INFO5992 Understanding IT Innovations
Innovation Report

Semester 2, 2024

THE UNIVERSITY OF
SYDNEY

Acknowledgement of Country

I would like to acknowledge the Traditional Owners of Australia and recognise their continuing connection to land, water and culture. I pay my respects to the first nations people and their Elders, past, present and emerging.

Copyright warning

Three stages of your Innovation Report and Presentation Assessments

Proposal Report (Innovation Report I)
- Group work
- Pick a technology and identify multiple industries using it

Technology Innovation (Innovation Report II)
- Group Work
- Report on how a technology is being used by two companies within your chosen industry

Address Reviews
- Group Work
- Address the marker's reviews and comments and amend your report accordingly.

(Innovation Presentation)
- Group
- Based on your group's technology, select a new industry
- Pitch a startup idea!

Innovation Report
Assessment 1

Innovation Report – Learning Objectives

- Research into emerging technology and applications / potential of Innovation concepts for various industries

- Learning to do critical analysis on a multiple innovation concepts with emerging technologies

- Analysing real-world company examples that are innovatively using the technology among the chosen industries

Innovation Report (Group)

- The assessment will be done in a group of 4-5 members
  - I hope you have already formed your group! If not, do form groups at your Tutorial today – talk to your tutor

- On average 4-5 groups per tutorial
- Groups cannot be changed after week 2

2-Stage Report

- **Innovation Report Project Proposal - Stage 1**
    - [0%] Technology – discuss your group's chosen Technology
    - Max 1000 words as a group
    - The group will select a common Technology and discuss

- **Innovation Report - Stage 2**
    - [17%]
    - Max 5000 words +/-10%

Stage 1 – Group Report Structure

- As a group, you will select one emerging **Technology** from the **Topic List**
- Each member needs to select one **Unique Industry that uses Technology**
  - Each member must provide a short paragraph about the selected industry (~150 words)
  - Define your industry with references
  - Pick and finalise one industry that has either been changed or is likely to be reshaped by your chosen Tech. Take into account the available information for your industry, i.e., not too new where there is no evidence.
  - **You do not need to write about your final selected industry, but ensure you can do so in Stage 2 of the report.**
- As a group, you will write about the chosen Technology based on its potential for all the chosen unique Industries.

Stage 1 – Group Report Structure (Cont.)

Stage 1 Report Technology – discuss your group's **chosen Technology**

1. Present the technology

2. Market potential

3. Current state of development

4. Discuss the Technology based on the concepts we studied in wks1-5
   1. **Dominant Design, Disruptive Innovation, and Diffusion**
   2. These concepts can be discussed based on either the tech being already applied or potential to apply

Stage 2 – Group Report Structure - Industry Application of the Technology

1. Select **2 real-world company examples**
2. Discuss from the Distribution Innovation concepts we will study in wks5 to 7
   a) Open / Closed innovation; Platform innovation; Web APIs; Crowd innovations; Free and Open source software; User innovation; Open Data; Platform Economy
   b) Choose two must relevant concepts that applies to your real-world company examples

Stage 2 – Group Report Structure - Industry Application of the Technology (Cont.)

- Choosing two example companies from an Industry:
  - **If possible, choose examples that are current or from the last ==three years.==**
  - ==**Try to pick examples that are discussed in a reputable Journal / Conference articles**==
  - If in doubt about whether your topic or examples are appropriate, check with the Teaching team

  - Do not rely on a single paper which introduces two examples!
  - New examples – innovation is a fast moving topic!
  - Do not necessarily accept all that you read at face-value, e.g. from self-published articles.

Submissions

- The report must be submitted electronically through Canvas and must be submitted in PDF format.
- It will go through Turnitin

Notes for the Report (Stages 1 and 2)

- There is no template – please use a template of your own choice.
- It is OK for the text to be either single-spaced or double-spaced.

- Figures (images or diagrams), tables and quotes are typically very effective in an essay.
    - When referring to figures/tables, make sure an appropriate description is given so that they are understandable – figures/tables contain a lot of information!
    - You are encouraged to create your own figures and tables. If you do, show that you created them (e.g. "created by Firstname Surname for INFO5992")
    - Cite your figures!
    - Use **Harvard, APA** or **Vancouver** referencing style – keep your referencing style consistent

Notes for the Report (Stages 1 and 2)
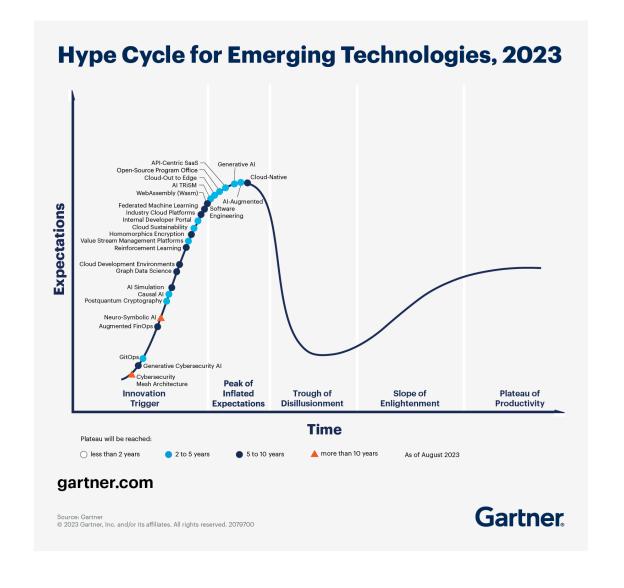
- Sources:
    - Read widely; read journal articles (eg online through the library), online magazines and high quality blogs.
    - Using reliable scholarly sources – innovation literature
    - Wikipedia is highly variable in quality, derivative and typically not a good source for your essay (except perhaps for gaining a general understanding before reading more deeply from the literature or high-quality blogs)
    - Company websites are rarely unbiased descriptions of examples (though may provide some useful information that should be understood in its context)
    - Finding the right references (more in later slides)

Technology List

Technology selection

- Select one from the below:
  - Chatbots (but not 'GPT' including Bing GPT)
  - Digital Humans (not Digital Twins!)
  - Non-Fungible Token (NFT)
  - Metaverse
  - Open Telemetry*
  - Generative Design AI* (is different from Generative AI)

Hype Cycle for Emerging Technologies, 2023

* These two topics are harder but more interesting; Will be rewarded!

Group Topic Selection

- Each group will select **one** emerging Technology as a Topic from the provided List (in order of priority)
    - You must discuss your topic with your tutor to avoid repetition and overall scope.
    - Repetition is considered as if two groups select the same technology and both industries are the same. Any other combination is not considered a repetition. E.g., it is allowed to select the same technology but one or two different industries.

- Please briefly describe the aspects of the technology your group is interested in and the industry in which it is interested.
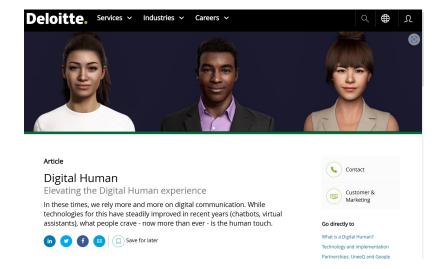
- Discuss with the teaching team and get feedback.

Topic 1 – Chatbots

- **Please don't select ChatGPT, it's way too easy**

- A chatbot is a computer program that can interact with users via text or speech, and simulate human conversation

- Usually powered by artificial intelligence (AI) and natural language processing (NLP) technology.

- Chatbots can be used for multiple purposes e.g.,
    - https://www.oracle.com/au/chatbots/what-is-a-chatbot/
- There are many chatbot companies already out there

Topic 2 – Digital Humans

- Digital humans are designed to interact with humans in a way that feels natural and human-like by simulating human emotions, expressions, and movements

- Different between Digital Humans and Chatbots can be summarized in two ways
  - In terms of their ability to understand and respond to human emotions and behaviours
  - The level of customization and branding

Non-Fungible Token (NFT)

- Unique digital assets that are verified using blockchain technology.
  - NFTs are used to represent a wide range of digital content, such as art, music, videos, and other types of creative works.

- Different than Bitcoin, which are interchangeable and have the same value. Each NFT is unique and has its own value based on factors such as the rarity, history, and perceived value of the underlying asset.

- NFTs provide a way for creators to monetize their digital content, as well as a way for collectors to invest in and own unique digital assets. However, the value of NFTs can be volatile and may be subject to fluctuations based on factors such as market demand and the perceived value of the underlying asset.

- https://www.investopedia.com/non-fungible-tokens-nft-5115211

#1 - CryptoPunks

Digital object: Alien

Price: 605 ETH

The most recent and fresh record of the NFT world belongs to the ultra-rare collectible Alien character from the CryptoPunks art platform.

Basically, this digital object doesn't have any implementation. It is perceived as a piece of art and is one of the oldest CryptoPunks world characters. At the moment, the NFT which secures the ownership of this piece of art is the most expensive token of this kind ever sold in history.

To stress the scale of the deal it's important to note that at the moment of the deal **605 ETH** was equal to **$761,889**.

Metaverse

– The metaverse is a fully immersive and interactive environment that allows users to engage with digital content and each other in real-time.

– The metaverse can provide a new platform for social interaction, collaboration, and creativity. It can also create new opportunities for businesses to reach customers in a more engaging and personalized way.

– Challenges and ethical considerations associated with the metaverse may include issues around data privacy, ownership of digital assets, and the potential for the metaverse to exacerbate existing inequalities.

– https://www.techtarget.com/whatis/feature/The-metaverse-explained-Everything-you-need-to-know

History of the metaverse

The metaverse is still emerging, but the concept of a 3D immersive internet where people can socialize, play, shop and work dates back decades.

1938 French poet and playwright **Antonin Artaud** uses the term *virtual reality* in his collection of essays, *The Theater and its Double*.

1984 American computer scientist, musician and VR pioneer Jaron Lanier founds VPL Research, Inc., which developed one of the first virtual reality headsets and data gloves.

1992 American sci-fi writer Neal Stephenson coins the term *metaverse* in his book **Snow Crash**, which depicts a dystopian future world where rich people escape into an alternative 3D connected reality.

2003 Linden Lab unveils Second Life, a shared 3D virtual space that allows users to explore, interact with others, build things and exchange virtual goods.

2007 Google augments Maps with **Street View**, which allows people to explore a virtual representation of the real world at scale.

2010 The gacha video game model is introduced.

2012 Israeli entrepreneur Yoni Assia introduces **Colored Coins** in a 2012 blog post titled "bitcoin 2.X (aka Colored Bitcoin)- initial specs."

2014 Facebook buys Oculus and helps scale the 3D infrastructure to support it.

2015 Canadian programmer Vitalik Buterin and English computer scientist Gavin Wood launch Ethereum, which includes features for building decentralized apps on a blockchain.

2016 **Pokémon GO** introduces the world to augmented reality games overlaid on the real world.

2019 Epic Games's Fortnite becomes the most popular shared virtual world ever, with over 250 million active users.

2021 Microsoft introduces Mesh as a new platform that promises to synchronize virtual collaboration.

1962 American filmmaker Morton Heilig builds the **Sensorama**, a machine that simulated the experience of riding a motorcycle through New York City via a 3D movie, vibrating chair, fan and smells.

1989 English computer scientist **Tim Berners-Lee** lays the groundwork for the World Wide Web while at CERN.

1993 Israeli computer scientist Moni Naor and American computer scientist Cynthia Dwork invent proof-of-work techniques to deter spam and denial-of-service attacks using concepts that become the basis of Bitcoin.

2006 Roblox allows users to create and play massively multiplayer games developed by other users.

2009 **Satoshi Nakamoto** (a pseudonym) mints the first Bitcoin and launches the first public blockchain, using a proof-of-work algorithm.

2011 Ernest Cline publishes **futuristic novel** *Ready Player One*.

2012 American entrepreneur Palmer Luckey launches the **Oculus** on Kickstarter as the first low-cost 3D hardware for the masses.

2014 Americans Kevin McCoy, an artist, and Anil Dash, a tech entrepreneur, create the first **non-fungible token**, a unique cryptographically secured virtual asset.

2016 The DAO, an early decentralized autonomous organization for raising VC funds, launches on top of the Ethereum blockchain.

2018 Video play-to-earn game Axie Infinity, developed by Vietnamese studio Sky Mavis, popularizes the use of NFTs integrated into the Ethereum blockchain.
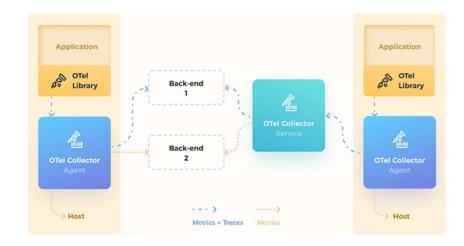
2021 Facebook's parent company rebrands itself as Meta and promulgates an upbeat and expansive vision for the metaverse.

2022 Siemens and Nvidia partner on **the industrial metaverse**.

OpenTelemetry

- OpenTelemetry is an open-source observability framework that provides IT teams with a common format for collecting and sending telemetry data, such as logs, metrics, and traces.

- OpenTelemetry components, APIs, and SDKs enable teams to instrument, generate, collect, and export telemetry data for analysis to understand software performance and behavior.

- OpenTelemetry is a Cloud Native Computing Foundation (CNCF) incubating project that aims to provide unified sets of vendor-agnostic libraries and APIs.

REFERENCE ARCHITECTURE

- https://www.dynatrace.com/news/blog/what-is-opentelemetry-2/

Generative Design AI

– Generative design is a process where a computer program generates design options based on user-specified criteria

   – AI is used to analyze and refine those options.

– Generative design can be used to optimize parts and assemblies, and it can also reduce the amount of time and resources required for product development.

– https://www.engineering.com/story/ai-driven-generative-design-redefines-the-engineering-process
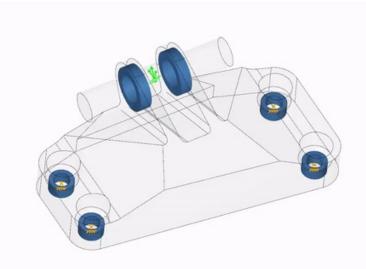

Image: This GE bracket redesign was 75 percent lighter than the original design and optimized to stay within the material yield stress using generative design.

https://www.ptc.com/en/blogs/cad/beginner-guide-generative-design

Innovation Report Writing Contents

Final Group Report Template

- Introduction to the Technology
  - What it is and how it is being applied to various industries
  - Market analysis/potential
  - The current state of development
- Innovation Concepts
  - Discuss the technology in terms of its dominant design
  - Discuss the concepts within the 'Diffusion of Innovation', e.g., Adoption rate (influencing factors), distributed innovation, etc.
  - Discuss disruptive innovation concepts – does it fit the requirements to be disruptive? New market? Value chain?
- Some samples

Final Group Report Template

– A clear description of the technology, sufficient understanding of its application and use, and knowledge of the current markets and the potential impact of the technology on these markets/industries.

- Description of the technology
- Applications of the technology
- Current market and industry trends
- Potential Impact

Final Group Report Template

- Clear **description of innovation concepts of Dominant Design, Disruptive Innovation, and Diffusion**
  - Dominant Design
  - Disruptive Innovation
  - Diffusion
- **Quality of the Report**
  - Report Structure
  - Language
  - Reference
  - Word Limit

Final Group Report Template

- Industry Application of the Technology.
  - Justify selecting the two real-world examples; this includes a short description of the examples.
    - Motivation
    - Explanation of the Use of the Technology by the Two Examples
  - Effectively apply **the two selected innovation concepts** when discussing the examples.
    - Relevance of Concepts
    - Discussion of Examples
  - Comparative analysis of the applications of the innovation concepts between the two real-world examples
  - The **quality of the Report** will be considered when marking.

Final Group Report Template

- These aspects are considered when marking:
  - Use of **suitable charts, diagrams and/or tables** to aid in conveying innovation concepts or the analysis of real-world examples.
  - Effective **structure, flow and clarity** of the report.
  - Use of suitable **high-quality sources** and appropriate quoting and referencing of these.

Final Group Report Template

– Reports will be assigned to tutors so that they can provide feedback

– **Lecturer will go through the reports, together with all the comments, to finalise the marks**

Late assessments

- We will follow the Faculty guideline – its always best to submit in time!
- If you have any challenges with the submission date, do get in touch with your teaching team as soon as possible.

Finding the right References

References

- Find journal articles or high-quality online sources on the topic
- News / Magazine / Editorial articles can be used to support your topic, e.g., used as an example
- Consultancy reports e.g., HBR, McKinsey are OK, especially as they introduce newer topics / examples
- If in doubt about quality of reading, please check with your teaching team
- Note: Be careful in how you treat information from companies (such as press releases, product websites, whitepapers) as they may be biased!)

References

- University Library
  - https://library.sydney.edu.au/
- Google Scholar
  - https://scholar.google.com.au/
- Google
  - Be careful of identifying reliable sources

- ! Wikipedia – perhaps only for you to read and understand

Reference Management Software

- Make maintaining references and creating bibliographies easy
  - **EndNote:**
    - Free for Uni of Sydney staff and students
    - For Windows, Mac
    - Plug-in for MS Word
    - http://libguides.library.usyd.edu.au/endnote
  - Zotero:
    - Free, open source
    - For Windows, Mac, Linux, …
    - Plug-in for Firefox, MS Word, Open Office
    - http://www.zotero.org
  - Many others:
    - http://en.wikipedia.org/wiki/Comparison_of_reference_management_software

Other resources

- **https://library.sydney.edu.au/help/online-training/elearning/**

iResearch: information skills for life

iResearch Learning Objects Printable versions

- How to reference **English** | **Chinese** (PDF)
- **Search smarter, search faster** (PDF)
- **Find that book!** (PDF)
- Plagiariam and academic honesty **English** (html – All your own work – University site on plagiarism) | **Chinese** (PDF)
- **Finding items on your reading list** (PDF)
- **Finding journal articles using databases** (PDF)
- **Scholarly versus non-scholarly resources** (PDF)
- What is Endnote? **English** | **Chinese** (PDF)
- **What is a literature review?** (PDF)
- **Finding music using the library catalogue** (PDF)
- **Finding Australian Government Reports** (PDF)
- **Analysing visual resources** (PDF)
- **Citation chaining** (PDF)

Academic dishonesty and plagiarism

THE UNIVERSITY OF
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Academic dishonesty and plagiarism

- Please read the University policy on Academic Honesty carefully:

  http://sydney.edu.au/elearning/student/EI/academic_honesty.shtml

- All cases of academic dishonesty and plagiarism will be investigated

- There is a new process and a centralized University system and database

- Three types of offenses:

  - Plagiarism – when you copy from another student, website or other source. This includes copying the whole assignment or only a part of it.

  - Academic dishonesty – when you make your work available to another student to copy (the whole assignment or a part of it). There are other examples of academic dishonesty.

  - Misconduct - when you engage another person to complete your assignment (or a part of it), for payment or not. This is a very serious matter and the Policy requires that your case is forwarded to the University Registrar for investigation.

Penalties

- The penalties are severe and include:

    1) a permanent record of academic dishonesty, plagiarism and misconduct in the University database and on your student file

    2) mark deduction, ranging from 0 for the assignment to Fail for the course

    3) expulsion from the University and cancelling of your student visa

- Do not confuse legitimate co-operation and cheating! You can discuss the assignment with another student, this is a legitimate collaboration, but you cannot complete the assignment together – everyone must write their own code or report, unless the assignment is group work.

- When there is copying between students, note that both students are penalised – the student who copies and the student who makes his/her work available for copying

Detection

- We will use the similarity detection software TurnItIn and MOSS to compare your assignments with these of other students (current and previous) and the Internet

  - Turnitin is for text documents: http://www.turnitin.com/en_us/higher-education

  - MOSS is for programming code: https://theory.stanford.edu/~aiken/moss/

- These tools are extremely good!

  - e.g. MOSS cannot be fooled by changing the names of the variables or changing the order of the conditions in `if-else` statements

- Examples of plagiarism in programming code:

  - http://www.upenn.edu/academicintegrity/ai_computercode.html

Student excuses

- All these are cases of plagiarism and academic dishonesty we have seen in our school

- The student excuses are not acceptable:

  - *I sat the test and then posted the questions and solutions to my friends whose test was later in the week. I only wanted to help them understand the concepts that are examinable.*

  - *I posted parts of my code on my web page (or the group discussion forum) because my solution was cool (or I wanted to help them). I didn't expect them to copy it.*

  - *I tried to do the assignment on my own but I had problems with the extension part that I couldn't fix, so I submitted my core part and his extension part. I didn't cheat.*

  - *I finished my assignment but my friend had family problems. I felt sorry for her, so I gave her my assignment as an example. She said she only wanted to have a look and promised not to copy it.*

Students excuses (2)

- *The test has finished but the tutor hasn't collected the papers yet. I showed my answer to my friend. I didn't expect him to copy it.*

- *He is my best friend. I had no choice but to let him copy my assignment.*

- *I couldn't find a partner to work in pairs, so I joined their pair as they are my friends* (when only groups of maximum of 2 students are allowed – illegitimate collaboration).

Key message

- Plagiarism and any form of academic dishonesty will be dealt with, and the penalties are severe

- We use plagiarism detection systems such as MOSS that are extremely good. If you cheat, the chances you will be caught are very high.

- If someone asks you to see or copy your assignment, or to complete the assignment instead of them, just say: *I can't do this - we can both be thrown out of the University. I will not risk my future by doing this*.

Be smart and don't risk your future by engaging in plagiarism and academic dishonesty!