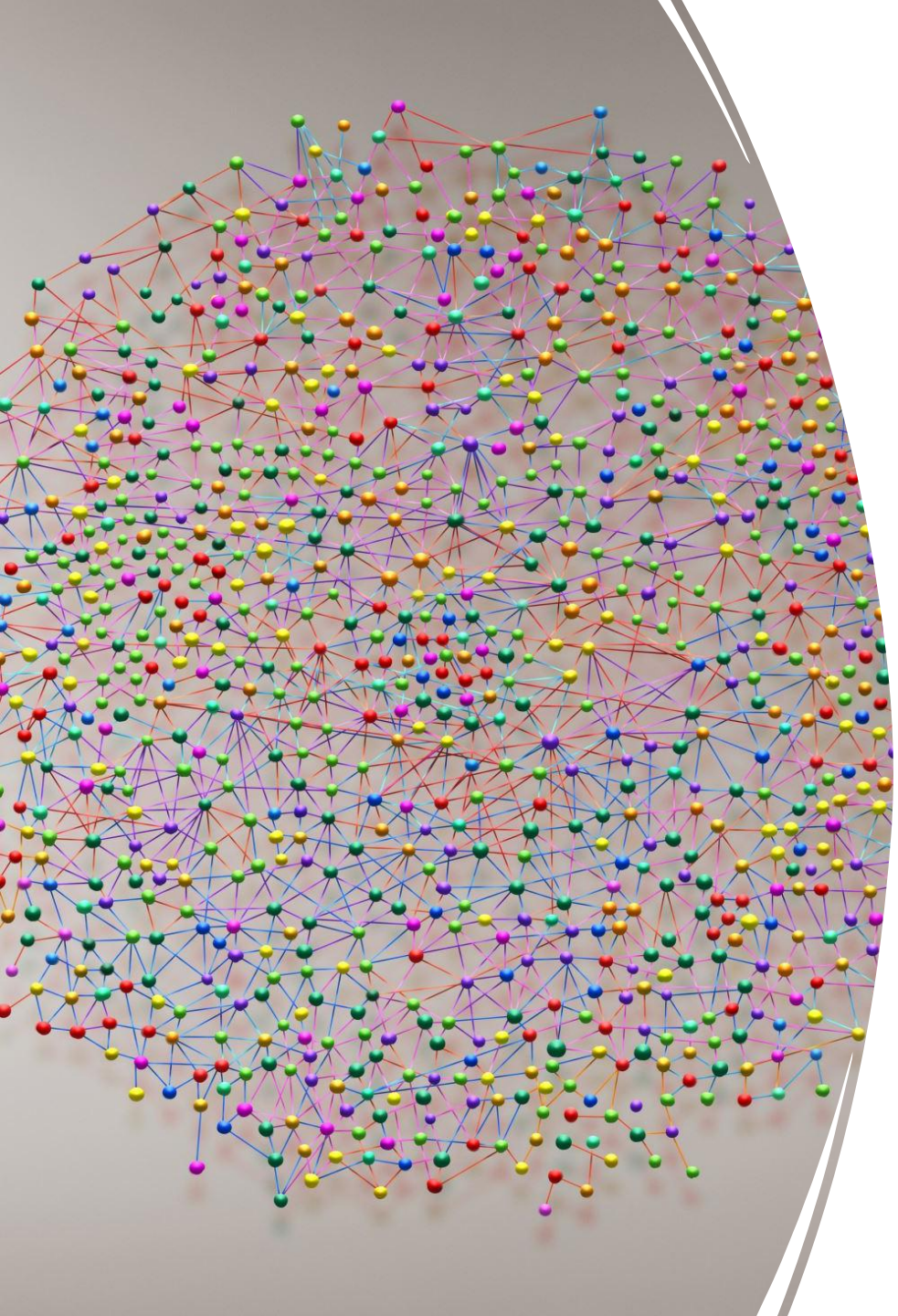

Challenges and Opportunities in AI Adoption: the case of AI for Social Good

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Motivation and Agenda

- My background
- Why do you need to care about AI adoption?
  - Diffusion and adoption in different sectors show varying speeds (Kinkel et al. 2022, Lee et al. 2022).
  - Is it a fit problem?
- What is AI for social good?
  - Design, development and deployment of AI systems in ways that help solve problems adversely affecting human life or the natural world, enable sustainable development without introducing new forms of harm or amplifying existing disparities and inequalities (Cowls et al. 2021).
- Why a talk on AI4SG?
  - Diffusion rate slower for AI developed for societal benefit (Chui et al. 2018)
  - Research on AI4SG is scattered and unorganized (Arsenyan and Piepenbrink 2023).
- Two recent papers
  - A Classification Framework for Generative Artificial Intelligence for Social Good
  - Artificial intelligence for social good (AI4SG): An in-depth look from paradox theory perspectives (under review)

Paper 1: A Classification Framework for GenAI4SG

- Early efforts of classifying AI uses cases include
  - McKinsey Global Institute
    - 400 commercial use cases
    - 160 social impact use cases
    - No theoretical foundation

- 2x2 Frameworks
  - Ballester (2021) Tasks vs Data needs based on 25 pilot projects
  - Haefner et al. (2021) Barriers vs Process in innovation context with 5 pilot projects

Tech adoption theories

- Technology Acceptance Model (TAM) (Davis et al. 1989)
  - Doesn’t do well with emerging tech (Kelly et al. 2023)
- Unified theory of acceptance and use of tech (UTAUT) (Venkatesh et al. 2003)
  - Is not well suited to explain adoption of GenAI (Ooi et al. 2023)
- Task-Technology Fit Theory (Goodhue and Thompson 1995)
  - Roots in information processing view (Galbraith 1973 and 1977) and equivocality of information (Daft and Macintosh 1981)
  - Has intuitive appeal
- Framework 1(Focus on Task): Task analyzability vs Task variety
- Framework 2 (Focus on Tech): capability vs capacity

Data and Methodology

- Data from the AI for Sustainable Development Goals Think Tank
  - Contains more than 400 AI4SG use cases
  - Identified 21 GenAI use cases from 12 countries covering 9 SDGs
- Exploratory research with in-depth systematic review of the websites for the use cases (i.e. secondary data)
- Unit of analysis is a use case
- Three researchers working independently to place use cases into quadrants in two frameworks, then checking each other's work, justifying their decision to reach consensus.
- Iterative process.

Summary of Use Cases

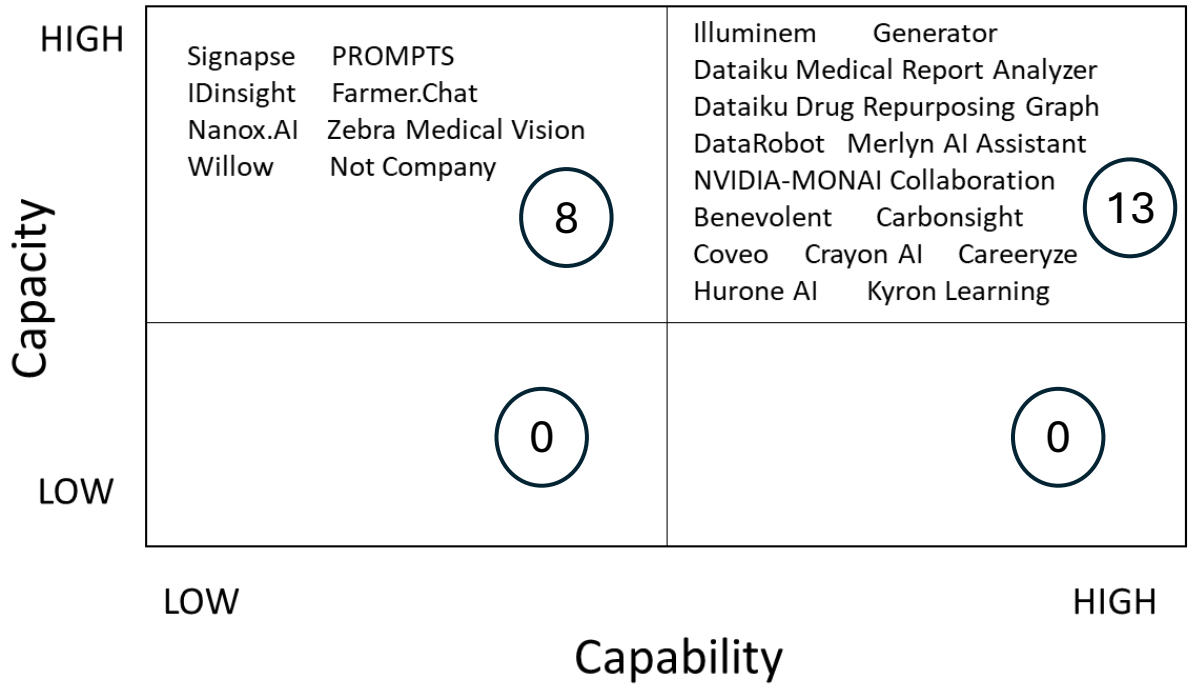
Use Cases	United Nations Sustainable Development Goals (UNSDGs)																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Illuminem											X		X				
Signapse			X														
PROMPTS			X														
IDinsight			X														
Dataiku Medical Report Analyzer			X														
Dataiku Drug Rep. Graph Generator			X														
DataRobot			X														
Farmer.Chat		X						X									
Merlyn AI Assistant				X													
NVIDIA-MONAI Collaboration			X														
Benevolent			X														
Nanox.AI			X														
Zebra Medical Vision			X														
Willow							X		X			X	X				
Not Company		X							X								
Carbonsight							X		X			X	X				
Coveo								X	X								
Crayon AI								X	X								
Careeryze								X	X								
Hurone AI			X														
Kyron Learning				X													

Results (Task framework)

- Overwhelming majority is in the analyzable – high variety quadrant
- High performance computing has been used for complex analyzable tasks and AI continues the same tradition
- Unanalyzable tasks require human intervention, out-of-box thinking, expertise developed over years, finess etc. (Daft and Macintosh 1981).
- Three use cases for unanalyzable tasks

Results (Tech framework)

- All use cases are in high-capacity category
- Expected as tech is typically used to increase efficiency
- Important for social good because organizations in this sector usually have resource crunch
- If there is no scale, AI may be overkill
- 6 of 19 high variety use cases use low capability. Not necessarily intuitive.
- All unanalyzable high-variety use cases needed high capability
- Low-variety use cases utilized low level of AI capability



Propositions

- P1: GenAI may play important role in some of the unexplored areas of social good where previously developed technologies could not be utilized.
- P2: GenAI is unlikely to be used in applications involving social good where scale or volume of work is not high.
- P3: Whereas GenAI may be equipped with very high level of technological capability, harnessing that high capability will not always be necessary. Depending on the scope and purpose of the application, sometimes lower level of capability may suffice.
- P4: For very complex tasks that are both unanalyzable and have high level of variety, deployment of higher level of capability of GenAI may be warranted.
- P5: Not all high variety tasks need to tap high level capability of GenAI. Depending on specific situation, low level capability of GenAI may be sufficient.

Paper 2: An in-depth look from paradox theory perspectives

- "*For an AI system to become tactful, it needs to be able to have an advanced sensitivity to specific contexts and their social and ethical implications and have the capability of approximately inferring the emotional and cognitive states of people with whom it is interacting*" (Berberich et al. 2020, p. 613)

- This human interaction also brings some tensions
- In social good, the developers (techies) and users (humanitarians, social workers, social enterprise etc.) are almost always different.
- Issues with misalignments of vision and objectives, governance, lack of transparency, unethical treatment of beneficiary data etc.

Theoretical Foundation

- Paradox Theory (Smith & Lewis 2011; Smith & Tracy 2016)
- Paradox Systems Framework (Smith & Lewis 2022)
- Paradox is defined as “contradictory yet interrelated elements that exist simultaneously and persist over time” (Smith & Lewis 2011, p. 382)
  - Belonging: tensions of identity
  - Learning: surface from creativity, innovation, and engagement of new ideas
  - Organizing: contradictory arguments which carry on over time
  - Performing: surface from differing and possibly conflicting demands from stakeholders
- Paradox theory has been applied to ambidextrous organizations and hybrid organizations

Methodology

- Case study with in-depth semi-structured interviews
- Identified 12 use cases, interviewed total of 18 individuals
- Interviews via video-conferencing (Zoom and Microsoft Teams)
- 60-90 minutes, recorded and transcribed
- Questions inspired by paradox theory and the four paradoxes
- Transcripts analyzed using Nvivo thematic analysis software
- Interpretive and iterative analysis (Liamputtong 2013)
- Coded paradoxical tensions, management strategies, and outcomes

Findings

- Belonging paradox: tensions in business approaches
  - **Stakeholders with diverse backgrounds**, positions or roles bring in diverse (even opposing) perspectives
  - **Organizational settings** such as startup, union, information access, culture, etc. add layers of complexity.
  - The approach of **IT being treated as core to business, or not**, contribute to tensions.

- Learning paradox: Preparation for AI acceptance
  - **Diversity of opinions** or backgrounds cause tensions in the context learning and innovation.
  - **Speed of change in technologies** and its maturity level add complexity in learning and innovation.
  - Without **proper education and training**, implementing automation using AI causes friction.
  - Finding the **balance between automation and augmentation** is challenging.

Findings

- Organizing paradox: AI4SG portfolio management
  - **Team composition** and organizational structure also add a layer of complexity.
  - **Technical challenges** (e.g., technology maturity, data quality, etc.) and lack of objective views may impede progress.
  - **Constantly changing scope of work and KPIs** during the course of the project causes problems.

- Performing paradox: AI4SG performance metrics
  - Different stakeholders have different objectives and **conflicting performance measures**.
  - Allocation of resources may vary across stakeholders, and **resource crunch** causes hardship.
  - **Solution footprint** may change depending on stakeholders' objectives.

Managing Tensions: Navigating the Paradoxes

- Continuous assessment and subsequent alignment provide clarity.
- Deft leadership is key to navigate through paradoxes
- Having macro view (including understanding customers) help in relieving tension.
- Mindset that humans are empowered but not replaced by AI helps in alleviating tensions.
- Openness in organization (inclusive culture, employee empowerment, open communication, etc.) helps in navigating rough patches.
- Instead of dichotomous either-or thinking more inclusive both-and thinking helps in developing enhanced stakeholder engagement
- Providing appropriate support to key contributors goes a long way.
- Data-driven evidences and mapping with current workflow help overcome dilemma of new ways of doing things.

Questions & Comments

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- Targeted at academics and practitioners in humanitarian public and private sector organizations working on all aspects of humanitarian aid supply chain management (i.e. disaster relief, development aid, sustenance aid)
  - Included in the Emerald Logistics & Ops Mgmt package
  - All articles **free open access** thanks to a gift from HELP Logistics
  - Practitioner access to the journal through the Logistics Cluster
- Promotes exchange of knowledge, experience and new ideas between researchers and practitioners.
  - Research articles, Practice Forum papers, and Viewpoints
- Encourages a **multi-disciplinary and cross-functional approach** to the resolution of problems and exploitations of opportunities within humanitarian supply chains.
  - Method agnostic
  - Double-blind
- OR papers need a realistic case study (numerical example) and focus should be on practical implications rather than algorithm development or computational analysis.