INFO5992 – Understanding IT Innovations

CSIRO Challenges

Overview:

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) has identified six critical challenges through rigorous analysis, including trend modelling, the report, and consultation with industry, government, and academic partners. A comprehensive review informs of these Australian and international priorities and challenges, encompassing the Australian Science and Research Priorities and the United Nations' Sustainable Development Goals.

The program of large-scale, major scientific and collaborative research initiatives aims to solve some of Australia's most significant challenges, focusing on outcomes that lead to positive impact, new jobs and economic growth.

Timelines and Important Information:

- This is an individual activity; the deadline for this activity is six weeks and is set on canvas.
- This case study needs to be completed in 6 weeks, divided into two main tasks:
    - Discussion and Questions & Answers during Tutorial Time (0.5 Mark each day)
    - Case Study Report Submissions (8 Marks)
- Your attendance is essential; you lose 1.5 marks for each absentee (i.e., 0.5 marks for missing Q&A, one mark for missing discussion over Weekly Case Studies)
- There are four milestones; each milestone must be discussed and completed during the tutorial sessions.

- Report Guidelines:
    - Write a comprehensive report based on the guidelines provided under each milestone. The maximum word limit is **2500** (+/- 10%), excluding references. Note that the word limit includes quotations, figures/table captions, and tables' contents.
    - Provide a comprehensive set of references in your report. The number of references should be at least **30**.
    - Submit a Word/PDF version of your report to Canvas.
    - It is highly recommended that you write your report in LaTeX and upload a PDF version.

- Marking Criteria:
    - Marking criteria are presented at the end of this document.
    - Deduction of 5% of the maximum mark for each calendar day after the due date.
    - After ten calendar days late, a zero mark will be awarded.

- Learning Outcomes Assessed**:**
    - LO1 to LO8.

CSIRO is actively engaged in assisting the nation in overcoming the following six prominent challenges, helping the nation to overcome and turn to Australia's unique advantage:

- **Health and wellbeing**: Enhance the health of Australians through preventative, personalised, biomedical and digital health services.
- **Food security and quality**: Achieve sustainable security through new AgriFood products, technology and innovation for Australia.
- **Secure Australia and region**: Help safeguard Australia from threats (terrorism, regional instability, pandemics, biosecurity, disasters, and cyber-attacks).
- **Resilient and valuable environments**: Enhancing the resilience, sustainable use, and value of our natural and built environments, including by mitigating and adapting to the impacts of climate and global change.
- **Sustainable energy and resources**: Build competitiveness, sustainability and security, nationally and regionally, of our energy and minerals systems and resources while lowering emissions to Net Zero.
- **Future Industries**: Help create Australia's future industries and jobs by collaborating to boost innovation performance and promote Science, Technology, Engineering and Maths (STEM) skills.

Source: https://www.csiro.au/en/about/challenges-missions/challenges
CSIRO Innovation Catalyst: https://www.csiro.au/en/showcase/innovation

Design a technological solution to address any of the challenges CSIRO mentioned above. Emphasise leveraging innovation and technology to assist the nation in overcoming six prominent challenges strategically to leverage Australia's unique strengths and advantages.

Important Note: If you selected the same area for case study 1, please choose a different one. This will post diverse challenges, as opposed to the last case study. This case study is unique since it is more in Australia’s context and will allow you to understand local innovations and problem areas.

In the milestones, the “selected” means the area you selected for your case study.

Milestones: Complete each weekly milestone to achieve your submission target by the end of week 4. Note that the **report submission is due on week 10**. Note that individual milestones will be part of the weekly discussion. Following guidelines (at least) must be part of your report.

Milestone 1: Problem Understanding and Solution Proposal (**Week 5**)

- **Tasks**:
  - Provide a comprehensive background outlining the challenges in your selected area.
  - Clearly define the proposed technological solution, emphasising how it aligns with selected challenges pointed out by CSIRO.
  - Develop an understanding of existing infrastructures and their limitations in addressing the specified area.

Milestone 2: Technology Modeling and Innovation Impact Assessment (**Week 6**)

- **Tasks:**
  - Develop a model for your proposed solution, illustrating its essential components and functionalities.
  - Apply frameworks to assess the proposed innovation's diffusion, adoption, and maturity potential.
  - Discuss the concept of dominant design in the context of the proposed solution and evaluate critical drivers influencing its emergence.

Milestone 3: Commercialisation and Financial Strategies (**Week 7**)

- **Tasks:**
  - Design the commercialisation process for (selected area's) IT innovation, incorporating open and closed innovation elements.
  - Discuss and apply business strategies such as the customer development process, lean startups, agile development, value proposition canvas, and business model canvas.
  - Outline and evaluate capital and fundraising pathways, considering local and international sources.

Milestone 4: Ecosystem Evaluation and Organisational Culture Analysis (**Week 8**)

- **Tasks:**
  - Compare and contrast the innovation ecosystems in various countries within the selected sector.
  - Evaluate organisational cultures and structures within (selected) institutions, focusing on their support for innovation.

- Analyse, compare, contrast, and judge the proposed IT innovation using various methodologies, considering its potential impact on (selected area's) outcomes and community well-being.
- Implement monitoring and evaluation mechanisms to track progress and outcomes, including metrics such as adoption rates, health outcomes, and stakeholder satisfaction.

Learning Objectives Achievement: The following are various expected learning objectives achieved through this case study:

- Understand how innovation goes beyond inventing your solution to encompass the strategic implementation of solutions that improve overall delivery and outcomes.
- Examine how your innovative idea enhances the selected area and well-being of a population and contributes to economic development, productivity, and overall quality of life.
- Evaluate whether certain technologies can be considered general-purpose, exploring their adaptabilities and potential applications beyond the primary problems addressed in the case study.
- Analyse the diffusion and adoption patterns of selected area's innovations within the context of Australian communities. Apply frameworks to understand the maturity levels of these innovations and their scalability.
- Explore the concept of dominant design in your solutions for the community. Evaluate the key drivers behind the emergence or lack of a dominant design in this context.
- Examine critical research on disruptive innovations in selected areas. Apply the Disruptive Innovation Model to specific case studies, discussing potential Innovator's Dilemma scenarios in the context of current solutions.
- Assess the application of open and closed innovation methodologies in developing proposed solutions. Evaluate the effectiveness of various open innovation methods in fostering collaboration and accelerating progress.
- Explore the commercialisation process and business strategies for IT innovations, considering concepts like the customer development process, lean startups, agile development, value proposition canvas, and business model canvas.
- Analyse fundraising strategies for proposed innovations, considering avenues like venture capital, government grants, and international partnerships to support the development and deployment of these solutions.
- Compare and contrast the innovation ecosystems in Silicon Valley and Australia within the selected sector. Examine how these ecosystems can contribute to developing and adopting innovations.
- Analyse organisational cultures and structures that foster innovation within an institution. Evaluate how these factors contribute to the successful implementation of proposed innovative solutions.

Generic Marking Rubrics:

1. A sufficient background provided to outline the problem clearly.
2. Proposed solution and goals clearly defined.
3. Understand the decision criteria and constraints.
4. Develop an understanding of the existing environment/technology.
5. Investigate innovative alternatives to existing technology.
6. Develop a model of the proposed solution.
7. Identify the impact of innovation (both long/short-term impacts).
8. Identify the maintenance requirements.
9. Referenced sources of information.

Specific Marking Rubrics:

Milestone 1: Problem Understanding and Solution Proposal (25%)

- Comprehensive background outlining the selected area's challenges.
- Clearly define a proposed technological solution and how it aligns with various areas selected by CSIRO.
- Good understanding of existing technologies and their limitations being practiced in your selected area.

Milestone 2: Technology Modeling and Innovation Impact Assessment (25%)

- Proposed model, illustrate its essential components and functionalities.
- Frameworks assessment for the proposed innovation's diffusion, adoption, and maturity potential.
- Discuss the concept of dominant design in the context of the proposed solution.

Milestone 3: Commercialisation and Financial Strategies (25%)

- Discuss the implementation of business strategies.
- Explore partnerships and collaborations with stakeholders.

Milestone 4: Ecosystem Evaluation and Organisational Culture Analysis (25%)

- Comprehensive evaluation of the existing ecosystem within the selected industry.
- Comparison of proposed innovative ecosystems in various countries.
- Proposal for monitoring and evaluation mechanisms to track progress and outcomes. Various performance metrics must be included for the presented mechanism.