

The Last Line in Bayan Lepas

Thirty-one years on one factory floor, and a machine that learned the job in a fortnight.

8 min read

Before you read

- **free trade zone** — an area where goods are made for export under relaxed tariffs
- **value chain** — the sequence of stages that add worth to a product
- **displacement** — the loss of a job to a machine or a process change
- **reskilling** — training a worker for different work
- **productivity** — output measured against the labour and capital used to make it
- **precarity** — employment without security, predictability or protection



Night shift inside an electronics plant in Bayan Lepas, Penang — bright inspection benches, dark aisles between them

¹ Puan Saraswathy started on the line in Bayan Lepas in 1994, when she was nineteen. The job was visual inspection: lead frames came past on a belt, she looked at them, and the ones with a flaw went into a tray at her left hand. She was good at it in a way that is difficult to describe to anyone who has not done it. By the second year she was finding faults she could not have explained if asked.

² Penang's free trade zone opened in 1972 on land that had been paddy and swamp, and within a decade it had done what almost no industrial policy manages: it worked. The island's electronics cluster drew in firms from the United States, Japan and Europe, and the people it drew in were mostly young women from rural Kedah, Perak and the Penang mainland, for whom a wage on an assembly line was the first money anyone in the household had earned outside agriculture.

- ³ The arrangement was understood on both sides. The firms came for cheap, careful labour. The labour came for a wage and, as it turned out, for a kind of mobility that nobody had promised. Saraswathy's daughter is a process engineer in the same industrial park, two kilometres and one social class from where her mother sat.
- ⁴ The machine that replaced Saraswathy's work was installed in 2019. It is an optical inspection system: cameras, lighting, and software trained on several hundred thousand images of good and defective parts. It took about a fortnight to reach her accuracy and roughly two months to exceed it. It does not get tired at four in the morning, and it does not look away.
- ⁵ Saraswathy was not dismissed. She was moved to a line-support role, which she holds today, and the company put her through a training programme in machine handling. She is fifty-one. The programme was designed, as these programmes generally are, for someone with more working years ahead of them than she has.
- ⁶ The debate about automation is usually conducted as though the question were how many jobs. It is the wrong question, or at least the least interesting one. Economists have pointed out for two centuries that mechanisation destroys particular jobs while raising output, and that higher output creates employment elsewhere — often in work that did not previously exist. The historical record broadly supports them. Penang itself is the argument: the zone displaced agricultural labour and created several hundred thousand manufacturing and engineering positions in its place.
- ⁷ The more useful question is whose jobs, and when, and what happens in between. Aggregate employment can recover fully while a particular cohort never does. The new jobs may appear in a different city, demand a different education, and arrive fifteen years after the old ones disappeared — which is of limited comfort to a woman of fifty-one with a mortgage and a secondary school certificate.
- ⁸ There is a second asymmetry, and it is the one that matters most for a country at Malaysia's stage of development. Automation does not strike a workforce evenly. It takes first the tasks that are routine, repetitive and visually specifiable — which is a precise description of the work that lifted Penang out of poverty. The rungs of the ladder are being removed from the bottom, and they are the rungs that the next cohort of rural school-leavers was expecting to stand on.
- ⁹ The standard answer is reskilling, and it is not a bad answer, but it is asked to carry more weight than it can bear. Retraining programmes work best for younger workers, in regions where the new work already exists, with firms that commit to hiring from them. Remove any one of those conditions and completion rates fall sharply. A reskilling budget is often, in practice, a transfer of responsibility rather than a solution: the state funds a course, the firm reports a figure, and the burden of succeeding remains exactly where it was.
- ¹⁰ What else, then. Some economists argue for taxing capital investment in automation, which has the virtue of directness and the defect of slowing the productivity growth that pays for everything else, including whatever is done for displaced workers. Others argue for shifting support from the job to the person — portable benefits, wage insurance that tops up earnings when a worker moves to a lower-paid role, income floors that do not depend on remaining in one post. These are expensive and politically awkward, and they

have the advantage of addressing the actual injury, which is not that the work changed but that one group was made to absorb the entire cost of a change the whole country benefits from.

¹¹ Saraswathy is clear-eyed about the machine. She has seen it work and she does not dispute that it is better than she was. What she objects to, when she objects to anything, is narrower and harder to answer: that a gain distributed across an entire economy was paid for, almost entirely, by the people on one floor of one building in Bayan Lepas.

Part A Reading closely

Circle the letter next to the best answer.

1. How long did the optical inspection system take to exceed Saraswathy's accuracy?
A About a fortnight
B Roughly two months
C Close to a year
D It never exceeded it
2. In paragraph 8, the image of rungs being removed from the bottom of a ladder is used to argue that
A manufacturing work in Penang has become physically more dangerous
B automation will eventually replace engineers as well as operators
C the free trade zone should never have been built on paddy land
D the entry-level work that allows upward mobility is what disappears first
3. Which objection does the writer raise against reskilling programmes?
A They succeed only under conditions that are frequently absent, while appearing to discharge responsibility
B They are opposed by the firms that would have to fund them
C They train workers for jobs that machines cannot yet perform
D They are too expensive for any government to attempt
4. According to paragraph 10, the defect of taxing investment in automation is that it
A is impossible to administer across international firms
B would be rejected by workers as an attack on their own employers
C slows the productivity growth that funds support for displaced workers
D has never been attempted anywhere in the world

Part B Analysis

Answer in two or three sentences each. Refer to the passage by paragraph number where it helps your answer.

5. The writer says the question of how many jobs is 'the wrong question, or at least the least interesting one'. Explain the distinction being drawn, and why the writer thinks it matters.
6. Paragraph 3 ends with the daughter working 'two kilometres and one social class' from her mother. Analyse what this phrasing achieves that a plain statement of her job would not.
7. Explain the writer's claim in paragraph 9 that a reskilling budget can be 'a transfer of responsibility rather than a solution'.
8. The passage uses Penang's own history both to support the economists' optimism and to complicate it. Explain how the same example does both jobs.

9. Comment on the writer's decision to end with Saraswathy's own objection rather than with a policy recommendation. What does the choice do to the argument?

Part C Think deeper

There is no single right answer here. Take a position and support it with reasoning and, where relevant, evidence from the passage.

10. The writer accepts that the machine is better at the job than Saraswathy was. Does that acceptance strengthen or weaken the argument that follows? Explain.

11. Of the responses surveyed in paragraph 10, which would you choose for a middle-income economy, and what would you be willing to give up to fund it?

12. Make the case that a country at Malaysia's stage of development should automate faster, not more slowly, even accepting the costs the passage describes.

13. The passage frames the injury as one group absorbing the cost of a gain the whole country receives. Identify another change — historical or current — with the same structure, and say what was or should have been done about it.

14. Imagine Saraswathy's daughter writing a reply to this passage. What would she say that her mother would not, and why?

Answer key

For parents and teachers

Part A

1. **B** — roughly two months (para 4) | 2. **D** — entry-level work disappears first (para 8)
3. **A** — conditional success, apparent discharge of responsibility (para 9) | 4. **C** — it slows productivity growth (para 10)

Part B

5. The quantitative question asks about total employment, which history suggests recovers. The distributional question asks who bears the loss, where, and over what period — and aggregate recovery is compatible with a particular cohort never recovering. Strong answers name the aggregate/distributional distinction even if not in those words.
6. It compresses physical proximity and social distance into one measurement, so the reader registers the scale of the mobility without the writer having to assert it. The understatement also keeps the sentence from sentimentality. Accept any answer identifying the yoking of two unlike units and the effect of that compression.
7. The state funds a course and the firm records a number, so both can show they acted, while the obligation to actually find and hold new work still sits entirely with the worker. The appearance of a remedy substitutes for the remedy. Credit answers that identify who is relieved of responsibility and who is not.
8. Penang supports the optimistic case because the zone destroyed agricultural livelihoods and created far more manufacturing and engineering work in their place. It complicates that case because the work now being automated is precisely the entry-level work that made the transition possible, so the mechanism that rescued one generation is unavailable to the next. Look for both directions, not one.
9. It refuses the resolution a policy essay would normally supply, and narrows the claim from a general argument about automation to a specific grievance about who paid. Ending on the person rather than the prescription makes the distributional point concrete and leaves the reader holding it. Accept answers noting the deliberate withholding of a conclusion.

Part C

These answers vary. Mark the reasoning, not the position taken.

10. The strongest answers see that the concession is doing work: by granting the machine's superiority the writer removes the easy objection and forces the argument onto distribution, where it is harder to dismiss. An answer that treats the concession as a weakness should still be credited if it argues the point, but push for engagement with the rhetorical function.
11. Look for a choice accompanied by an explicit cost — higher taxation, slower growth, reduced spending elsewhere. A proposal without a funding source is not yet an argument at this level.
12. This asks students to argue against the passage's sympathies. Strong answers invoke competitiveness, capital mobility, demographic change, or the cost of falling behind regional rivals, and engage with the human cost rather than ignoring it.
13. Any well-chosen parallel counts — trade liberalisation, mechanised agriculture, mine or mill closures, the shift to online retail. The analysis must identify both the concentrated loss and the dispersed gain.
14. This tests perspective-taking under constraint. A strong answer gives the daughter a materially different position — she is a beneficiary of the same process — rather than making her a mouthpiece for the student's own view. Prompt with: what does she have that her mother does not?

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