

Institutional History

A review of the CSIRO-CTU Partnership to develop CTU's
commercialisation and innovation capacity

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Background

In February 2019, the Science Commercialisation Partnerships (SCP) workstream under the Aus4Innovation program¹ commenced. This workstream was led by Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) Agriculture and Food Business Unit and aimed to support Viet Nam's Ministry of Science and Technology's National Agency for Technology Entrepreneurship and Commercialisation Development (NATEC) implement its mandate of enhancing Vietnamese research lead-commercialisation and innovation. An analysis of Viet Nam's innovation system by the Vietnamese Government had identified a weak commercialisation capability across researchers as a key barrier still to be addressed. Until this point, the Vietnamese Government had invested significant effort in developing a legal framework for commercialisation and numerous donors and international research organisations had invested in building individual researchers' capability in commercialisation through training programs based on their individual countries' experiences and context (i.e., not explicitly contextualised for Viet Nam).

Based on this analysis, it was agreed that the SCP workstream would prioritise development of commercialisation approaches and practices for both individual researchers and universities / research organisations that are fit-for the Vietnamese context. Specifically, it focused on building and strengthening the technical skills for commercialisation beyond IP and researcher and research organisation relationships and networks with the private sector and other users of knowledge and technology. Using a co-development approach, SCP worked with NATEC and three universities / research organisations² in Viet Nam to pilot different approaches to build fit-for-purpose commercialisation capability and capacity approaches. This included developing and implementing partnership agreements with each organisation focused on 1) developing a Vietnamese commercialisation approach and training program, 2) raising awareness about how Commercialisation is more than just IP, and 3) undertaking practical experiential learning activities that build capability and provided evidence and informed advice to individuals, research organisations and universities and policy makers on effective commercialisation practice and policy³. For more information about the partnership agreement see Annex B.

Purpose of the review

This review focuses on Can Tho University (CTU) one of the three targeted universities / research organisations. It takes place approximately 4 years into the partnership and provides an independent assessment of the results achieved to date. It explores changes in CTU's innovation capability and capacity, and the role CSIRO has played in these changes. Using surveys, interviews and facilitated workshops key institutional changes related to the partnership were codified.

¹ In January 2019, the Aus4Innovation development assistance program commenced. It aims to strengthen Vietnam's innovation system, prepare for and embrace opportunities associated with Industry 4.0, and help shape Vietnam's innovation agenda in science and technology. It is about creating and using science, innovation and technology for economic, social and environmental benefit. Aus4Innovation is managed by CSIRO in partnership with the Vietnamese Ministry of Science and Technology (MoST) and the Australian Department of Foreign Affairs and Trade (DFAT). For more information about the project logic and how this activity fit see Annex A.

² The three organisations are Can Tho University (CTU), Viet Nam Academy of Science and Technology (VAST) and Viet Nam National University of Agriculture (VNUA)

³ For more information about the CSIRO and CTU partnership goals and objectives refer to Annex B.

The aim of this report is to share the results of the review and develop a better the understanding of how the innovation support for interventions and approaches implemented through this partnership have contributed to changes in CTUs innovation capacity.

The report is divided into two sections. The first section, outlines CTU’s evolution and innovation capacity changes, and the SCP’s support and contribution to these changes. Specifically, it highlights key events that participants in the review believed to be important contributors to strengthening CTUs innovation capacity. The second section unpacks how SCP’s support and influence can be understood and it could be measured going forward.

Methodological approach

The review’s institutional history approach⁴ involved six (6) key steps:

1. A **document review** to inform the creation of a common understanding of the objectives of the partnership, the actions taken over the last few years, and the successes achieved, applicable project documents were reviewed.
2. **Key informant interviews** with key stakeholders engaged in the change process within CTU and outside CTU (i.e. clients).
3. A **learning journey workshop** internal to the SCP team to map out key events and significant changes observed through project monitoring evaluation and learning activities
4. A **draft institutional timeline** developed based on the learning journey workshop with the SCP team and from key informant interviews
5. **Validation of the institutional timeline** through workshops with key CTU staff and the SCP team to ensure validation of the draft timeline including the key changes and the factors that influenced the changes, and
6. A **Report** that identifies key institutional changes from the institutional timeline, the influence of the partnership in these key changes and a **Maturity Model** based on the key institutional changes to help shape ongoing planning, monitoring and evaluation of CTU’s innovation capacity development.

Institutional histories explained:

Institutional histories are narratives about institutional changes or ways of working. The process focusses on uncovering specific routines, working habits, and team culture i.e. the institutions that shape behaviour in projects and organizations (Banerjee, et al 2017⁵). Documenting these changes is important in helping to understand the role of institutional change in achieving success (Prasad et al, 2006⁶).

The institutional history methodology is a flexible process that can be adapted to best fit the project it is being applied to (Source: [Better Evaluation](#)⁷). It based on the systems thinking and innovation and change literature (Hall et al., 2004; Shambu et al., 2006⁸).

⁴ The timeline highlighted key institutional changes with CTU and how the partnership influenced these changes

⁵ Banerjee, R.R., Mude A., and Wandera B. (2017) Using an Institutional History for illuminating project processes and the theory of change: The case of the Index-Based Livestock Insurance (IBLI) project. IBLI Practice Note (https://www.researchgate.net/figure/The-steps-undertaken-in-IBLIs-institutional-history-process-explained_tbl1_320372176 sourced 25 February 2023)

⁶ C. Shambu Prasad, Andrew Hall and Laxmi Thummuru (2006) Engaging scientists through institutional histories. ILAC Brief 14. (https://www.researchgate.net/publication/228993415_Engaging_scientists_through_institutional_histories accessed 25 February 2023)

⁷ [Better Evaluation Website – Institutional histories page](https://www.betterevaluation.org/methods-approaches/methods/institutional-history#:~:text=As%20part%20of%20an%20evaluation%2C%20an%20institutional%20history,highlight%20barriers%20to%20and%20mechanisms%20that%20assist%20change.) <https://www.betterevaluation.org/methods-approaches/methods/institutional-history#:~:text=As%20part%20of%20an%20evaluation%2C%20an%20institutional%20history,highlight%20barriers%20to%20and%20mechanisms%20that%20assist%20change.> accessed 25 February 2023

⁸ Prasad et al., 2006.

CTU's commercialisation and innovation capacity development

The institutional timeline developed as part of this review (see Annex C) provides an overview of CTU commercialisation and innovation capacity development journey. It highlights how CTUs evolution has resulted in institutional innovations that have enhanced its capacity to respond to challenges with new institutional innovations going forward. The journey captured through the institutional timeline, highlighted evidence that suggests CTU has developed an enduring ability to respond to shifts within the specific context and challenges faced by the institution.

Over time the support provided through the partnership has become noticeably more sophisticated. In the first two phases, the support focused on researchers who had personal networks with industry and were based in the schools and research institutes focused on transferring technology. The emphasis of these exchanges was on single disciplinary solutions to problems. However, as CTUs innovation capacity strengthened, CTU becomes more explicit about what is required as an organisation to enable and sustain more meaningful innovation. It is now focused on developing a new Center for Industry Engagement and Technology Transfer Services (CIETTS) that has a mandate to coordinate multi and trans-disciplinary innovation projects with industry. This center is being developed to play a key role in CTUs leadership in the Sustainable Development of the Mekong Delta initiative).

The dynamic nature of these changes reflects the ebb and flow of institutional change, underpinned by an institution that over time becomes better at responding and adapting, in order to introduce necessary changes. As CTU responds to challenges and opportunities with new institutional innovation, a need for further institutional change has been identified. As illustrated below ([Error! Reference source not found.](#)), as CTUs commercialisation and innovation capacity matures, it has become more sophisticated in how it responds, promotes, and introduces lasting institutional changes.

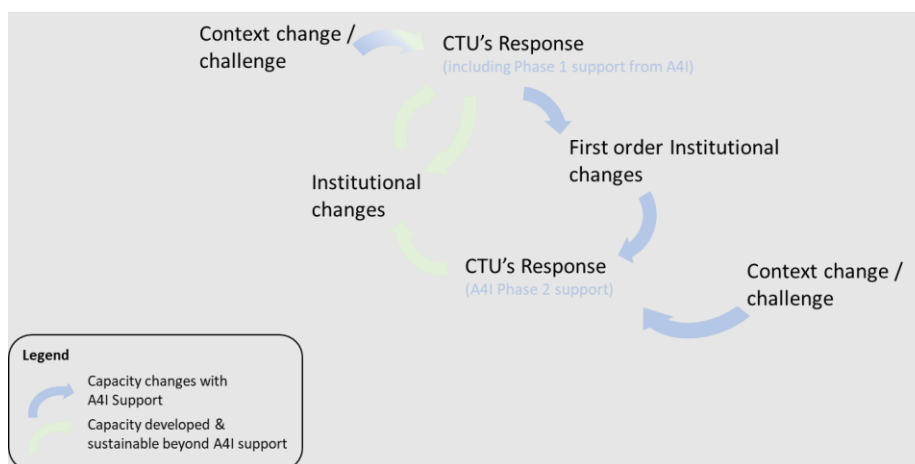


Figure 1: A heuristic of how CSIROs Innovation Support evolved with CTUs innovation capacity

Institutional changes

As suggested above, this institutional history review has highlighted several significant institutional changes within CTU over the last 4 years. Specifically, these institutional innovations include; changes in CTUs commercialisation and innovation capability, networks, rules, norms, organisational structural changes, policy and strategy, and roles for different people within CTU. These changes have led to an expanded list of collaborators and stronger connections and relationships than previously. For example, not only has the

number of formal collaborations been increased, but so has the diversity of collaborations (from different levels within government through to different sectors of the private sector).

Five (5) noteworthy institutional changes / innovations include:

1. **Improvement in CTU's relationship with the private sector:** CTU has developed a deeper understanding of the interconnectedness between researchers, business, government. In the past the private sector did not perceive CTU as a potential innovation partner. Now, due to CTUs efforts to build more innovation focused relationships with the private sector, namely CTUs alumni (who are presidents/directors of enterprises), CTU has increased its number and value of commercialisation agreements and projects with the private sector.
2. **Changes in CTU's culture:** CTU is developing a more 'entrepreneurial culture' and researchers are 'increasing their confidence to engage directly with industry'. Researchers reported taking actions that reflect how they were far more responsive to responding to the commercial needs of industry, taking deliberate steps to listen to industry, and implementing actions that reflect a more nuanced understanding of the need for different role players within the commercialization process. In particular, CTU emphasised the importance of individual researchers, leaders from individual schools and the CIETTS working together to develop innovative solutions to industry challenges (i.e. a whole of CTU team approach).
3. **Changes in researcher's commercialisation capabilities and practices:** Hands on practical training in commercialisation combined with the supporting opportunities for researchers to engage directly with industry has helped build confidence and understanding on the risks associated with working with the private sector, as well as the need for a more systemic approach beyond the revenue only. The new CIETTS also focuses on building and connecting the technical skills and knowledge required to support academics and researchers pursue different paths to market, which has already resulted in numerous Memorandum of Understanding (MoU), partnerships and service contracts with industry, as well as substantive intellectual property (IP) registration.
4. **Changes in strategy and enabling policies and regulations to enhance commercialisation and innovation outcomes:** CTU's senior leadership have been strongly engaged in the design and establishment of the new CIETTS. The responsibility of the new CIETTS has been elevated to a Vice Rector, while its purpose has two (2) key differences to the Center for Technology Transfer Services (CTTS) (its predecessor). The first point of difference is that the CIETTS has become part of the university's core structure. It is no longer a semi-autonomous center with a primary focus on revenue from technology transfer to fund its operations. The CIETTS is funded through the university's core funds and forms a key part of the organisational structure. The second point of different is the CIETTS has become a key part of CTU's role as facilitator and partner in the implementation of the Mekong Delta's Sustainable Development vision. To support these changes CTU has reformed procurement and contracting procedures and provided incentives and greater resources to researchers to support their commercialisation efforts.
5. **Changes in CTU organisational structures for enhanced coordination and cooperation:** A key rationale for creation of the new CIETTS was greater recognition of the need to coordinate commercialisation and innovation activities across the university. CIETTS has initiated new cross-faculty and research institution committees to respond in a joined-up manner to industry challenges associated with sustainable development. Reports from stakeholders within the university suggest that this committee has helped strengthen internal networks and relationships between/across CTUs facilities and research institutions.

These institutional changes have evolved over the last 3 to 4 years in response to institutional and contextual changes. To understand how these institutional changes evolved over time and the influences contributing to changes (including the CSIRO partnership but also beyond the partnership) refer to Annex C.

The role of the CSIRO and CTU partnership

The partnership agreement between CSIRO and CTU has provided important framing for what and how CSIRO and CTU have worked together to build CTUs commercialisation and innovation capacity. Over the course of the 4 years, CSIRO and CTU reflected on progress, reviewing, and updating priorities based on changes both within and outside CTU. It recognised that the operating context for CTU is dynamic and evolving. Therefore, it was important that the partnership adapted to align and respond to this changing context. On a practical note, this meant the support provided by CSIRO (through the Aus4Innovation program) evolved over time. At the start the agreed priority was on building individual capability in commercialisation, e.g. development of the Commercialisation PLUS How to Guide and providing mentoring to researchers as they navigated through their commercialisation journey. However, over time this transitioned to providing advice and a low-risk environment for CTU to explore different institutional innovations, e.g., financial support for researchers to engage with the private sector or advice and support for developing a strategy for the new CIETTS.

The underpinning principles for this approach included: 1) practicing reflective learning with CTU, 2) tailoring lessons and insights from internationally practice to the specific contextual reality within which CTU operates, 3) articulating innovation capacity principles in a manner that serves multiple purposes and can be applied to a variety of different challenges faced by researchers throughout the commercialisation process, and 4) the co-creation of a step-by-step guidelines which provided practical guidance on the complexities of the commercialisation process and the importance of applying a gendered and inclusive lens as part of this process.

By proactively taking time to reflect on changes and lessons learnt, this enabled responsive and targeted support that focused on ensuring relevancy and effectiveness. This trusted advisor or practical mentor support was new and novel for CTU. Traditionally, its relationships with CSIRO and other donors had typically been one of three things, 1) a recipient of training, 2) a partnership to conduct research for development, or 3) implementing activities within an agreed donor program. CTU now see the expertise and advice provided through this partnership as highly valuable and are strongly appreciative at all levels (from individual researchers to senior management) of this mode of engagement.

As the relationship deepens and CTU's capacity grows, the type, design and implementation of the activities is increasingly led by CTU, with CSIRO playing more of a sounding board and technical backstop. Compared to the start of the partnership where the CSIRO team spent considerable effort leading the design process and providing technical advice on international good practice to guide discussions and actions.

For more information about CSIROs specific roles and activities at different stages of the partnership refer to Annex C.

Conclusions and where to from here

This institutional history has provided evidence of these changes over time. Specifically, what is also evident from the institutional history is that CTU's capacity to innovation has strengthened over the last 3 to 4 years. As challenges and contextual changes occur, CTU is responding through new or novel institutional developments and approaches. In other words, CTU's ability to makes choices and respond to the continually changing context is a key part of their evolving and maturing innovation capacity.

SCP's role in this partnership was helping in CTU build its capability and capacity to engage in this challenging space, through:

- foundational skill building, and
- a partnership that de-risked and encouraged CTU to engage with the changes and challenges (as outlined in Annex A).

To continue to monitor and evaluate the institutional changes supporting CTU's commercialisation and innovation capacity development, a maturity model has been developed. The aim of the maturity model is not to provide a checklist, but rather to capture CTU's institutional changes and assess its the level of capacity or progress towards being able to continually learn and evolve in the institution's responses to challenges and contextual changes. The maturity model draws evidence from progress reports and reflection discussions with CTU. The institutional history process has helped both capture the evidence for the maturity model but also develop it – i.e. ensured it is appropriate. The domains of change specified in **Error! Reference source not found.** are intended to highlight the maturity across different levels (i.e. not one level), as well as where support and action planning could be targeted going forward. As CTU's innovation capacity continues to evolve the maturity model can capture these changes against the key domains of change identified through this process.

Error! Reference source not found. CTU is currently in the process of significant change, including transitioning from CTTS to CIETTS, introducing major policy reforms for researchers working across faculties, and addressing considerable external pressures and changes within the Vietnamese context. Phase 2 of A4I provides opportunities for SCP to continue to support CTU, including CIETTS, to enable necessary policy reform and, to promote and leverage its ongoing networking efforts to bring its approach to scale.

The institutional changes achieved so far has provided CTU with a strong foundation to play a key role in facilitating innovation and sustainable development in the Mekong Region. However, for CTU to effectively lead this process, further innovation is required to build internal and external networks and multi-stakeholder collaborations to understand and respond to complex challenges and opportunities in sustainable development, e.g., Climate Change. A4I's Resilient Agriculture and Food team are well placed to build on this foundation built over the last 4 years and to partner with CTU, providing continued capacity building support. It should focus on building institutional arrangements that enable CTU to work collectively with other innovation system stakeholders to respond to priority sustainable development challenges and opportunities.

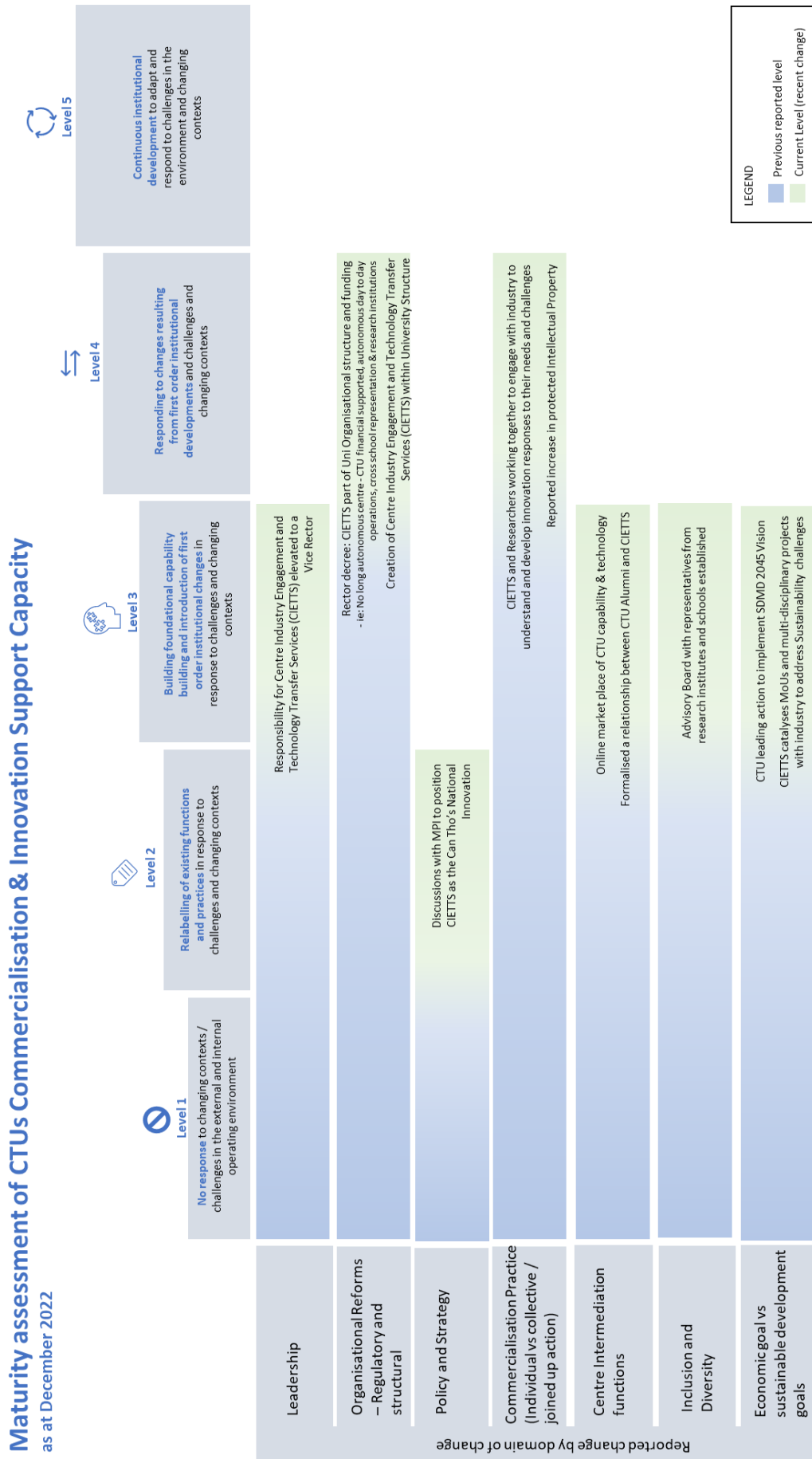


Figure 2: Maturity assessment of CTUs Commercialisation & Innovation Support Capacity (as at December 2022)

Acknowledgements

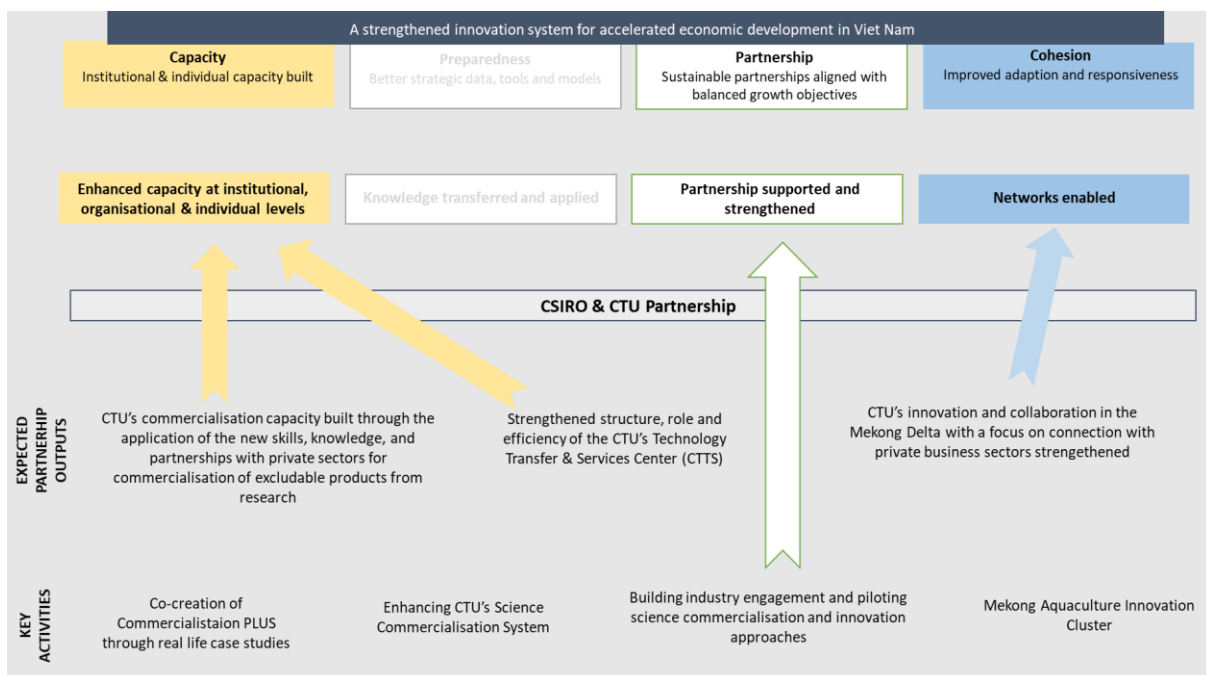
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The institutional history process was co-designed with Jennifer Kelly, Michaela Cosijn and Minh Nguyen members of the Aus4Innovation Resilient Agriculture and Food team (formerly the Science Commercialisation Partnership Team)

Annex A: How the CTU & CSIRO partnership expected to contribute to the A4I Program

The Aus4Innovation (A4I) program aims to contribute to strengthening the innovation system for accelerated economic development in Vietnam. The A4I program also contributes to the delivery of DFAT’s Vietnam COVID-19 Development Response Plan through innovation promotion activities that enable economic recovery and bring about improved institutional capacity and leadership of research organizations and local agencies under MoST.

The Science Commercialisation Partnerships (SCP) workstream within the A4I program aims to strengthen the Vietnamese innovation system through building commercialisation capacity and respond to COVID-19 and other risks; for example, climate change and African Swine Fever have both created unprecedented shocks, disruptions, and challenges to the agri-food sector and piloting different approaches to support commercialisation and recommend effective approaches for scaling. CTU is a key delivery partner for this workstream. Figure 3 highlights how the CSIRO-CTU partnership supported delivery of the A4I planned outcomes more broadly.



Sources: CTU & CSIRO Partnership Agreement and A4I Program Logic

Annex B: Excerpt from Partnership Agreement and Workplans between Can Tho University (CTU) and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) October 2019.

Background Note:

As a leading research institution in the South of Vietnam, Can Tho University (CTU) plays an important role in supporting innovation in the Mekong Delta. CTU has been an important state higher education institution, and the cultural, scientific and technical center of the Mekong Delta and Vietnam since its founding in 1966. CTU's main missions are training, conducting scientific research, and transferring and commercialising technology to serve the regional and national socio-economic development. CTU's target is to be one of the leading higher education institutions in Viet Nam and to be recognised as one of the top universities in Asia-Pacific in training and research.

Consequently, during scoping discussions with NATEC at the start of the SCP project, CTU was identified as a target institution to experiment with building capacity and piloting different approaches to:

- Building new knowledge and new skills;
- Adopting and adapting science commercialisation and partnership guidance and capability-building tools that support commercialisation;
- Consolidating and expanding a network of innovation systems actors;
- Providing guidance and analysis for program and policy-makers to strengthen innovation systems; and
- Supporting investment ready commercialisation opportunities

PURPOSE OF AGREEMENT

This document reflects the understandings of CTU and CSIRO concerning their cooperation in connection with the Aus4Innovation program.

This document is intended to be a working document and will guide engagement between the CSIRO and CTU teams for the duration of the project, from June 2019 to December 2020. It reflects guiding principles, shared and individual objectives, financial and non-financial contributions, respective roles and responsibilities, and expected behaviours felt important in order to achieve the overarching objectives of the program.

GOAL AND OBJECTIVES

All partners are committed to achieving shared goals related to the Aus4Innovation Science Commercialisation and Partnerships project. In addition, these shared objectives this partnership

agreement recognises that both CSIRO and CTU also have their own valid individual motivations and objectives for being involved in the partnership.

Both partners share the following joint partnership objectives:

- a. Strengthen CTUs ability to work with industry and others to use its research and technology to solve challenges and support sustainable and balanced economic, environmental and social growth in the Mekong Delta
- b. Adopt a collaborative, experimental (evidence-based) approach to explore ways of delivering commercialisation and innovation outcomes;
- c. Connect to commercialisation and innovation community of practices and networks to learn and contribute to national and global innovation and development agendas,
- d. Enhance Viet Nam government's innovation policies and regulations, specifically the science commercialisation regulation, to enable sustainable innovation

In addition, CTU's individual partnership objectives are to:

- a. Meet the expectation from the Vietnamese government as an autonomous university in the coming years,
- b. Enhance CTU's reputation and role with industry stakeholders as a reliable and effective source of innovation, and a research provider of choice
- c. Enhance CTU's role as an innovation leader in the agriculture and food sector of the Mekong Delta.

CSIRO's individual partnership objectives are to:

- a. Contribute to the achievement of CSIRO's core mandate of delivering science impact, specifically in the context of global sustainability development, i.e. to explore *how* to direct the use of research for sustainable impact, as a research enquiry.
- b. Strength connections between Australia and Viet Nam's Innovation Systems
- c. Maintain and strengthen CSIRO as an active partner in Australia's ODA.
- d. Manage the project within DFATs and CSIROs regulations and policies

Annex C: Institutional changes over time

The institutional history process illustrated a number of important institutional innovations within CTU. The three phases described below (as depicted and summarised in Figure 3) are not meant to be seen as distinct but are rather illustrative of the dominant approach to innovation at that particular time within CTU. As one would expect within a dynamic context, there is inevitably some overlap between the different phases.

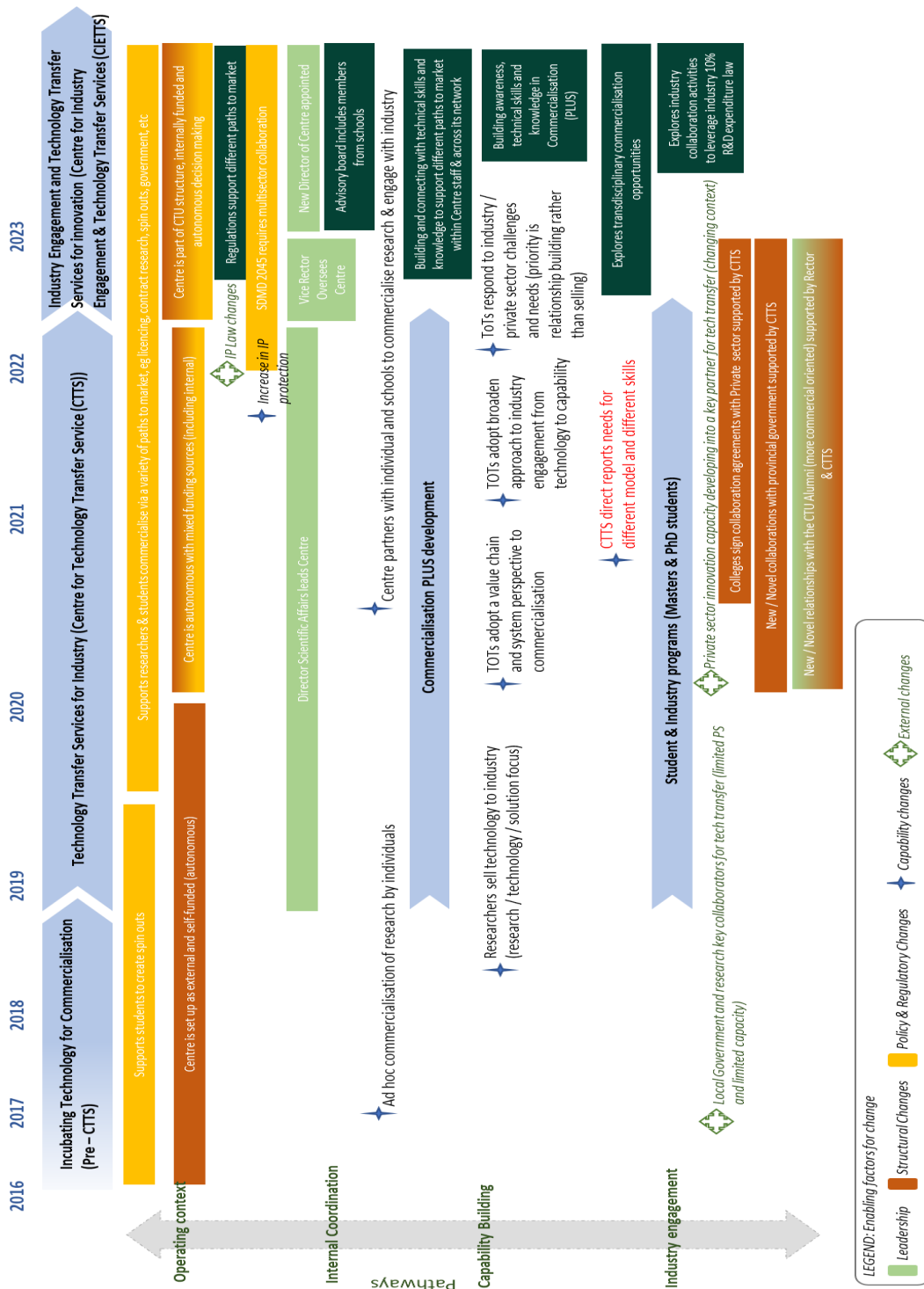


Figure 3: A validated timeline of key institutional changes / innovations (including enabling activities)

Phase 1: Incubating Technology for Commercialisation: Pre-2018

Prior to the start of this phase CTU had been operating two centers to incubate and promote innovation. Established in 2009, the Center of Services and Technology Transfers (CSTT), under the leadership of Dr Nguyen Phu Son, focused on CTU infrastructure management services, with some degree of focus on technology transfer activities. The establishment of CSTT was a preliminary model by CTU to explore the means of effective technology transfer. In 2012 CTU, established the Center of Technological Business Incubator. Under the leadership of Dr Khoi, director of the center, the purpose of the incubator was to explore and develop connections with business for science commercialisation using an incubation approach. The center was modelled on similar centers in the region at this time (such as the Korean KPIP, and MoST center). With its focus primarily on students, interaction with researchers and lecturers at CTU was primarily a bi-product of the support being given to applicable students.

Both centers operated in line with government regulations which prescribed the establishment and operation of such centers across tertiary institutions in Vietnam. By its own admission CTU initially had little capacity or capability to operate such centers. The centers were autonomous financially from CTU and had no formal connections to schools and research institutions within CTU. Nevertheless, despite the ad hoc commercialisation of research by individuals, the Incubators did over time support researchers to create innovation spin outs. Typically, these ventures, whilst of some benefit to the researchers involved, were of little commercial value to CTU. A further characteristic of these spinouts was the emphasis placed on researchers selling ready-made solutions/technology to industry, albeit there was limited success in engaging with the private sector and instead collaborations were largely conducted at local government level.

It was against this backdrop that the A4I program catalysed a formal partnership between CSIRO and CTU that aimed to help develop CTUs commercialisation and innovation capacity.

Box 1: The foundations for CTU and CSIROs relationship

The origins of the relationship between CSIRO and CTU can be traced back to 2009, when CSIRO and CTU's Dragon Research Institute began collaborating to deliver a research for development initiative (funded by DFAT) focused on climate change in the Mekong Delta.

In 2015 this relationship was elevated from project to an organisational level through Memorandum of Understanding (MoU). This MoU built on the previous relationship and strengthened relationships between CSIRO and senior leaders at CTU (including both the Rector and the now Vice Rector – formally the previous director of the Dragon Institute).

These early collaborations laid an important foundation that the Aus4Innovation funded partnership could springboard from, despite it being a different subject matter.

Phase 2: CTU Center for Technology Transfer and Services (CTTS): 2019-23

In 2019, CTU restructured the two centers to create a Center of Technology Transfers and Services (CTTS⁵) and a Center of Students Consultancies, Assistance and Start-up (CSCAS⁶). This restructure was in response to external changes; namely the focus on 'innovation' and 'science commercialisation' policies by the Government of Vietnam. CTU realised it needed to rethink its approach to innovation, in part guided by the initial innovation support SCP had been providing to CTU.

Dr Le Nguyen Doan Khoi, the Deputy Director of CTU Research Affairs Department at the time, took the leadership of CTTS. The CTTS was different to the previous centers. The explicit inclusion of 'Services' into its title meant that the CTTS would focus on services related to science and technology transfer not infrastructure management, a focus of the earlier center. Whilst the revamped center remained autonomous financially from CTU (and in terms of formal links to schools and research institutions within CTU), it increased the scope of its support to now include not only students, but also lecturers and researchers, in addition to promoting relationships with CTU alumni within the private sector. Increasingly during this phase CTTS partnered with individuals and schools to commercialise research and engage with industry.

The CSIRO team met the CTU Rector and Dr Khoi for the first time at the beginning of 2019. This coincided with Dr Khoi assuming his new role. With strong support from the rector, who joined an initial study tour visit to Australia in August 2019, CTU provided financial resources to co-invest in agreed activities under the partnership. Whilst the initial emphasis on innovation within CTU was primarily focussed on the commercialisation of research by individuals, by the end of this phase this had changed to a more nuanced focus on the different pathways to market, and the types of support required to make these pathways more effective.

Box 2: Key features of CSIRO's capability building support for individual researchers

Through a practical learning approach, CSIRO collaborated with individual researcher to translate international good practice into advice relevant for Viet Nam. Examples of this include adopting a value chain and system perspective to commercialisation, broadening the approach to include industry (with emphasis on the different pathways, and the necessary steps within each pathway), and shifting the focus to a more demand driven approach to ensure CTU's researchers were both responding to private sector challenges (with the emphasis on building a relationship with the private sector as opposed to selling ready-made solutions) and considering the economic, social and environmental benefits and dis-benefits of potential solutions.

With the previous center being largely autonomous to CTU, the newly established CTTS was overseen with a more formalised organisational structure, under the leadership of the Director of Scientific Affairs. Funding sources for the new center were also sought, drawing on a mixture of both external and internal sources, although the emphasis remained on it being self-funded with limited support initially from CTU. Whilst the emphasis was still on the incubation center providing links for students to industry, there was a

⁵ For more information about the CTTS refer to its web page at <https://ctts.ctu.edu.vn/>

⁶ For more information about the CSCAS refer to its web page at <https://scs.ctu.edu.vn/>

subtle shift from industry sending staff to CTU to do Masters degrees, to one where students were placed within industry to tackle industry defined problems.

The growing importance of the CTTS can be seen in it helping colleges in signing collaboration agreements with private sector, establishing new collaborations with provincial government, and increasing awareness within CTU of the importance that its more commercially orientated alumni can play in enhancing commercialisation of CTU's research. As CTTS's innovation capacity strengthened, CTU gradually develop more partnerships with the private sector, who started to become a key partner for technology transfer.

At the start of this phase SCP and CTU signed a Partnership Agreement, conceptualised through a series of scoping missions to map out existing capability and identify capability gaps, which detailed the initial roles and responsibilities. As we discussed below, these activities were revisited because a) SCP noted that a different set of role-players would need to be engaged in innovation capacity, and pitching to support existing capability building (as in a shift from focussing on the individual to enhancing TTO capacity); b) the need to adapt existing tools to the context; and c) CTU needed to reorientate from selling technology to industry to responding to the needs of industry/private sector. Whilst the emphasis of the support has focussed on multiple different aspects of commercialisation, the type of support provided by SCP has changed in response to both the needs of CTU and lessons learnt.

The initial focus on establishing capability platforms and the role of TTOs was revised in light of the realisation that CTU's institutional and organisational environment was not yet ready for this approach, that it was better to focus on the key catalysts of change within CTU, and that initial efforts to provide mentoring support were not specifically tailored to the needs of CTU and that there was insufficient practical support for mentees to implement what they had learnt during mentoring sessions. This lesson learning was further reinforced by CTU leadership undertaking a study tour of Australia, which not only provided CTU with a better understanding of what SCP was encouraging, but it allowed SCP to demonstrate insights on the need for a commercialisation process that responded to the needs of industry as opposed to trying to market ready-made solutions. A key feature of the trip was it reinforced the strength of the relationship between key individuals in the process, especially the role of SCP being an 'honest broker' who through informal conversations was able to provide strategic guidance to CTU, and within CTU the emergence of an 'innovation champion' who provided critical leadership of the institutional changes (initially as Director of Scientific Affairs at CTU) that CTU were introducing and continue to introduce.

Critical reflection within the SCP saw the team reorientate its approach, including designing and developing a comprehensive Commercialisation PLUS guide, and redesigning its mentoring support to place greater emphasis on practical paths to market mentoring to support CTU and other research institutions. Both the guide and SCP's adaptation of its approach to implementation created 'lightbulb moments' within CTU as academics and researchers who began to question their approach to industry, both in terms of shifting the focus from supply to demand, and also in terms of rethinking the role of students in the process. The value of the Commercialisation PLUS Guide was not simply the output, but also the co-creation process that was followed to ensure it provided a practical guide on the necessary skills and knowledge needed within CTU, and how it supported staff along different paths to market. An essential process was involving CTU in testing tools, giving feedback on the process, and including actual examples based on the experience of CTU staff who had followed the 9-step process the guide introduces.

Important features that helped enhance the changes introduced also emerge during this phase, including the new networks and novel collaborations with provincial government. Whereas previously the focus on industry had been through students, this phase saw CTU broadening its approach to industry (linking technology to capability) and engaging more deliberately to develop tech transfer partnerships. A series of

events supported by SCP enhanced this process including development of an online marketplace of capability and technology which created an online space to broaden engagement across CTU and include a far wider spectrum of academics and researchers at CTU. In addition, specific pilot interventions with targeted industry (such as shrimp processing, water quality monitoring, and fertiliser production) afforded researchers the opportunity to better understand the needs of industry, defined areas for collaboration and student placements, and helped teams understand where technology solutions fitted into the market and the potential pathways required to scale for market. These opportunities to engage directly with industry helped build the confidence in researchers and academics and better understand not only the risks associated with working with the private sector, but that a more systemic approach is required beyond the provision of technology transfer. CTU began to purposefully establish linkages with alumni working in the private sector (either as potential investors or partners). CTU also began to see the benefits of these relationships with private sector as the institution began to sign more MoUs with its industry partners, with 2021 being one of the biggest years for revenue earned through CTTS, despite the pandemic placing considerable downward pressure on the Vietnamese economy.

Although it was clear that CTTS was being successful, by the end of the phase it was apparent that there were obvious limitations in driving CTU's approach to innovation through CTTS. Internal capability within CTU remained limited, the focus on students was inadequate to realise the full potential of what CTU could offer, and the financing of the structure was inadequate and too dependent on earning money from the commercialisation process to maintain its operations.

Box 3: Key features of CSIRO's capability building support to the CTTS

In partnership with the Director of the CTTS key priorities based on capability gaps identified through the practical learning were agreed and CSIRO support provided complementary funding and encouraged the pursuit of opportunities to experiment with different approaches and create important infrastructure to enable commercialisation and innovation. Typically, these experiments focused on activities that required a proof of concept (e.g. the online marketplace of innovations) and did not fit into the standard operations of the center (thus was not financially planned). Essentially, the support de-risked activities and made them a possibility for the CTTS to explore.

Phase 3: Industry Engagement & Technology Transfer Services for innovation CTU: 2022-ongoing

A rapidly changing context, and a growing realisation that the CTTS was insufficient to their needs led CTU to engaging in a consultative process to transform CTTS into a center that aligned better with senior leadership's vision for leveraging previous success with innovation. By 2022 CTU had transformed CTTS into CIETTS. A deliberate choice was made to emphasise industry engagement as part of the title of the new center. This not only reflects CTU's noticeable shift away from seeing innovation as simply technology transfer, but it also takes into consideration noticeable shifts within the external context.

Over the past two years Vietnam's regulatory environment has become more conducive to commercialisation. For institutions such as CTU, recent amendments to the *Intellectual Property Law* (which has strengthened IP rights) and the *Law on Technology Transfer* have helped improve the regulatory framework and consequently eased the commercialisation of innovation by institutions such as CTU. An

industry requirement to allocate 10% of R&D expenditure to innovation, has also afforded opportunities for CTU to be more strategic about seeking ways to tap into this potential revenue stream.

Shifts within the regional context have also shaped CTU's thinking about its approach to innovation, and its capacity requirements to best respond to these changes. CTU is the host of the Sustainable Development of the Mekong Delta (SMD 2045) initiative, whose goal is to contribute to the sustainable development of the Mekong Delta region and beyond by 2045 (as outlined during the 13th Communist Party Congress). CTU not only hosts this program, but is also expected to coordinate and lead a large number of central agencies/ministries, local and provincial government departments, institutes and universities, local communities, and private sector enterprises. SDMD 2045 requires CTU not only to demonstrate its ability for multisector collaboration, but also to foster relationships with many different players including industry.

Whereas previously its organisational hub for innovation was external, self-funded and autonomous to the institution, CIETTS is firmly located within the institution, funded by CTU, with strong ties to the different schools. Whilst it is initially overseen by the Vice Rector, a new director is appointed, advised by an advisory board that includes representation from the different schools.

Drawing on the foundational work that SCP provided in the previous, CIETTS focuses on building and connecting the technical skills and knowledge acquired to support academics and researchers pursue different paths to market. A measure of the success of the partnership between SCP and CIETTS can be seen in the fact that by its first year of operating it had signed 7 MoUs with industry partners, established 6 joint research and technology collaborations with industry partners, signed 12 service contracts, and successfully registered 20 IP registrations (a noticeable increase on the previous year).

Box 4: Key features of CSIROs evolving support to match CTUs maturing capacity

During this phase, CSIRO has no longer provided a foundational awareness raising and skill development for CTU. Instead, it is focused on supporting the development of institutional policies and strategies and continuing to develop CTUs capacity to critically reflect and analyse system changes and the implications of these changes on its goals.

CSIRO also continues to create an environment that supports experimentation through de-risking particular activities and providing analysis and interpretation of relevant international policies and practices to support decision making in complex and changing environments for sustainable development.

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