

) ACTIVE POLICY DESIGN TOWARDS ADAPTIVE SOLUTIONS

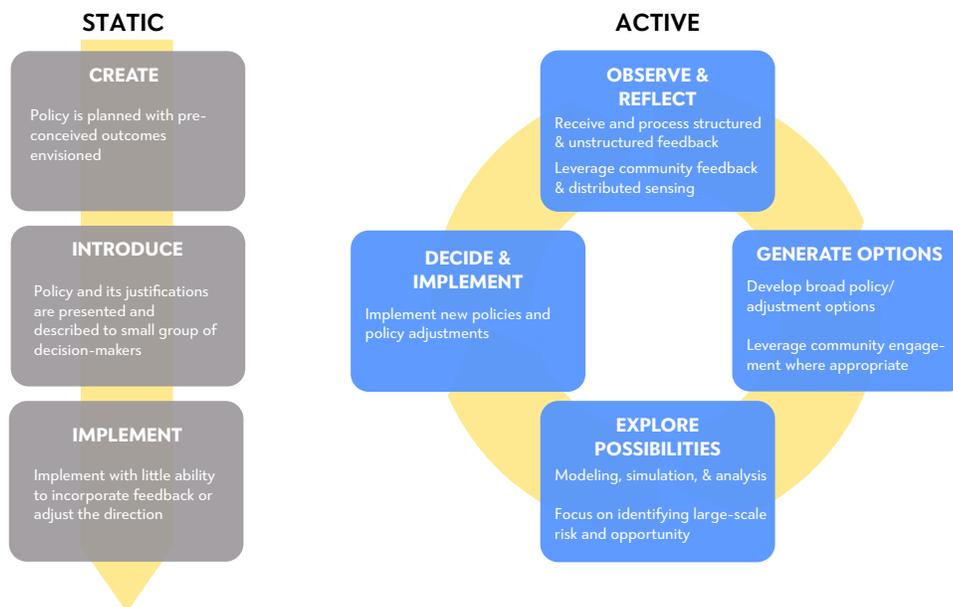
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Bottom Line Up Front

The increasingly dynamic and uncertain environment has made it extremely difficult for current policy making processes to achieve desired outcomes. Failures in policy can be devastatingly costly, both monetarily and in terms of human life and well-being.

In order to rectify this, the policy making process must be structured to be responsive and adaptive—policy design must become *active*. This goal can be achieved through policy design that is deliberately iterative and subject to continuous refinement. Each iterative cycle should be supported by a sequence of phases that moves policy towards achieving desired objectives and minimizes unintended consequences. These phases are:

-) **Observe and Reflect:** Leverage distributed sensing as well as community and stakeholder engagement to observe current needs and reflect on the impact of previous policy.
-) **Generate Options:** Develop broad policy options to address identified needs and unintended consequences; engage relevant communities and stakeholders to increase optionality.
-) **Explore Possibilities:** Leverage modeling, simulation, and analysis to broaden the awareness of possible futures, with a focus on early identification of large-scale risks and opportunities.
-) **Decide and Implement:** Put new policy and adjustments into action and establish channels for structured and unstructured feedback.



An Alternate Approach. The current, linear policy-making process is slow and only adapts when externally forced. Utilizing community feedback, other technological advances, and iterating through the cycle promises to improve policy outcomes with a dynamic, multi-dimensional process.

Discussion

) POLICY

Policy is a tool to generate processes that will lead to desirable futures. However, current policy-making approaches are failing to achieve their aims. This failure is due to an environment that is increasingly dynamic, complex, and uncertain, owing to the rapid growth in material and informational interconnectivity across the globe. Policy makers are often stuck in a reactive cycle, only spurred to action by outside events. This environment clouds policy makers' ability to predict outcomes from policy choices, leading to wildly divergent results and unintended consequences.

This problem is not exclusive to specific domains, and extends into critical areas such as national security. For example, the lingering interventions in the Middle East, designed to bring stability to the region, provide a stark example of the difference between policy expectations and the realities of their outcomes. Rather than stability, since 2001 the region has been awash in war and unrest, with various factions seeking to fill power vacuums created by the interventions themselves. Currently, we approach the 16th anniversary of the the beginning of combat operations in Afghanistan accompanied by the news that an additional 4,000 soldiers are to be deployed there.

Below are a selection of examples of potential unintended consequences from policy actions. This list, by no means exhaustive, offers an awareness of how unexpected effects can result in failure to achieve ends. In some cases the results are opposite of what is desired. In others, harmful tangential effects, seemingly out of the scope of the policy, are induced.

Table 1. Policy Outcomes. While establishing cause and effect is difficult and therefore debatable, many policy outcomes differ sharply from their original intent.

Policy Action	Intended Outcome	Unintended Consequence
Mandate on corn-to-ethanol conversion for supplementing gasoline	Incorporate renewables into energy supply, reduce dependence on oil	Rise in global food prices, linked to food riots
Approve herbicide resistant crops for commercial use	Reduce burden of weeds on farmers to increase productivity	Herbicide-resistant superweeds; Herbicidal drift damaging non-resistant crops
Intervene militarily	Stabilize region, advance human prosperity, spread democracy	Create power vacuum for pathological organizations to gain leverage, destabilize region
Mandatory seatbelt law	Decrease traffic fatalities	More reckless driving, traffic fatalities remain constant
Expand roadways	Relieve congestion	Attract additional cars and drivers, congestion increases
Basel II Accord Risk-based Capital Buffers	Ensure financial institutions have enough capital to cover risk in case of financial downturn	During economic downturns capital buffer requirements increase, which can pull capital away from lending and potentially exacerbate the downturn and / or slow the upturn
Standardized curriculum	Ensure minimum exposure to set of material for all students	Reduce variety of experiences, create systematic blindspots

Source: Neptune Research

Current practices are too slow, rigid, and narrow, and rely too heavily on the misguided belief of being able to predict the future in detail. Consequently, as limitations are exposed and unintended consequences emerge there is an inability to rapidly adjust course.

In order to make policy that can effectively achieve desired ends, and minimize the cost of erroneous action, an iterative approach is needed. Policy should be regularly refreshed, with meaningful feedback connecting consequences, outcomes, and other relevant information back to policy decisions and decision makers. This will enable policy to be adaptive and responsive, and to adjust to what was unforeseen or what has changed.

“Despite the abundant evidence that points to the need for extreme caution in prediction, politicians and officials seem unable to resist the temptation to peer into crystal balls.” - Colin S. Gray, *The Future of Strategy*

To bring such a cyclical policy-making process to fruition, four distinct functions are necessary: (1) a function that enables observation of and sense-making about the current state of the relevant environment, including reflections on previous policy action and their detectable consequences, (2) a function to generate policy options for addressing identified needs, (3) a function that facilitates the exploration of possible futures with a focus on identification of major risks and opportunity, and (4) implementation of new and adjusted policy, as well as mechanisms and channels for receiving feedback.

Iterating policy is essential to achieving desired outcomes in the face of uncertainty. Those that embrace iteration will thrive.

) THE NEED FOR FEEDBACK

An iterative approach to policy-making does not rely on perfect predictive powers. Instead, such a process anticipates the need for adjustment after initial implementation, without knowing beforehand precisely what the need will be.

This approach to policy-making is already being employed in critical domains. In July 2017, India implemented a complete tax reform, replacing a complicated set of tax codes with a single, comprehensive Goods and Services Tax (GST). This new policy was implemented with the knowledge that not everything would work perfectly, but with the understanding that it will adapt and change with feedback. The GST implementation includes a Twitter handle that actively engages those impacted by the policy, both receiving feedback and responding to queries.

Sanjeev Sanyal, Principal Economic Adviser, had this to say about the GST implementation: “... what was done was the fast-moving groups were created to take feedback and adjust. This was done deliberately because it was understood that no matter how great the modelling, you are going to not be able to tell the unintended consequences of all this. [sic]” Time will tell whether the very young GST will have a positive impact on the economy in the long-run, but there are early

indications of optimism across many economic sectors.

As the U.S. considers its own reforms, it should be open to embracing this style of feedback-driven iterative policy design.

The way to best structure the means and processes for collecting and processing feedback are open questions. Best practices will vary across domains and instances, however some general remarks can be made:

- The manner in which feedback is collected, processed and leveraged should itself be subject to feedback and adjusted as policy is refined.
- Different policy domains and purposes will necessitate different ways of collecting, processing and responding to feedback. Leveraging technologies such as mobile devices, social media, and distributed sensing technologies can aid in the collection of relevant information, while data analytics and visualization can help distill information to highlight relevant trends and patterns.
- Feedback should be collected in both structured and unstructured formats. Structured feedback enables the tracking of variables that are identified *a priori* as relevant, whereas providing channels for unstructured feedback can help bring attention to unanticipated issues and opportunities.
- On each policy cycle, major themes of feedback from all stakeholders should be addressed. An effort should be made to link previous policies with their effects, identifying what did and did not work, highlighting faulty assumptions and points of surprise.

) GENERATING POLICY OPTIONS

In general, the development of policy options is in the province of human creativity and can't be fully automated or formalized. However, the ability to brainstorm options does not need to be limited to a small number of decision-makers. Online platforms can enable community engagement in the crafting of proposals, generating a larger variety of options than available otherwise. Moreover, such platforms can support the distributed ratings and preferences of various options across stakeholders, which can aid in the prioritization and consideration of various proposals.

In the U.S., NASA is leading the way in leveraging community for generating options, hosting regular challenges to address demanding and difficult tasks. Last month, for instance, a challenge was held to “Develop an Origami/Folding Concept for Radiation Shield Packing/Deploying”.

In 2008, Iceland used a community approach to drafting a new constitution. While what was produced was not ultimately passed in parliament, this highlights the enormous potential for crowdsourcing to influence even the most critical policies.

As the above examples show, the ubiquity of the internet has increased the talent pool for generating options by orders of magnitude—the diversity of communities across the U.S. and their creativity are a resource to be leveraged.

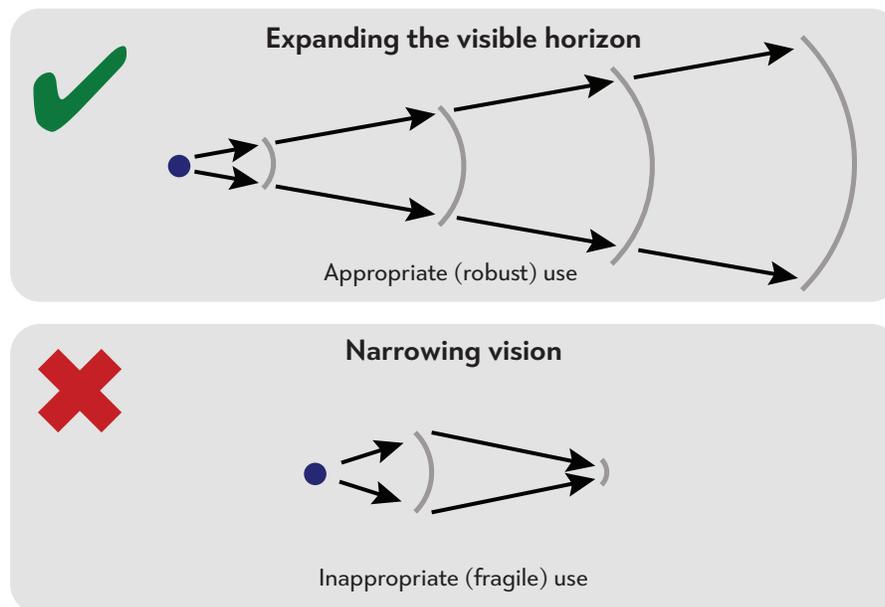
EXPLORATION OF POSSIBLE FUTURES

Mathematical and computational modeling, simulation, and analysis are a means of reducing real world complexity, making problems more manageable in order to aid in decision making. This capacity is often thought of in relation to making predictions about the future.

However, beginning with the understanding that from any policy action unintended consequences are to be expected (even with thorough modeling), the main utility of these tools shifts from *prediction* to the *exploration of possibilities*.

The goal of these formal endeavors should be to broaden decision-makers' visible horizon, of both risks and opportunities.

“All models are wrong, many are useful, some are deadly.” - Nassim Nicholas Taleb, *Skin in the Game*



Outcomes through use of Modeling & Simulation. Modeling, simulation, and analysis can best aid iterative policymaking by widening the view of possible futures, facilitating course adjustments to move away from large-scale risk and towards opportunity. In contrast, narrowing attention to specific predicted outcomes can lead to missed opportunities and being blindsided by harmful effects.

Because the full set of possibilities will never be realized prior to real-world implementation, the prudent focus on modeling efforts should be on generating additional options, probing the scalability of a proposal, and identifying large-scale risk. Small-scale risk, while worth some consideration, is necessary for innovation.

A variety of methodologies should be leveraged, providing multiple perspectives from which to explore proposed policy and potential impacts. The (non-exhaustive) table below shows three classes and exemplar sub-classes of models, some of their potential utility, and an example of how they might aid in considering specific policies.

Table 2. Policy Models. Classes of models and their utility in expanding the visible horizon.

Class	Example sub-class	Utility	Example
Probabilistic / Statistical	Extreme Value Theory	<ul style="list-style-type: none"> • Anticipate long-term exposure properties • Identify potential for extremes (e.g. floods) 	Anticipate the susceptibility of metropolitan areas to severe flooding
Generative / Dynamical	Agent Based Modeling	<ul style="list-style-type: none"> • Reveal (non-obvious) aggregate behavior • Explore alternative policy on aggregate behavior 	Uncover inability of a given approach (e.g. ‘contact-tracing’) to combat outbreaks above a certain threshold
Structural	Network Modeling & Analysis	<ul style="list-style-type: none"> • ID structural bottlenecks / vulnerabilities / points of influence / Potential for spreading/contagion • Explore alternative structures 	Highlight central dependencies and vulnerabilities in financial networks

Those who model policy (and variables relevant to policy) should not have conflicts of interest with respect to the policy. For this reason, it may be sensible in many cases to engage in a modeling exercise that is explicitly independent from those who propose a given policy, as they likely have a stake in its adoption. Avoiding conflict of interest on the part of modelers will decrease the tendency for models to simply demonstrate what a policy-proposer expects to happen. For critical policy, modeling efforts should be accompanied with an additional round of scrutiny via an independent peer-review process.

IMPLEMENTATION

Active policy design means that implementation must both take the actions necessary to bring new and adjusted policy to bear on a problem as well as establishing channels for feedback. Without the crucial step of establishing means of receiving feedback, active policy design will suffer the same deficiencies as current static approaches.

For feedback, a policy might leverage existing platforms like Facebook or Twitter if they provide sufficient functionality. Otherwise purpose-built feedback mechanisms should be developed.

CONCLUSION

To craft policy that achieves desired ends, the policy-making process must become responsive and adaptive. An iterative approach that leverages feedback will enable policy to address the unforeseen and unintended. Community engagement will expand the scope of policy options to creatively overcome challenges. Additionally, modeling and simulation, when used properly, can expand the visible horizon, aiding in the identification of large-scale risk and opportunity.

In order to achieve success using an iterative process, an organization must have the necessary

characteristics. Some of these include:

- Willingness to receive (potentially uncomfortable) feedback
- Willingness to take (appropriate, non-systemic) risks
- Ability to overcome the “sunk cost fallacy” that leads to sticking with failing solutions
- Transparency to provide a view of the effects of feedback and encourage continued engagement
- Absence of conflicts of interest that might prevent appropriate changes to policy
- Access to diverse resource pool (variety of expertise and perspectives)
- Rapid, flexible decision making

Active policy design is not something that will happen overnight, or without impediments or resistance. It is a challenge to the status quo and requires stakeholders to embrace a novel concept and a new reality.

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