Synthetic Biology and Risk Governance: An Action-Oriented Approach

Christopher Cummings¹, Sharon Stauffer, Sheron King, Tina Ndoh, and Jennifer Kuzma²

Risk governance for emerging technologies presents significant challenges due to accompanying uncertainties, complexities, ambiguities, and a lack of historical experience. Decision makers, technology developers, and others involved in oversight are sometimes paralyzed by these challenges, either unduly stalling or inappropriately permitting technological applications to enter society. A paradigm shift is needed to better shape governance in the face of exponential growth and convergence of emerging technologies.

In this presentation, we present a general approach, which we call "action-oriented risk governance," that does not rely on years of data collection for action. Instead it incorporates the mental database of diverse experts and stakeholders at early stages of technology development in order to reveal policy options for moving forward. While at the same time, it prioritizes data, engagement, and information needs for specific types of applications. As an example of an action-oriented, risk governance process, we describe our Sloan Foundation synthetic biology (SB) project that uses a policy-Delphi method to identify potential governance options for applications that are expected to enter society in the mid- to long-term.

For the policy-Delphi, our team first considered the diversity of SB and drafted 9 descriptive cases to highlight various technologies and sectors for its applications. The case studies were then reviewed for accuracy by experts working in the selected SB areas. A second set of general SB expert-stakeholders helped us prioritize and narrow the 9 cases down to 4 for use in policy-Delphi. We then selected another group of 40 expert-stakeholders using purposive sampling to cover a range of potential societal implications, expertise areas, and sectors associated with SB. The first stage of the policy-Delphi utilized the 4 cases as focal points of discussion for a standardized, open-ended interview protocol. Questions were designed to help formulate the issues, expose the options, and examine initial positions of the interviewees. Preliminary results from these interviews will be presented.

In addition, the second, third, and four stages of the Delphi (two follow-up surveys and a workshop) will be described to illustrate how the process can more broadly contribute to risk governance in the face of very limited data and information. Unlike other projects for SB governance, which have relied primarily on face-to-face workshops, the Delphi process allows respondents to voice themselves anonymously, take time to reflect between stages, and change their opinion without fear of repercussion. At the same time, it also capitalizes on group knowledge to build consensus or better understand points of agreement and disagreement. For our project and most other policy-Delphis, consensus is not forced, but group convergence is used to identify policy options, criteria for evaluating these options, broader societal implications, and data needs.

Finally, after describing the policy-Delphi for the 4 cases, we reflect on whether and how such an "action-oriented risk governance" approach could be used for societal decision making, on opportunities for including it in existing systems, and on potential political and organizational barriers.

¹ Nanyang Technological University, Singapore

² North Carolina State University, Raleigh, NC, USA