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To whom it may concern

RE: Submission to the SAPC Research and Development Inquiry

The Future Industries Accelerator (FIA)

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BACKGROUND

In the 2016-17 budget, the SA Government announced an investment of \$7.5 million into the Future Industries Accelerator (FIA), to be administered through the Future Industries Institute (FII) at UniSA. The FIA facilitates opportunities for local businesses to engage with researchers from FII, and affiliates of FII from across the University of South Australia (UniSA), to solve industry problems and contribute to growth in the SA economy.

Since January 2017, the FIA has proven to be an exceptionally successful model, providing support for companies across SA to build their research and development capacity and accelerate growth internally and economically for the state. The FIA constitutes three funding schemes, that support collaborative initiatives between UniSA and businesses to address industry's challenges and opportunities:

Infrastructure Access Scheme - Short term, quick access to research infrastructure worth over \$70M and expertise. Includes support from technical staff.

R&D Voucher Scheme - Project funding (\$100K) to provide salary, consumables and equipment to test product ideas or enhancements.

Mobility Scheme - Up to 12 month secondments either for UniSA staff into industry or vice versa. Industry funds any necessary expenses beyond salary. Facilitates transfer of knowledge, training and skills in areas of expertise business critically needs.

THE PHILOSOPHY BEHIND FIA

Australian industry investment in collaborative research hovers around 4%, significantly below the OECD average. In South Australia, where 98% of industry is small and just 0.1% is large (200+FTE), R&D investment is further challenged. Research is prohibitively high risk and requires capital or capabilities that much of industry do not have access to. The FIA bridged this gap in a scalable way, by providing companies with access to expertise and infrastructure they identify they need and bolstered where needed through discussion with researchers. The FIA aligns with industry timescales and IP is agreed transparently before commencement and with a generous spirit in alignment with UniSA's broader IP principles. The FIA engages with industry associations and conferences and councils to reach new partners, who are then actively introduced to the relevant researcher experts and the relationship is managed throughout the project lifespan.

UniSA and the SA State Government provide the platform, and industry identify their needs to inform the collaborative discussion. This industry-led approach maximises the benefit to industry and has attracted completely new partners to achieve their business objectives through research. Over half the FIA recipients had never engaged in research or with the higher education sector previously. The FIA produced additional benefits beyond the industry community and economic aspects. Young researchers and students are directly involved in projects, providing an excellent

industry training experience to better equip them for their future careers. Our partners have spanned all major SA industries and the work has heralded benefits for the environment through cleaner technologies or improved use of materials, improved health via new treatments or improved diagnostics, improved workplace safety and satisfaction through industry 4.0 or resource management. This activity has all been in SA, with SA companies. The FIA has generated revenue, jobs and benefited future SA's healthcare, environment and wellbeing by providing our industries with the support they needed, when they needed it. Its legacy will be to show a new model type for industry-research collaboration that is able to attract new partners to research, and achieves significant outcomes and benefits in a scalable and quick approach.

Throughout its tenure the FIA has met or exceeded all KPIs and demonstrated across a number of key metrics its tremendous success. These successes include, but are not limited to, the following:

- Over 200 companies have engaged, resulting in 124 funded projects;
- \$2.6M has been awarded in 36 R&D Voucher grants, co-invested by industry with \$885k cash and \$2.3M in-kind;
- \$2.85M has been awarded in 32 Mobility grants, co-invested by industry with \$348k cash and \$1.7M in-kind;
- 56 companies have engaged with the Infrastructure Access Scheme, undertaking projects ranging from simple analyses to investigative and exploratory work to verify new commercial opportunities or uncover solutions to existing challenges;
- Over 70 jobs have been created directly through FIA projects, not including flow on employment or other direct outcomes from commercial successes;
- Over half our FIA recipients have not previously engaged with UniSA. This is creating a pipeline of future business activity for FII and UniSA, improving SA's research-industry ecosystem;
- Every major SA sector has engaged. Applications from Defence & Space, Advanced Manufacturing, Mining & Resources, Food & Beverage, Health, Environment, Education & Training and Space have been evenly spread, demonstrating that FIA is universally relevant;
- Every Unit within UniSA has engaged in a funded project; and
- The FIA has a unique structure, size, and speed of operation which aligns with industry's needs while providing end-users with direct access to the University.

The FIA has become an exemplar of the University's broader and well known approach to industry collaboration.

ABILITY TO ENGAGE ACROSS ALL SA SECTORS

Since the formal launch of the Scheme in January 2017, over 200 companies have engaged with the FIA and has includes all of SA's major industry sectors, demonstrating its universal appeal. The team have attracted over \$1M dollars in cash co-investment to UniSA through funded projects, and \$4M in in-kind commitments from industry, demonstrating the value these projects represent to the companies involved. Over 70 jobs have been created directly through the Program, with indirect figures to be calculated. Every major SA sector has been funded, including Defence & Space, Advanced Manufacturing, Mining & Resources, Food & Beverage, Health, Environment and Education & Training. Conservative early assessments indicate the FIA has provided \$8 to the economy for \$1 invested.

A few examples of FIA's impact across SA's industry sectors are provided below:

Defence & Space

A defence industry partner required development of an analytical method for testing for the presence of hydrogen in construction welds, critical to a major project and a source of hundreds of jobs in SA. The presence of hydrogen during the construction welding phase can cause weaknesses that may result in a catastrophic failure. The analytical method was developed with advice from FII's technical team staff and our industry suppliers of analytical equipment. The hydrogen analysis itself required access to our dedicated gas chromatography analytical laboratory facilities. The developed analytical technique is now being utilised to analyse welding used in the SA shipbuilding industry.

FIA has also supported space companies across projects designing components for small cube satellites as well as assisting them to upgrade their project management approaches to achieve efficiencies and higher quality outcomes.

Advanced Manufacturing

Coiltek

Coiltek manufacture metal detectors, requiring a conductive paint for the detector coils. They had been notified their paint suppliers would cease production, risking Coiltek's mid-long term viability. Via a FIA grant, Coiltek collaborated with conducting polymer researcher, resulting in a new conductive paint that outperforms their existing supply. This has led to new opportunities, including further development for mass production with a global engineering company.

Mining & Resources

Specialised spectroscopic analytical equipment and facilities in the FII are world class. The IFS and its staff have provided access to X-Ray photoelectron spectroscopy (XPS), scanning electron microscopy (SEM) and Quantitative Evaluation of Minerals by SCANning electron microscopy (QEMSCAN) equipment to resolve industry issues.

This equipment has been utilised for projects for mining and construction companies, as well as service industries. Projects have included the separation of raw mineral resources, purity of extracted minerals, nature of the surface contamination of sand minerals, and the identification of stains on autoclaved medical equipment.

IPACS

IPACS are leaders in the collection, monitoring and reporting of real-time asset performance in industries including mining and resources, defence, energy and manufacturing. In their FIA project, IPACS have developed new camera-based technologies for oversized rock identification on conveyor belts and infra-red (IR) cameras for froth floatation. These new sensors in conjunction with data analytics enhance mineral production through the process plant. This project has generated new funding streams and new clients that has already produced \$100k of revenue.

SPS

The company acquired land with a large sand deposit, initially intended for low value glassware. Through FIA funding, the collaboration established a scalable method for purification, enabling high cost electrical hardware applications. This has increased the value of the deposit tenfold and the company are now seeking investors.

Food & Beverage

This industry predominantly makes use of FII's extensive organic chemistry analytical capabilities and expertise. One company had an intermittent issue with failure of their beverage product packaging. They suspected the failure was in the packaging itself, supplied by a third party. Utilising our TOF-SIMS, optical microscopic analysis, and Scanning Electron Microscope, we were able to demonstrate that packaging corrosion was indeed the cause of product failure. The company used this information and data to modify their product package processing process and reduce product failure rate.

The success led the company to apply for another IFS grant to identify potential microbial-cross contamination points in a multi-product production line. This project was conducted in a different scientific area and utilised speciality microbial laboratory facilities and analytical equipment from the first IFS. By utilising the unique protein structure of microbial organisms, sample analysis and identification of organisms was conducted in a number of hours compared to the traditional laboratory practice of several days. The project identified that there were several common sources of microbial contamination in the beverage processing which the company is now addressing internally.

Bickfords

Bickfords experienced a manufacturing issue that was causing intermittent and unpredictable issues that were affecting whole batches, disrupting delivery logistics and longer term had the potential to affect the company's reputation. The FIA provided them with access to expert researchers and to some of the Future Industries Institute's \$70M infrastructure. Through this the team were able to identify improvements necessary to the manufacturing process

Nutrisea

Nutrisea, on behalf of a fishery, approached FIA to collaborate on the development of an oral dose of Praziquantel, a medicine used in fisheries to prevent various parasitic conditions in Yellowtail Kingfish. Once patenting has been completed the new formulation will allow the fishery to reduce costs associated with parasite prevention and allow them to expand their fishery locations. The fishery is a major source internationally for Yellowtail Kingfish and a global leader in full cycle breeding. This outcome will provide millions of dollars in increased revenue.

Health

SA companies have utilised specialised analytical capabilities and facilities to validate the presence of restricted drugs, in one case in testing kits. This project required laboratory facilities licenced to hold and analyse for restricted drugs such as Heroin and Ecstasy. Specialised laboratory facilities and staff at the School of Pharmacy and Medical Sciences were able to analyse supplied materials for the presence of a range of restricted compounds and cross-validate the company's analysis against the established standardised methodologies.

Green Dispensary

The company are collaborating with UniSA pharmacology to develop new formulations to allow patients with conditions that make tablets or other medication types difficult or impossible to use. This will allow the company to not only support citizens with these conditions receive medication and allow them to improve their quality of life, but also access the Australian and international markets by being first to market with these customised medications with unmet medical needs.

Environment

Arris

Arris approached FIA to help them develop a facility able to provide Australian Standard AS1546.3:2017 compliance testing for small treatment systems. Through a FIA secondment, a UniSA researcher worked alongside Arris staff to undertake the installation and pre-testing (commissioning) phase as well as ongoing development and providing expertise to clients and training Arris staff. In the first year alone, the new facility secured 9 contracts worth \$600k.

Education & Training

As well as the aforementioned space relevant projects which included upskilling a company on their project management practices, the FIA has also supported a project dedicated to optimisation of resourcing in the engineering sector. The challenge was to identify the most efficient way to blend skills, personalities and experience when there is a large cohort of engineers to deploy across a disparate number of projects. This scenario is typical for many engineering consultancy firms. The outcomes of this project has allowed an Adelaide firm to provide this as a service to help firms better understand their workforce.

The examples of our partners and projects provided in this section highlights just some of the impacts of FIA and UniSA. We have helped companies to increase their competitiveness or value-add proposition, helped them avoid or negate costly issues, or confirmed viability of proposed new products and developed them in collaboration. Our Mobility secondments have trained and upskilled companies, as well as given UniSA students and early career researchers invaluable direct industry experience to support their careers and provide them with links to the relevant SA industry. Those secondments have facilitated true collaboration by embedding experts in companies or senior company staff into the University. FIA R&D Vouchers have similarly funded teams to work together to redesign machinery products, develop drug reformulations, establish and verify testing services protocols and many more.

Together the FIA industry partners demonstrate the impact of UniSA as the University of Enterprise, across all major SA sectors and providing economical, environmental, health and sociological benefits.

Alignment to the State Government's EXCITE Strategy

The 10 year EXCITE strategy states research and innovation are key drivers of economic transformation. Our ability to provide access to the state's businesses to our infrastructure and expertise allows industry to explore opportunities as they move towards industry 4.0 and adapt to a rapidly changing economic environment.

EXCITE states that R&D is estimated to provide up to 75% of national total factor productivity growth. The FIA and UniSA have demonstrated that SA businesses are strongly incentivised to engage when a low risk, low cost mechanism exists for them to access research infrastructure and expertise, even if they have never engaged with the higher education sector before. The EXCITE strategy states "Innovation active businesses also make a disproportionate contribution to business income and employment, are 2-3 times more likely to report increased productivity and twice as likely to export compared to non-innovation active businesses". FIA's demonstrated ability to attract new businesses to become innovation active is an opportunity for SA to leverage at this critical time.

Most SA companies do not have the capability in-house to explore their opportunities and challenges, nor do they have the capital to purchase infrastructure required and this limits their ability to grow. Facilitating access to University infrastructure and expertise focused on a low cost, low risk to business can fill that gap and achieve significant productivity and economical benefits for SA. Access of this nature would align well with the Modern Manufacturing Initiative (MMI) by providing SA industry with greater incentive and opportunity to maximise their ability to grow and benefit the state's economy through R&D and innovation. UniSA, FII and FIA have demonstrated the ability to engage across all four of the STEMM Research and Innovation Value Chain elements of Excellence, Collaboration, Innovation & Translation and Enabled Future Workforce. We also engage with all the state's major industry sectors and thus are ideally placed with our range of research infrastructure to offer an open door to help them overcome their challenges and provide a launching pad for their ideas.

UniSA's FII boasts over ~\$70M of research infrastructure, access to which has already proved extremely popular with our business community and has led to economic growth. Additionally the \$2M Industry 4.0 Testlab with 3D printing capabilities (a range of polymers and metal), a scanning facility and VR setup allows companies to explore and develop their products in completely new ways. The Testlab represents new opportunities for SA businesses, particularly in the defence, manufacturing and space sectors. Several businesses have already engaged with the Testlab and further engagement will allow SA industry to explore opportunities and solve challenges they would not otherwise be in a position to. This is precisely the feedback we have observed in our interactions with companies through the FIA. UniSA and the other SA Universities also boast incredible NCRIS facilities that can be leveraged to support companies in the same way. Nodes hosted at UniSA are Microscopy Australia, ANFF and Bioplatforms Australia which mostly serve the health and medical research sectors as well as high tech manufacturing.

During the pandemic UniSA and our sister SA universities has demonstrated our ability to collaborate with SA industry towards an urgent need and we want to continue to achieve even more. FII has worked with Detpak to assist them in their work to respond to the need to rapidly increase their mask manufacturing facility in Brompton, including efficacy and material testing and advice.

Yours sincerely



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