

Operationalizing Political Analysis for Development: An Agent Based Stakeholder Model for Governance Reform

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Introduction

Changes in public sector institutions and governance systems in developing countries are not easy to achieve technically. They are even tougher to implement politically. These reforms create winners and losers, so understanding the political realities that shape the incentives of key stakeholders in a given program or policy is vital to securing consensus. This may mean the difference between a well-designed intervention that mobilizes critical support and a failed initiative that alienates crucial clients. Increasingly, this realization has become part of mainstream thinking of major international development donors, such as the World Bank (Haggard and Webb 1994, World Bank 1997, World Bank 2000.) But even if donors now recognize the importance of the “politics factor,” do they have a way to apply political analysis that is operationally useful? Here we analyze the World Bank’s experience in applying an agent-based stakeholder model to the politics of public sector reform in selected borrower countries.

Until recently, the instruments employed by donors like the World Bank to analyze the politics of reforms have been blunt-edged, coming mainly through retrospective research or through broad country reviews of political economy that provide informative contextual understanding but do not have immediate and decisive impact on investment decisions. Some analysis has looked more specifically at the behavior of interested groups and actors (stakeholders) in relation to particular reforms (Haggarty and Matsuda 1999). Such stakeholder analyses have relied on relatively “soft,” intuitive methods. (Overseas Development Administration 1995). The findings they produce are sensible but not rigorous. Thus they don’t meet the confidence threshold needed to justify delicate judgments about program design or lending levels. Could sharper, more robust approaches that tap into cutting edge political science methods provide a helpful guide to designing reforms that optimize stakeholder support? Could such methods tell donors when to jettison programs that are going nowhere politically?

The World Bank has been working to elevate the sophistication, accuracy and operational relevance of its political analysis by piloting an agent based approach to analyze public sector governance reform issues in multiple client countries. The pilot study tested the use of the agent based stakeholder model to understand the preferences and behaviors of key stakeholders on civil service and anti-corruption reforms. Because of the sensitivity of the findings, the specifics about countries and details about issues examined are not elaborated here. But we draw general lessons from the experience and demonstrate how the model has worked in the country of “Anyland” a pseudonymous borrower country. More broadly, we explore ways in which the agent based stakeholder technique could, on a more systematic basis, usefully feed into donor decisions about operational priorities and about the design of interventions.

Traditional stakeholder approaches

Traditional stakeholder analysis has relied on qualitative assessments of stakeholder preferences as the basis for predictions of how stakeholders are likely to behave in forming coalitions in favor of or in opposition to reforms. This approach relies on identifying primary and secondary stakeholders who have an interest in either propelling or impeding various reform packages. Stakeholders can be persons, institutions, agencies, private sector groups, governmental departments or external aid

groups -- any entity that is a beneficiary or negatively affected by aid or the borrowing process. Primary stakeholders are direct recipients of aid or participants in the borrowing process, while secondary stakeholders are part of the delivery process (Overseas Development Administration 1995). Typically, once stakeholders are identified, they are categorized along two dimensions – their ability to influence outcomes and how important the reform process is to them. This is characteristically translated into a matrix mapping with four typologies:

1. Large influencers with high importance can either help or impede reform progress. If they are opponents, they should be isolated while proponents should be empowered to form larger coalitions.
2. Large influencers with little importance who should be mobilized to assist the reform process if they support it, or alternatively blocked if they oppose the process.
3. Small influencers with high importance who could either help or impede reform progress. If they are opponents, they should be isolated while proponents should be empowered into a stronger coalition.
4. Small influencers with little importance who could be motivated to assist the reform process if necessary but would not be worth the effort or resources to block.

Other methodologies attempt to aggregate specific stakeholder interests or scale their influence or importance. But these approaches are lacking a dynamic, analytical component that allows observers to know what will happen over time. This traditional stakeholder analysis may enlighten, but it cannot answer the key operational question: “what’s next?”

Combining stakeholders and agent based modeling

Over the last thirty years, a large, multidisciplinary literature on agent based simulations has slowly emerged and, more recently, proliferated (Axtell, Axelrod, Epstein and Cohen 1996, Epstein and Axtel 1996, Chwe 1999, Axlerod and Tesfatsion 2005). Stemming from the work on macro forecasting and dynamical systems modeling, agent based models focus on individuals as the unit of analysis.

Microsimulation is a ‘bottom-up’ strategy for modeling the interacting behavior of decision makers (such as individuals, families and firms) within a larger system. This modeling strategy utilizes data on representative samples of decision makers, along with equations and algorithms representing behavioral processes, to simulate the evolution through time of each decision maker, and hence of the entire population of decision makers (Caldwell 1997).

Given the various approaches, there are some commonalities -- some basic criteria for most agent based models (Macy and Willer 2001):

1. Agents interact with little or no central authority or direction.
2. Agents are interdependent.
3. Agents follow simple rules.
4. Agents are adaptive and backward-looking.

The reality of the reform process is that stakeholders exert influence to shape the dynamics of outcomes, based on the interactions with each other (Bueno de Mesquita 1981 & 1985). Tracking these dynamics and capturing the knowledge to achieve a desired outcome is a complex process. Such solutions are relatively straightforward in dyadic interactions. In n actor environments they become more unpredictable. This is further complicated in environments where multiple policy or reform issues are present (Abdollahian and Alsharabati 2003). This is where combining traditional stakeholder analysis with recent advances in agent based simulation allows the simulation of stakeholders in the reform context.

The agent based stakeholder model transcends traditional stakeholder approaches by providing a consistent and systematic “modeled” framework of stakeholder perceptions and behavior. For a given reform issue, the model simulates the round-by-round negotiations among stakeholders with different interests in and varying influence over the reform process. With considerable accuracy, the model is able to predict how these bargaining dynamics play out over time. The result is an empirical assessment of the likely extent of reform and of the degree of stakeholder support for this outcome.

Using a rigorous data collection process, this model provides a rich and specific picture of the reform environment. It identifies key stakeholder positions on policy reform, weighs their potential influence and assesses the strength of their commitment to their current policy position. Thus all agents are not created equal, *de novo*. They possess unique and individual capabilities which subsequently will help determine their interactions with other agents. Regardless, all agents are subject to the same *push* and *pull* of the political process, trying to maximize their available resources to support or oppose reform. The agent based model assumes that all agents attempt to maximize their interests in the reform process and thus seek to create viable coalitions to support those interests. This approach depicts the current landscape and then determines how stakeholders will dynamically interact in this context in anticipation of reform outcomes.

Capturing a snapshot of the reform landscape provides the inputs to a set of consistent rule-based vector solutions used to anticipate stakeholder bargaining dynamics.¹ Lalman (1979) suggests employing vectors in static form. Combining this insight with recent developments in agent based modeling motivates the *push* and *pull* dynamics of the political process over time. From the policy perspective, vector analysis allows an analyst to simulate the response of stakeholders to the reform process *a priori*, pointing to possible means to facilitate and affect the ultimate implementation of the reform outcome.

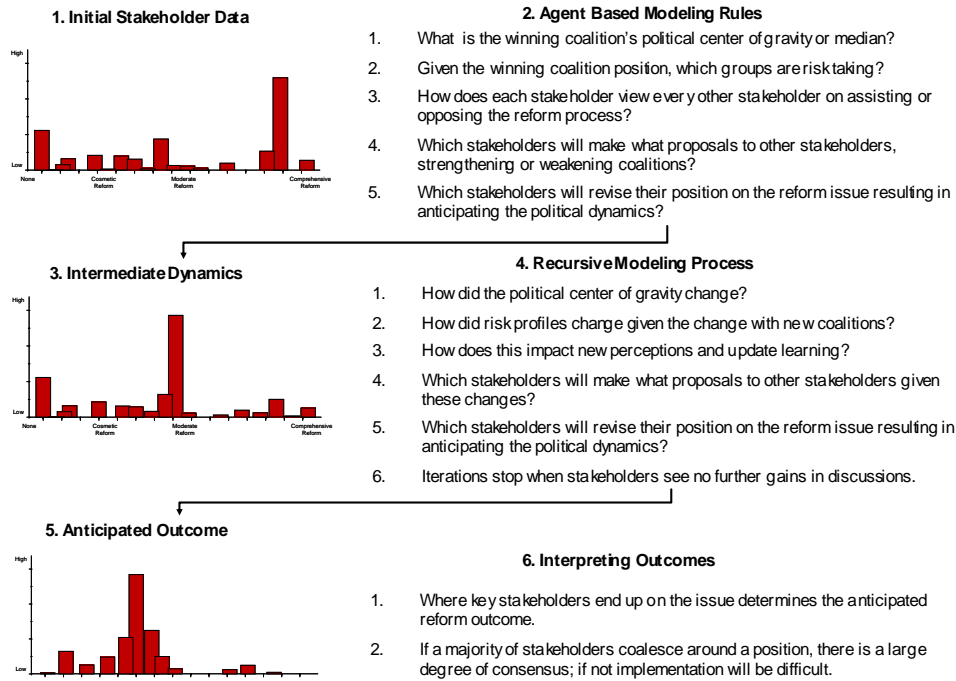
The agent based stakeholder approach models the intuition behind each stakeholder’s political calculus in the reform process by breaking down the process into sub-elements that can be modeled. Each element models a particular part of the decision process, and by combining the elements sequentially, the approach can anticipate how all stakeholders will interact to arrive at a particular decision or political outcome. Each sub-element of the modeling process is designed to help predict a part of how stakeholder positions will change and thus predict the evolution of the policy process *in toto*. The approach is a dynamic and recursive estimation of how stakeholders will interact and the resulting compromises and coalitions that will form in response. See Figure 1 for an overview of the agent based approach.

It provides a consistent framework for objective analysis of stakeholder perceptions, rather than relying solely on individual expert opinions about the outcome of negotiations. Moreover, using this

¹ We thank Sentia Group, Inc. for the use of their software.

type of analysis, the specific dynamics of stakeholder negotiations surrounding particular reform activities can be examined in order to first gauge whether the reforms are politically feasible as designed, and second to determine possible strategic options for optimizing reform levels using knowledge about the political dynamics.

Figure 1



Modeling stakeholder preferences in Anyland

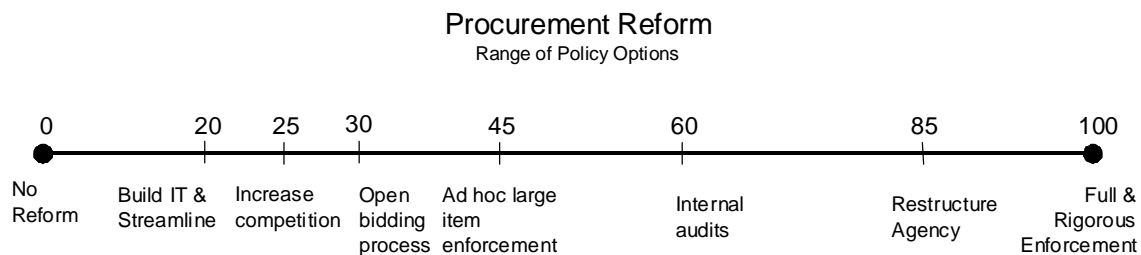
The case of governance reform in Anyland shows how the approach works. This middle-income country had traditionally been highly centralized, but the emergence of a vocal and vibrant civil society began to change this. Due in part to media attention, Anyland's extensive corruption became a high-profile issue. National surveys indicated that corruption was particularly pervasive within the government's procurement process. Individual government agencies exercised significant discretion over the awarding of contracts, and loopholes in the national procurement regulations made it easy to give preferential treatment to politically connected firms. Because control over procurement processes afforded government officials important political clout, it was necessary to understand the stakeholder dynamics of this issue in order to design politically feasible reforms.

Applying the agent based methodology to the issue of procurement reform in Anyland began with rigorous data collection through interviews of country experts, including academics, donor institution staff, policy specialists and government officials with an extensive understanding of both the country context and the specific policy issues involved. These experts were not asked to provide opinions or predictions but rather to characterize and explain the context of reform and provide information about relevant players.

The first objective of the interview was to establish a continuum of options for procurement reform, ranging from the lowest to the highest level of reform under consideration, laying out the full progression of reform options in between. Figure 2 shows the increments in Anyland’s procurement reform process.

The steps were arranged in order of political difficulty, from no reform at all to the full and rigorous enforcement of procurement infractions, and coded with scores indicating the relative difficulty of each step. For example, in Anyland implementing a system of internal audits (score of 60) was perceived to be roughly twice as hard to accomplish politically as initiating a system of open bidding for contracts (score of 30). Quantifying responses in this way allowed for consistency among different expert interviews and formed the basis of the model’s agent based calculation.

Figure 2



The expert interviews also provided the following information, with assigned numerical values for each of the agents:

1. All **stakeholders** with an interest in the progress of reform, including domestic leaders, interest groups and international organizations.
2. Any stakeholders who enjoyed **veto** power over reform negotiations. A veto stakeholder could prevent other stakeholders from implementing an outcome she did not support, even if she were against majority opinion. In Anyland, for example, the Prime Minister was identified as a veto player.
3. Policy stance of each stakeholder, or **position** along the reform continuum.
4. Relative **influence** exerted by each stakeholder on the defined issue. This can be thought of in terms of the resources available to stakeholders in defending their policy position.
5. The **importance** each stakeholder attaches to the issue outcome.

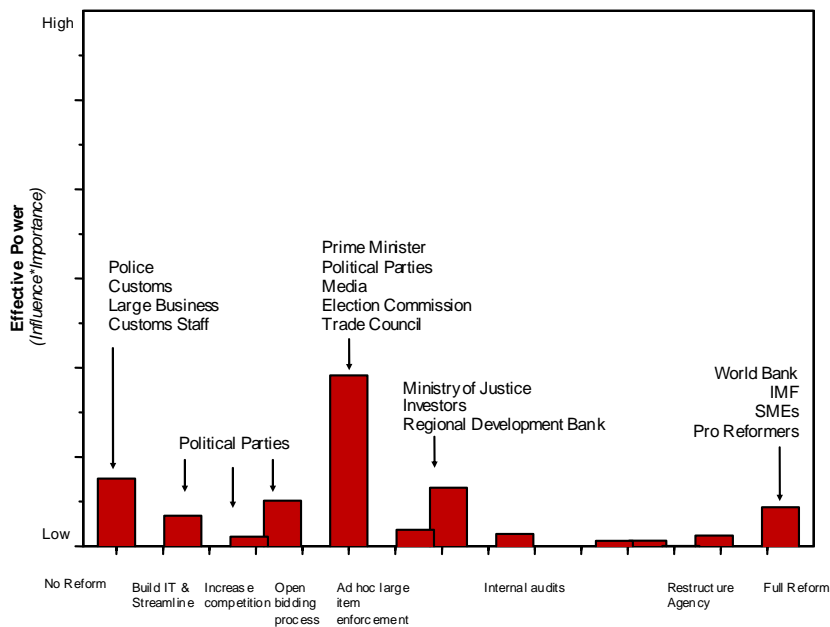
Mapping coalitions

This information was then mapped along the original policy continuum to display the coalitions that supported varying levels of reform and the distribution of power among them. As shown in Figure 3, stakeholder opinions varied widely on the issue of procurement reform in Anyland.

The Prime Minister, a veto player, advocated a system of *ad hoc* enforcement. While this may have represented a step forward, it still allowed for political manipulation of the enforcement of procurement regulations. Among the most reformist stakeholders were new small- and medium-enterprises, who stood to be most directly hurt by unfair procurement practices.

The most powerful opposition coalition was aligned against any level of reform. This group included large businesses, major political parties and ministry staff, all of which were enjoying great discretion over the procurement process. They clearly had little interest in giving up their control of this powerful political instrument.

Figure 3



Analyzing bargaining dynamics

Taking these stakeholder positions as the starting point, the agent based stakeholder model was then used to simulate the ensuing negotiation among stakeholders by iterating their interactions to predict the level of reform that would be most feasible politically. The model examined the relationships between each pair of stakeholders in terms of each agent’s initial attributes: desired reform outcome, influence, and importance to identify all the stakeholders’ values and expectations. What emerged was a clear picture of which players would challenge others to accept their views and which would acquiesce. These dynamics were taken forward to the point at which no stakeholder could see a potential policy gain from further dialogue. The bargaining process stopped; that was the likely reform outcome.

The policy dynamics in Anyland, depicted in Figure 4 below, suggest a convergence of hardliners in favor of mild reforms that would permit wider access to the procurement process. No consensus could be expected to develop in favor of more significant procurement reforms, however. The

analysis allowed the World Bank to see, given stakeholder dynamics, how far procurement reform was likely to while remaining politically sustainable.

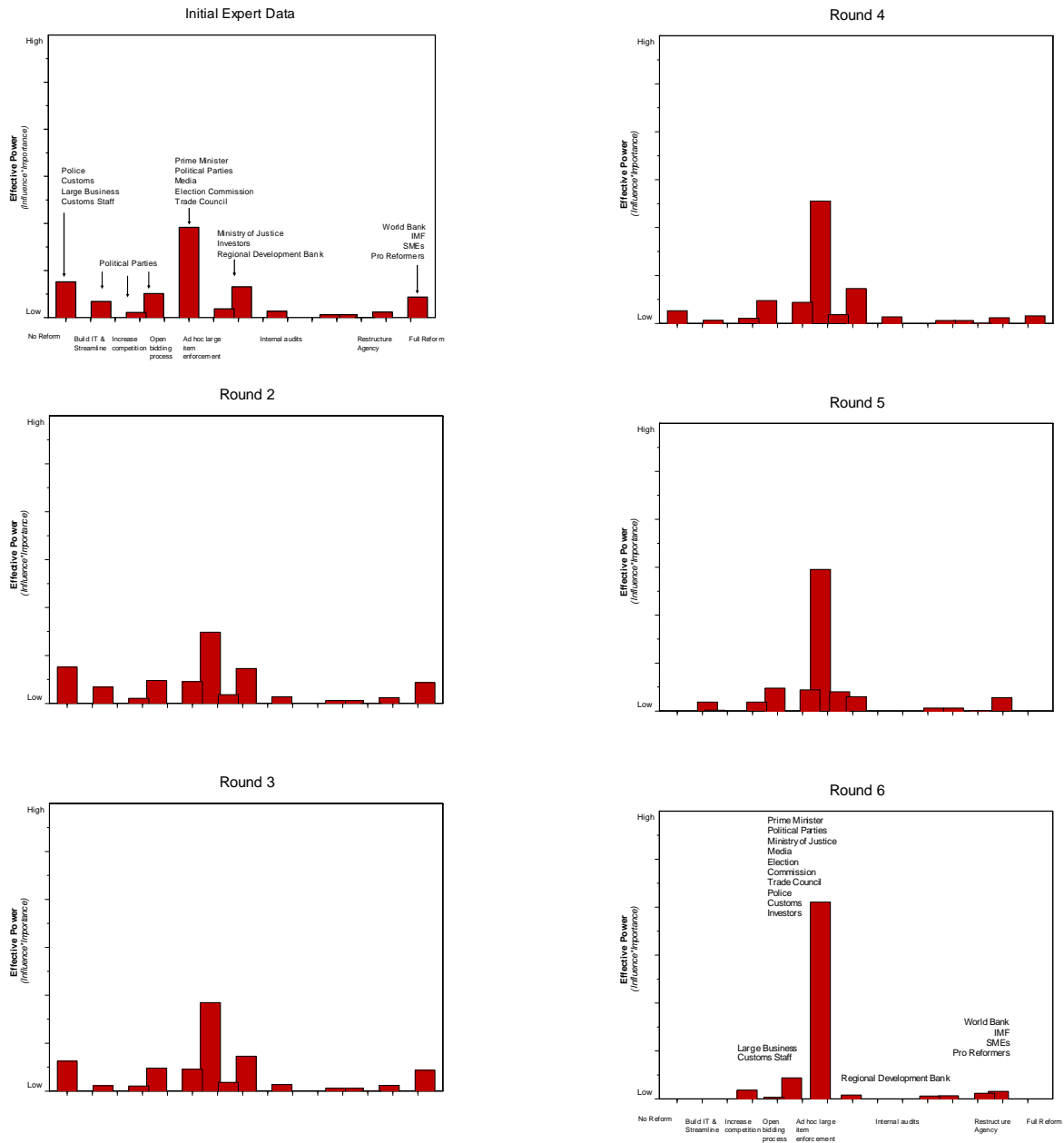


Figure 4

Determining the potential for further reform

The agent based stakeholder model does not just analyze current support for reform. It can also predict how a change in a particular stakeholder’s initial policy position might affect the behavior of other actors, showing how much consensus is likely to develop in light of the shifting stance. The analysis can be run over and over, assuming a variety of different initial policy stances for pro-reform stakeholders. Analyzing the impact of different initial

positions, we can determine the conditions under which reform momentum can be generated. This dynamic feature of the model provides an important reality check for reform sponsors, such as the World Bank. It provides a means to manage lending programs more effectively by helping donors target reform resources where they will have the greatest impact.

For Anyland, the model was re-calibrated to see what would happen if the World Bank's initial hard-line reform position --advocating full reform including the restructuring of government agencies that dealt with large procurement items - were adjusted downward to support the more moderate policy position that simply advocated the use of internal audits within ministries to enforce procurement regulations. This reiteration – or “sensitivity analysis” suggested that scaling back the Bank's initial demand for full-throttle reform could win support from more stakeholders at higher levels. If the findings of this modeling exercise were not heeded, the “best” would turn out to be the enemy of the “good” in Anyland.

Harnessing stakeholder analysis for operational work – why the agent based model

Older generations of stakeholder modeling approaches have been under development since the 1970's, yielding modest analytic success (Feder 1994). The current agent based stakeholder model has several advantages over its predecessors. One is its verisimilitude to microsimulation, using individual behavioral cues to understand and predict reform outcomes. Another advantage comes from the structured data collection format. The accuracy of the context built through systematic expert interviews enhances the probabilities of creating more realistic bargaining simulations.

The model's dynamic quality makes it particularly well-suited to operational policy requirements. By permitting analysts to change the players involved or to alter their preferences in order to model varying scenarios, the model more closely approximates the conditions of policy making in the real world. In particular, the ability to analyze the effects of a change in an individual stakeholder's policy position gives donor organizations such as the World Bank a format for determining whether their own policy positions are likely to bring about optimum levels of reform success and policy consensus.

This tool also allows donors and policy makers to target reforms more precisely through dual analysis, in which a macro issue is examined alongside its component policies to determine where the most progress is likely to occur. For example, in looking at a country's overall anti-corruption agenda, the macro-level analysis permits a systematic view of the range of anti-corruption initiatives, showing the relative political difficulties of individual measures as well as the feasibility of attacking the agenda as a whole. These insights can form the basis for decisions about the kinds of reform actions to support and the strategy and sequence reforms should follow. The micro-level analysis, on the other hand, may be helpful in informing choices about where to invest resources and in helping to identify where technical assistance is most likely to succeed.

The agent based stakeholder model also has the capacity to analyze the trade-offs involved in reforms with interrelated but conflicting policy priorities. For example, the issue of civil service reform is often complicated by the tension between salary increases and employment

reductions. Using this model, the conflicting issues can first be examined separately and then combined to determine the possibility for a successful compromise.

As in any attempt to quantify perceptions, there are limitations associated with the application of the agent based stakeholder model. First, it depends on timely, accurate information. Without high quality data, the model will produce less reliable results. In many developing country settings where the World Bank and other donors operate, there may be a shortage of qualified experts with in-depth knowledge of both the technical aspects of the policy issue and the political and institutional realities of the country. The degree to which the data collection and modeling exercise is embedded in an in-depth understanding of the political economy context is likely to affect the robustness of the findings.

For donor organizations, the effectiveness of this approach also depends on how closely it is integrated into ongoing programs and routine operational tasks. The findings of the modeling exercise are more likely to be incorporated into decisions to the degree that these applications become a systematic element in the policy deliberation process. This internalization process is only in its infancy in the World Bank.

Conclusion

Even with these limitations, the agent based stakeholder model has the capacity to take analysis of political feasibility in international donor sponsored reform programs to the next level. By filtering highly complicated stakeholder dynamics through this systematic framework, donors can now take the politics of their development assistance into account in a dynamic, precise and accurate way. The prospects for designing strategically targeted and politically realistic reform support are thus significantly improved.

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