SUBMISSION

TechFast - a Novel Market Pull Knowledge Transfer Program

Intermediary-Collaboration-Outcomes

For

Input to the Productivity Commission Report Public Support for Science and Innovation

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Commercial in Confidence

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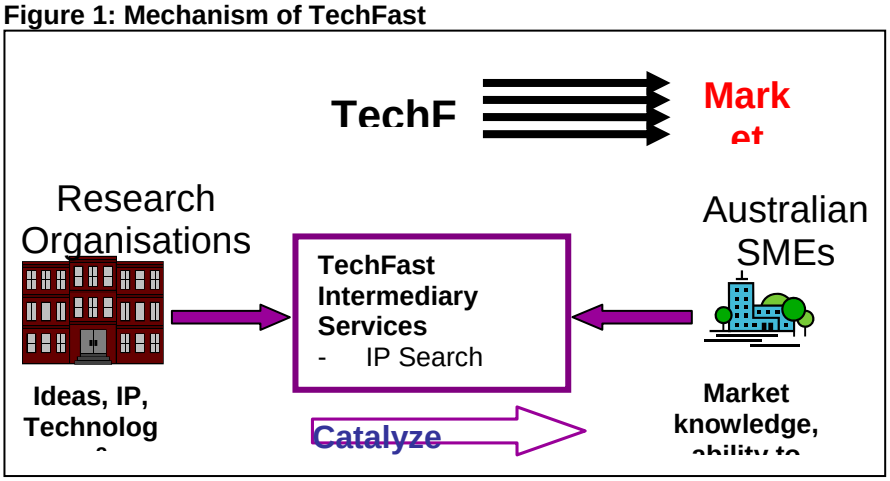
OBJECTIVE

The objective of this submission is to highlight the key elements of the Australian Institute for Commercialisation's TechFast program and how these address some of the issues that have been raised in the Productivity Commission Draft Report "Public Support for Science and Innovation", 2006.

WHAT IS TECHFAST?

The TechFast program was established by the Australian Institute for Commercialisation (AIC) to address a market gap in the knowledge transfer of research outcomes from publicly funded research organisations (PFROs) to small to medium enterprises (SMEs). The TechFast Program accelerates successful technology and knowledge transfer, diffusion and adoption by SMEs using a novel market-driven, demand-pull approach. This involves firstly identifying established, technology-receptive SMEs that have a track record in a particular sector and are eager to grow via innovation, and then sourcing technologies, intellectual property (IP) and know-how with potential market impact, from research organisations that can be matched to the needs of the SME. The AIC provides a variety of services to facilitate the knowledge identification and exchange, including the IP searches, market research, technical feasibility and project management needed to 'de-risk' the technology and facilitate successful knowledge diffusion and collaboration between PFROs and SMEs. Figure 1 shows the mechanism of the TechFast Program.

Figure 1: Mechanism of TechFast



WHAT IS NOVEL ABOUT TECHFAST?

TechFast has a number of unique characteristics:

1. It is a demand driven, **market-pull** approach to technology and knowledge transfer. Market-pull technology transfer provides the opportunity for more rapid diffusion of innovations. In market-pull knowledge transfer there is an existing demand from absorptive firms for the new knowledge. Evidence from innovation research argues that the economic benefits of innovation will be realized more quickly and the return on investment of public funds will be greater in cases where there is a rapid uptake of knowledge in industry[1]. This is more likely in the case of market-pull technology transfer, for which innovation outcomes are commensurately greater.

2. It has an emphasis on **knowledge receptive and absorptive SMEs** because of their perceived link to competitiveness in the knowledge economy. Absorptive capacity is a critical issue in the likelihood of success of a technology transfer. As such, TechFast has potential broad economic benefits because of its emphasis on a policy approach that is designed to match technologies to receptive and ready small companies (rather than the more common policies which seek to facilitate university commercialisation through the creation of new spin-off companies). Readiness is indicated by the track record of innovation in the firm and receptiveness by the number and type of collaborations it is involved in. Knowledge transfer involving such companies is likely to have broader and more substantial economic benefits[2].

   Furthermore, in many countries small businesses have played a prominent economic role over the past decade[3]. Some countries are highly reliant on SMEs for their economic and social well-being[4]. In this context, greater emphasis is placed on small firms because of their perceived link to competitiveness in the knowledge economy. The growing emphasis on entrepreneurial activities and small business is a response to the critical role of innovation and knowledge creation in modern economies. The generation and use of new ideas is thought to have become increasingly important, as has the capacity to test those high-risk and uncertain ideas in a commercial setting. Established SMEs also have the operational infrastructure and resources to exploit commercial opportunities emanating from the publicly funded research sector.

3. It involves an independent third party **intermediary** in the knowledge and technology transfer process to actively facilitate and drive collaboration between PFROs and industry. Many examples of market failure exist where imperfect knowledge on the part of potential exchange

[1] Brusoni, S. and Geuna, A. 2004 An international comparison of sectoral knowledge bases: persistence and integration in the pharmaceutical industry, *Research Policy,* 32, pp 1897-1906
[2] Zahra, S., & George, G. 2002. Absorptive capacity: a review, reconceptualisation and extension. *Academy of Management Review*, 27: 185-203
[3] Lee,S. Florida, R. and Acs, Z. 2004. Creativity and Entrepreneurship: A Regional Analysis of New Firm Formation . *Regional Studies.* 38(8); pp 879-901
4 OECD 2001a. What is a Small and Medium-sized Enterprise (SME)? *OECD*, Paris

partners (research organisations and firms) necessitates the intervention of an independent intermediary as match-maker. The need arises because those with intellectual property and innovative products in their research and development pipelines and those seeking new products to improve their competitiveness and market standing remain unaware of each others' existence. Furthermore, they are often unsuccessful in their interactions because of cultural differences, the time it takes to establish mutual trust and respect, and a lack of knowledge of how to engage. Even the best and most open universities struggle to work with SMEs. Government policies and programs are important to encourage a facilitative third party intermediary to be involved in the exchange, independent of either party, thereby improving the behaviour of both parties and providing an additional resource to help drive a successful outcome.

4. It can **farm IP** from across the nation and from multiple research organisations. Commercialisation offices of universities and other research organisations typically only commercialise their own intellectual property using a technology or supply-push approach. Through TechFast a solution to the needs of the SME can be sourced from any PFRO across Australia, and frequently along a transfer or diffusion pathway that does not involve monopolistic exploitation. The solution could be in the form of a specific technology or patent, or in the form of know-how that resides within the expertise of the researcher or academic. In many cases the IP sourced from a PFRO is not fully developed or neatly packaged, ready for adoption by the SME. The majority of IP is in the form of knowledge and intellectual capital, and generally requires further development for integration into the SMEs business, and certainly further downstream investment by the SME to take it to market. Market-ready IP is generally an output of the collaboration, rather than a predecessor to it.

HOW DOES TECHFAST ADDRESS POLICY ISSUES?

The policy basis for government support of TechFast needs to rest on its spillover effects and its additionality.

If investment is made in basic science, knowledge diffusion mechanisms need to be efficient. [3.8]. Absolutely! TechFast is a mechanism to improve the efficiency of knowledge diffusion from the research sector.

[9.14 ..the Bureau of Industry Economics (1993) found that the earlier 150 per cent tax concession provided a net social benefit of $56 million per annum even though up to 90 per cent of the supported R&D would have occurred anyway. Importantly, that study found that the tax concession had a much higher inducement rate for small firms (with less than 20 employees) compared to larger firms]. There is little doubt that just as for the tax concession, TechFast induces more R&D for SMEs than for larger firms. As noted above, most knowledge transferred from research organisations requires considerably more R&D by the firm to make it market-ready. Most of the TechFast SMEs have not previously accessed publicly funded R&D, or have failed when they have tried. TechFast encourages risk-averse SMEs and Directors move into a more risk-managed approach to new product or process improvement. Also, 50% of TechFast SMEs are regional without immediate linkages into sources of research or knowledge. The case for additionality is in our view, clear cut.

[3.14 As in the case of basic science, firms and other agencies must often make some investments in an absorptive capability to gain the benefits of others' commercially useful knowledge. This reduces the prospects for free-riding on the global science and innovation system]. TechFast improves the absorptive capacity of SMEs by de-risking the uptake process, and by facilitating and project managing technology and knowledge transfer. TechFast services include business services necessary to enable the absorption to occur.

[3.18 The strongest case for public support based on spillovers occurs…where businesses are engaged in novel R&D activities that either spill over cheaply to others or that trigger cycles of innovation by rivals. The spillover benefits will be greatest when there are many potential domestic beneficiaries from spillovers (generic technologies, or many potential users of the spillover technology because of industry structures)….Spillovers not only provide a rationale for public support, but pinpoint other policies that are important in increasing the effectiveness of an

innovation system. These include measures that reduce the costs of absorption (such as skill upgrading); that facilitate research cooperation;…]. Although the TechFast program is focused on individual SMEs, it does focus on working repeatedly with the same universities and CRCs, who benefit from the process and will presumably apply it more broadly to other, non-subsidised interactions. The AIC also contends that TechFast can generate a demonstration effect for other SMEs and research organisations, in which the advantages of collaborating with the R&D community can generate greater innovation returns. As part of the TechFast program, there is also a broad and general transfer of skills that encourages repeated collaborative behaviour across the entire industry.

Furthermore, the IP transferred can be considered the 'seed' for the innovation that is ultimately marketed – typically it will be less than 10% of the final product value. Even were TechFast to fund the entire 10% of that seed – which it clearly does not – the real spillover effect is the induced 90% of expenditure required to productise it. Without such a seed, the spillover would be zero.

[4.7 The other question is whether there are complementarities between publicly supported R&D in non-business entities and that in business. In theory, increases in R&D in one can actually stimulate, rather than crowd out, R&D in the other]. TechFast not only changes the culture in both research organisations and SMEs and thus provides spillover benefits, but the reduction in project risk undertaken by TechFast makes the R&D investment decision easier for the SME and stimulates its downstream R&D investment to build on the IP it absorbs. Such R&D investment is subsequent to the TechFast intervention, and surpasses the cost of the initial TechFast intervention. New private investment in R&D is encouraged by the program because it establishes a new set of initial conditions that would otherwise have prevented it occurring.

[6.28 Lack of effective linkages between research organisations and firms]. TechFast is not primarily about facilitating SMEs to commercialise 'cutting-edge' science, it is about encouraging SMEs (whether they are low, medium or high technology-based) to access knowledge and capability from the research sector to solve their business problems or improve their processes. For example, a low-technology shoe sole manufacturing business may be able to access 'cutting-edge' technologies or materials to improve its competitive advantage.

It is also important to note that University spin-off companies are not a good comparator with the more broadly established SME base. University spin-offs are typically venture funded and spend substantial amounts on early stage R&D. They are also more likely to rely primarily on their originating institution and research links for research and innovation input.

[6.32]. TechFast is a demand driven, market pull program that complements existing supply push initiatives utilised by publicly funded research organisations. As such, it is not comparable to CSIRO's proposed Australian growth partnerships model, which begins with the research organisation. TechFast takes into consideration the needs of SMEs and then it identifies and sources knowledge and capability from across the research sector to match these needs. It subsequently creates linkages and collaboration facilitating the transfer, diffusion and utilisation of knowledge and capability from research organisations to SMEs.

CONCLUSION

The AIC's core mission is to facilitate the demand-driven application of knowledge, which we refer to as commercialisation. Such application requires a source of knowledge (in this context, a research organisation) and a developer of knowledge that can then take it to market for application (typically, a company, but sometimes government). Core to fostering such knowledge application is establishing collaborations between the 'supplier' and 'developer'. It is the AIC's experience that SME's, because of their agility, are well placed to identify and satisfy market demand, but because of their size and capacity for risk, are frequently unable to form such collaborations unassisted, since it requires significant levels of trust (and resources) to establish. For this reason, the AIC has developed its active intermediary program, TechFast, to reduce the transaction costs, lack of trust, and market failure that work against SMEs collaborating with the research sector.

We believe the additionality of intermediary programs such as TechFast are clear: there are very few SMEs able to collaborate with the research sector in the absence of programs like TechFast. The spillover effects are also demonstrable, because although the collaboration may produce economic benefits for a single SME, there are broader benefits to be gained: further extensive R&D, participation of regional SMEs and subsequent multiplier effects, enduring collaborations and skills beyond the initial facilitated collaboration, job creation and growth, and a demonstration effect as other SMEs observe the benefits and respond accordingly.

The AIC believes that its TechFast intermediary program addresses an existing market gap by using a market-pull approach to create and accelerate knowledge and technology transfer and adoption from publicly funded research organisations to SMEs. As a result of this program, SMEs are now better able to collaborate with publicly funded research organisations, and reap the benefits of increased innovation.