

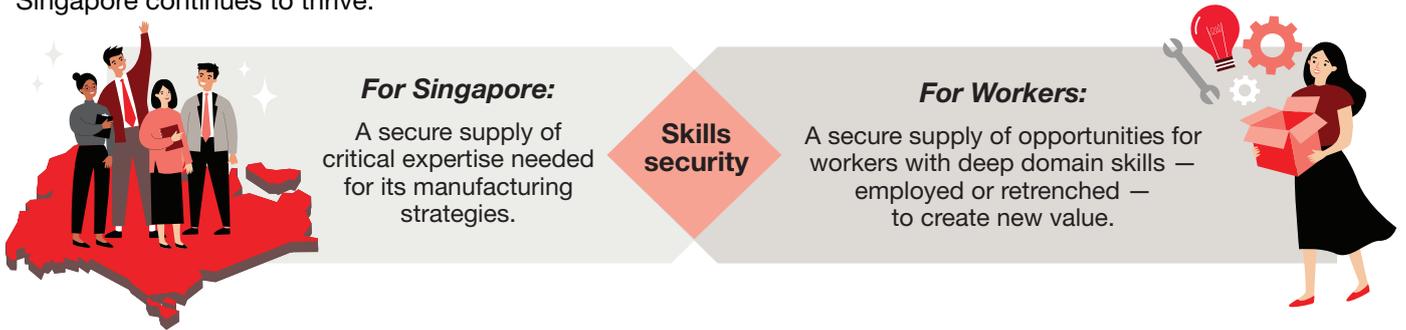


# FUTURE OF MANUFACTURING: CRAFTING SKILLS SECURITY AND MASTERING UNCERTAINTY

## Key Insights

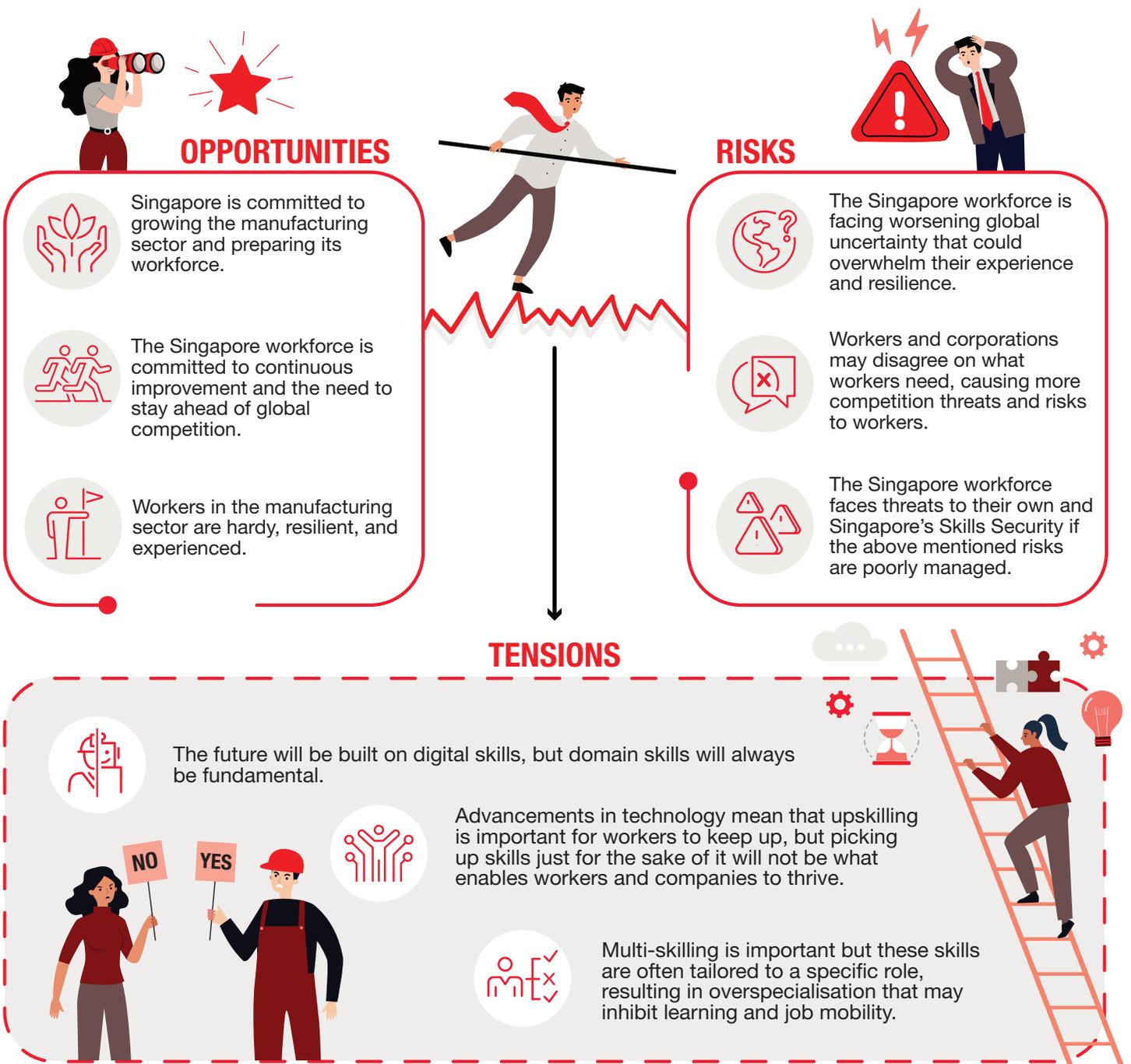
Research Partnership between **National Trades Union Congress (NTUC)**, **NTUC LearningHub** and the **Lee Kuan Yew Centre for Innovative Cities**, **Singapore University of Technology and Design (SUTD)**

Singapore's manufacturing sector faces renewed strengths and threats in a changing post-pandemic world. Close to 2,000 workers were engaged to gather the insights that informed this study on empowering workers with the Skills Security needed to create new value to fulfil Singapore's manufacturing strategies, so that the manufacturing sector in Singapore continues to thrive.



## MUCH TO BE OPTIMISTIC FOR, MANY RISKS TO BE MANAGED

We find there is much to be optimistic about in the opportunities ahead in the manufacturing sector, but also many risks that need to be managed. For workers, navigating these opportunities and risks requires resolving three tensions.



The dichotomy between the opportunities and risks above lead to workers experiencing uncertainty. If we want more workers to thrive, we must understand in-depth what they experience.

## THESE TENSIONS RESULT IN UNCERTAINTIES EXPRESSED BY WORKERS ABOUT...

### ... economy and jobs

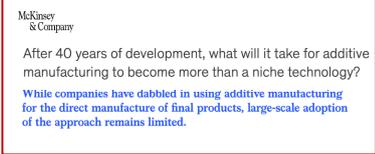


### ... industry's future

Less and less talent is coming into the industry. Or they may have moved to other countries, which results in less talent availability...So overall I see a weakening of the semicon ecosystem in Singapore.

(Semicon Engineer)

### ... growth prospects



### ... competition

When you talk about fully automated [in Foreign Country], is it in the same industry? What kind of process is it?

(E&C Technician)

### ... skills application

People feel flooded with course options: companies and workers do not know which are the relevant courses to go for. Some eventually attend these courses and get quite disappointed because they don't find that they learn much. They can't apply much of what they learnt because the courses may be too theoretical with little emphasis on application.

(AM Engineer)

### ... knowledge gaps

At the moment, technical sales is done by one of our materials engineers and our admin department. But they needed someone with more industry knowledge. So, things like material naming, engineering parts required for the process...became a bit of a challenge for them. This is where the gap is...

(AM Engineer)

### ... systems risks

We can learn a lot from our colleagues and we do have update meetings, but those are not really learning in a way that if one of them is on leave for a whole week one of us is still able to step in to fulfil the role. At the moment it's still that if that person is not here today nobody else knows what to do.

(AM Engineer)

### ... tech application

One thing interviewee noted in comparing AM workers in Singapore with those in [Home Country]: In [Home Country] people have more "hands-on" experience. While people in SG may be well educated and know how the AM as technology operates, they have difficulty translating this to real-world shop-floor applications.

(AM Engineer)

### ... up-skilling

I think there are too many courses out there, so the workers and companies do not know which are the relevant courses that will really give them the upgrading and skills.

(AM Engineer)

### ... re-training

When you talk about re-training, it's a grey area for me. Like, where can I do, where can I start...

(E&C Engineer)

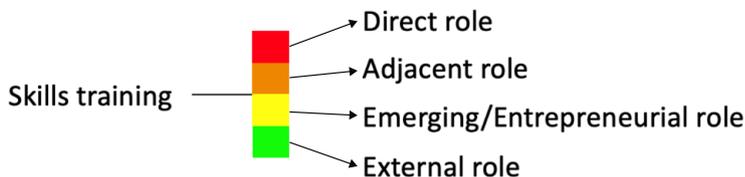
### ... digital tech's value

For the PE Industry, the skills that are needed right now are not necessarily AI and data analytics but the ability to transform the current shop floor by introducing automation and robots.

(PE Engineer)

## RECOMMENDATIONS

- 1 Embed** an Interactions-Centric View in Training Programmes to Ensure Manufacturing Excellence
- 2 Craft** Research Innovation and Enterprise- Pre-Employment Training - Continuing Education and Training (RIE-PET-CET) Ecosystem Work Options to Secure Singapore's Stock of Manufacturing Skills (aka a Manufacturing Multivitamin)
- 3 Develop** N+1 Experiences\* to Attract Younger Graduates from Institutes of Higher Learning
- 4 Exploit** Combined RIE-PET-CET Ecosystems to Reduce Uncertainties Over New Growth Technologies
- 5 Design** Factories-for-All-Ages for Multi-Generational Workforce



\* "N+1" is a terminology commonly used in the electronics industry to refer to the next-generation technological node.

Our recommendations capitalise on what Singapore has that few countries have to offer. When we succeed in making these preparations and drawing on the strengths of our workers, we can secure skills and create a strategic advantage unlike any other.



To view the full report, visit [www.ntuc.org.sg/Research-FutureOfManufacturing](http://www.ntuc.org.sg/Research-FutureOfManufacturing)

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