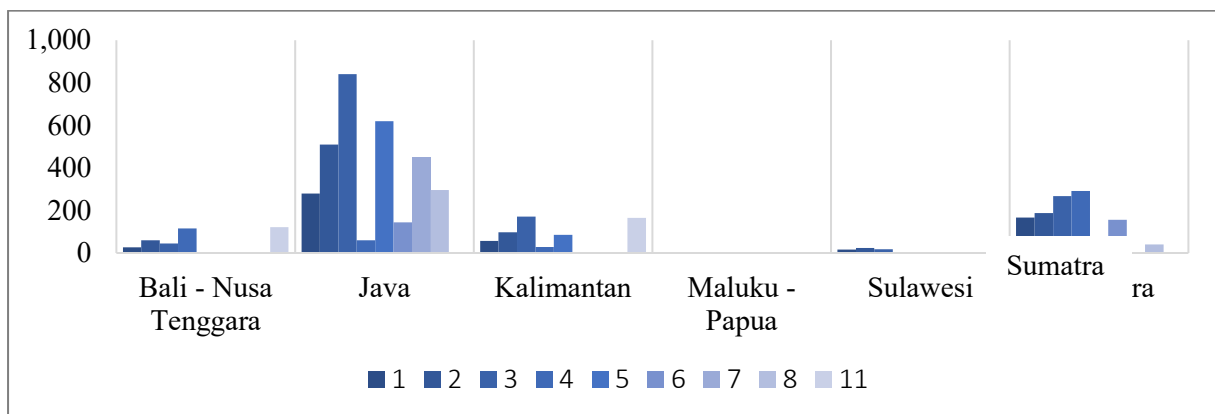
Figure 4: Continued



Source: Authors.

Most respondents lived in districts with good-quality mobile phones and internet signals supported by more BTSs; they generally lived in areas that had one to three BTSs. Based on the data collected from Speedtest Global Index, Bali and Java have better internet access, which is also strengthened by the fact that Java has the highest number of BTSs (Figure 5).³

Figure 5: Distribution of Base Transceiver Stations in Indonesia



Source: Authors' calculations based on PODES 2021 data.

³ Ookla, Speedtest Global Index, <https://www.speedtest.net/global-index>

Box 1: Base Transceiver Station Overview

Base transceiver stations (BTSs) are stations used to transmit and to receive radio signals to telecommunications devices, such as landline phones, smartphones, and other gadgets. This infrastructure is essential for wireless communications between operator networks and telecommunications devices (Bakti, 2019). According to Statistics Indonesia (2022), BTSs are available in 39,062 villages in Indonesia. In general, the length of a BTS tower is 40–75 metres, and the length varies by region, depending on geographical conditions and the extent of the targeted network coverage (Bakti, 2019). Pelly, Fauziah, and Syafri (2018), based on research conducted in four sub-districts of West Pasaman Regency, showed that one BTS can accommodate signals up to 3.24 square kilometres. The signal coverage area may be different for other regions, however, which affects the capacity and quality of the network received by cellular phone service users (Yadnya, Wedarama, Sudiarta, 2022).

4. Methods

This study employed a combination of econometrics methods. Pooled ordinary least squares (OLS) methodology was used as a general approach to estimate causal relations using observational data. For the Mincer earnings function, an instrumental variable (IV) dealt with the possibility of endogeneity issues due to unobservable variables such as ability. As *prakerja* was a dummy variable of beneficiaries, the IV in this study was year of schooling (Mincer, 1974) and mother year of schooling (Blackburn and Neumark, 1993).

The model was formulated as follows:

$$Y_{n,t} = \alpha + \beta_1 prakerja_{n,t} + \beta_2 internet_{n,t} + \beta_3 Z_{n,t} + \varepsilon_{n,t} \quad (1)$$

where:

$Y_{n,t}$ are dependent variables, which are competency, productivity, competitiveness, or entrepreneurship skills, and monthly income in the Mincer earnings function;

$prakerja_{n,t}$ is the dummy of beneficiaries of Kartu Prakerja (1 is Kartu Prakerja beneficiaries, 0 is non-beneficiaries);

$internet_{n,t}$ is the number of BTSs;

$Z_{n,t}$ are control variables, such as personal characteristics including age (in years), year of schooling (in years), female (dummy of sex, 1 is female, 0 is male), marital status (dummy for marital status, 1 is married, otherwise 0);

α is constant;

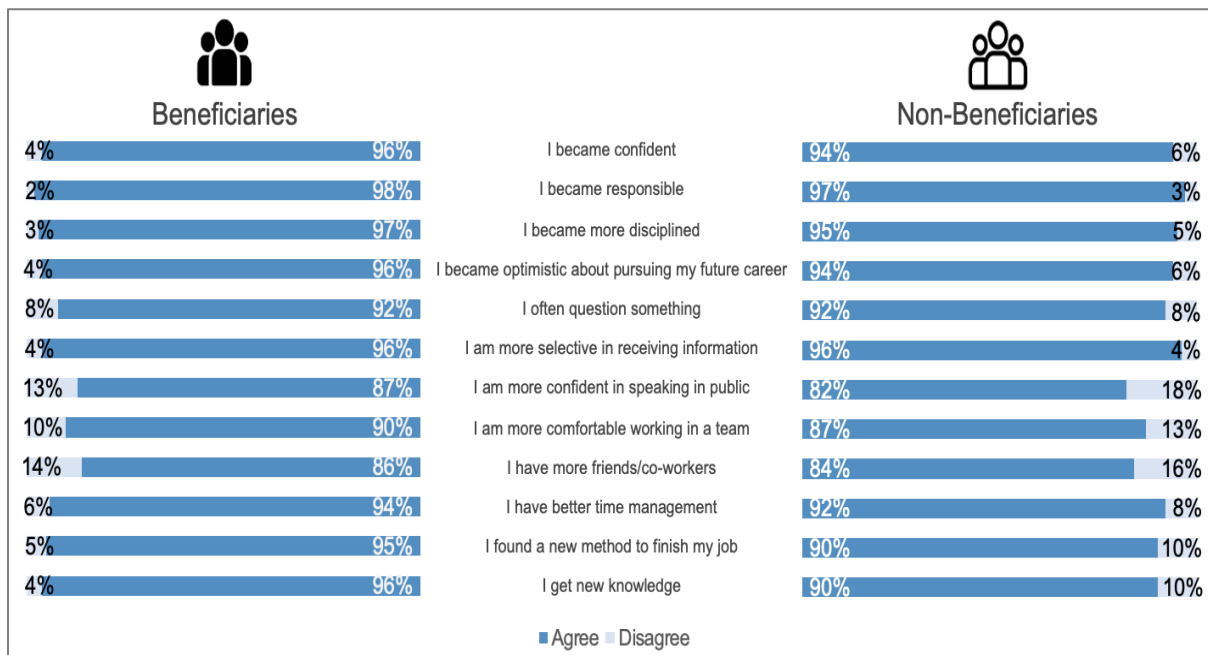
β is the coefficient; and

$\varepsilon_{n,t}$ are error terms.

Competencies, productivity, competitiveness, and entrepreneurship skills in this study were based on self-assessment or respondents' perceptions. Thus, the improvements in competencies, productivity, competitiveness, and entrepreneurship skills were not related to academic or training assessments.

Competencies were assessed based on 12 self-assessment statements on individual conditions, including obtaining new knowledge, being more confident, being more optimistic to improve careers, gaining better critical thinking, and having better networks (Figure 6). The respondents needed to self-assess all elements (i.e. 1 for highly disagree, 2 for disagree, 3 for agree, and 4 for highly agree). The competencies score became the summation of those 12 elements; a higher score means higher competencies. Furthermore, a t-test was performed to test any differences between beneficiaries' and non-beneficiaries' outcome.

Figure 6: Competencies Comparison between Kartu Prakerja Beneficiaries and Non-Beneficiaries



Note: The t-test results for competencies were 0.32, implying that the distribution of perceptions from both beneficiaries and non-beneficiaries is almost the same.

Source: Authors' calculations.

The perception of productivity was then assessed from three statements related to work pace, load, and accuracy (OECD, 2001). Wage data were also analysed as a proxy of productivity using the Mincer earnings function. These methods complement each other and can be used as a robustness test at the same time.

For competitiveness, the respondents were given three statements regarding self-assessment on competency, productivity, and performance compared to peers. The t-test results were similar to the competence results. Meanwhile, entrepreneurship skills were assessed according to six statements related to respondents' knowledge of business finance management, product marketing, production activity, raw materials, machinery, and employee management (Figure 7).

Figure 7: Entrepreneurship Skills Comparison between Kartu Prakerja Beneficiaries and Non-Beneficiaries



Note: The t-test result was 0.50, implying that the distribution of perceptions from both samples is almost the same.

Source: Authors' calculations.

5. Results and Analyses

The results of Program Kartu Prakerja on competencies, productivity, competitiveness, and entrepreneurship skills are significantly positive between beneficiaries relative to non-beneficiaries (Table 1). These results are in line with Presisi Indonesia (2022). In detail, Kartu Prakerja beneficiaries score 74 percentage points (2.2%) higher in work competencies than non-beneficiaries after completing training. This result implies that beneficiaries perceive competency improvements, particularly in self-confidence, knowledge, critical thinking, and networks.

Improvements also occur in productivity, competitiveness, and entrepreneurship skills of 24 percentage points (2.7%), 50 percentage points (2.9%), and 150 percentage points (41%), respectively. These results confirm that the beneficiaries have improved work efficiency and

performance in general. For entrepreneurs, improvements occur in terms of production, financial management, marketing, and employee management.

Table 1: Competencies, Productivity, Competitiveness, or Entrepreneurship Skills, Using Pooled OLS

Variables	(1) Competencies	(2) Productivity	(3) Competitiveness	(4) Entrepreneurship Skills
Prakerja	0.741***	0.235***	0.504***	1.506***
	-0.21	-0.066	-0.134	-0.441
BTS	0.114*	0.047**	0.070*	0.004
	-0.055	-0.017	-0.035	-0.115
Age	-0.036**	-0.010*	-0.025**	0.136***
	-0.013	-0.004	-0.008	-0.027
Year of education	0.154***	0.040**	0.045*	0.066
	-0.040	-0.012	-0.025	-.083
Female	-0.10	0.259***	-0.112	0.265
	-0.212	-0.067	-0.135	-0.444
_cons	31.84***	8.383***	17.64***	-2.186
	-0.675	-0.213	-0.431	-1.416
N	2,156	2,156	2,156	2,156
R-sq	0.019	0.025	0.014	0.017

BTS = base transceiver system, OLS = ordinary least squares.

Note: Standard errors in parentheses: *** p < 0.01, ** p < 0.05, * p < 0.1.

Source: Authors' calculations.

From Table 1, it is seen that Kartu Prakerja as well as amenities – particularly related to internet access – affect the outcomes positively as reflected by the BTS variable. Good internet access affects the increase in competencies, productivity, and competitiveness of 11.4 percentage points (0.3%), 4.7 percentage points (0.5%), and 7.0 percentage points (0.4%), respectively. Compared to Kartu Prakerja coefficients, the effects are relatively lower, but this finding confirms that internet access – as well as quality – is essential because most of the training is conducted online. Thus, besides developing training programmes, the government should also improve infrastructure for human capital improvement.

This finding is in line with CSIS Indonesia (2022), which asserted that to fully reap the benefits of digitalisation for inclusive growth, equal access to digital infrastructure must be ensured. Hjort and Sacchetto (2022) also emphasised that better access to internet-based technologies affects the development of productivity, because workers can carry out tasks more rapidly and produce higher-quality work. Similarly, Aldashev and Batkeyev (2021) stated that

digital infrastructure effectively boosts e-learning outcomes and increases human capital development.

The results above are also confirmed by the in-depth interview results, which showed that respondents benefitted from the online courses due to improved productivity and competitiveness that helped them generate income and increase sales.

In terms of control variables, year of education has a positive impact on competencies, productivity, and competitiveness variables. Thus, the higher education background of the beneficiary, the better the improvement of competencies, productivity, and competitiveness. In contrast, age has a negative correlation with the same variables. This aligns with Momanyi, Too, and Simiyu (2015), who asserted that age significantly affects a student's academic performance, as younger students have higher scores in academic performance than older students. In terms of sex, being female has a positive and significant effect on productivity; women beneficiaries have higher productivity. Thus, the programme is most effective for young, higher-educated women.

However, the result for entrepreneurship skills is different. Internet access has an insignificant effect on entrepreneurship skills improvement. A possible reason is low business participation in digital platforms, particularly for micro, small, and medium-sized enterprises (SMEs). According to the Ministry of Cooperatives and SMEs, of 65 SMEs in Indonesia polled, less than 26% were connected to the digital ecosystem (Bank Indonesia, 2022).

To analyse the improvement in productivity using wages as the proxy, the Mincer earnings function was employed. The result shows that Kartu Prakerja has a positive impact on income (Table 2). This implies beneficiaries who work or get a job after completing the training experience an increase in income of 15.6% (Equation 5). Using an IV to control ability bias, an even higher increase of 17.6% (Equation 6) was found. If the average income is IDR1.5 million per month, participating in Kartu Prakerja can increase a beneficiary's income around IDR234,000–IDR264,000. Better internet access also has a positive correlation with income; it can increase income 7%, around IDR105,000. In-depth interview results supported this finding, as some employee beneficiaries claimed to have their incomes rise after joining the programme.

Box 2: In-Depth Interview Result

‘I have been working as an online motorcycle taxi driver since 2017. The pandemic sent my income as an *ojol* down 50%. However, thanks to Kartu Prakerja, I was able to build my own business as a clothing reseller in 2020. The marketing training through social media [that] I participated in boosted my spirits [and] encouraged me to seek out and have other sources of income. Now, this reseller business can replace the decline in my income as an *ojol*’.

- Male, 45 years old, Central Java, 26 September 2021

Table 2: Mincer Earnings Function

Variable	(5) OLS	(6) IV
Prakerja	0.156*	0.176**
	0.0796	0.081
BTS	0.073***	0.072***
	0.021	0.021
Year of education	0.097***	0.194***
	0.015	0.047
Age	0.062**	0.035
	0.028	0.031
Age2	-0.001*	-0.000
	0.000	0.000
Female	-0.451***	-0.534***
	0.084	0.092
Married	-0.064	-0.121
	0.278	0.283
Java	0.179**	0.215**
	0.081	0.084
Services2021	-0.175	-0.223**
	0.108	0.113
Workhrs_2021	0.015***	0.016***
	0.002	0.002
Cons	10.60***	9.822***
	0.557	0.660
N	1,223	1,221
R-sq	0.121	0.091

BTS = base transceiver system, IV = instrumental variable, OLS = ordinary least squares.

Notes:

1. Standard errors in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

2. The IV in the IV model is mother’s education; IV is year of schooling.

Source: Authors’ calculation.

6. Conclusion

Based on the results and analysis, Program Kartu Prakerja beneficiaries have higher competencies, productivity, competitiveness, and entrepreneurship skills than non-beneficiaries. Particularly regarding productivity, a similar conclusion can be drawn using the Mincer earnings function. The result is robust since an IV was also employed to deal with ability bias. Thus, this programme is well worth continuing.

In terms of infrastructure, the availability of BTSs, which translate into better internet access, significantly improves the programme's outcomes. This result aligns with prior research by Aldashev and Batkeyev (2021), which showed that digital infrastructure boosts e-learning outcomes and increases human capital development. Digital connectivity can also help develop productivity; workers can carry out tasks more rapidly and produce higher-quality work with better access to internet-based technologies (Hjort and Sacchetto, 2022). Also, recent data from PODES and Ookla showed that regions with more BTSs are more likely to have better internet quality. The number of BTSs available has a positive and significant effect on competencies, productivity, and competitiveness; through better internet access, better competencies, productivity, and competitiveness can be gained. However, note that internet access has an insignificant effect on entrepreneurship skills improvement. This is due to the low number of entrepreneurs who are involved in the digital ecosystem.

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