



INNOVATION PROCESS AND ETHICS IN TECHNOLOGY:

TOWARDS A RESPONSIBLE INNOVATION GOVERNANCE FRAMEWORK

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OUTLINE

- Introduction
- Technological evolution, innovations and ethical concerns and dilemmas
 - Ethical implications of ICT
 - Ethical implications of Nanotechnology
- Innovation process models and decision-making
- A framework for understanding the (un)ethical decision-making process
 - Moral imagination, systems thinking and multiple perspectives
- Conclusion

INTRODUCTION

- Why do we need innovation governance?
- What are the models practised?
- The gap between innovation governance models and ethical decision-making process

TECHNOLOGICAL EVOLUTION, INNOVATIONS AND ETHICAL CONCERNS AND DILEMMAS

- Why technological innovations sidestepped ethical impacts and concerns?

TECHNOLOGICAL EVOLUTION

- Constituted by technological innovations both incremental and radical
- Influenced and shaped our production, distribution and consumption patterns
- Transformed our society inducing 'global change' (Grübler, 1998)
- Technological innovations depend on increasing interdependence and interrelatedness
- However, they did not pay much attention to 'externalities'
- Negative externalities are increasingly opposed by society

TECHNOLOGY AND SOCIETY

- Technology developed and shaped by social actors, while at the same time shaping social values and behaviour (Veblen, 1904, 1921&1953)
- It is not a polarised dichotomy – technological determinism vs. social construction
- Technological evolution is not without regress, doubts about progress and challenges to the environment, society as well as to humanity

SOCIAL CONSTRUCTIVIST PERSPECTIVE

- This “social constructivist” perspective emphasizes feedbacks between consumers and designers, between actual and potential users, and among different social groups promoting or resisting particular technological configurations and designs. (Grübler, 1998:74)
- Examples: Luddite movement in England, Fire of Uster in Switzerland, EPRS in Netherlands and Smart Electricity Readers in the Netherlands

LATE LESSONS FROM EARLY WARNINGS

- EEA: The precautionary principle (1896-2000)
 - 12 key lessons from 14 case studies of earlier technologies

ETHICAL IMPLICATIONS OF ICT

- Predictable ethical issues vs. less predictable ethical issues (Stahl et al. 2013)
- Predictable ethical issues:
 - Privacy, security, trust, liability and digital divide
- Less predictable ethical issues:
 - View of humans (therapy vs. enhancement, normality, morality and identity)
 - Power relationships
 - Changing culture and environment

EVALUATION OF ETHICAL ISSUES (ETICA)

- Law
- (Institutional) ethics
- Gender
- Technology assessment

ETHICAL IMPLICATIONS OF NANOTECHNOLOGY

- Nanotechnology – early lessons from early warnings’ underscores the lack of ‘clear design rules’ for developers of nanotechnology taking into consideration health, safety and environmental concerns although the first concerns about the adverse impacts of nanotechnology and nanomaterials were raised in 1986 (Drexler, 1986).
 - ‘Late lessons from early warnings: science, precaution, and innovation’ by the European Environmental Agency (EEA, 2013)
- The Royal Commission on Environmental Protection (RCEP) in the report on ‘Novel Materials in the Environment: The Case of Nanotechnology’ in 2008 identifies that the ‘fundamental ethical and political questions still need to be debated’ (Lee and Petts, 2013: 146).

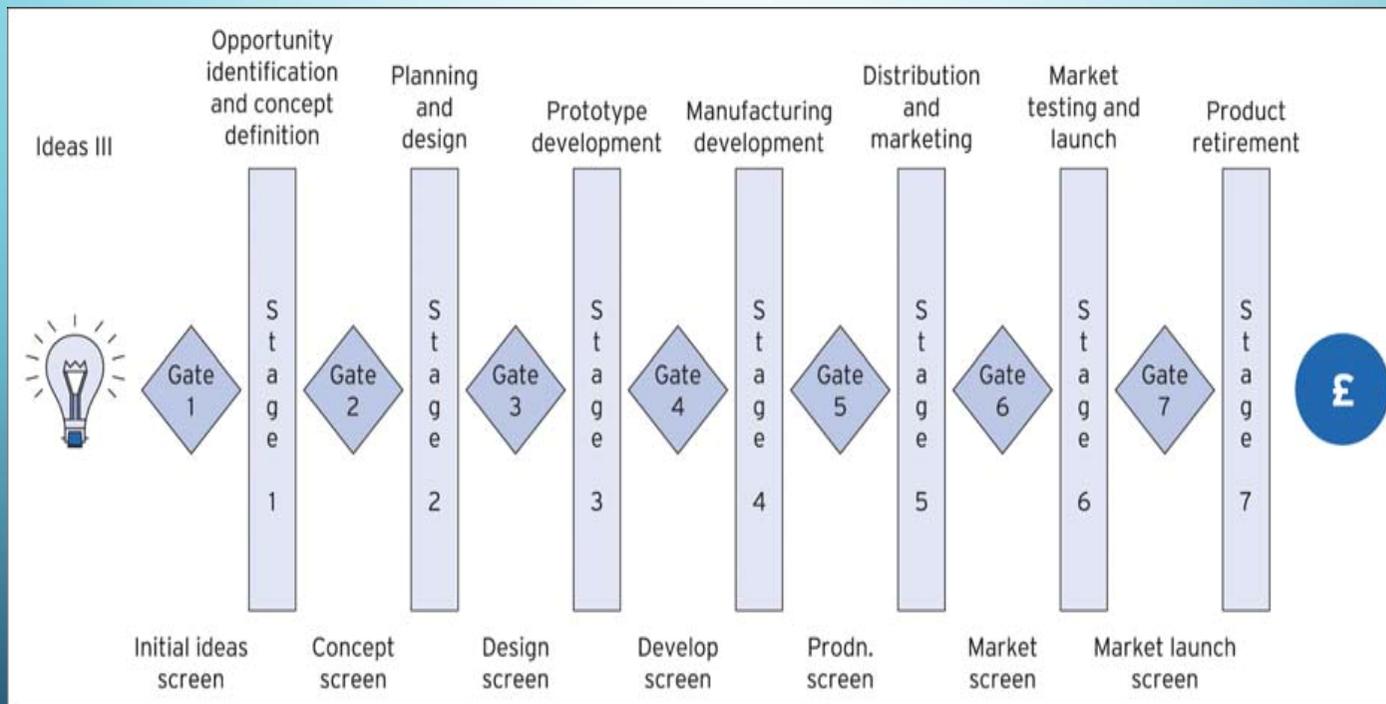
INNOVATION PROCESS MODELS AND DECISION-MAKING

- Innovation is a process
- Innovation process models simplify those complex processes and procedures for the sake of understanding and refining the innovation process and introducing changes that may be required;
- Reducing uncertainty through converting uncertainty to risk through knowledge (Tidd & Bessant, 2009)
- Facilitates reducing risk and increasing commitment and 'lock-in' over time

INNOVATION PROCESS MODELS

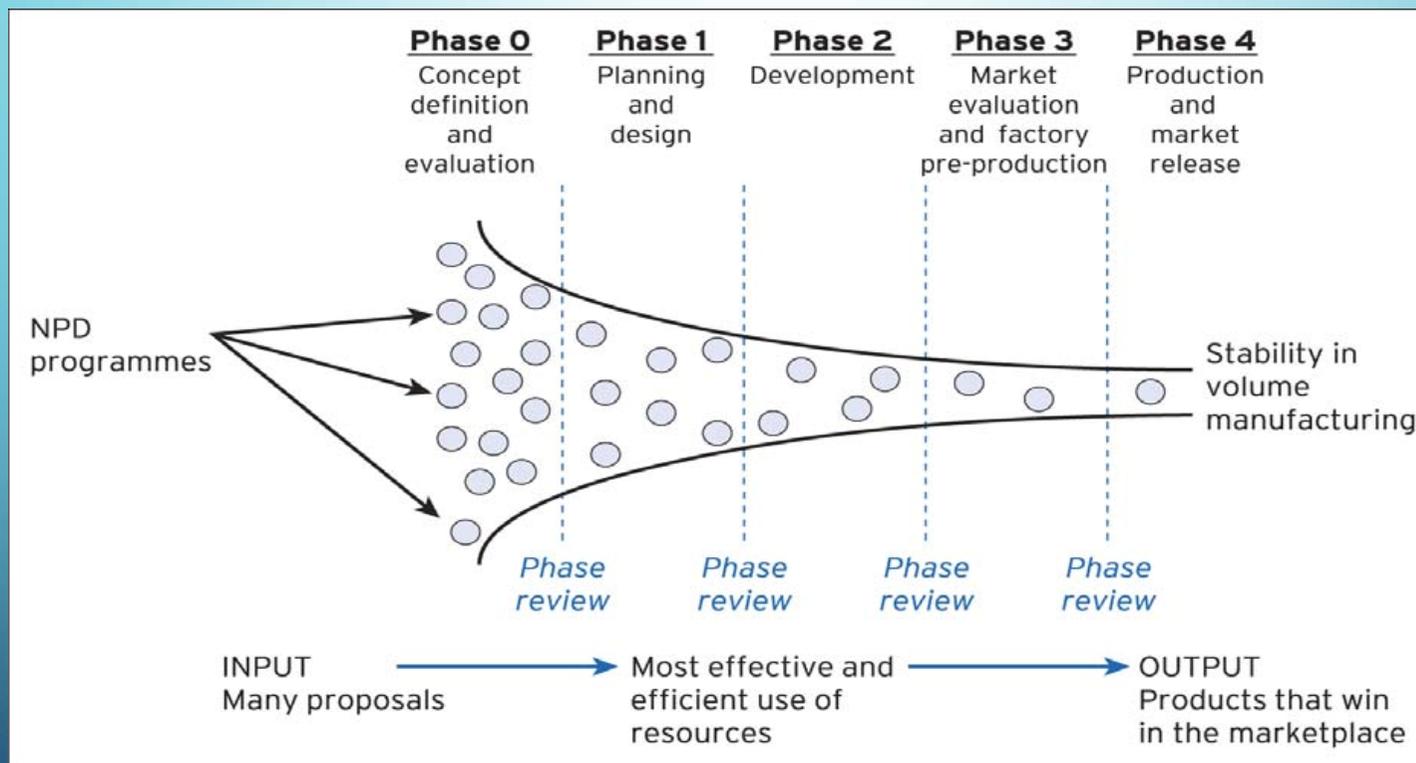
- Innovation process models:
 - Stage-gate
 - Funnel Approach and Structured Development Process (SDP) for New Product Development (NDP)
 - Tidd and Bessant – simplified 4-phases model
 - Open innovation model (Chesbrough, 2003)

STAGE-GATE PROCESS MODEL



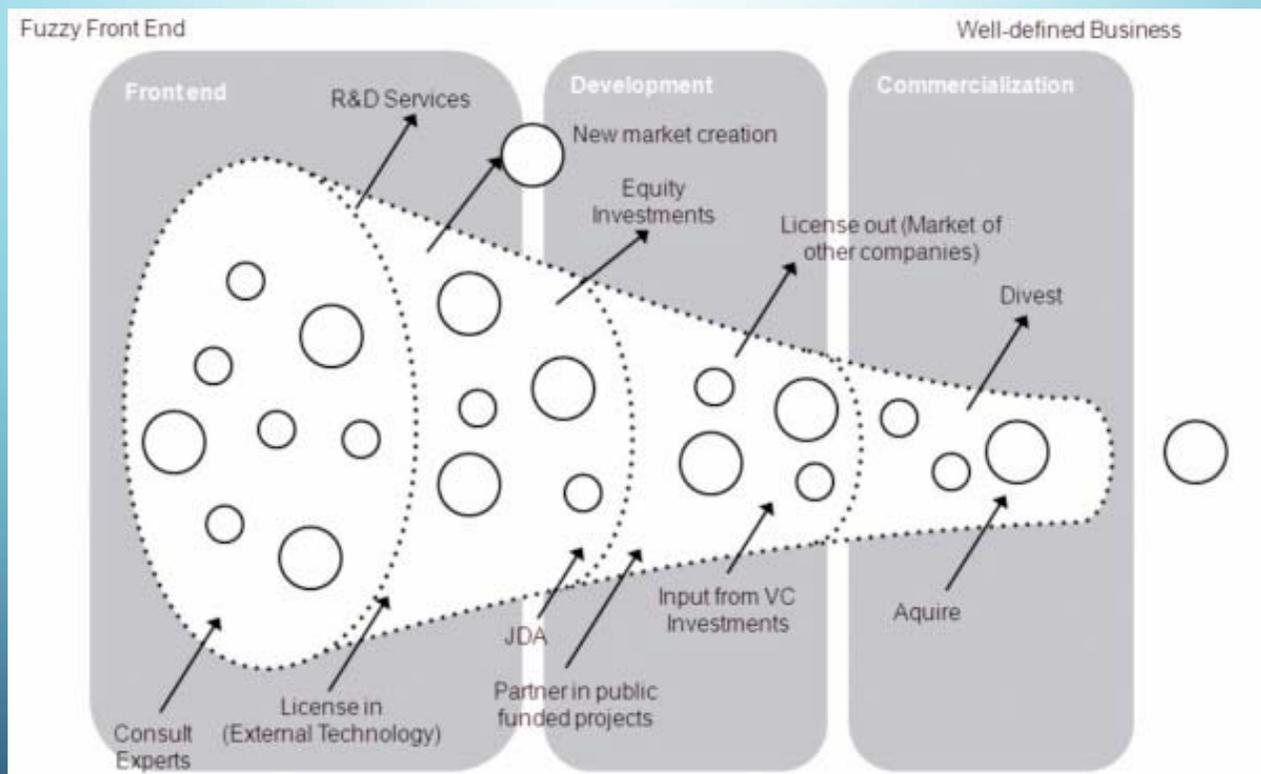
Source: Ahmed and Shepherd, 2010; based on Cooper, 2000

FUNNEL APPROACH

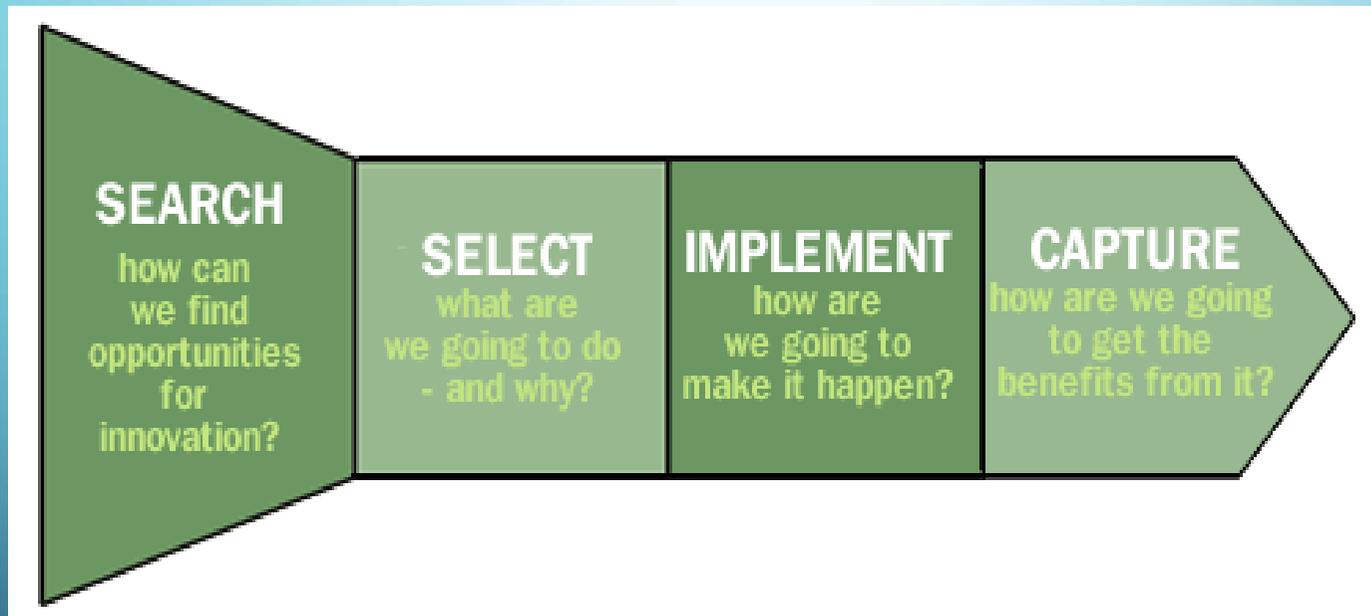


Source: Ahmed and Shepherd (2010)

OPEN INNOVATION MODEL



SIMPLIFIED INNOVATION MODEL

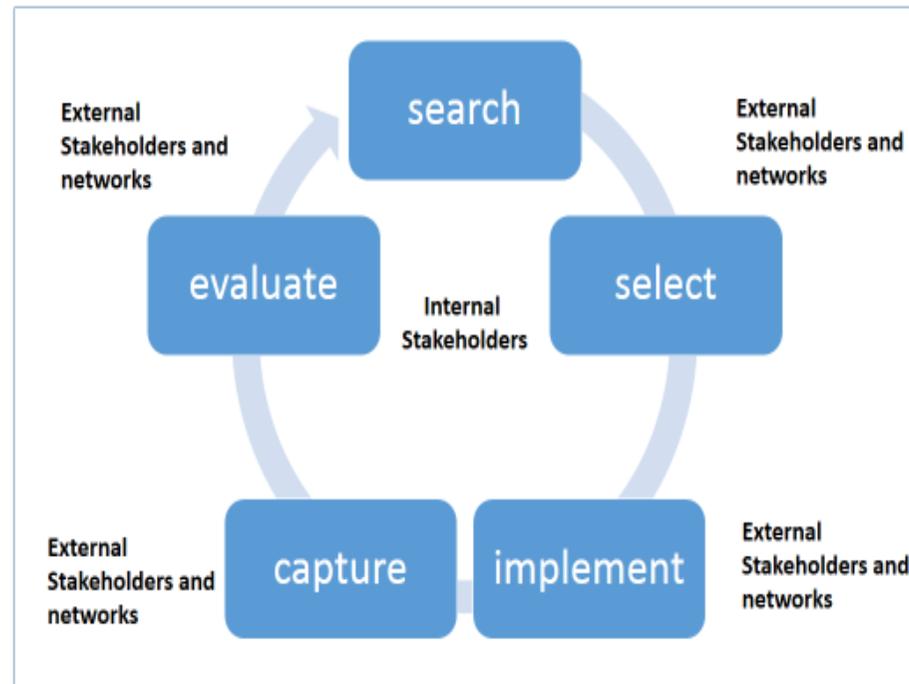


Tidd and Bessant (2009 & 2013)

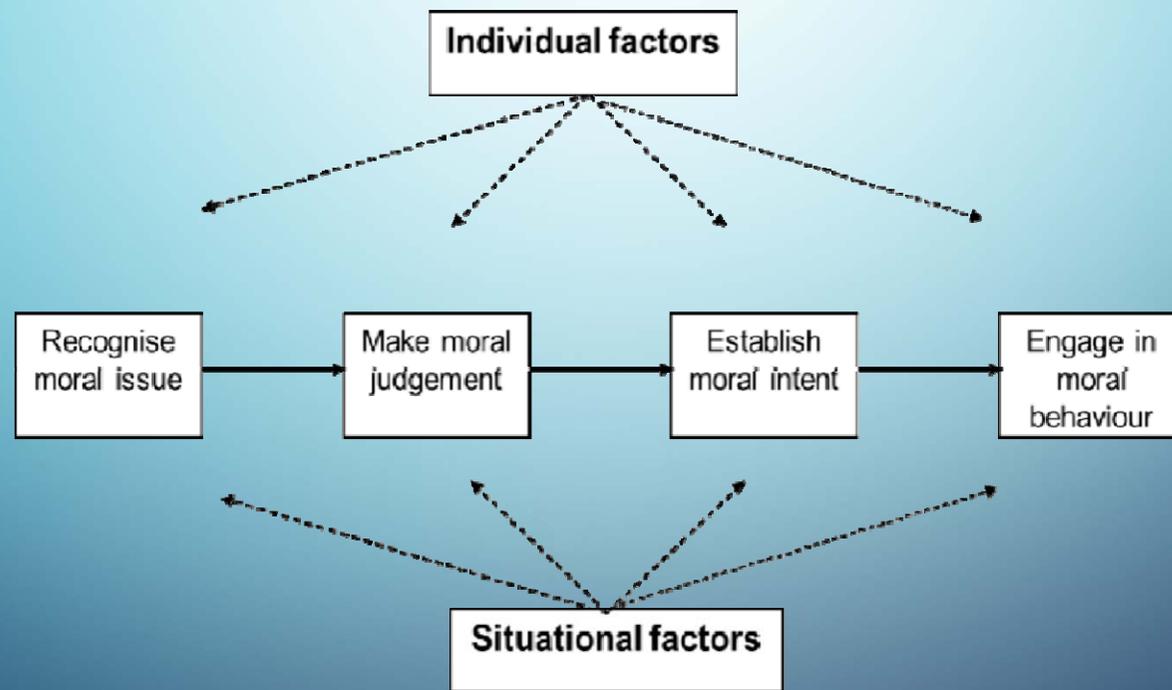
CRITIQUE OF THESE LINEAR OPEN ENDED MODELS

- These models do not explicitly address ethical concerns and dilemmas
- It is not clear how rights and responsibilities are allocated among various stakeholders
- These models are supposed to reduce risks but the risks are mainly associated with financial / economic risks – do not consider risks arise out of ethical concerns and dilemmas that have an impact on society and the environment
- The phases and stages are sequential and progressive
- Ethical concerns and dilemmas at each stage is not carefully considered to regress
- Technological uncertainties are not fully captured during the implementation and launch phase and evaluated

CLOSED LOOP (CIRCULAR) STAKEHOLDER ORIENTED INNOVATION PROCESS MODEL

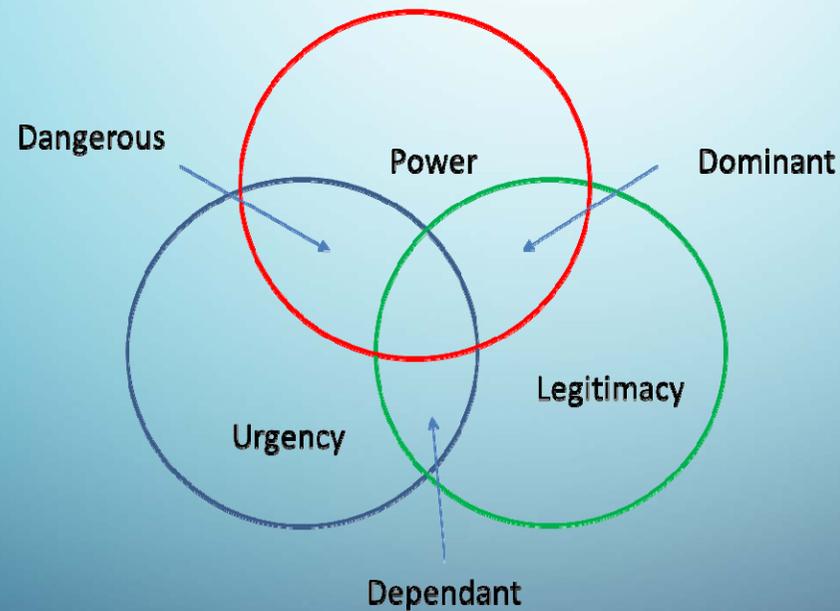


FRAMEWORK FOR UNDERSTANDING (UN)ETHICAL DECISION-MAKING



Source: Crane and Matten, 2010; based on Jones, 1991

TYPES OF STAKEHOLDERS AND POWER RELATIONS



Source: Mitchell et al. 1997

STAKEHOLDER MAPPING

Stakeholders	Type	Interests	Rights	Responsibilities / duties	Ethical concerns / dilemmas

MORAL IMAGINATION, SYSTEMS THINKING AND MULTIPLE PERSPECTIVES

- Ethical concerns can vary among various stakeholders
- Stakeholder inclusion is imperative
- Seek solutions for various ethical concerns and dilemmas through stakeholder dialogue, deliberation and engagement
- Use moral imagination (consider various possibilities and moral consequences) both at individual and organizational level
- Systems thinking approach may help to identify outcomes that have normative (moral) consequences
- Multiple perspectives can help to understand, revise and critique our operative mental models (Werhane, 2008)

TOWARDS A RESPONSIBLE INNOVATION GOVERNANCE FRAMEWORK

- Innovation process model need to capture ethical concerns and dilemmas and engage all relevant stakeholders
- Ethical decision making framework should be embedded within the process model
- Stakeholder dialogue, deliberation and engagement to seek solutions (through moral imagination, systems thinking and multiple perspectives) that no stakeholder can reasonably reject
- Include both participatory and anticipatory mechanisms to take collective responsibility for innovation seriously – collective action problems require collective pledge

FUTURE RESEARCH

- Qualitative and empirical research to understand the challenges, dilemmas and constraints that innovation managers face in implementing a responsible innovation governance structure



THANK YOU