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'ADVANCED MANUFACTURING' SHOULD BE ABOUT PEOPLE, SKILLS AND THE ENVIRONMENT, NOT FANCY NEW TECH

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Image by Matt Roberts

Compared to the rhetoric we regularly hear from politicians, those directly experiencing the long-term impacts of deindustrialisation have very different perspectives on technology, employment and skills. Mainstream politics presents a vision of 'advanced manufacturing' as being part of a globalised, high tech future of services, finance and 'flexible work'. But if the 'advanced manufacturing' jobs generated are few, and only in very high-skill areas, they will be of little help to most people.

This article puts forth a suggestion for what 'advanced manufacturing' should mean. And it doesn't mean exclusively robotics and additive manufacturing, or 'smart' anything. It's about

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Yes, and not just for altruistic reasons. It makes good business sense. The global 'green economy' is booming (that is – products and businesses related to the decarbonisation of the energy sector), and there is scope for Australia to join in, with the right policy settings.

Australia has reached an impasse where even relatively conservative observers of politics and industry can identify the profound irrationality behind this country's continued reliance on expanding mining (particularly coal) and carbon-based energy production. In my recent fieldwork interviews with manufacturing small business owners in Australia – not known to be a progressive or radical voting group – many were quick to point out the folly of continuing to rely on mining for the country's economic security.

While those who support Australian manufacturing can at times strike an uncomfortably nationalistic chord, there is a great deal of common sense in value-adding to raw materials, and skilling the population in practical ways, rather than funnelling large numbers of school leavers into tertiary education.

Manufacturing diversifies our social, economic and educational mix for the better. Investment in local manufacturing can also enhance national research and development capacity. In addition, local manufacturing often produces reasonably paid and desirable jobs in regional areas. The work is frequently interesting and satisfying, it is more likely to be part-time or full-time (rather than contract based or casual) and it tends to be paid at award wage rates (or higher).

Evidently, since 2020 we have seen the economic and public health impacts of the Covid-19 pandemic, trade tensions, global price increases, product shortages, and alarming examples of climate disasters in Australia. All these issues have revealed clear weaknesses in Australia's economy, as well as exposing a fractured and unsustainable social fabric. Clearly, things cannot return to the 'status-quo' before 2020; we have to find alternative ways to think about jobs, production and environmental sustainability.

With this context in mind, we must seriously consider targeted paths for sustaining and expanding Australian manufacturing, niche industries which could intelligently integrate our existing strengths in small to medium-scale manufacturing with appropriate emerging technologies.

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essential material literacies and wide-ranging production knowledge.

A renewed emphasis on skills development in practical trades could combine both 'traditional' and emerging techniques and technologies. Over time, this could produce a deep cultural sensibility towards materials and how to handle them, which would extend well beyond isolated workplaces or industries.

This is something that Germany and Scandinavian countries have known for a long time: technical and craft skills ought to be built-in to our formal education systems. The Swedish craft education program of *Slöjd* is a good example. It is no surprise that Sweden and Germany are globally recognised for high quality design and manufacturing, as those nations provide the structural means for the population to gain the essential craft, design and production skills necessary to support specialisation.

But isn't this all out of our control?

The recent history of Australian manufacturing is often presented as part of an inexorable global decline. And it *is* a story of decline. I do not mean to discount or avoid the reality of this decline, even though I emphasise survival and potential future growth. This decline has been dramatic: in 1966 a quarter of Australian jobs were in the manufacturing sector, and by 2001 this had [declined to under 12 percent of total jobs](#). Manufacturing jobs are now down to around [6.4% of workers](#) (continuing a long-term downward trend). But the point is – none of this has been inevitable. Much of this decline has been the result of specific trade and industrial relations policies driven by successive Australian Liberal and Labor governments since the 1980s.

Most particularly, the recent closure of local automotive manufacturing in Australia (and the lack of support for a potential electric car industry) are examples of the tight association between manufacturing and public policy. It follows, then, that things need not be as they are, and that there are concrete measures that can be taken – by government, educational institutions and the private sector – to shift this pattern. Australia's excellence in producing Bushmaster armoured vehicles ([recently requested by Volodymyr Zelenskyy](#)) demonstrates that when the state funds things well *on-shore*, we *can* still make excellent-quality things.

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same products that can be cheaply sourced elsewhere: the key will be to target support for [discrete and specific high-quality products](#).

For example, we can value-add to existing raw minerals extraction through production of high quality, durable and lasting things, produced with close attention to labour and training, and to the downstream impacts of particular materials and processes. In this, manufacturing must be understood as operating within a generative landscape, combining older and newer skillsets and technologies, and encompassing small to medium size businesses (SMEs), not just large multi-national firms. Being able to use materials and technologies *well* means being willing to listen not just to engineers and project managers, but also to skilled industrial craftspeople and makers, designers, other production employees, and even those who work at the 'end' of product cycle: waste sorters and recycling managers.

Australia is already a specialist producer in medical manufacture, and this is an area that could be further supported. But other areas are also ripe for support, given the present global business appetite for technologies related to the 'green economy'.



Image source: sonnen

For instance, Australia could become a specialist in solar battery production, to complement the nation's enthusiastic embrace of domestic rooftop solar panels, and the local availability

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This points to the fact that Australia also has the existing infrastructure to re-boot its automotive manufacturing industry: but this time as a participant in the electric vehicle component supply chain. EVs are a booming international market, and Australia has the chance to join an industry where demand is currently outstripping supply.



Precision Components, CC Credit to Jack Baldwin, The Lead South Australia

Recent research into bio-plastics, such as the possibilities of seaweed-based and algae-based polymers, also has great future capacity for small- to medium-scale specialist manufacturing, among other applications.

Recent research into the potential of e-waste as a productive input for new systems and recycled materials also has the capacity for niche manufacturing outputs. And Australia has existing strengths as a specialist producer of finely crafted products produced on a small to medium-scale, such as timber [guitars](#), ugg-boots, and [hand-shaped surfboards](#). Leaving out the 'craft' in 'advanced manufacturing' would be a key mistake.

Repair, reuse, augment, recreate

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Image from [Phyxtar](#)

As a relatively isolated nation, Australia is an appropriate venue for a strong national strategy for repairing and maintaining products and infrastructure. The implementation of the recommendations made by the [Productivity Commission's Right to Repair Inquiry](#) would be one place to start. The on-shore production of spare-parts and the local provision of skilled repairers, would each provide diverse and viable extensions of existing industrial craft skillsets.

Skilled workers in a decarbonising economy

With the inevitable decarbonisation of Australian electricity production, Australia will soon have new groups of industrial workers to redeploy into non-fossil-fuel industries. Many of these workers will have trade skills in a variety of industrial applications. What would happen if we treated these skill sets as a resource, rather than a burden?

In the second decade of the twenty-first century, we are now at risk of losing an effective mix of trade skills and materials knowledge, as industrial and manufacturing workers shift industries or retire, with very few apprentices being trained in their wake. If something does not change, the end result will be a profound knowledge-loss about how to make things as a sovereign nation. The decline of industrial trades is not a 'natural' result of market economics or automation. The market demand for skilled workers is there. It was a political choice to

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fundamentals of the material world. We cannot solely rely on digital solutions to the impending problems of the future. Without industrial craft, we would be far less capable and more superficial as human beings attempting to survive in this fragile world.

A progressive sovereign effort towards sustainable production

Sadly, in the current Australian political context, the idea of government taking a leading role in meaningfully funding and supporting manufacturing in Australia is sometimes dismissed as naively utopian or even dangerously 'socialist' in a pejorative sense. Yet, these ideas are not 'fringe' or 'radical', but are increasingly seen as 'common sense' views, even held by voters living in conservative electorates. Too often, the concept of local manufacturing has been captured and mobilised by nationalistic political elements, but this should not mean that the idea of boosting domestic production is, in and of itself, toxic.

This requires a reframing of national manufacturing through a progressive sovereign effort. In the twentieth century, a great deal has been achieved through the institution of the nation state, even though over the past 40 years neoliberal ideologues have done a great deal to curtail, roll-back and destroy those achievements. Since the 1980s there was an emerging (and erroneous) consensus that globalisation left the nation state powerless in the face of capitalist 'market forces', and national governments simply had no choice but to step back and give business the space to flourish, allegedly producing a 'trickle-down' effect.

It is evident by now that Australian manufacturing renewal cannot be left to the 'market' alone: industrial decline has gone on too long to hope that somehow business will meet particular demands. Australian manufacturing businesses in the current context understandably complain that, right now, the skillsets, industrial zones and supply chains are simply not available. Whoever wins the Federal Election will need to think very differently about what to manufacture, and how to support this endeavour. The mechanisms to make these changes are available, over time, through national governmental means.

Today, the changing climate, insecure work and practical skill-loss are the key considerations in how we might imagine an alternative future for Australian manufacturing, one that encompasses social and environmental sustainability, genuine possibilities for employment,

saying that the global energy production mix *must* radically shift to renewable energy, in order to produce a meaningful and swift reduction in carbon emissions. We know this already. Manufacturing should be part of this reformed picture, if nation states globally take a strong role in shaping which particular manufacturing industries, production methods, and energy sources are used, and meaningfully addressing how waste is handled.

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This article [originally appeared at medium.com](#) and is an amended extract from Jesse Adams Stein's new book, [Industrial Craft in Australia: Oral Histories of Creativity & Survival](#) (Palgrave Macmillan 2021). It has been reproduced with permission.

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By Editor April 28, 2022

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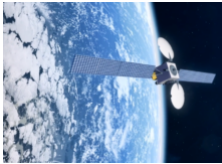
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