ISCF Digital Pathology and Imaging consultation workshop 28th Feb 2018

(How) might Social Sciences contribute?

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Who are these social scientists?

- Wide array of Humanities and Social Sciences with differing potential inputs (e.g. Law, Political Science, Business Studies, Sociology, Economics)
- Science, Technology and Innovation Studies –
  - strong interdisciplinary tradition
  - seeks to bridge technical, policy, behavioural domains – engage with practitioners
- You can find collaborators through the UK Association for Studies of Innovation Science and Technology AsSIST-UK

What are the issues: Data protection, governance

- Use of machine learning depends on sharing data/developing large corpuses of health data/images
- Legal constraints (privacy, consent); info management
- Issues of public acceptance
  - Laurie & Haddow benefit sharing as way to offset citizen and health professional concerns e.g. about genetic/health databases?
- Trust?

What are the issues: Trust

- Algorithm aversion (Dietvorst et al 2014) where users have less confidence in algorithmic than human advisory systems – despite evidence of their effectiveness

- User responses may change with greater experience
  - May encourage more appropriate and selective investment in 'guarded trust' [Oravec 2004])
  - How might this vary between different (Health etc.) settings?

Issues with machine learning in health

- Validity of training data
- Reproducibility (evidence for regulatory approval)
- Ability to explain (imputed GDPR right to explanation - a particular issue for deep learning systems)

Computerised Decision-Support Systems CDS: issues

- Liability

- Models of CDS use by Health Professionals (need better understanding)

  - ◆ Computer-aided mammography used as aid to expert judgement: a tool for training and professional development (Hartswood)

  - ◆ Calls for restrictive implementation of CDS in electronic prescribing (Coleman et al 2018)
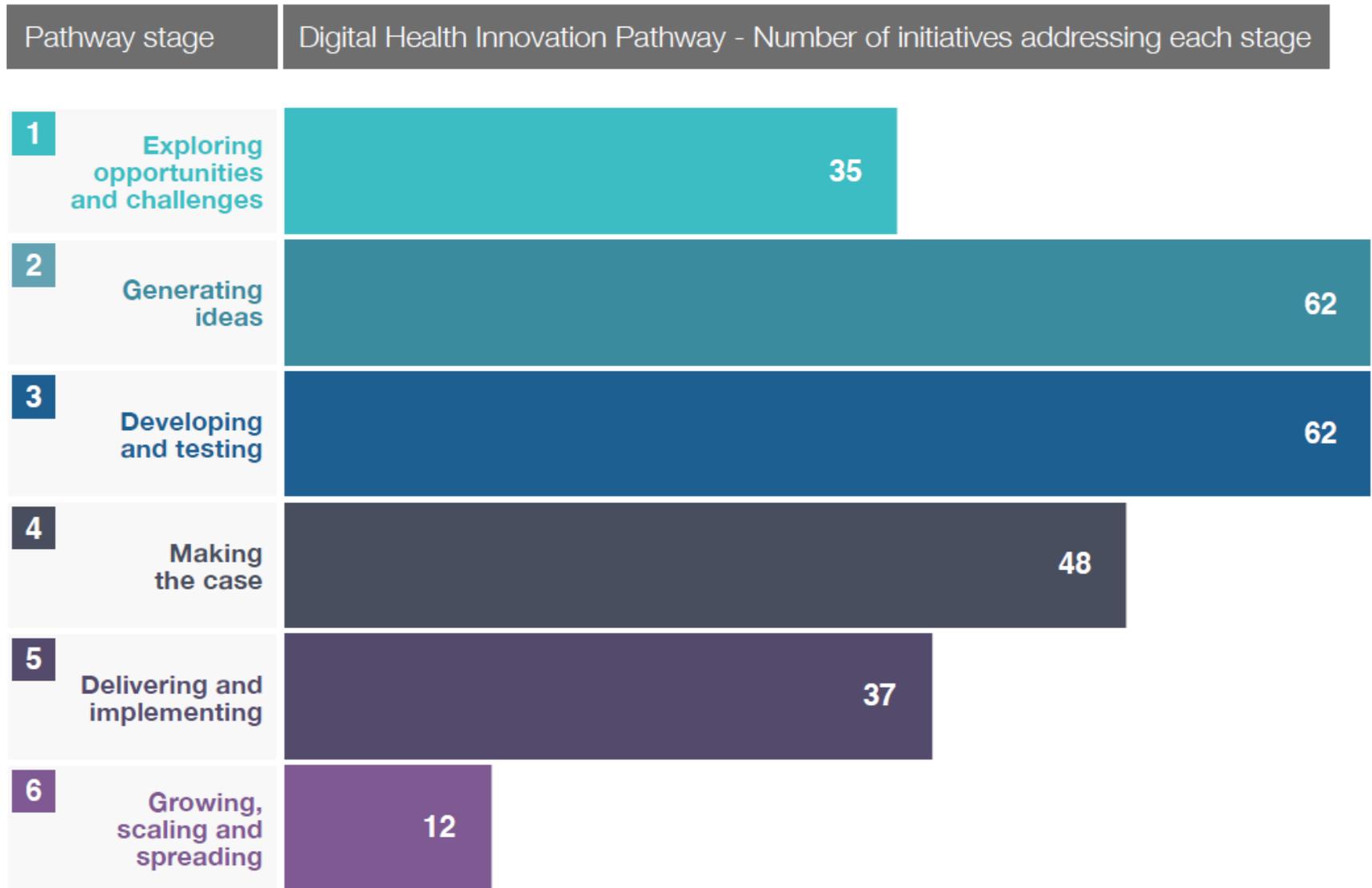
  - ◆ Problems of alert-fatigue;

  - ◆ How to optimally combine human and machine scrutiny to enhance quality & safety

Innovation journeys in Health IT

- A cornucopia of innovation opportunities
- A graveyard of failed Health IT initiatives
- particular challenges (Hyysalo 2017):
  - Scale up
  - Sustainability
  - Re-innovation –systems evolve and are improved in implementation/use
- Dig-Health Innovation support is focused on upstream stages (Ogilvy 2018)

Support at different stages (Ogilvy 2018)

Pathway stage	Digital Health Innovation Pathway - Number of initiatives addressing each stage
1 Exploring opportunities and challenges	35
2 Generating ideas	62
3 Developing and testing	62
4 Making the case	48
5 Delivering and implementing	37
6 Growing, scaling and spreading	12

Innovation journeys are:

- highly unpredictable
- sometimes very rapid,
- more often protracted
- <u>Usually fail</u> altogether or fail to meet objectives
- Vary between different innovation contexts
- Challenging features of health market and NHS procurement

The Kings Fund 2018 *Adoption and Spread of Innovation in the NHS*

Initial concepts must often be reworked

- Market research (e.g. user panels) may not be effective in assessing novel products

- Value of living labs and test beds – opportunity to explore novel artefacts in protected, life-like conditions

- May need to launch and test applications in real life

- Social science tools to enhance efficiency of learning

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Bringing social scientist on board. Value of expertise.

Methodology & repository of studies to better:

- Understand users and their context
  - ◆ (a resource for requirements analysis, design, uptake strategy)
- Understand human interaction with CDS and algorithmic systems
- Address ethical and legal dimension
  - ◆ *as an intrinsic part of development rather than an afterthought*
- Exploitation strategy – analysing and reflecting on innovation journeys
- Responsible Research and Innovation

What (honest) social scientists cannot offer

- To be the people that sort out the sticky issues for your project
(e.g. law, ethics and public acceptance)
- To be the people that will develop a business model that will guarantee commercial success

Need instead to develop mutual understanding across multiple specialist constituencies

- skills in interdisciplinary working
- Contributions cannot be specified at the outset

Association for Studies of Innovation Science and Technology AsSIST-UK

300+ members across UK Universities
https://assist-uk.com/association-for-studies-in-innovation-science-and-technology/

-Bring together UK strengths in *Science and Technology Studies* and *Innovation* studies
-Respond to emphasis on interdisciplinarity, cross-Council funding, impact agenda
-Help build and maintain links with stakeholders
-Contribute towards government S&T policy
-Work across the social science/science boundary *beyond* simply issues relating to 'public engagement'

AsSIST UK Members' areas of expertise: main fields

S&T field
Bio/Life sciences
Digital systems and social media
Energy systems and futures
Health and medicine
Environment
Innovation and S&T policy
Governance and regulation

Thank you

Feel free to contact AsSIST UK through joint chairs

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