Skill Development and Employment Outcomes in Maharashtra: A Review of PMKVY And BARTI's Skill Development Initiatives, With A Focus on Wage Employment and Self-Employment

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***Abstract*—India's growing young-workforce needs skill-development-programs that deliver sustainable livelihoods. This review examines how *PMKVY-scheme* and *BARTI-initiatives* contribute to wage-employment and self-employment in Maharashtra. It synthesizes several scholarly and institutional reviews alongside official data on parliamentary replies, Economic-Survey 2022-23, and PLFS-data. Two-proportion and one-sample z-tests assess two employment-related hypotheses. Maharashtra trained more PMKVY 2.0 candidates than any other state during 2019-20, yet reported placement rates declined from approximately 19.5% under PMKVY 2.0 to 5.6% under PMKVY 3.0. This decline highlights a gap between training reach and employment conversion. Self-employment accounted for approximately 11.9% of reported PMKVY outcomes, compared with 39.4% among Indian workers. Different reporting populations make this comparison contextual rather than directly equivalent. Reviewed sources provide limited empirical evidence on BARTI and this review identifies no independent tracer study linking its training with subsequent income outcomes. These gaps restrict program comparisons and assessment of sustained livelihood improvements. *Its novelty lies in jointly examining both programs across wage employment and self-employment while identifying critical livelihood evidence gaps.* Findings support state-level tracer studies, consistent outcome definitions, stronger post-training enterprise assistance, and accessible outcome data. Future evaluations should measure employment retention alongside placement and business continuity alongside enterprise creation. This review advances understanding of PMKVY and BARTI by jointly examining wage employment and self-employment outcomes, identifying critical evidence gaps, and informing strategies for sustainable livelihoods in Maharashtra.**

***Index Terms*—Skill-development, PMKVY, BARTI-initiatives, Wage-employment, Self-employment, Employment-outcomes, Maharashtra, Program-evaluation.**

I. INTRODUCTION

India adds millions of young people to its labor force every year, yet jobs have not kept pace. Studies of Indian employment since early 1990s describe a pattern of fast output growth and weak job creation. *Kannan and Raveendran (2009)* showed that organized manufacturing grew quickly while payrolls stayed almost flat, and profits took a rising share of value added. *Mehrotra et al. (2014)* found that farm jobs shrank after 2004-05, and that construction and services took in many workers who left agriculture, though quality of those jobs stayed low. Abraham (2017) warned that job growth slowed sharply in mid-2010s. *Mehrotra and Parida (2017)* added that women's labor force participation fell, partly because families kept girls in school longer and partly because suitable work was scarce. Together, these studies suggest that India's problem is not only a shortage of workers with skills; it is also a shortage of productive jobs for workers who already have some. Skills-still-matter. *Heckman et al. (2006)* showed that both cognitive-ability and personality traits such as persistence and self-control shape wages and

schooling. *Deming (2017)* found that social skills earn a growing reward in labor markets. For India, *Azam et al. (2013)* reported a large wage premium for English-language skill, and *Kingdon (2007)* argued that weak learning in schools leaves many youths without basic skills when they reach working age. *Jeffrey (2010)* described young men in north India who held degrees but spent long years waiting for work that never came. Such evidence explains why governments treat short vocational courses as a quick bridge between school and work. Global research gives a cautious view of that bridge. *Card et al. (2010)* reviewed nearly one hundred evaluations and found that training raises employment modestly, with gains showing up two or three years after a course ends. *Card et al. (2018)* confirmed this on a larger sample. *McKenzie (2017)* reviewed trials in developing-countries and concluded that gains from vocational training are small and costs per participant are high. *Kluve et al. (2019)* found more encouraging results for skills-training and entrepreneurship support in low- and middle-income countries, especially when programs combine several services. *Hirshleifer et al. (2016)* found little effect on employment from a large Turkish-program, while *Attanasio et al. (2011)* found real-gains for Colombian-youth, especially young women. These mixed findings tell us that design, targeting and follow-up decide success more than training itself.

India has built one of world's largest skilling-systems. Government launched NSDM in 2015 and placed PMKVY at its center. PMKVY pays for short-term *training, assessment* and *certification*, and NSDC runs it through approved training partners. PMKVY 2.0 ran from 2016 to 2020 with a target of one crore trainees, and about 1.10 crore candidates were trained or oriented under it *(MSDE, 2023)*. Economic-survey 2022-23 reported that 83% of PMKVY 2.0 trainees earned certificates and about 21.4 lakh were placed, whereas PMKVY 3.0 certified 66% and placed 41,437 up to January 2023 *(Ministry of Finance, 2023)*. Those numbers show scale, but they also raise a hard question: how many certificates turn into paid work or a running enterprise? Maharashtra gives a useful setting for that question. It led all states in candidates trained under PMKVY 2.0 in 2019-20, with 17.29% of national total *(MSDE, 2020).* It also has a large, mixed labor market, with industrial belts in Mumbai-Pune, farm-based districts in *Marathwada-and-Vidarbha*, and tribal and drought-prone areas. Usual-status unemployment in Maharashtra fell from 4.8% in 2017-18 to 3.3% in 2023-24 *(Ministry of Labor and Employment, 2025).* A low headline rate, however, hides underemployment, informal-work and weak-earnings, so unemployment alone cannot judge a skill-program. A second-scheme gives this study its social focus. *GoM* set up BARTI in Pune in 2008 under its SJSA-Department. BARTI trains unemployed SC youth and women for jobs and offers entrepreneurship training to those who wish to start-enterprises *(BARTI, n.d.).* Caste still shapes who gets hired. *Thorat and Attewell (2007)* sent matched job applications to private firms and found that applicants with Dalit-names received far fewer-positive replies than equally qualified upper-caste applicants. *Madheswaran-and-Attewell (2007)* found that a large part of wage gaps between SC workers and others stays unexplained by education or experience. *Deshpande-and-Newman (2007)* showed that students from SCs enter job markets with different expectations and expect bias in private hiring. *Munshi (2019)* noted that caste networks both help and limit economic mobility. A program built for SC-youth therefore has to do more than teach a trade; it must open doors that networks keep shut.

Wage-work and *self-employment* need separate-treatment. India's PLFS shows that about 49.2% of workers held regular wage or salaried jobs, 39.4% worked for themselves and 11.4% did casual labor in April-June 2023 *(NSO, 2023).* Self-employment is thus not a side path; it covers four in ten workers. Evidence on business-training is cautious. *McKenzie and Woodruff (2014)* found that business training improves practices but lifts profits only modestly. *Cho and Honorati (2014)* found similar patterns in a meta-regression of entrepreneurship programs. *De Mel et al. (2008)* showed that cash grants raised profits of small firms in Sri Lanka, especially male-owned ones, which suggests that capital often limits growth more than know-how does. Yet PMKVY reports no loan-provision, and only about 2.94 lakh candidates became self-employed up to *December 2022 (MSDE, 2023)*. That gap between training and enterprise-finance sits at heart of this review. This paper pursues four aims. *First*, it traces how PMKVY and BARTI-initiatives work in *Maharashtra*. *Second*, it reviews 20 scholarly and institutional sources on skills, jobs and enterprise.

Third, it analyses official secondary data to judge outcomes for wage employment and self-employment. *Fourth*, it spots research-gaps that a future-study can fill. Sections that follow present literature, gap, objectives, method, results, discussion, summary, conclusion, recommendations and future-scope.

II. REVIEW OF LITERATURE

Reviews are arranged in time-order and grouped them in three-phases. Each review notes what authors-did, what they-found and why-it-matters for PMKVY and BARTI in Maharashtra.

2.1 Early evidence on skills, caste and jobs (2006-2011)

- *Heckman et al. (2006)* used longitudinal data from United States to compare cognitive and non-cognitive abilities. They found that both shape wages, schooling-choices and social-outcomes, and that personality-traits often matter as much as test-scores. For our study, this result backs soft-skill and workplace-behavior modules inside PMKVY and BARTI-courses, since employers hire for attitude and reliability as well as technical know-how.
- *Deshpande and Newman (2007)* surveyed university students in Delhi about job plans and found that caste shaped what they expected from work. Students from SCs leaned toward public-sector jobs and expected bias in private hiring. This finding helps explain why a scheme like BARTI, which targets SC youth, has to prepare trainees for private-sector entry through placement support, not only through classroom teaching.
- *Thorat and Attewell (2007)* ran a field test in which they sent matched applications, differing only in caste-linked names, to private employers. *Dalit* applicants received far fewer positive responses than upper-caste applicants with equal qualifications. This study offers direct proof of hiring discrimination and shows why certificates alone may fail to deliver jobs for SC candidates.
- *De Mel et al. (2008)* gave cash and equipment grants at random to small firm owners in Sri Lanka. Profits rose sharply for male owners, while female owners saw little gain. Their work shows that lack of capital, not lack of training, often holds back small enterprises, and it warns that self-employment programs may help men and women in different ways.
- *Kannan and Raveendran (2009)* studied organised manufacturing in India over a quarter century. They found that output grew quickly without matching job growth, and that wage share in value added fell. Their evidence explains why skilled youth struggle to find formal wage jobs, and it shows that training programs work against a hard background of limited demand.
- *Card et al. (2010)* reviewed close to one hundred evaluations of active labour market programs. They found that effects are small right after a program and grow over two to three years, and that training works better than job-search help for long-run gains. For India, this means that placement counts taken at certification understate real effects, and evaluation must follow trainees for years.
- *Attanasio et al. (2011)* ran a randomized trial of a youth training subsidy in Colombia. Trained youth, especially young-women, gained in paid-employment and earnings, and gains were strongest for jobs in formal firms. This case suggests that a program with practical placements and stipends can lift disadvantaged groups, and it offers a design model for BARTI-initiatives

2.2 The program evaluation wave (2012-2017)

- *Jensen (2012)* tested what happens when villages in India gain recruitment help for outsourcing jobs. Young women in treated villages worked more outside home, delayed marriage and stayed in school longer. The result shows that visible job openings change behavior as much as training does, and that linking skill courses to real employer's matters.
- *McKenzie and Woodruff (2014)* reviewed business training trials across developing countries. They found that training improves business practices and raises start-up rates, but effects on profits are modest and often fade. Their review tells us that PMKVY's short entrepreneurship modules cannot, by themselves, produce thriving enterprises.
- *Mehrotra et al. (2014)* analyzed Indian employment between 1993-94 and 2011-12. They found that farm jobs fell in absolute terms after 2004-05, while construction and some services grew, and that casual and informal work dominated new jobs. This

study sets labour-market context for Maharashtra, where trainees compete for informal-work as much as regular-posts.

- *Banerjee et al. (2015b)* tested a bundle of assets, training, coaching and savings support for very poor households in six-countries, including India. Households gained in income, assets and consumption, and gains persisted. This finding supports bundled design: skills work best when paired with *money, mentoring* and *follow-up*.
- *Hirshleifer et al. (2016)* evaluated a large vocational training program for unemployed adults in Turkey. They found small and mostly insignificant effects on employment, with some gains in job-quality and costs far above benefits. Their result warns that scale does not guarantee impact and sets a benchmark for judging PMKVY's placement figures.
- *Maitra and Mani (2017)* tested a subsidized tailoring and stitching-course for women in Delhi slums. Trained women were more likely to work and earned more, and many took up self-employment. This is one of few Indian randomized-studies on short courses, and its finding on women's self-employment bears on Maharashtra's skill-programs.
- *McKenzie (2017)* reviewed trials of training, wage subsidies and job-search help in developing countries. He concluded that vocational training lifts employment by only a few percentage points at high cost per person. His review pushes Indian policy makers to compare PMKVY's cost per placement with cheaper options.

2.3 Recent syntheses and policy records (2018-2023)

- *Card et al. (2018)* extended their earlier review to more than 200 studies. They found that average effects are close to zero in short run but turn positive after two to three years, and that gains are larger for women and for long-term unemployed. This result calls for long follow-up in any PMKVY or BARTI study and for separate analysis by gender.
- *Kluve et al. (2019)* reviewed over one hundred youth employment-programs worldwide. Skills-training and entrepreneurship support performed better in low- and middle-income countries and programs that combined-services and matched-local demand did best. Their review gives strongest-support for blended-models of training, finance and placement in a state like Maharashtra.
- *Munshi (2019)* surveyed research on caste in Indian economic life. He argued that caste networks give members credit, jobs and insurance, yet also limit movement into new occupations. This view helps us read BARTI's work: a public agency that builds skills and market links for SC youth can ease some limits that community networks impose.
- *Alfonsi et al. (2020)* compared vocational-training in institutes with on-the-job training in firms for youth in Uganda. Both raised employment-and-earnings, and firm-based training matched jobs-to-skills more closely. Their study supports industry-linked and apprenticeship-style delivery for PMKVY and BARTI courses.
- *MSDE (2023)* told *Parliament* that about 1.10 crore-candidates were trained or oriented under PMKVY 2.0, and that around 2.94 lakh became self-employed under PMKVY 2.0 and 3.0 up to December-2022. It added that PMKVY provides no loans after training. This record gives official scale and exposes thin link between training and enterprise finance.
- *Ministry of Finance (2023)* reported in Economic-Survey 2022-23 that 83% of PMKVY 2.0 trainees were certified and about 21.4 lakh placed, while PMKVY 3.0 certified 66% and placed 41,437 up to January-2023. These figures show a steep drop in placement across scheme-phases and form core of our empirical-analysis.

III. RESEARCH GAP

The review identifies five gaps: *i) official records do not distinguish wage-employment from self-employment or report job duration and earnings ii) independent evidence on BARTI skill-courses remains limited iii) studies do not compare PMKVY and BARTI-trainees in Maharashtra using common measures iv) follow-up rarely captures longer-term outcomes, although training gains may take time to emerge (Card et al., 2010, 2018) and v) evidence on how credit, mentoring and market-links affect enterprise survival is scarce.* Gender-and-caste differences also need attention *(Jensen, 2012; Maitra and Mani, 2017; Thorat and Attewell, 2007).* The proposed study addresses these gaps by comparing trainee outcomes and examining wage-employment and self-employment over time.

IV. OBJECTIVES OF THE STUDY:

From core measurement to policy-use, study objectives are arranged in order of priority.

1. To measure, for PMKVY and BARTI-trainees in Maharashtra, how many move into wage-employment and how many into self-employment, using placement and enterprise-start rates at six and twenty-four months after certification.
2. To compare wage-employment and self-employment outcomes of PMKVY and BARTI-trainees on monthly-income, job formality and job-duration.
3. To examine how gender, caste-category, district and course-sector change those outcomes.
4. To identify which design features, such as course length, placement support, access to credit and trainer quality, explain differences in outcomes.
5. To propose evidence-based changes that raise conversion from training to sustained work in Maharashtra.

V. RESEARCH METHODOLOGY

5.1 Research design

This paper uses a structured-narrative-review joined to secondary data analysis. A narrative design suits a topic where evidence comes from journal articles, government-records and program documents of unequal rigour, and where a pooled meta-analysis cannot be done. Data-analysis stays descriptive and inferential, and it uses only public-figures.

5.2 Source selection protocol

We searched Scopus, Web-of-Science, UGC-CARE-listed journals and Google-Scholar, alongside official-sources from MSDE, *Open-Government-Data-Platform India*, MoSPI, Parliament, Economic-Survey and BARTI. Search terms covered *skill-development*, *vocational-training*, PMKVY, BARTI, active labor-market-programs, self-employment, entrepreneurship-training, caste and Maharashtra. We reviewed sources published during 2006-2025, using an earlier foundational-concept where relevant.

We included empirical-studies and official data addressing training, employment, enterprise-outcomes and caste or gender-barriers. We excluded opinion pieces, press-releases without data and articles without stated-methods. Twenty-sources form the core review in Section-2 additional articles support context and discussion.

5.3 Data Extraction and Appraisal

For each core-source, we noted country, design, sample, outcome-measure and main result, and we judged strength of evidence by design: randomized-trials and meta-analyses first, large-sample surveys-next and descriptive official-records last. We read official figures with care, since agencies define terms like ‘placed’ in their own-way.

5.4 Secondary data and variables

Empirical-analysis draws on five-public-sources: *(i) Economic-Survey* 2022-23 for PMKVY 2.0 and 3.0 trainees, certification and placement *(ii) Rajya-Sabha-reply* of 15 March 2023 for 1.10 crore trained under PMKVY-2.0 and 2.94 lakh self-employed *(iii)* Rajya-Sabha-Session 251-data for state-wise trainees in 2018-19 and 2019-20 *(iv)* PLFS bulletin for worker status shares in April-June 2023 and *(v)* Ministry-of-Labour and Employment-data for usual-status unemployment rates in Maharashtra and India.

We define four measures:

1) *Certification rate* = certified candidates ÷ trained candidates.
2) *Placement rate* = candidates reported placed ÷ trained candidates.
3) *Self-employment-share* = self-employed candidates ÷ (self-employed + placed candidates).
4) *Unemployment rate* = unemployed persons ÷ labor force, usual status, age 15 and above.

5.5 Statistical tools

We computed growth-rates, shares and percentage-point changes and we used a two-proportion z-test and a one-sample proportion z-test at 5% significance, with 95% CIs for differences. We drew graphs from the same figures that we tested, so each chart ties to its table of source-numbers.

5.6 Hypotheses

1) Hypothesis-1 (placement across scheme phases)

H0: Placement rate under PMKVY2.0 equals placement rate under PMKVY3.0 (P1 P2) Vs

H1: Placement rates under PMKVY 2.0 and PMKVY 3.0 differ ($P1 \neq P2$).

2) Hypothesis-2 (self-employment pathway)
H0: Self-employment share among PMKVY reported outcomes equals self-employment share among Indian workers, 39.4% (P = 0.394). Vs
H1: Self-employment share among PMKVY reported outcomes is lower than 39.4% (P < 0.394).

5.7 Limitations and ethics
Official-counts are cumulative, are cut at different-dates and come from partner-reports, not from independent-surveys. Candidates are not-random draws from any population, so *p-values* here measure how large a gap is against chance in counts, not causal effect. State-level placement data for Maharashtra under PMKVY 2.0 and BARTI-outcome data were not available in sources we used, so Maharashtra state results are descriptive. We used only public-data, and no human-participants took part.

VI. RESULTS AND EMPIRICAL EVIDENCE

6.1 Data and approach
This section uses public secondary data to answer three questions. How large is Maharashtra's part in PMKVY training? How many trainees reach work, and in what form? What does Maharashtra's labor market look like around those trainees? We present six figures, then test two hypotheses. Each figure carries a short note on its source, and interpretation follows right after.

6.2 Maharashtra's place in PMKVY training

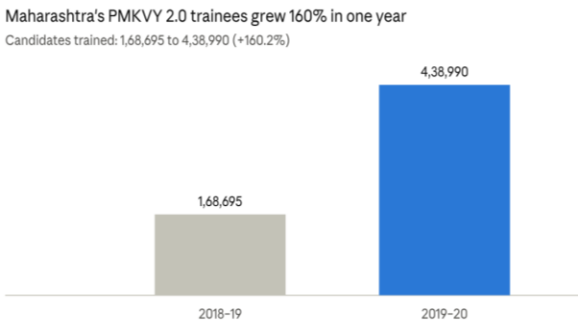

Figure-1. Candidates trained in Maharashtra under PMKVY 2.0

Source: Ministry of Skill Development and Entrepreneurship (2020), Rajya Sabha Unstarred Question 3198, Session 251, via Open Government Data Platform India.

Interpretation: Figure-1 shows that Maharashtra trained 168,695 candidates in 2018-19 and 438,990 in 2019-20, a rise of 160.2%. Scheme activity in state grew very fast in last full year of PMKVY-2.0, which tells us that training capacity existed and could scale quickly. Speed raises a quality question: did placement support grow at same pace?

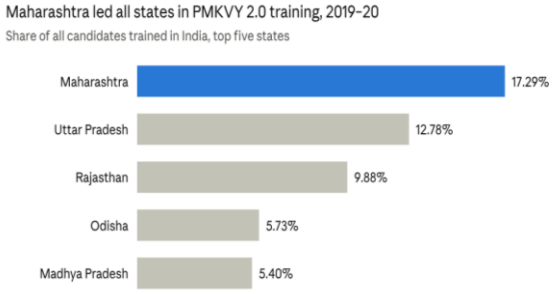

Figure-2. State-wise share of PMKVY 2.0 trainees, 2019-20

Source: Ministry of Skill Development and Entrepreneurship (2020), Rajya Sabha Unstarred Question 3198, Session 251, via Open Government Data Platform India.
Interpretation: Figure-2 puts Maharashtra first, at 17.29% of all candidates trained across India in 2019-20. Uttar Pradesh follows at 12.78% and Rajasthan at 9.88%.

That share implies about 25.4 lakh candidates trained nationally in that year, and Maharashtra's count is about 1.35 times that of Uttar Pradesh. Together, three states account for roughly 40% of national trainees. For our thesis, this finding justifies Maharashtra as a high-volume case: outcomes here shape national averages.

6.3 From training to placement

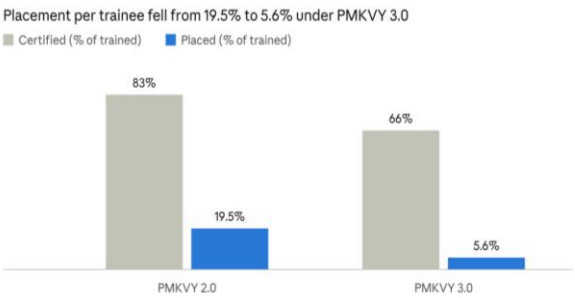

Figure-3. Certification and placement under PMKVY 2.0 and PMKVY 3.0

Source: Ministry of Finance (2023), Economic Survey 2022-23; PMKVY 2.0 (FY17-FY23) and PMKVY 3.0 (FY21-FY23) up to 5 January 2023. Trained counts in lakh; placement rate computed by authors.

Interpretation: Figure-3 shows two stages of conversion. Certification fell from 83% under PMKVY 2.0 to 66% under PMKVY 3.0, a gap of 17 points. Placement fell much more: about 19.5% of PMKVY 2.0 trainees (21.4 lakh of 1.10 crore) reached reported placement, against about 5.6% under PMKVY 3.0 (41,437 of 7.4 lakh). Seen another way, about 23% of certified PMKVY 2.0 candidates found a reported placement, and only about 8.5% of certified PMKVY 3.0 candidates did. Two cautions apply: PMKVY 3.0 cohorts are newer, and *Covid-era* disruption fell in its first years, so placements may still arrive. Even so, a gap these wide calls for a closer look at what changed.

6.3.1 Test of Hypothesis-1. We compare two placement rates with a two-proportion z-test. Sample values are p1 = 0.1946 (n1 ≈ 1.10 crore) and p2 = 0.0560 (n2 = 7.4 lakh). Pooled rate is 0.1858, standard error under H0 is about 0.00047, and z ≈ 296 ($p < 0.001$). Difference in rates is 13.9 percentage points, with 95% confidence interval from 13.8 to 13.9 points. We *reject H0 and accept H1*: placement rate under PMKVY 3.0 sits well below PMKVY-2.0. Because trainee counts are rounded and cumulative, z is approximate, but result stays significant even if counts shift by several per cent. Size of gap, not z-value, carries meaning here.

6.4 Wage employment versus self-employment

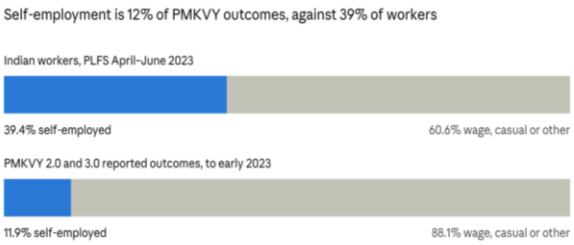

Figure-4. Self-employment share: PMKVY reported outcomes against Indian workers

Source: National Statistics Office (2023), PLFS April-June 2023; Ministry of Skill Development and Entrepreneurship (2023), Rajya Sabha Unstarred Question 1722; Ministry of Finance (2023). Shares computed by authors.

Interpretation: Figure-4 compares two mixes. Among Indian workers in April-June 2023, 39.4% worked for themselves, 49.2% held regular wage or salaried jobs and 11.4% did casual labor. Among PMKVY outcomes reported up to early 2023, about 2.94 lakh candidates were self-employed against about 21.8 lakh placed *(21.4 lakh under PMKVY 2.0 and 41,437 under PMKVY 3.0).* That puts self-employment at about 11.9% of reported outcomes. Even if we assume all self-employed candidates already sit inside placement counts, share would be about 13.5%, still far below 39.4%. PMKVY thus feeds wage placement much more than enterprise, even though enterprise covers four in ten Indian workers.

6.4.1 Test of Hypothesis 2. We use a one-sample proportion *z-test* with P0 = 0.394 and n = 24.75 lakh reported outcomes. Sample share is 0.1188, standard error under H0 is about 0.00031, and z ≈ -886 ($p < 0.001$). Gap is -27.5 percentage points. We *reject H0 and accept H1*: self-employment share among PMKVY reported outcomes lies below its share among Indian workers. We read this as a statement on program mix, not as proof of failure, since PMKVY never aimed to match labor-force shares.

6.5 Maharashtra's labor market context

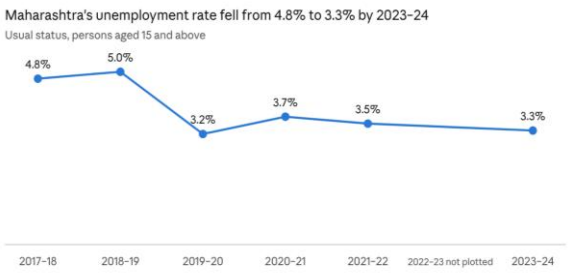

Figure-5. Usual-status unemployment rate in Maharashtra

Source: Ministry of Labour and Employment (2023, 2025), PLFS annual reports. 2017-18 to 2021-22 from Rajya Sabha Unstarred Question 2646; 2023-24 from PIB release of 1 December 2025.

Interpretation: Figure5 shows Maharashtra's unemployment rate at 4.8% in 2017-18, a peak of 5.0% in 2018-19, a low of 3.2% in 2019-20 and 3.3% in 2023-24. In rural Maharashtra, rate fell from 3.2% to

2.1% over same span *(Ministry of Labour and Employment, 2025)*. Low headline numbers sit beside high youth joblessness at national level: PLFS put unemployment among those aged 15-29 at 17% in January-March 2024 *(NSO, 2024)*. Trainees are mostly young, so youth figures matter more for them than the all-age rate.

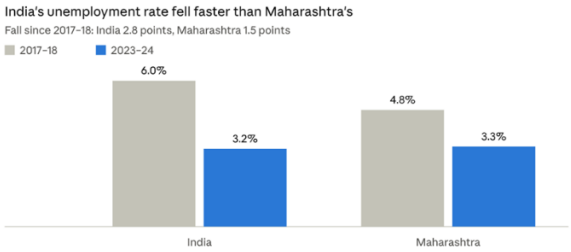

Figure-6. Change in unemployment rate: India and Maharashtra, 2017-18 to 2023-24

Source: Ministry of Labour and Employment (2025), PIB release of 1 December 2025, PLFS annual reports. All-India and Maharashtra, usual status, age 15 and above.

Figure-6 shows that India's rate dropped from 6.0% to 3.2%, a fall of 2.8 points, while Maharashtra's rate dropped from 4.8% to 3.3%, a fall of 1.5 points. Maharashtra began 1.2 points below India and ended 0.1 point above it. Falling joblessness in state therefore came more slowly than nationwide, which means that high training volume has not yet lifted state's relative position.

6.5.1 District-Level Dynamics and the Case of Buldhana

While state-level aggregations capture broad policy trends in Maharashtra, statewide metrics frequently mask significant regional disparities between highly industrialized urban corridors (such as *Mumbai-Pune-Nashik*) and agrarian, semi-urban districts like Buldhana, located in the Amravati administrative division of Western-Vidarbha.

6.5.2 Socio-Economic and Labor Market Context in Buldhana:

Buldhana is characterized by a predominantly agrarian economy with limited large-scale industrial employers, making local wage-placement avenues scarce compared to metropolitan hubs. Consequently, skilling initiatives in Buldhana rely heavily on agricultural-allied sectors, micro-enterprises, and localized service trades.

6.5.3 PMKVY-Penetration and Implementation Challenges:

Under PMKVY-implementation frameworks, TPs in districts like *Buldhana* encounter unique logistical constraints. While short-term vocational courses (such as *retail, apparel, and basic IT*) register steady-enrollment among rural youth, local-job-placements often fall short of statutory-expectations. Trainees frequently face a geographical mismatch: formal job opportunities often require migration to *Pune, Aurangabad* or *Nagpur*, which many trainees from rural Buldhana are reluctant or financially unable to undertake.

6.5.4 Comparative District Insights

When comparing *Buldhana* with districts like Pune or Nagpur, urban districts benefit from denser industry-clusters, active CSR-tie-ups and robust placement-cells. Agrarian/Semi-urban districts like Buldhana require a pivot toward localized-entrepreneurship, agro-processing, SHG-integrations and digital-freelancing skills rather than standard corporate-wage placements.

6.6 What data show about BARTI-initiatives

Public records describe BARTI's skill-work but do not report outcomes. BARTI works as an autonomous body of Maharashtra's *Social-Justice-and-Special-Assistance-Department*, and it trains unemployed SC youth and women for jobs and runs entrepreneurship development training *(BARTI, n.d.)*. Its skill department lists employment-oriented programs, captive-manpower programs, industrial-cluster programs, government-to-government and corporate-social-responsibility programs, online and offline delivery, residential and non-residential courses and soft-skill training.

Candidates must hold a SC certificate and meet course-specific education norms. A recent certificate event in Satara honored 150 SC candidates who completed technology-based courses, among them graphic designing, social media executive, IT help desk assistant, GST assistant and desktop publishing *(India CSR, n.d.)*. Such reports show activity and course mix, but we found no public figure on how many BARTI trainees later took wage jobs or started enterprises. We therefore treat BARTI as an evidence gap, not as a tested result.

6.6.1 The Role of BARTI Initiatives in Buldhana:
Since Buldhana hosts a significant Scheduled-Caste (SC) demographic, targeted interventions by BARTI-such as technology-based training, skill upgradation, and entrepreneurship modules-play a vital equity role. However, field observations and secondary data gaps indicate that while training programs are successfully conducted, sustained self-employment conversion is constrained by Limited-access to institutional credit *(Mudra-loans or collateral-free bank-finance)* from local-rural-bank branches. Inadequate post-training business mentoring, leaving nascent entrepreneurs vulnerable to market fluctuations.

6.7 Summary of tests

Table-1: Summary of Hypothesis Tests on PMKVY Placement and Self-Employment Rates

Hypothesis	*Test*	*Statistic*	*Decision*
H1: Placement rate, PMKVY 2.0 *vs* 3.0	Two-proportion z-test	$z \approx 296$; difference 13.9 points; $p < 0.001$	Reject H0
H2: Self-employment share *vs* 39.4%	One-sample proportion z-test	$z \approx -886$; gap −27.5 points; $p < 0.001$	Reject H0

Source: Authors' calculations based on Economic Survey 2022–23 (Ministry of Finance, 2023), Rajya Sabha Unstarred Question No. 1722 (MSDE, 15 March 2023), and PLFS Annual Report 2021-22 (NSO).

6.8 Main Findings
Maharashtra trained more PMKVY 2.0 candidates than any other state in 2019-20. Placement per trainee fell sharply from PMKVY 2.0 to 3.0. Self-employment forms a small slice of reported outcomes. Maharashtra's unemployment rate fell, but not faster than India's. BARTI outcome data remain unavailable. Each finding links to a thesis objective in Section 4.

VII. DISCUSSION

Results show that PMKVY expanded training-participation substantially but converted a smaller share of trainees into reported-employment. Maharashtra's training numbers rose from 168,695 in 2018-19 to 438,990 in 2019-20, demonstrating considerable delivery capacity *(MSDE, 2020).* However, reported placement rates declined from approximately 19.5% under PMKVY 2.0 to 5.6% under PMKVY 3.0. *Hypothesis-1* rejected equal placement rates, addressing this review's objective of comparing employment conversion across program-versions. This result identifies a difference in reported outcomes; it does not establish that program-changes caused lower placement. *International-evidence* helps interpret this gap. Training often produces modest employment gains, and benefits may emerge only after two to three years *(McKenzie, 2017; Card et al., 2018).* Short follow-up periods, *Covid-era* disruption and limited demand for regular-jobs may therefore influence observed placement rates. Indian studies also document weak employment growth despite rising output and continued dependence on informal work *(Kannan & Raveendran, 2009; Mehrotra et al., 2014).* These findings suggest that expanding training alone cannot overcome limited job creation. *Program-design* offers practical directions for improvement. Studies from Colombia, Uganda and other settings show that workplace experience, stipends, soft-skills and employer links can strengthen employment and earnings outcomes *(Attanasio et al., 2011; Alfonsi et al., 2020).* Broader reviews similarly support combining training with complementary services *(Kluve et al., 2019).* For PMKVY-Scheme and BARTI-initiatives, these findings favor closer employer partnerships and practical-placement opportunities, while recognizing that results depend on local labor demand and participant needs.

Self-employment accounted for approximately 11.9% of reported PMKVY-outcomes, compared with 39.4% among Indian-workers. Hypothesis 2 rejected equal shares, identifying a statistical difference under this benchmark comparison. However, these figures represent different populations and reporting systems. Consequently, this result provides context for assessing enterprise outcomes rather than proof of program underperformance. PMKVY was not designed to reproduce national labor-force shares. *Enterprise-studies* suggest that skills require complementary-resources. Capital, coaching and market-access can support business-growth, while training or credit alone often produces limited gains *(McKenzie & Woodruff, 2014; Banerjee et al., 2015a, 2015b).* PMKVY includes entrepreneurship content but provides no loans directly after training *(MSDE,*

2023). This distinction supports examining beneficiaries' actual access to finance and mentoring rather than assuming that training automatically leads to viable enterprises.

Gender-and-caste also matter when comparing beneficiaries. Research documents barriers to women's employment and discrimination against SC applicants in hiring and wages *(Thorat & Attewell, 2007; Madheswaran & Attewell, 2007; Mehrotra & Parida, 2017).* BARTI's targeted initiatives therefore require evaluation within this social context. Reviewed public sources describe training activities but provide insufficient evidence on subsequent employment, earnings and enterprise continuity. This gap prevents a reliable comparison with PMKVY and limits conclusions about BARTI's contribution. *Maharashtra's* unemployment rate declined from 4.8% to 3.3% between 2017-18 and 2023-24, while India's rate fell from 6.0% to 3.2% *(Ministry-of-Labor-and-Employment, 2025).* These trends provide labor-market context but cannot establish either initiative's impact. *Overall,* findings address employment-conversion, self-employment, evidence-gaps and program-improvement. Both hypothesis results identify reported differences, while cohort-variation, unequal follow-up and reporting limitations restrict-interpretation. Comparable-tracer studies should separate wage-employment from self-employment and measure earnings, job-retention, business-continuity, credit-access and mentoring. Such evidence would support clearer evaluation and targeted reforms for sustainable-livelihoods in Maharashtra.

VIII. LIMITATIONS OF THE STUDY

The findings should be interpreted in light of the following study limitations:

1. *Limited BARTI-outcome data:* Publicly-available evidence provides insufficient-information on trainees' employment, earnings and enterprise-outcomes.
2. *Inconsistent-measures:* PMKVY and PLFS figures cover different-populations and use different outcome-definitions, limiting direct-comparisons.
3. *Limited causal-interpretation:* Aggregate secondary data and differing program periods do not establish that training alone caused observed employment changes.

IX. SUMMARY

This paper reviewed how PMKVY-Scheme and BARTI-initiatives support wage-employment and self-employment in Maharashtra. We combined 20 scholarly and institutional-sources with official secondary data to examine job-outcomes, implementation gaps and enterprise support. Reported placement rates fell from about 19.5% under PMKVY 2.0 to 5.6% under PMKVY 3.0, and statistical testing rejected equal rates. Self-employment accounted for about 11.9% of reported PMKVY-outcomes, compared with 39.4% among Indian-workers, although different reporting populations limit direct comparison.

Maharashtra's unemployment rate declined from 4.8% to 3.3%, while India recorded a faster decline. The review also identified gaps in comparable program-measures and separate reporting of wage-work and enterprise-outcomes. Limited BARTI outcome-data, short follow-up periods, and missing-information on credit and mentoring restrict firm conclusions. Together, these findings highlight a gap between training participation and verified livelihood gains, providing context for subsequent conclusions.

X. CONCLUSION

This review examines how PMKVY-Scheme and BARTI-initiatives support wage employment and self-employment in Maharashtra. Reported placement rates fell from about 19.5% under PMKVY 2.0 to 5.6% under PMKVY 3.0. Self-employment represents about 12% of reported outcomes, compared with 39.4% among Indian workers, although reporting populations differ.

Available BARTI records describe activities but provide limited outcome evidence. Global-studies highlight how stipends, practical-placement, soft-skills, capital and mentoring complement skill-training. Independent, long-run evidence remains essential to distinguish wage-work from enterprise and assess earnings and retention. A tracer-based research study can follow trainees over time to identify what works, for whom, and at what cost.

XI. RECOMMENDATIONS

We offer seven recommendations from this review.

1. *Report outcomes in detail*: MSDE, NSDC and BARTI should publish placement data split by wage-job, self-employment, pay-band, job-duration, gender, caste-category and district, at six and twenty-four months after certification.
2. *Run independent tracer studies*: State government should fund university-led follow-up surveys of PMKVY and BARTI trainees, with samples large enough for district and caste splits.
3. *Link training to credit:* Training partners should connect self-employment trainees to bank loans, Mudra credit and self-help-group finance, since capital often limits small firms more than know-how does.
4. *Add mentoring after training:* Each enterprise trainee should get at least twelve months of mentoring on markets, costs and record keeping.
5. *Tie payment to lasting work:* Part of a training partner's fee should depend on placement that lasts six months or more, not on first placement alone.
6. *Build employer links and apprenticeships:* BARTI and PMKVY courses should include paid on-the-job periods with local firms, since firm-based training matches skills to jobs more closely.
7. *Support women and SC-trainees:* Courses should offer stipends, safe-and-flexible schedules, soft-skill training and anti-bias placement-support and BARTI should publish a yearly results-report.

XII. FUTURE SCOPE

Future research can build on this review by addressing the following priorities:

1. *Track employment outcomes:* Follow PMKVY and BARTI trainees across Maharashtra's six-administrative divisions at six and twenty-four months. Record wage-employment, enterprise creation, earnings and job-retention.
2. *Assess program contribution:* Compare trainees with similar non-participants using suitable methods, such as propensity score matching or difference-in-differences, where data permit.
3. *Examine outcome differences:* Analyze results by gender, caste category, district type and course sector, including barriers that may affect employment after training.
4. *Identify effective program features:* Interview trainees, trainers and employers to assess course length, practical training, placement support, credit access and mentoring. Compare cost per placement and enterprise start.
5. *Inform program improvements:* Use findings to develop practical recommendations for Maharashtra's Skill Development and Social Justice departments. Future studies can also examine newer PMKVY phases, other states, and digital or green skills as reliable outcome data become available.

ABBREVIATIONS:
PMKVY: PRADHAN MANTRI KAUSHAL VIKAS YOJANA
BARTI: DR. BABASAHEB AMBEDKAR RESEARCH AND TRAINING INSTITUTE
PLFS: PERIODIC LABOUR FORCE SURVEY
NSDM: NATIONAL SKILL DEVELOPMENT MISSION
NSDC: NATIONAL SKILL DEVELOPMENT CORPORATION
MSDE: MINISTRY OF SKILL DEVELOPMENT AND ENTREPRENEURSHIP
GOM: GOVERNMENT OF MAHARASHTRA
SC: SCHEDULED-CASTE
SJSA: SOCIAL JUSTICE AND SPECIAL ASSISTANCE
NSO: NATIONAL STATISTICS OFFICE
MoSPI: MINISTRY OF STATISTICS AND PROGRAM IMPLEMENTATION
CI: CONFIDENCE INTERVAL
SHG: SELF-HELP GROUP
TP: TRAINING PARTNER
CSR: CORPORATE SOCIAL RESPONSIBILITY

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