NIHR | Innovation Observatory

Newcastle University

Building Automation and AI into Horizon Scanning at the NIHR Innovation Observatory – Our Journey So Far

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24/04/26

20 Years

Disclosures

NIHR

This presentation is funded by the National Institute for Health and Care Research (NIHR) Innovation Observatory (NIHR209269)

The views expressed are those of the author(s) and not necessarily those of the NIHR or the UK Department of Health and Social Care

NIHR Innovation Observatory

Who we are and what we do

National horizon scanning centre based at Newcastle University

We identify and track health innovations (e.g., medicines, devices, diagnostics and digital technologies)

We work closely with our stakeholders to deliver timely intelligence on health innovations in the pipeline

We also engage in active research to advance horizon scanning methods and tools to identify emerging health innovations and current/future trends

Newcastle University

Horizon Scanning

An overview

Scanning the medical field

Therapeutics (medicines)

Novel

Repurposed

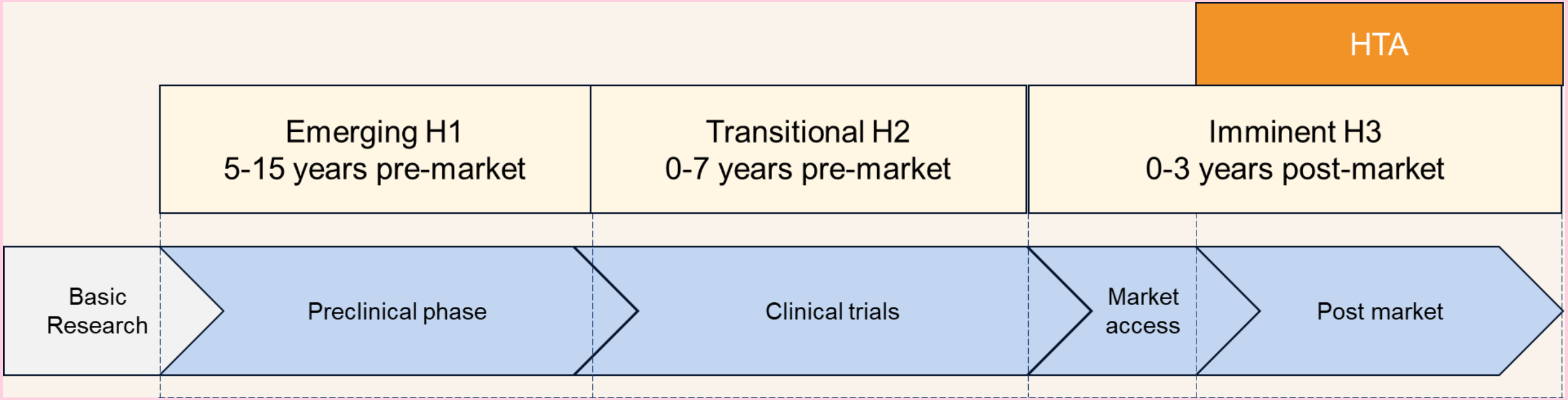
Combination therapies

HealthTech (MedTech)

Devices

Diagnostics

Digital Technologies


HTA
Emerging H1
5-15 years pre-market
Transitional H2
0-7 years pre-market
Imminent H3
0-3 years post-market
Basic Research
Preclinical phase
Clinical trials
Market access
Post market

Types of Scan

Type	Description
Product Pipeline	Identify the development pipeline of a product.
Intelligence and Insights	Understand a field of innovation from manufacturer, industry, patient, and public perspectives to highlight challenges and opportunities.
Clinical Landscape	Understand the pipeline of products reaching clinical trial stages.
Funding Landscape	Identify main funders and research groups in the field.
Patents scan	Identify novel technologies and early signs of innovation.
Literature scan	Identifying signals of innovation and contextualisation.
Bibliometrics	Identify patterns and networks of research groups in the field, and signals of innovation.
Expert Consultation	Used to seeking advice, guidance, and specialised knowledge about innovations.

Our Team

2017 to 2026

2017 – launch of the NIHR Innovation Observatory

The team

Small team of 9 people

Remit was to horizon scan for medicines approaching licensing in the UK

Took over from previous centre hosted at Birmingham

Adopted their systems infrastructure

AI integration was a central goal

Our team in 2026 – nearly 70 people. This reflects growing demand for horizon scanning.

AI at the IO

An overview

AI ‘central’ teams

Who’s working on AI?

Information Specialists – searching and sourcing

Technical team – infrastructure and software

- Engineers
- Developers

Innovation signals team – identifying need: internal, stakeholder, international remit

Supported by – operations team, researchers, analysts, engagement team

OpenScan Technical Infrastructure

Current and Future developments

OpenScan is a Data warehouse

Pulls trial records from global registries

Cleans, deduplicates, extracts and sort data into a predefined schema

Can be accessed via user interface with built in AI summaries (in development)

Working closely to look at other information sources (i.e. publications and grey literature)

Planning AI enhancement to incorporate new information (needs driven)

We are developing API for access to OpenScan and Sandbox for tool development

Software development

Current tools for Screening and data extraction

Clinical trials screening tool – Machine learning process

Publication screening tool – Generative AI process

RevU – Generative AI process

Lena Schmidt – PhD Studentship

Overview

Horizon Scanning support tool - screening

Uses machine learning techniques

- Continual re-ranking until threshold is met
- Gives a score for each record

Clinical trials screening only

- Title and summary

Muhinyia Ndegwa – Summer Internship

Overview

Systematic review support tool

- Screening
- Data extraction

Uses PICO formatted prompts for Generative AI screening & extraction

Publication screening only

- Title and abstract
- PDF full texts

RevU, Chris Marshall – Technical Programme Lead

Overview

Systematic Review and Horizon scanning tool

- Screening
- Data extraction (in development)

Uses PICO formatted prompts for Generative AI screening

- Fully automated, with option to override decisions

Clinical trial records and published literature

- Title and abstracts/summaries
- Full texts

IOPrompts, Hannah O’Keefe – Innovation Signals

Overview

Support tool

- Open repository, anyone can add to it
- Collate prompt frameworks in one place

Not AI itself, but there to support generative AI users

Building a baseline for information specialist research and development

- Mean number of concepts per prompt
- Number of prompts each concept occurs in
- Co-occurrence network of concepts

https://ioprompts.nihrio.com/

AI research at IO

An overview

How, What, Why, Where, When, Who
- Applications of LLMs
- Concerns of use
- Theory of change
- Behavioural space

Concerns:
- Survey
- 3 x event data collection
- Umbrella review (MSc student)

Theory of change:
- Based on concerns
- CPD/resources/actions

- Schematic of contextual/dynamic factors

Modelling behaviour change:
- Based on theory of change
- Illustrative research network
- Social science

Recommendation and Implementation

Concerns of using AI

Most frequently reported

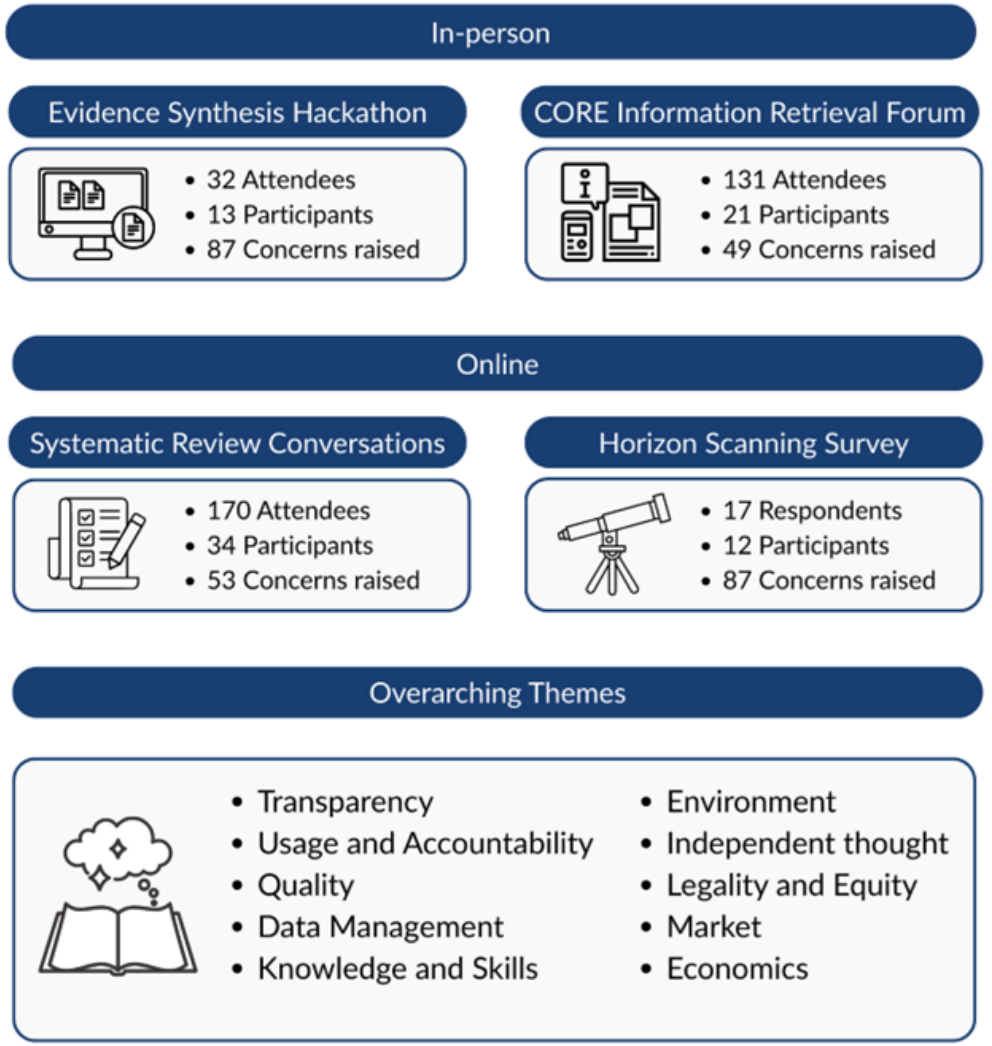
Knowledge and skills

Transparency

Data management

Legality and equity

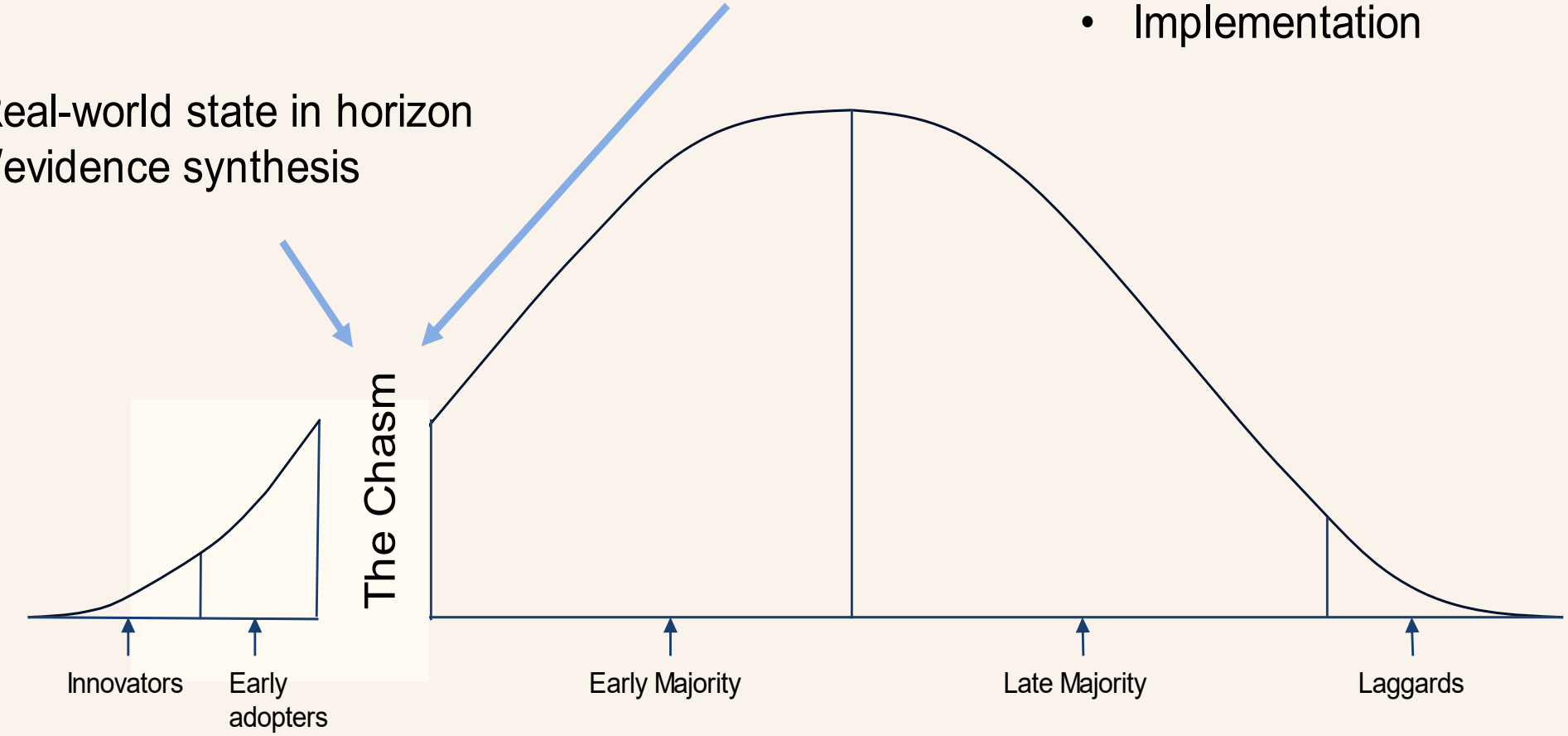
Quality



Theory of change – how can we overcome concerns?

- Recommendations
- Implementation

Current Real-world state in horizon scanning/evidence synthesis



Theory of change

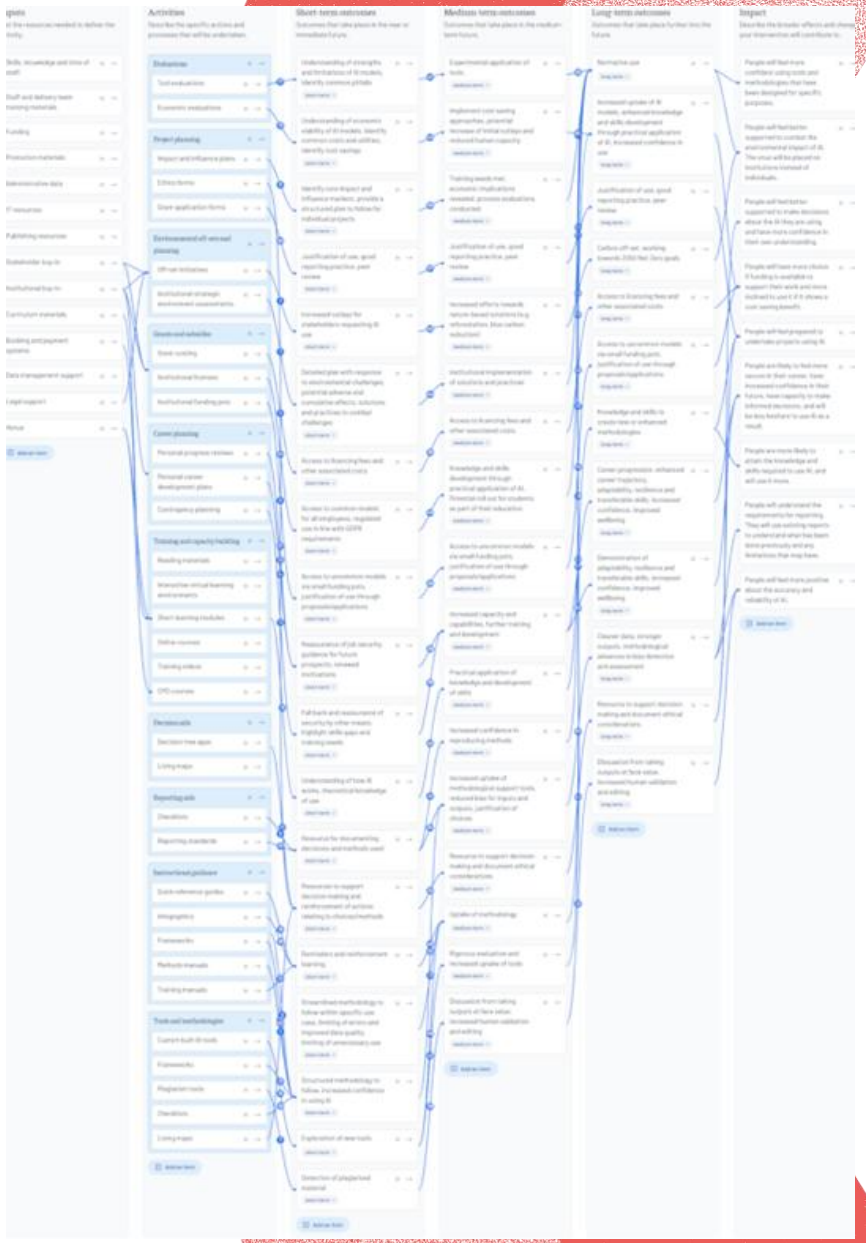
Overview

Assumption that people will take opportunities offered

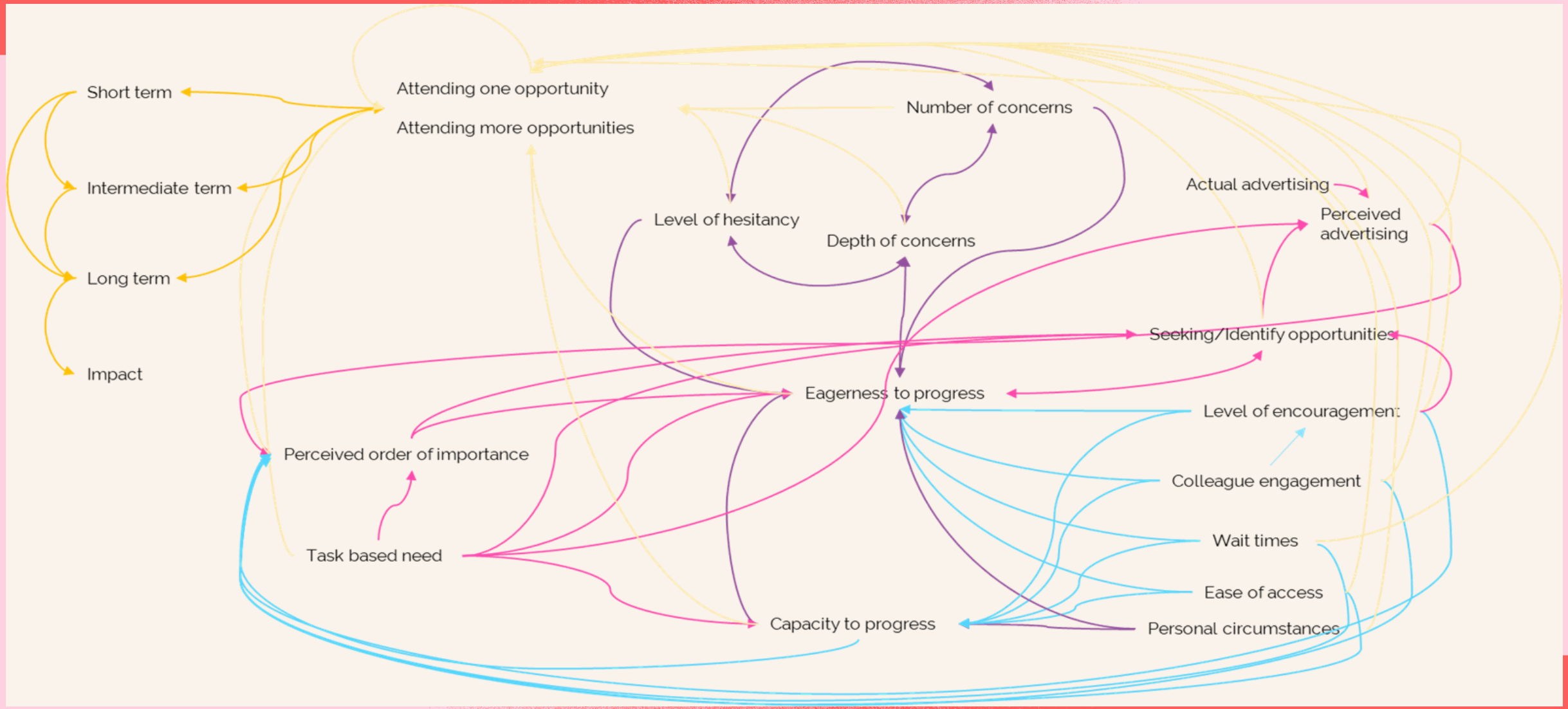
Impact = increased uptake of AI

Examples:

- Reporting standards
- Guidelines
- Short courses
- Online learning environments
- Environmental off-set agreements
- Access to licences



Complex factors that influence the decision to take opportunities that are offered



Activity

How do you want to use AI?

Outline

We will work through an activity together and discuss amongst colleagues

Examples are given as bullet points on each slide. You do not have to use these examples, be creative!

Use this time to be adventurous and enjoy the process

Goal setting – 5 mins

Task

In 5 years time how do you want to be using AI? Pick one thing

- I want to use an AI tool to translate my searches between databases
- I want to use AI to track my institutes citations and demonstrate our impact
- I want to be able to programme my own AI tool
- I want to use AI to organise my calendar/diary

Write one line that explains why this is beneficial for your work?

- It will save me time/speed up my work
- It will be more efficient than manual methods
- It will cut costs

Steps – 15 mins

Task

Pick 5 tasks that need to be completed to reach your goal

Think big! Don’t constrain yourself

- Undertake a training course, masters degree, PhD
- Identify & evaluate relevant tools
- Outline what a tool would look like & how it should function
- Hold focus groups & workshops
- Employ a technical developer

Actions & Motivations – 20 mins

Task

How does each step link together? Are there additional steps that are needed?

- Outlining tool requirements means I have the information to support discussions with developers

What benefit do you get from completing each step? Are there any risks?

- Knowledge
- Satisfaction
- Sense of achievement
- Qualification or certification
- Career progression

What benefit does your institution get from it? Are there any risks?

Inputs & requirements – 5 mins

Task

What inputs are needed for you to complete each step?

- Funding (grant applications)
- Equipment
- Time
- Team of people
- Institutional buy-in
- Stationary
- Student or interns

Rounding off

What have we achieved today?

Theory of change

Final picture: By working through this activity, you have designed your own ToC

Outcome - Identified a goal

Actions – what steps are needed

Causal pathways – how does each step link together

Inputs – what is needed to complete this

Change mechanisms – personal motivation to complete each step

(benefits/risks to ourselves and our institutions)

Impact - Thought of the benefits to our own work

Logic model

Example

Workshops

List of requirements for tool

- I will feel confident having conversations with developers
- It will take a lot of my time

Talk to developers

Outline new tool specifications

- I will feel positive about the progress being made
- Requirements are too costly and my personal ‘need’ cannot be included

Test tool

Evaluate use

- I will have the knowledge to promote the tool and back up my claims
- I will spend time on a tool that doesn’t work as efficiently as expected

Why?

Benefits of ToC

Daunting to try new things

Break it down, one step at a time

Reference point for yourself and your institution

Reminder of your motivations

Empowerment!

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Voluntary research contributions

Photograph/screenshot of your model

Consent to use anonymously in research & publication

- Any common themes emerging?
- How do those themes fit with concerns of AI use?
- How does it fit with my community theory of change model?
- What does the future of Information Retrieval look like?

Newcastle University Ethical Approval Ref: 74689/2026

Q&A…Discussion

Time to ask any questions or talk about any insights you've gained

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Thank you

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20 Years