Swinburne University of Technology

Submission to the
Senate Economics References Committee
Interim Report

Inquiry into the future of Australia's automotive industry

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Overview

Swinburne University of Technology (Swinburne, the university) is pleased to make this interim submission to the Senate Economics References Committee Inquiry into the future of Australia's automotive industry.

The terms of reference of the Inquiry encourage broad discussion of the topic, including "maintaining the capacity for Australia to engage in advanced manufacturing, by ensuring skills and industrial capabilities that have been sustained by the automotive industry are not lost". At Swinburne, we believe Australia has the potential to be a nation of engineering and manufacturing excellence and that the closure of Australia's automotive manufacturing industry should be seen as a catalyst to transform and grow this sector into new and prosperous areas.

Australia has existing areas of competitive strength – we excel in high-quality technology and manufacturing – but these capabilities will not transition or grow on their own. Australia now needs to carve a new platform on the world manufacturing stage.

Swinburne believes Australia's unique capabilities in both raw materials and technologies readily positions us to be a major player in future mega supply chains, for the international automotive industry and wider applications in related sectors such as aerospace, military, civil, whitegoods and the health industry. The objective is to capture more of the upstream value chain, across these industries, by utilising more of our sourced raw material and manufacturing stock.

Critical to the productivity and independence of our nation is the level and diversity of skills in our labour force. By better combining our existing and unique knowledge – including world class engineering and R&D networks – with the opportunities made available from our vast mineral resources, Swinburne believes Australia is in a unique position to recast itself as a major player in the mobility and other high tech industries.

As such, Swinburne supports the government's new Industry Growth Centres (IGC) Initiative. Swinburne is currently focused on many of the Industry Growth Centre sectors, including Food and Agribusiness; Medical Technologies and Pharmaceuticals; Advanced Manufacturing; and, Oil, Gas and Energy Resources. Our key focus is science, technology and innovation, with special interest in photonics and biomedical; our expertise is supported by our research centres and state-of-art laboratories and facilities. Swinburne hopes to work in consultation with the new IGCs to address increased commercialisation opportunities, enhancing workforce skills, addressing regulatory barriers and forging closer links with supply chains in specific sectors.

As the government fine tunes the IGC Initiative, it is important to consider what might not, as yet, have been addressed. Whilst governments cannot generate jobs, they can write the policies that make it easier for business and industry to create those jobs and to encourage education providers to work in collaboration with industry to transition workers into new sectors, with customised skills training.

Small to medium enterprises often struggle to commercialise or adopt new technologies that would allow them to diversify their product range. Swinburne is keen to stimulate and promote new business innovation and collaborative models (developed in cooperation with industry), and collaboration between research centres and the education sector.

An equally important factor in developing solutions to the current structural adjustments to the Australian manufacturing landscape, is improving integration between education, R&D organisations and industry. Importantly, business and industry need improved access to experts across all areas of education – it is not all about research. Likewise, Universities need access to business and industry to provide industry based learning opportunities to students, and find problems worth solving by collaborative R&D. Policies that encourage universities to open their doors to business and to connect them with expert consultants, new technologies and laboratory facilities will accelerate this process. Policies that encourage foreign owned companies to invest in Australia also need to foster engagement with local Universities to help maintain and develop local expertise in related growth areas.

Areas of new policy could encourage closer integration between education, R&D organisations and industry (including finance and management) to assist Australia to build the productivity and skill relevance of the economy. A greater degree of vertical integration in industry within Australia will help protect skills diversification, generate more value within the domestic economy, and will insulate the economy from fluctuations in the foreign exchange rates. Training, education and development of Australia's future entrepreneurs is also necessary, to create a vibrant and innovative nation known for its resilience and resourcefulness.

To achieve our combined goals a reshape is necessary – Australia needs to rethink many of its current business models – for primary and secondary education, and for universities. The way we approach innovation is generally positive yet there is a struggle to convert ideas to successful real world commercial applications. We need to embrace change and become the world leaders in the ability to adapt and prevail. Our national attitude to change and perhaps even our politics must facilitate this if we are to prosper. The following brief contains an overview of some suggestions for addressing these issues, as considered by industry and academic experts at Swinburne University of Technology.

1. **Bridging the gap between the mining of resources and a final product**

   Swinburne believes Australia can make better use of the unique strengths offered by the Australian context, by tying access to raw materials with advanced materials application, full design and development capability and a robust agile manufacturing capability.

   Our strengths include high levels of technical capability in all stages of the tangible value stream from minerals processing, materials development through to manufacturing operations. Our learning from the automotive industry, of data analytics, efficient systems and high productivity processes can be applied to improving productivity of SMEs across industry sectors.

   Australia is well known for having vast mineral wealth, particularly in iron ore, bauxite and other important metal ores such as lead, zinc, silver, gold, nickel, copper, lithium, magnesium and titanium. High on the priority list would be a focus of attention to developing technologies associated with in-situ milling and mineral processing at the mine site. This will enable significant improvements in the competitive economics of mining operations as well as make environmental impacts easier to minimise.

The next stage in the macro value chain is development of agile refining technologies that cater directly to market forces both locally and globally. Concepts being explored in this field include modular ore processing systems that may be installed either near the mine site or near the market distribution hubs. The subsequent stage is where Swinburne's strength is greatest; the application of advanced materials via advanced manufacturing technologies. This is also the stage at which further value is generated.

New applications of lightweight high strength alloys or hybrid structures using advanced rapid manufacturing techniques and advanced design methods, utilising smart systems, may enable production of mobility related components, sub-systems and final assemblies to be manufactured in small scale operations in localised regions.

Our existing automotive technologies, particularly those associated with electric vehicles, can be used to create new product categories, such as personal lightweight electric aircraft, public transport vehicles, urban service vehicles and purpose designed delivery vehicles.

2. Realigning our technical skills and knowledge

It is critical that Australia develops a narrative about what future Australian jobs could look like and implement policies that support the necessary transitions at all levels of the market.

Australia has considerable skills for the provision of high quality education, research and development, advanced product design and development and digital communications. In fact, Australia is one of a handful of nations in the world capable of designing and developing a complete passenger vehicle from concept to commercialisation and our knowledge and skill is actively sought by global systems integrators. We need to better harness this knowledge, in support of the government's growth agenda and the IGC activities.

Swinburne currently works with the aviation maintenance and other industries to develop a range of bridging skills programs – to transition workers from one closing industry to other relevant trades or industries where those skills are in demand. This process can be expedited and rolled out across the automotive industry, through targeted policies and greater encouragement from government.

Swinburne additionally drives knowledge transfer through our workplace employment practices. We focus on employing highly experienced teaching staff directly from industry – professionals who provide current content and context to their teaching, at both an undergraduate and postgraduate level.

Work integrated learning programs and final-year student-industry (capstone) projects are another critical tool Swinburne employs to capture and transfer knowledge between industry, academia and students. We are actively ramping up our current suite of offerings across the industry based learning areas to assist transition of critical industry knowledge.

3. Capitalising on Australia's research facilities

Australian universities house some of the most advanced facilities and equipment from around the world. We need to ensure industry can readily avail itself of these facilities, to advance Australia's future manufacturing agenda.

Currently, many of Swinburne's industry partners outsource their research and development to Swinburne. An example of this is the 'electric bus project' where Swinburne and the Queensland firm Bustech are collaborating with the AutoCRC and its Malaysian collaborative partner, the Malaysian Automotive Institute (MAI), to design and develop electric buses. In this scenario Swinburne's facilities are testing and developing and Bustech is taking the engineering lead.

4. Developing government policy that supports transition and growth

Overall, Swinburne sees the following areas as requiring further government policy support, to maintain the capacity for Australia to engage in advanced manufacturing, by ensuring skills and industrial capabilities that have been sustained by the automotive industry are not lost:

- Encourage skills transfer programs – industry and vocational and higher education providers working together to transition Australian workers
- Clearly articulate the key areas of innovation required in Australia and support stimulation of research in these areas
- Encourage greater representation of industry professionals within universities
- Increase industry access to a broader range of university services by encouraging universities to open their doors
- Offer industry funding schemes that reduce the risks associated with research
- Acknowledge and reward researchers and academics for successful industry engagements and valued economic impact
- Reward businesses with strong R&D through subsidised consultancy from universities
- Consolidate support for existing core industry expertise, to maintain impetus for export opportunities

5. Conclusion

With the support of effective government policy and well communicated programs that build capacity and capability, Australia can progress from being "the lucky country" to being a nation that is more accurately defined by preparation meeting opportunity.

Many challenges are best solved through collaboration and partnership and Swinburne is keen to work with all levels of government and industry and play an integral role in the development of strategy and policy, in support of the transformation of the Australian advanced manufacturing sector.

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About Swinburne

Swinburne's 2020 vision is to be Australia's leading university for science, technology and innovation. With a unique combination of strengths that spans vocational education, higher education and research, Swinburne aims to make a difference in the lives of individuals and contributes to national economic and social objectives.

Top 400 research university

Swinburne continues to be ranked as one of the world's top 400 research universities (based on the Academic Ranking of World Universities 2014), and in the top 75 for physics. Swinburne has a strong commitment to the advanced manufacturing sector, including exploring new opportunities in mobility industries through design led innovation, lightweight materials and electric vehicles.

Electric Vehicle research

Swinburne's Electric Vehicle Research Group is a global leader in world electric vehicle research, development, policy and education. Electric vehicle research is multi-disciplinary and covers broad and complex issues across mechanical engineering, electrical engineering, robotics and mechatronics, as well as information and communications technologies.

Intelligent Transport Systems

Similarly, Swinburne's Intelligent Transport Systems (ITS) Research Group is at the forefront of the development of technology-driven and innovative solutions for transport systems. ITS is an emerging solution for a safer and better managed transport network; where people and goods are transported in a socially, environmentally and economically sustainable way. ITS combines innovative technologies and efficient algorithms with information and communication capabilities to share knowledge of situations and network conditions, relating to traffic and vehicles, in order to make better, smarter decisions in real-time. Swinburne currently works with national and international governments and peak bodies to facilitate and foster excellent, industry relevant, cross-disciplinary and collaborative smart transportation research.

Future Manufacturing

Swinburne's advanced manufacturing capability and reach grows daily and we are firmly focused on supporting an Australian manufacturing transition. This concentration will shortly be supported by the opening of Swinburne's Factory of the Future (June 2015) which is located within the new $140million Advanced Manufacturing and Design Centre at our Hawthorn campus. The Factory of the Future will offer Australian SMEs the space and opportunity to design and rapidly test new product ideas through its virtual laboratories, fast 3D printing prototyping, and product lifecycle and recycling assessments. It will house state-of-the-art advanced manufacturing equipment and be easily accessed by industry.

Business Entrepreneurship and Innovation

The University is further supporting business and manufacturing innovation through its entrepreneurship programs and new functional linkages. Swinburne Business School, is exploring two new concepts- the Incubator and the Innovation Lab – which will facilitate the commercialisation of new ideas and help industry absorb innovative approaches to problem solving.