Mr Andrew Laming MP
Chair
Standing Committee on Education and Employment
Parliament House
Canberra ACT 2600

11 March 2016

Dear Mr Laming

It is with pleasure that I forward to you Deakin University's submission to the Inquiry into Innovation and Creativity: Workforce for the New Economy.

Given the scale of disruption in global higher education and the critical need to train Australians for the jobs of the future, this Inquiry is a particularly pertinent issue for national policymakers and legislators. The University is pleased to bring issues of global competitiveness with respect to international education to the House of Representatives' attention and urges detailed examination of these with a view to urgent reform.

A sustainable higher education system must enable Australian providers to compete on a level playing field with international practice, in particular, with new US cloud-based methodologies.

Deakin University is well placed to contribute to this discussion, debate or inquiry given the recent growth of our Cloud Campus to over 12,500 EFTSL.

In terms of the commercialisation of research and the role of incubators, the University notes that for the National Innovation and Science Agenda to succeed, the Australian Government must demonstrate long-term support for a conducive environment before industry will invest in expensive, time-consuming research and development pathways. Failure to provide stable, long-term policy settings will mean that industry-research relationships continue at small scale relative to our competitors.

I commend this submission to the House of Representatives Standing Committee on Education and Employment. I am happy to make senior academic and research leaders available to expand on this submission by appearing before the Inquiry given the immediacy of the issue for Australia's Higher Education industry.

Best wishes

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Vice-Chancellor

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Deakin University
Responses to the Terms of Reference

House of Representatives Standing Committee on Education and Employment
Inquiry into innovation and creativity: workforce for the new economy

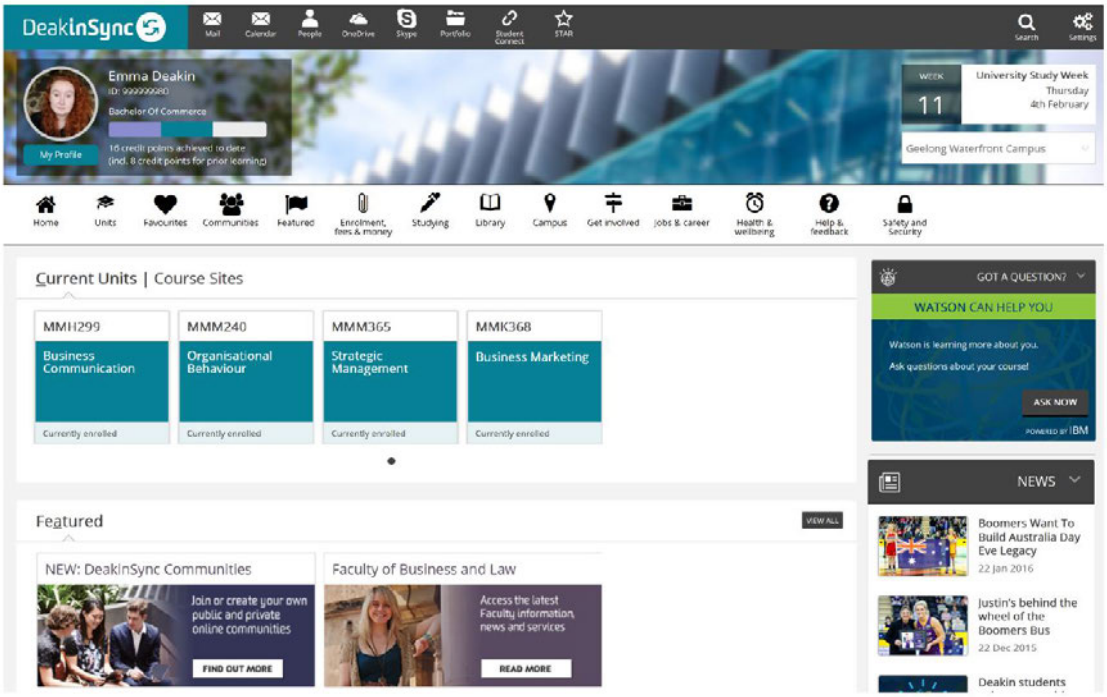
March 2016

a) The extent to which students are graduating with the skills needed for the jobs of today and of the future.

Higher education providers issue credentials and qualifications that warrant that their graduates have demonstrated evidence of learning. These qualifications are used as proxies, by industry and employers, that those graduates are therefore equipped to perform at a required level in a new career, or at an advanced level in a career. Traditional education is based on the transmission of knowledge, and success in traditional educational is based on 'passing' tests and assignments, where the learner is normally required to achieve at least half of the available marks. This model is at odds with an outcomes-focused world, and when the very skills required for success in employment (often deemed 'soft skills') are also those that are hard to test and measure.

To address this issue, Deakin promises to educate learners for the jobs and skills of the future (graduate employability) through courses enhanced for highly personal, engaging and relevant learning experiences - on campus, in the cloud, or wherever learning occurs. Course enhancement, a university-wide initiative completed in 2015, sees Graduate Learning Outcomes for employability explicitly assessed and evidenced in every degree: all Deakin domestic and international students can create, curate and share digital evidence of achievement of employability outcomes through DeakinSync, our adaptive, personalised digital learning environment that provides students with a course-level view of progress towards completion, portfolio tools for curation of their learning evidence, and a profile tool where students can assemble and publish professional-quality profiles and connect to employers through professional channels such as LinkedIn. Over and above required course assessment tasks, students who demonstrate outstanding achievement of those Graduate Learning Outcomes most valued by employers earn a new lifelong credential (called a Deakin Hallmark). In addition, Deakin is implementing new Professional Practice Masters degrees in which experienced professionals can have their capabilities warranted at the appropriate AQF level - this is a degree that lowers financial cost to the learner and assesses employment capability.

Deakin Hallmarks are awards that recognise students' outstanding achievement of Graduate Learning Outcomes, particularly those valued in the workplace.



DeakinSync: Deakin's adaptive, personalised digital learning environment.

The future world of work is unknown: but it is extremely likely that the skills required to flourish, over and above knowledge, will be strongly related to key employability skills such as communication; teamwork and collaboration in a global community; critical, creative and entrepreneurial thinking. Today's degrees must be capable of ensuring those skills are warranted, in addition to the application of discipline knowledge.

Deakin Advice to the Committee:
To ensure Australian higher education is strongly linked to key employability skills, universities and other higher education providers must be capable of warranting these skills in addition to the application of discipline knowledge.

b) Matters relating to laws and regulations that may act as a barrier to education providers being able to offer qualifications that meet the needs of the new economy and fastest growing sectors.

Higher education providers work within a regulatory framework that provides some constraints on the qualifications that they are able to offer. In particular, *Higher Education Standards Framework (Threshold Standards) 2011* provides minimum acceptable requirements for the provision of higher education in or from Australia.

The current Standards require providers to meet specifications in the Australian Qualifications Framework (AQF) which include requirements relating to 'volume of learning' that have had a particular impact on the design and duration of Masters Degrees (Coursework). A revised set of Standards (that will be applied from the start of 2017) are less prescriptive about adherence to the volume of learning specifications in the AQF but still limit the allowable types of qualification and require that learning outcomes are consistent with the relevant AQF classification.

The National Code under the *Educations Services for Overseas Students (ESOS) Act 2000* also includes requirements relating to delivery of courses to students studying in Australia on student visas that have significant implications for the design and delivery of courses which include online components. In particular, these students can currently undertake no more than 25% of their course online and must study at least one unit face-to-face in any compulsory study period. There is no such limitation on domestic students' mode of study, and students' attendance at a physical campus is difficult to enforce or monitor. This approach is at odds with the focus on assurance of graduate outcomes in the forthcoming Standards.

While these frameworks are designed to assure quality, the global environment now means that learning happens 24/7/365 by learners who learn on the go, and on powerful digital devices. While the campus with timetabled scaled classes may remain a focus for some cohorts for some time, time-poor learners trying to change career or advance in their career will opt for a more flexible path to a recognised qualification. Much hype surrounded the rise of MOOCs in 2012, and seemed to disappear while they struggled to find a workable business model. Now, MIT offers a MicroMasters in Supply Chain Management online at edX. To achieve a full Masters, students go on to complete the remaining half of the program on campus at MIT. Models like this one, where substantial credit towards a degree is available at distance and at low cost and (often) through self-paced online courses are very attractive to learners, and will impact on traditional models.

Deakin Advice to the Committee:
Australian regulators and legislators need to increase the percentage of post-graduate and international studies that can be undertaken in the Cloud to be globally competitive with comparable US practice.

Commonwealth regulatory agencies should be encouraged to work with universities to develop a structure whereby successful completions of MOOCs by international students can count as credit towards a degree or higher degree award.

c) Factors that discourage closer partnerships between industry; in particular small and medium enterprises, the research sector and education providers; including but not limited to: intellectual property; technology transfer; and rapid commercialisation.

A core tenet of Deakin's Strategic Plan, *Live the Future Agenda 2020*, is to benefit the communities we serve through our research and teaching. A large focus of this agenda is to build partnerships with industry, to both improve employment pathways for our students and to build the relevance and impact of our research and innovation.

The main factors discouraging such partnerships are often built around long-held assumptions by both parties that include:

- industries don't really want anything truly novel; the questions they ask are for highly commercial solutions that don't require real research
- SMEs have no time or incentive to explain their research and development needs and mostly don't even understand these themselves
- academics are driven by the need to publish and not by the practical (and financially valuable) solution
- university processes involve a morass of bureaucratic red tape and legal agreements that will delay the project, take too much time and cost SMEs money
- universities work to their own timetables, thus you can't depend on them (and their students) getting work done efficiently
- academics talk a lot and deliver very little
- academics don't understand the financial imperatives and very slim margins that SMEs work within.

A major problem in dispelling these assumptions is that such barriers to effective partnerships and commercial benefits are sometimes based on past experiences in which the cultural and attitudinal differences were, unfortunately, not effectively bridged. Such experiences tend to polarise the parties and reinforce old biases. The push to engage or re-engage must be accompanied by renewed enthusiasm, increased effort and, most of all, evidence of real benefit. Thus, much work is needed around developing engagement, including:

- improved two-way communication and understanding between university academics and businesses to identify the potential for short and longer term engagement—this includes investment of time to educate, inform and explore possibilities, finding the right champions on both sides and developing the trust to take initial steps
- demystifying intellectual property (IP) on both sides - This needs to be done on a case-specific basis, in the process of understanding background IP, the potential for developing new, shared or independent IP through the course of the partnership and the real appetite to commercialise or otherwise benefit from any IP
- appreciation of the time scale and balance sheet limitations on both sides
- understanding the options for leveraging cash and in-kind investments.

Commercialisation from within universities typically emerges via one of two distinctive pathways. Rapid uptake of university IP or research engagement is typical of new start-ups while a longer route through SME engagement can develop via incremental improvements that lead gradually to novel innovations. University research and support systems (contract and IP management, working with leveraging projects on behalf of the SME, etc) need to be flexible and nurture the opportunities in ways that maximise the outcome. The time to commercialisation, or taking prototypes, services and products to market realisation, varies markedly depending upon the nature of the item: apps can be implemented online almost immediately while new drug therapies may take decades and substantial investment to meet stringent regulatory requirements. Certainly, commercialisation can be accelerated when the pathway to market is

well understood, the IP effectively agreed and managed and investors engaged. All of this requires early planning, clarity of purpose and perseverance of the partners. In other words, a good deal of common understanding and agreement from the beginning.

This interaction is probably best facilitated through close and continuous interactions of the partners. At Deakin we are achieving this best with industries that have chosen to co-locate on our campuses. These relationships are now growing sufficiently on the Waurn Ponds Campus to warrant establishment of ManuFutures, our advanced manufacturing incubator, which is detailed in the case study below.

Other areas of Australia's innovation system that would benefit from review within the context of strengthening university-industry partnerships include: a re-examination of universities' promotion and remuneration processes to support increased industry engagement; incentives for increased university-industry co-location to leverage research infrastructure and create 'innovation hothouse' ecosystems throughout the university system; enhanced recognition of joint academic-industry publication; continuous development of curriculum relevant to industry; and, opportunities for students and early-career academics to apply discipline knowledge in interdisciplinary and industry-relevant problem solving projects.

Advice to the Committee:
Links between universities and industry will be strengthened by a fundamental understanding of long-held assumptions that discourage partnerships with industry. Long-term cultural change must be supported though enhanced communications and the development of shared models to better manage IP, cost, project timeframes, the creation of industry-relevant curriculum and environments, and leveraging private and public sector funding.

d) Relationships between tertiary education entrepreneurship programs and private incubators and accelerators.

Deakin's headquarters are in Geelong, where the need for economic reinvigoration and realignment to global markets is acute. In addition to the creation of entrepreneurship programs, Deakin University has brought together industry, research, education and government at its Waurn Ponds campus to create an export-focussed research-industry hub, the **Geelong Innovation Precinct**. Deakin's entrepreneurship and incubation programs are headquartered within the Precinct. The Committee should note the significance of the highly-strategic context in which they are located that puts our people alongside industry.

The Geelong Innovation Precinct comprises:

- **New research infrastructure and capability** in materials engineering and fibre science including the Australian Future Fibres Innovation and Research Centre and the world's leading carbon fibre research line, Carbon Nexus, as well as first class research facilities for robotics and simulation, energy technology, metals manufacturing, design and modelling, all of which have very significant industry engagement, many with leading international corporations. CSIRO's Fibre Processing Team of over 70 CSIRO fibre and material scientists is also located adjacent to Carbon Nexus.
- **Co-located industry partners** include established and developing companies reliant on continuous innovation. These include composite product exporters QuickStep Holdings and Carbon Revolution who employ approximately 200 workers including many retrenched from Ford and Alcoa. A number of early stage spinouts have been located adjacent to fibre processing and laboratory facilities. The Epworth Hospital, once completed, will employ 660 full time equivalent positions and will be linked to the University's regional health hub (REACH), and medical school. Construction of a manufacturing incubator and accelerator, ManuFutures, is underway to support our expanding industry involvement and will support 150 innovation and entrepreneurial positions.
- **Government Agencies to facilitate industry-research advancement** are located in the precinct. These are the Victorian Defence Procurement Office and the Advanced Manufacturing Industry Growth Centre.
- **CADET, the Centre for Advanced Design in Engineering Training,** is a futuristic engineering facility emphasising solution-focused engineering design and product development. CADET is a fulcrum for small to medium enterprise (SME) engagement via the Industry Innovation Program (IIP) managed by the Geelong Manufacturing Council (GMC). The IIP is a vehicle to identify specific research and development projects of relevance to GMC members and match these to engineering research groups, including students, building small scale innovation into the SME community. The uptake of this bottom up approach has been accelerated by building confidence in university research value through the presence of our co-located industry partners.
- **Deakin's Incubation and entrepreneurship programs,** SPARK@Deakin and ManuFutures are detailed below.

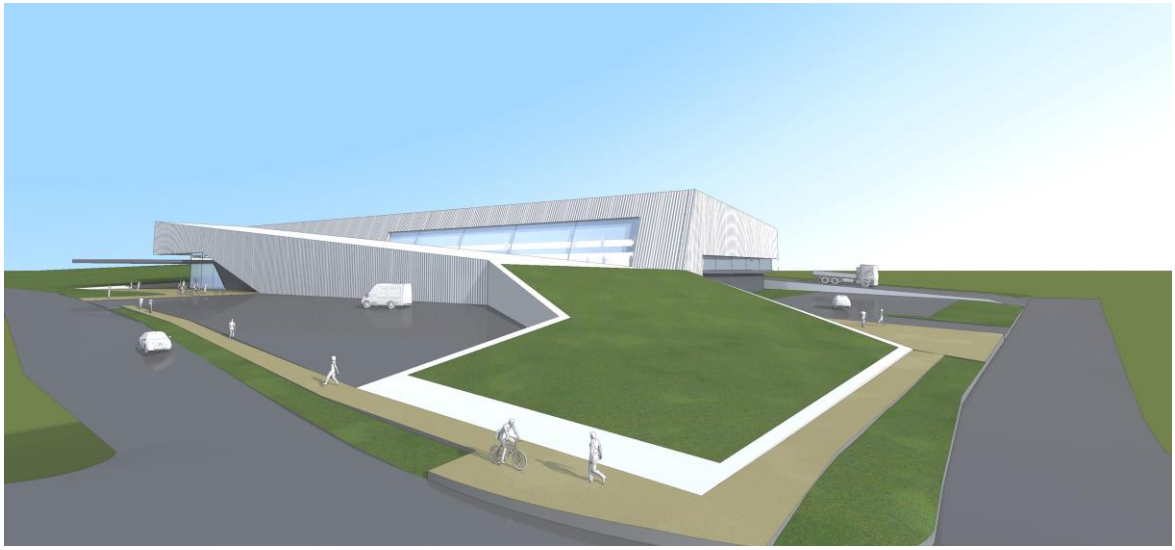
By the end of 2016, there will be over 2000 jobs in the Geelong Innovation Precinct with many directly engaged in development or manufacture of innovative exports such as Carbon Revolution's wheels for the US and European markets.

Aerial view of the Geelong Innovation Precinct February 2016

The University's ambition is to further accelerate this regional economic activity, product development and job creation in the Precinct though a new $13M advanced manufacturing incubator and accelerator currently under construction. As an industrial incubator for future technology enablement, **ManuFutures** will provide flexible and reconfigurable working spaces, shared corporate facilities and a collaborative environment that supports projects and enterprises ranging from start ups' through to multi-nationals, with a capacity for five to fifteen SMEs and up to 150 people at any one time. The University has secured interest and commitment from a range of globally focused advanced manufacturing organisations and early stage start-up enterprises to take up tenancy agreements as soon as the ManuFutures facility is completed.

ManuFutures will be:

- **A hub to generate advanced products and manufacturing technologies** to drive research, prototyping and process development. Access to advanced equipment and multidisciplinary business and technical expertise will create a nexus to generate ideas, technologies and skills, critical for sustainable jobs and economic growth.
- **The heart of a regional innovation network.** Activities concentrated in the local catchment of Geelong and Barwon, will link through Deakin's educational and industry partnering initiatives throughout Melbourne, Warrnambool and the Western Victorian districts, out to Bendigo and beyond creating a focal point for transformation to nimble, advanced and additive manufacturing.
- **A solutions-based environment** to accelerate the prototyping, improvement and commercialisation of a wider range of manufactured goods, developed and manufactured locally for domestic and international markets.
- **A host to multi-nationals, small to medium enterprises and start-up entrepreneurs** via:
    - flexible, configurable spaces ranging from collaborative working areas to secured private suites
    - tailored accommodation arrangements to meet any budget and tenancy length
    - centralised corporate facilities, including meeting and presentation spaces
    - front of office support and reception
    - specialised laboratory and advance manufacturing facilities.



Architect impression: ManuFutures building in the Geelong Innovation Precinct.

Another example of growing an entrepreneurial culture within and beyond the university environment is the **SPARK@Deakin** program which commenced in 2015. SPARK is an experiential program designed in the first instance to provide Deakin students and staff an opportunity to see, experience and relate to the early stages of the commercialisation path. The first SPARK intensive weekend involved 90 participants, from which there were three team ideas identified for further development. SPARK is an evolving program, running three workshops in 2016 and informing the University's approach to building commercial value from within the University and the community.

Spark@Deakin: encouraging early stage commercialisation for Deakin staff and students.

Deakin has also developed a commercial research program ***Deakin Research Commercial*** to assist academics in identifying and developing industry partnerships and we are currently working on a University-wide entrepreneurship program that will be incorporated in our graduate employability student initiatives.

Deakin is not currently participating in private incubator or accelerator schemes. However, the university intends to locate the Australian hub of a highly successful international incubation program operated by a multinational corporation within ManuFutures in Geelong. The cross-fertilisation and intense industry focus stemming from such a co-location of industry and university expertise is, we feel, likely to produce an accelerated innovation model for all partners, with a concomitant economic benefit.

Deakin Advice to the Committee:
That the Committee support a multiplicity of innovation models while ensuring that they are tailored to specific and well-researched innovation agendas; that they actively encourage the embedding of industry skills and knowledge within university entrepreneurship programs and incubators and, thirdly, that such incubators be encouraged to develop programs involving companies ranging from multi-nationals to start ups.