



Victoria's Future Industries - Transport Technologies

Swinburne discussion paper

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24 Wakefield Street, Hawthorn

4 February, 2016

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Introduction

Swinburne University of Technology (“Swinburne”) is pleased to make this submission to the Victorian Government’s Future Industries taskforce. We believe it is vital for Victorian business, industry, government and communities to have these discussions about how we grow, or transition existing industries into new and emerging markets.

The Swinburne response focuses on the University’s areas of research expertise in manufacturing including Industry 4.0 and supply chain management, as well as our expertise in higher education. Included are a number of recommendations for the consideration of the Victorian Government.

Swinburne has recently made other sector-based submissions to the Victorian Government’s Future Industries Consultation including:

- Construction Technologies
- International Education
- Medical Technologies and Pharmaceuticals
- New Energy Technologies
- Professional Services

1. **Question 1: How can Victorian businesses best access new sales channels and emerging markets?**

In order for Victorian businesses to understand their unique selling proposition and to be globally competitive, it is critical for them to understand global markets, trends and opportunities. One key element of this is to gather and distribute market intelligence. University market research expertise, combined with information from their global partner networks can be a valuable resource in identifying research opportunities, emerging trends, potential partners and untapped markets.

In terms of relationship management and development, Austrade is a very effective and highly regarded channel to connect Australian businesses into global supply chains. One of Government's key roles in the export trade space is to facilitate ongoing communication with supply chains and organise trade missions.

For manufacturing organisations, a collaborative approach to the development of enabling technologies will allow a dynamic and agile response to market demand. In Australia, our weakness may be diseconomies of scale, however we are a highly skilled and technologically advanced nation. We can apply distributed manufacturing strategies that enable the transfer of knowledge from technology hubs (e.g. design information) to independent manufacturers and services that provide the labour and agile capability (e.g. flexible manufacturing systems) in a region, for a broad range of products and services.

Recommendation 1

Facilitate a strategic market intelligence gathering and distribution program that draws upon existing international relationships via Victorian Government Business Offices (VGBOs), Austrade knowledge, and research trends identified by universities, to provide market data to transport technology organisations in a timely, cost effective and equitable manner.

Recommendation 2

Foster deeper collaboration amongst local manufacturing and service provision companies to achieve economies of scale in various supply chains. This may be related to transport technology, but could potentially touch on other manufacturing sectors. Existing funding programs to assist companies to transition their businesses should be broadened to support innovation activities more specifically, along with capital investment.

2. Question 2: What is the transport equipment sector's unique selling proposition in international markets?

The transport equipment sector has two unique selling propositions in international markets: 1) expertise in light weighting and 2) quality of our engineers.

In terms of light weighting, Australian research is developing light vehicle structural components that have a high capacity to absorb energy. The goal is to reduce the weight and increase the safety in the newly designed vehicles. While this technology will benefit all vehicles, this is an enabling technology for electric vehicles which must to reduce weight to maximise range, yet still be capable of securely holding batteries in a collision.

In regard to engineering standards, Australian engineers are recognised for their world-class design capabilities, their systems approach, their ability to work flexibly across functions and their ability to do more with less.

There are many examples of Australians coming up with ingenious, low-cost solutions to problems in manufacturing that would otherwise have been resolved with less efficiency and higher capital investment. One example is the paint facility at Kenworth trucks. This system was designed for larger, more complex facilities in North America, but was installed in a more compact, budget constrained operation in Australia. The programming and application in the Australian facilities pushed the limits of the technology, but has resulted overall in a better technical result.

Unfortunately, as a result of our positive international reputation, skilled Australian engineers are leaving the country in great numbers as multinational companies (e.g. Tesla, Apple, Google) aggressively recruit design capabilities and automotive experience. At the same time, the severe contraction in automotive manufacturing means that there are fewer local opportunities for this home-grown, world-class talent.

Recommendation 3

To limit the loss of engineering expertise to international organisations, and to benefit from the knowledge gained by Australian engineers whilst working overseas, it is recommended that an incentivised, strategic approach is employed to retain and bring key expertise back to Australia. Elements of the VESKI fellows programs are already effective in encouraging successful expatriate academic leaders to return to Australia and could serve as a model.

3. Question 3: Where are the opportunities for Victorian firms to partner with overseas companies to take advantage of their greater scale and technology?

A fundamental means for Victorian firms to partner with overseas companies is through collaborative schemes, CRCs and other technology hub initiatives. With the exchange of applied know-how, enabling technology and product development methods, we can liaise with overseas organisations to access their capacity (i.e. capability for capacity).

An example of this is the eBus program at Swinburne. This program is providing technical capability via a collaborative applied research project for a joint venture between Australian bus manufacturer Bustech, and Malaysian joint venture start-up Amber Dual. A new product offering is being developed, with Swinburne as a key technology provider. The expected outcome is international market access and growth for Bustech, and potentially a new supply chain into Australia for sub-assemblies that have a high labour content.

Australia must consider how we can partner more closely with German industry and universities with the aim of successfully emulating the Leading-edge "*Spitzencluster*" model. German industry is leading the world in adopting the Industry 4.0 model and incorporating process automation. We have an opportunity to partner with them and learn from their experiences to ensure we are not left behind.

Recommendation 4

Victorian industry would welcome the opportunity to meet more potential international business partners through government facilitated inbound and outbound trade missions. This needs to be complemented by facilitated access to information about EU funding programs that are potentially relevant to partnerships involving Victorian companies. An emphasis on German companies would be welcomed by the local manufacturing sector, given that Germany has a similar high wage economy to Australia and an enviable record of industry-research partnerships.

4. Question 4: Are there better supply-chain models that the industry can use to improve its capabilities?

Integrated supply chain models have demonstrated viability and value. There are recent examples where Australian companies are partnering through the supply chain to jointly develop new technologies and share risk. However barriers can exist, such as regulatory approvals, particularly in the aerospace sector. For SMEs these can be prohibitive and sector-wide information, support and facilitation by government would be welcome.

While this paper does not focus on automotive, there are lessons to be learned from this industry. The industry has always faced global competitiveness challenges because of diseconomies of scale, labour cost and required capital investment. The ASEA program is an excellent resource for best improvement examples¹. Overall, some local experts believe Australia

¹ <http://asea.net.au/asea-program.php>

has been too conservative in our approach, and radical rather than incremental change is required. Specifically, Australian industry must improve its ability to implement radical change via effective risk management, stable support initiatives, technology hubs and collaborations.

5. Question 5: What assistance would you need to take advantage of global trends and what role should the Victorian Government play?

The government can play a vital role in championing initiatives and gathering support from the industry and technology sectors. Incentives that help manage the business investment risk have potential to address conservative constraints. In the past, the Victorian Government's technology voucher program has been a very effective catalyst to de-risk innovation activities conducted jointly by industry and research providers.

In addition, trade, technology and economic agreements between nations can provide mechanisms to implement more detailed agendas, for instance the Malaysia-Australia Free Trade Agreement (MAFTA) and the Asia-Pacific Economic Cooperation (APEC). While these are the remit of the federal, not state government, local facilitation of opportunities is very valuable.

6. Question 6: How can we effectively build networks and foster relationships to support innovation and business growth in the sector, and what role should government play, in particular with small to medium enterprises?

On an international level, there is an opportunity for government to facilitate government/industry/academic networks and overseas models to be emulated. In late 2015, VESKI facilitated the visit of Dr Siobhan Jordan from Scotland's 'Interface' knowledge connection agency, which has a highly successful record of fostering innovation, especially for SMEs. IDA Ireland² is another best practice example worth considering as a model in Australia.

IDA Ireland has a long-term strategic approach to attracting foreign investment and a proven track record of bringing large multinational companies to Ireland. Integral to this is the gathering of substantial market intelligence which has informed their strategy and planning for market opportunities. A great deal of emphasis is placed on developing relationships with large companies, to learn about their priorities, particularly relating to technology.

With such a long-term view, IDA Ireland is able to work with education institutions to identify skills gaps and implement initiatives to ensure that the appropriate workforce is available when companies require them. Universities develop new degrees, courses or majors to achieve the

² <http://www.idaireland.com/>

skills requirements, ensuring a large proportion of local professionals find employment with these organisations.

On a local level, the Victorian Government can play a role to facilitate business to business connections and to support the development of clusters around key technologies. Professor Goran Roos, a renowned academic in innovation management, has worked with the Geelong Manufacturing Council to establish clusters in the Geelong region. This model could be rolled out to other areas, based on a clear understanding of the technology needs of specific industries.

Recommendation 5

Develop a relationship with best practice agencies, such as IDA Ireland or Scotland's Interface, and understand the drivers of their success. This will enable the Victorian Government to build on the good work from Invest Victoria and develop a very long-term, strategic plan to attract multinational corporations to Victoria, bringing new technology and global linkages.

Recommendation 6

Consider how Professor Goran Roos' work with the Geelong Manufacturing Council can be expended to other industries in Victoria.

7. Question 7: How can Victorian transport equipment manufacturers capitalise on the state's strong research base?

Victoria has a strong research base and Universities are increasingly becoming more outwardly focussed on understanding and solving the challenges faced by industry. Effective research organisation/industry liaison is fundamental to maximising the success of such collaborations. Many businesses don't understand the required investment in time and resources to obtain successful outputs from research.

An interesting case-in-point is the proliferation of crowd-funded new product development. The majority of crowd-funded programs are underfunded and underestimate the time and effort required to bring new technology to market. Effectively they become market research exercises, rather than genuine providers of capital that allows research to be commercialised. The successful ones are not only the most tenacious, but they only promise what they can deliver and have a clever way of managing downside risk.

Recent national dialogue and numerous well credentialed studies highlight the poor performance of Australia (within the OECD) on industry-research collaborations. This unarguable market failure warrants concerted action by both state and federal governments through programs that improve industry-research linkages (see Recommendations 5 and 6 above) and support a more robust venture capital sector in Australia.

8. Question 8: How can Victoria's transport manufacturers incorporate innovative manufacturing technologies into their businesses?

For many manufacturers there is a resistance to change and innovation because of the associated risk. The Innovation and Technology Voucher Scheme helped to mitigate this risk, particularly for SMEs who were unaccustomed with the research and development process.

Recommendation 7

Swinburne recommends the Victorian Government invest in a program that encourages SMEs to engage with research partners for long-term collaborations. While some federal programs also seek to address this (for instance Research Connections), the Innovation and Technology voucher scheme provided a very accessible and effective model for collaboration.

9. Question 10: What mechanisms are required to enable the transfer of knowledge and skills from the carmakers to increase capability in the transport equipment sector?

As identified in Question 6, the formation of clusters or technology hubs is a mechanism that will allow the transfer of knowledge from carmakers to the broader transport equipment sector.

Recommendation 8

The Victorian government can stimulate the development of technology hubs through the provision of space in government facilities, secondment of government experts to participate in hub activities and financial incentives to attract international experts and companies to our shores.

10. Question 14: What are the most important regulatory and reform priorities for your business?

In terms of transport technologies, the legal and safety compliance standards are often the most challenging hurdle for new technology developments to reach commercialisation.

Recommendation 9

The Victorian Government is encouraged to support manufactures to achieve legal and safety compliance standards. This may include seconding experts to businesses to manage compliance projects, or the provision of subsidies to reduce the overall financial burden of the commercialisation process.

11. Question 15: Where are the specific skills and training gaps and how best can we build, attract and retain the right skills in the transport equipment sector?

Local industry has identified a need for training in industrial automation of processes, control systems, mechatronics and robotics.

To facilitate the commercialisation process, many manufacturing companies would benefit from a better understanding of the time, money and effort required to take a new technology to market, once it has passed proof of concept. Fundamental to this is the ability to develop robust business plans and manage risk effectively.

As discussed in Question 2, an ongoing challenge in Australia is the ability to retain our skilled workforce, or entice those with international postings to return to Australia. By attracting large technology companies to Australia, we will provide the same job opportunities that are currently taking our best and brightest off-shore.

12. Question 16: How can government procurement be better used to encourage the development of local industry capabilities?

Consolidated procurement, provided by a government or expert-agency managed hub is a stand-out opportunity. An hourglass approach that combines purchases from multiple organisations would allow SMEs to order the required (often small) amounts of materials / components while taking advantage of bulk-order pricing.

In addition to cost savings, involving procurement experts in this manner would see an improvement in planning efficiency, something that can often plague large manufacturing contracts.

Recommendation 10

The Victorian Government consider a consolidated procurement portal, allowing manufacturers to purchase raw materials as needed, yet having access to bulk purchasing prices.

13. Question 18: What is your vision of success for the transport equipment sector?

Swinburne's vision for the transport equipment sector is to be agile, lean and prepared for rapid change on a large scale. We must develop new technologies and niche products that attract international investment, and use technology to better manage assets.

From a personnel perspective, having the ability to attract and retain our top graduates is integral to the future success of the industry in Australia.

Swinburne thanks the following for their contribution to this paper:

[Professor Bronwyn Fox](#), Director, Factory of the Future

[Dr John Hopkins](#), Senior Lecturer, Logistics and Supply Chain Management

[Jason Miller](#), Research Manager, Transport Theme

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Sincerely,



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