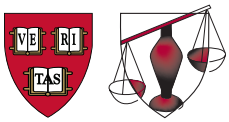

Berkman
The Berkman Center for Internet & Society
at Harvard University

Public-Private Partnerships

for Organizing and Executing

PRIZE-BASED COMPETITIONS

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In the course of our research, a number of prizes were reviewed, including, but not limited to:

Apps for Healthy Kids, Aspen Prize for Community College Excellence, Battle of the Buildings, Community Health Data Initiative, Health 2.0, MIT Clean Energy Prize, NASA Centennial Challenges, NASA Tournament Lab, Progressive Insurance Automotive X PRIZE, and the SME Finance Challenge.

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Executive Summary

Prizes can be effective tools for finding innovative solutions to the most difficult problems. While prizes are often associated with scientific and technological innovation, prizes can also be used to foster novel solutions and approaches in much broader contexts, such as reducing poverty or finding new ways to educate people.

Now that the America COMPETES Reauthorization Act[1] has given all government departments and agencies broad authority to conduct prize competitions, agencies may find themselves looking for resources to learn about prizes and challenges. This paper describes how government agencies can design, build, and execute effective prizes – though these models can easily be adapted to meet the needs of foundations, public interest groups, private companies, and a host of other entities with an interest in spurring innovation.

Prizes can have numerous advantages over conventional means of research and development. First, they can greatly increase the cost effectiveness of developing ambitious solutions to hard challenges. If an agency uses a vendor or provides a grant to a third party, the agency is obligated to pay for all results; however, if the agency uses a prize, it pays only for the winning entry. Second, prizes can help identify solutions faster. Instead of the slow patterns of sequential innovation often found in the private sector, prize competitors can work in parallel, motivated by the need to meet a deadline. Third, prizes can dramatically increase the number of minds simultaneously tackling a problem. The most valuable and innovative solutions often come from the most unexpected corners. Finally, prizes can stimulate private sector investment in amounts far greater than the cash value of the prize. Winning teams in prize competitions are often magnets for private sector interest.

Government agencies need not administer prizes on their own. Rather, agency involvement in prizes falls along a spectrum, from prizes developed internally to those developed entirely by external partners who invite the agency to contribute. An agency can play a variety of roles in partnership arrangements: as the "host," it generates prize ideas, oversees operations, and solicits partners as needed (as sponsors, for instance); as the "coordinator," it develops the prize but finds external partners to implement the operational components; and as the "contributor," it enables external actors to handle the prize design and operations, while the agency contributes in other ways (for instance, by providing data sets, overseeing the judging process, or offering testing facilities). Over the course of a prize lifecycle, the agency may move between these broad categories, or combine them according to its specific needs, capacity, and skillset. Various partnership arrangements affect the agency's cost, control, and coverage of the prize lifecycle.

As an informational guide to promote the use of prizes within government agencies, with an emphasis on opportunities to form different types of private-public partnerships, this paper:

- ***Provides an overview of the prize lifecycle to help agencies better understand when to use prizes and the various elements involved in developing a prize;***
- ***Presents a framework outlining the various roles agencies can fill in the prize process and the importance of using partnerships to maximize the effectiveness of a prize; and***
- ***Highlights important steps and considerations regarding partnerships with other organizations.***

[1] America COMPETES Reauthorization Act of 2010, H.R. 5116, 111th Cong. (2010).

Drawing on interviews and secondary research on existing prizes that rely on multi-sector partnerships, this paper explores every aspect of forming partnerships and implementing prizes across the broad range of activities that occur within various stages of the prize lifecycle.

While prizes may not be suited to solve every type of problem, they offer a powerful complement to government agencies' traditional channels of innovation. As the use of prizes in the government sector increases, new practices and novel ways of structuring competitions and partnerships will undoubtedly emerge. To share best practices, agencies are encouraged to collaborate by offering lessons learned from previous competitions and seeking opportunities to assist other agencies in conducting prizes when objectives overlap.

I. Introduction

From the Nobel Prize, which recognizes outstanding achievement in several fields, to the Ansari X PRIZE, which advances commercial space flight, prizes have been used to foster innovation for hundreds of years. While innovation in the public sector has traditionally been accomplished through grants and contracts, prizes offer governments a number of advantages when used in the right circumstances. Over the last two years, the Obama Administration and Congress have taken important steps to accelerate public sector adoption of these ground-breaking tools, including new legislation that provides all federal departments and agencies (hereafter referred to as "agencies") with a simple and clear legal path for using prizes to solve tough problems.

The America COMPETES Reauthorization Act of 2010 authorizes federal investment in R&D, education, innovation, and competitiveness. Specifically, it grants federal agencies the authority to conduct prize competitions, in addition to funding federal R&D labs and the Department of Energy's (DOE) ARPA-E, modeled after DARPA in the Department of Defense. Reflecting the view of Sun Microsystems co-founder Bill Joy that "(n)o matter who you are, most of the smartest people work for someone else,"[2] prize competitions enable agencies to leverage the "crowd" by tapping the resources and ingenuity of citizen solvers in generating solutions to a wide variety of problems. Although the rise of the R&D lab displaced prizes over much of the past 60 years, modern governments and industrialists have made use of incentive prizes to great effect. America COMPETES reinvigorates this model. Indeed, Challenge.gov, the online platform for agencies to showcase prizes that debuted following the passage of America COMPETES, featured 57 challenges from 27 agencies in its first three months, generating advanced vehicle technologies and responses to childhood obesity, among other solutions.[3] A recent report by the Office of Science and Technology Policy details the over 150 prize competitions implemented by 40 agencies since 2010.[4] The analysis predicts the increased use and scope of public-sector prizes in the coming years by Federal agencies as a means to solve complex problems, stimulate new forms of innovation, and advance their missions.[5]

In an effort to promote the use of prizes within government agencies, with an emphasis on opportunities to form different types of private-public partnerships, this paper:

- ***Provides an overview of the prize lifecycle to help agencies better understand when to use prizes and the various elements involved in developing a prize;***
- ***Presents a framework that outlines the various roles agencies can fill in the prize process and the importance of using partnerships to maximize the effectiveness of a contest; and***
- ***Highlights important steps and considerations regarding partnerships with other organizations.***

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[2] Tom Kalil and Robynn Sturm, "Congress Grants Broad Prize Authority to all Federal Agencies," *Open Government* (blog), December 21, 2010, http://www.whitehouse.gov/blog/2010/12/21/congress-grants-broad-prize-authority-all-federal-agencies/; "Implementation of Federal Prize Authority: Progress Report," Office of Science and Technology Policy, March 2012, http://www.whitehouse.gov/sites/default/files/microsites/ostp/competes_report_on_prizes_final.pdf.

[3] Kalil and Sturm, "Congress Grants Broad Prize Authority to all Federal Agencies"; John P. Holdren, "America COMPETE's Act Keeps America's Leadership on Target," *The White House Blog,* January 6,2011, http://www.whitehouse.gov/blog/2011/01/06/america-competes-act-keeps-americas-leadership-target; Eric S. Hintz, "Creative Financing," *The Wall Street Journal,* September 26, 2010, http://online.wsj.com/article/SB10001424052748704505804575483423120157674.html.

[4] "Implementation of Federal Prize Authority: Progress Report," *Office of Science and Technology Policy,* March 2012, http://www.whitehouse.gov/sites/default/files/microsites/ostp/competes_report_on_prizes_final.pdf.

[5] Tom Kalil and Cristin Dorgelo, "Identifying Steps Forward in Use of Prizes to Spur Innovation," *Office of Science and Technology Policy* (blog), April 10, 2012, http://www.whitehouse.gov/blog/2012/04/10/identifying-steps-forward-use-prizes-spur-innovation.

Using information gathered from interviews and secondary research, the paper also discusses a series of existing prizes that rely on multi-sector partnerships in order to provide ideas and takeaways on how to structure future contests. Although this section is primarily designed to benefit agencies with limited experience using prizes, the paper will also be useful for those that are more familiar with the topic and wish to refine and build upon their current practices and processes.[6]

II. Prize Types

In a 2009 report, McKinsey and Company presents a conceptual framework for understanding several prize types and their associated benefits:[7]

- **POINT SOLUTION PRIZES** aim to solve well-defined problems. The NASA Tournament Lab produces software solutions quickly and inexpensively because problems can be explained clearly and the criteria (e.g., speed, resource usage) are objective and easily measurable.[8]

- **MARKET STIMULATION PRIZES** facilitate the creation of new markets such as, for example, mobile banking in developing countries. The Gates Foundation and the US Agency for International Development (USAID) are using a contest to develop mobile banking applications in Haiti, a country where less than 10% of the population used a commercial bank prior to the earthquake in 2010.[9] By offering $4 million to the first two application operators in the country and an additional $6 million when five million transactions are reached, the contest provides incentives to fill this market need.

- **EXPOSITION PRIZES** are designed to highlight a broad range of promising ideas or practices, attracting attention and mobilizing capital to further develop the winning innovations. The G20 SME Finance Challenge[10] was designed to identify innovative and scalable business models to increase financing for small to medium sized enterprises.[11] The SME Finance Challenge received over $500 million in support from the G20 and Multilateral Development Banks.

- **PARTICIPATION PRIZES** create value during and after the competition by encouraging participants to change behavior or develop new skills. The Environmental Protection Agency's Battle of the Buildings is a competition where participants reduce their energy usage.[12] Changing behavior is part of the process, and the

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[6] Christian Terwiesch and Karl Ulrich, *Innovation Tournaments: Creating and Selecting Exceptional Opportunities* (Boston: Harvard Business School Publishing, 2009); and Alpheus Bingham and Dwayne Spradlin, *The Open Innovation Marketplace: Creating Value in the Challenge Driven Enterprise* (Upper Saddle River, New Jersey: FT Press, 2011).

[7] McKinsey and Company, *And the winner is...: Capturing the promise of philanthropic prizes,* 2009, http://mckinseyonsociety.com/downloads/reports/Social-Innovation/And_the_winner_is.pdf. The report lists two additional archetypes: Exemplar Prizes, which highlight excellence within an area, and Network Prizes, which build networks and strengthen communities by organizing winners into new problem-solving communities that can deliver more impact than individual efforts.

[8] "What is the NASA Tournament Lab?," http://community.topcoder.com/ntl/?page_id=64.

[9] Gates Foundation, "Gates Foundation and USAID Announce Innovative Fund to Incentivize Mobile Money Services in Haiti," June 8, 2010, http://www.gatesfoundation.org/press-releases/Pages/building-assets-with-mobile-money-service-in-haiti-100608.aspx.

[10] SME: small and medium enterprises

[11] Changemakers, "G-20 SME Finance Challenge: OVERVIEW," http://www.changemakers.com/g20media/g20challenge.

[12] US Environmental Protection Agency, "Battle of the Buildings," http://www.energystar.gov/index.cfm?fuseaction=buildingcontest.index.

EPA provides energy monitoring tools to ensure the changes last beyond the end of the competition.

Competitions are appropriate for agencies that have objectives aligned with one of these prize types. Given the broad range of agency objectives, prizes may not suit every situation; nonetheless, they can be powerful mechanisms when combined with a broader strategy to spur innovation.

III. Prize Benefits

Prizes can have a number of advantages over traditional grants and contracts. Well-designed prizes allow government agencies to:

- **ESTABLISH AN AMBITIOUS GOAL, PAYING ONLY FOR RESULTS.** Contracts and grants often force agencies to use past performance and credentials as predictors of future success. However, paying only for ideas that meet the prize's criteria shifts risk and cost from the government to the competitors. NASA's Tournament Lab does not have to identify which software developers will submit the best idea before the competition, nor is the Lab obliged to purchase software entries if none of the entries adequately solves the problem. Also, NASA does not employ the prize's participants, which decreases the agency's overall cost.
- **FIND SOLUTIONS FASTER.** Competitors develop their ideas in parallel with one another and are motivated to find a solution by the prize's deadline. The Progressive Insurance Automotive X PRIZE had over 111 teams compete for a $10 million prize purse, each striving to develop an automobile that could achieve fuel efficiency rates over 100 MPGe (miles per gallon or energy equivalent).[13] In comparison to private sector investment in fuel efficiency by automotive manufacturers, this competition developed cars with significantly better fuel efficiency than existing models, and accomplished this objective quickly and with far less funding.
- **REACH BEYOND THE "USUAL SUSPECTS" TO INCREASE THE NUMBER OF MINDS TACKLING A PROBLEM.** Prizes can provide opportunities to channel and capture contributions from a broader range of participants (e.g., entrepreneurs, scientists, and citizens at large), often finding solutions from unexpected sources. For example, when NASA launched a challenge for a predictive algorithm to better protect American astronauts from radiation exposure in space, 500 problem solvers from 53 countries answered NASA's call.[14] NASA received a solution from a retired radio-frequency engineer in rural New Hampshire that exceeded their requirements. The winner had never before responded to a government request for proposals, let alone worked with NASA. Yet his winning solution forecast solar proton events with 85% accuracy, a result NASA dubbed "outstanding."[15]

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[13] Progressive Automotive X PRIZE, "Three Teams Awarded Share of $10 Million Purse in Progressive Insurance Automotive X PRIZE for Super Fuel-Efficient Vehicles," September 16, 2010, http://www.progressiveautoxprize.org/news-events/press-releases/three-teams-awarded-share-10-million-purse-progressive-insurance-automotive-x-prize-super-fu.

[14] Innocentive, "NASA Innovation Pavilion," https://www.innocentive.com/ar/challenge/browse?pavilionName=NASA&pavilionId=1918&source=pavilion.

[15] US Department of Health and Human Services, "OSTP Memo on Prizes and Challenges," http://www.hhs.gov/open/initiatives/challenges/ostp_memo.html.

- **STIMULATE PRIVATE SECTOR INVESTMENT THAT IS MANY TIMES GREATER THAN THE CASH VALUE OF THE PRIZE.** Prizes can provide credibility to winning ideas, which can stimulate outside investment after the competition concludes. For instance, in partnership with the DOE, the MIT Clean Energy Prize[16] has distributed approximately $1 million to winning teams over the last four years, and these teams have gone on to raise over $85 million in investment capital and research grants.[17] This 85:1 ratio demonstrates how government-funded prizes can be catalysts for private sector investment.

IV. Prize Lifecycle

The prize lifecycle can be divided into three stages – Design, Operation, and Follow-up – each with an associated set of activities. In addition, competitions require underlying infrastructure such as data to build software applications, expertise, and facilities. Throughout the process, partnerships can contribute in various ways from input to funding to expertise. **Exhibit 1** provides an overview of the lifecycle of a typical prize competition.

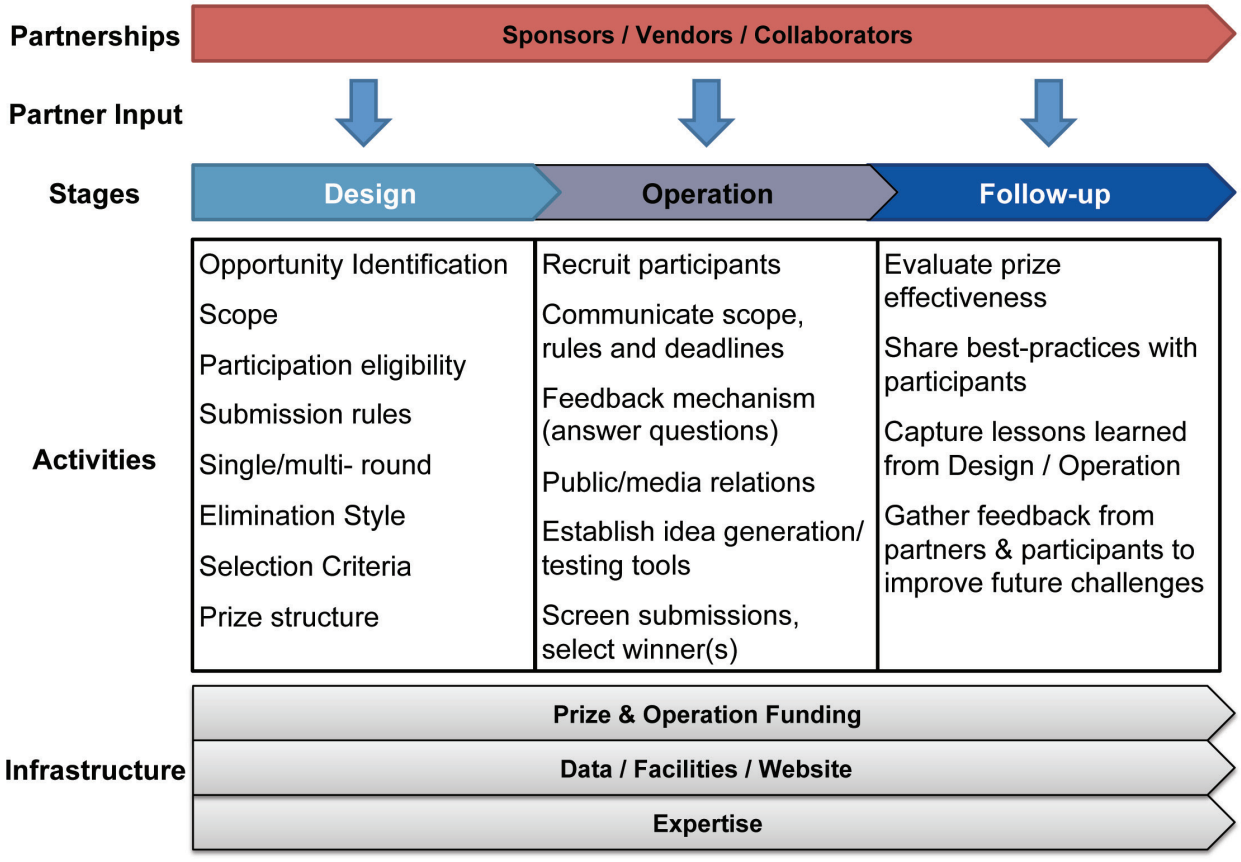

Exhibit 1 - Competition Execution Overview

[16] MIT Clean Energy Prize, http://cep.mit.edu/.

[17] NSTAR, "NSTAR MIT Clean Energy Prize," http://www.nstar.com/about_nstar/green/mit-clean-energy.asp.

A. Design

Opportunity Identification

What problems are prizes best suited to solve? Agencies may find it useful to engage or partner with external entities, even during this initial phase of identifying high-impact prizes. In some instances, prize concepts may look to pre-existing models and be fairly straightforward (e.g., data-based app competitions). In other cases, especially for ambitious prizes, agencies may need to do more extensive idea generation, mapping, and prioritization.

Identification of such opportunities may take several forms. For example, an agency may deploy internal methods and channels of communication to solicit ideas from people within the organization, from simple anonymous suggestion boxes to elaborate workshops. External methods focus on finding inspiration from sources outside of the department via convening inter-agency discussions, reading publications, and partnering with companies, NGOs, or think tanks. Internal methods offer greater control by focusing on ideas in a certain area and with stakeholders who are familiar with the issue, whereas external methods tend to generate ideas more quickly and can surface a wider range of ideas.

Opportunity prioritization is also central to the process and can be achieved in a variety of ways. It can be done unilaterally by the head of the organization, by committee, or through an open vote, which allows the entire organization (or those who participated in the opportunity identification) to vote on the best ideas. In addition to deciding who will participate in the prioritization process, it is important to clearly delineate the selection criteria. For example, ideas could be selected based on estimated completion time, feasibility, cost, or a combination of all three. Selection criteria differ by organization, intended outcomes, or context, but determining the key dimensions that separate "good" ideas from "bad" ideas is just as important as specifying who will make the decision.

Scope

The scope of the prize is determined by how broadly or narrowly the problem is defined. Broader problem statements encourage greater solution diversity and are particularly useful for challenges where conventional thinking has not made significant progress. For example, exposition prizes may attract a range of ideas with diverse applications. At the same time, however, soliciting a wider range of solutions can increase the likelihood of both extremely valuable and less relevant entries. Narrower objectives focus the efforts of participants and are appropriate when specific objectives must be met (e.g., point solution prizes). However, focusing efforts may unnecessarily restrict creativity. Prize administrators should assess these trade-offs based on the purpose of the prize.

Participation Eligibility

Because one of the major benefits of using prizes is the generation of a diverse set of solutions, restricting participation should be done carefully, if at all. One way to determine whether participation eligibility should be limited is by analyzing the objectives of the prize. For example, if a prize is designed to benefit people within a specific geographic region, it may make sense to restrict eligibility to citizens living in the area. Focusing on particular groups who the prize is designed to benefit or those who have a vested interest in implementing the winning solution may make it easier to run the competition (e.g., participant and sponsor recruitment), yet also runs the risk of limiting the variety of submissions.

Rules & Guidelines

Establishing a clear set of rules and guidelines for the competition is a prerequisite for several other activities later in the prize lifecycle, including communications with participants and submission evaluation. Prize rules

are typically associated with deadlines and entry formats, but they should also define other elements such as the number of elimination rounds, elimination style, and selection criteria.

Determining whether a competition should be *single-round* or *multi-round* depends on the need for efficiency versus accuracy. In a single-round competition, a winner is selected from the entire pool of entries. Single-round formats are most appropriate for competitions that can evaluate entries both efficiently and accurately. In a multi-round competition, the entry pool is narrowed from one round to the next until a winner is selected. For competitions where achieving accuracy is resource intensive, multi-round formats perform better, using a general filter to eliminate entries in the beginning rounds and investigating entries more deeply in the later rounds. From a recruitment perspective, multi-round competitions can encourage participation by lowering the amount of investment needed to submit an entry and using each subsequent round as a signal for the remaining teams to further develop their solutions.

The duration of the competition also affects the decision between single- or multi-round processes but should be considered separately. Prizes with short timelines can still use a multi-round format but probably need to eliminate more entries in earlier rounds to shorten the list of finalists.

With regards to elimination style, prize designers can choose between *cascade* and *iteration* in each round. In cascade elimination, submissions cannot re-enter the competition once eliminated. Iteration elimination allows participants to receive feedback, then improve their entries and re-submit them in the next round. While iteration may result in higher quality submissions, it is also significantly more time consuming for prize organizers, as it requires entries to be evaluated twice. For prizes that have limited resources and compressed timelines, cascade-style elimination may be the better option. For multi-round prizes in which resource constraints and deadlines are less pressing, but still restrictive, a hybrid model can be used with cascade elimination in the beginning and iteration towards the end.

Selection criteria can be divided into two types: *absolute* or *relative*. Using absolute criteria, any entries surpassing a pre-defined performance threshold are declared winners. Using relative criteria, only the best entry is declared the prize winner. The choice of one type of criteria over the other depends on several factors, including the purpose of the prize and its available resources. For participation prizes, absolute criteria are consistent with the goal of helping the entire participant population to improve. For point solution or exposition prizes, relative criteria are consistent with the goal of recognizing and rewarding exceptional performance. From a resource standpoint, designers must determine whether there are enough prize resources to reward multiple winners, and should ensure that the prizes are large enough to motivate productive participation.

Selection criteria also affect other parts of contest execution. It may be necessary to put critical infrastructure in place; for instance, objective criteria such as technical metrics require tools and facilities to gather data. Beyond infrastructure, selection criteria influence judging panel formation. For subjective criteria that require domain expertise, designers must ensure judges have the ability to look beyond numerical data to evaluate entries. Furthermore, expertise on the judging panel can provide credibility during the evaluation process and can be used from a marketing perspective to recruit participants, especially if there are prominent individuals or companies represented on the panel.

Prize Purses & Other Incentives

The primary purpose of the prize purse is to motivate people to submit solutions. Conceptually, the "size" of the prize purse must correspond to the desired number of entries and the quality of submissions. The more effort required to develop a solution or the more difficult a problem is to solve, the larger the prize purse must be. While many prize purses are monetary, non-monetary incentives should also be considered in prize design. One category of non-monetary incentives is experiences that could otherwise never be purchased for cash – for instance, touring NASA facilities, meeting high profile sponsors, exposing ideas to expert judges, and presenting to policy leaders. Participants are also motivated to participate by the potential for generating

positive career signals and peer community recognition through traditional and social media amplification. Recognition and assistance with post-prize implementation can also serve as encouraging non-monetary rewards. For business or economic development plan competitions, providing credibility to the winning ideas and connecting winners to organizations that can help implement their ideas, such as venture capital firms or government agencies, can be just as valuable as monetary rewards.

Intellectual property (IP) is another important consideration in prize design. In the private sector, many prizes require participants to relinquish the rights to their solutions if they win in exchange for the monetary reward. If the government agency retains the IP from the winning entries, it may give that agency the flexibility to make those solutions available to the public, allowing everyone to benefit and enabling further improvement. For example, the Netflix Prize competition adopted this approach to foster learning and further solution development within the pool of its competitors.

However, permitting participants to retain ownership of their intellectual property, while allowing for unfettered governmental license and use, may also be beneficial in some cases, usually when the participants are using the competition as a means to implement their ideas. In these cases, the value of IP ownership mitigates the need for a large prize purse to some extent.

In contrast, a prize that requires the solution provider to relinquish IP ownership may require a larger prize purse to encourage participation, since the solver cannot monetize the solution in the future. Ownership of the final winning solution(s) can also be shared between the participant and the prize sponsor, by naming both parties when securing the patent or giving one party the license to use the solution. While shared IP ownership may appear to be an attractive middle ground, this model introduces additional considerations, such as deciding how to implement the solution, determining whether licenses should be exclusive or non-exclusive, and agreeing on ownership of future IP that uses the prize solution.

B. Operation

Participant Communication

Considering participation eligibility in the Design Stage addresses how to determine the target population. Recruitment is typically the first form of communication with potential participants. Agencies can use various marketing channels such as social media, print, television and radio, which are effective if the purpose is to reach the general public. For prizes that target a specific set of people, however, a more focused strategy may yield better results and create additional opportunities to partner with organizations that have access to prospective participant communities.

The communication content used in recruitment efforts must be persuasive. Emphasizing the prize's purpose – that is, the ultimate application of winning solutions – is one way to motivate participation. Another method is to convey the competition's benefits to participants, including the prize purse, non-monetary incentives, and opportunities for public recognition. In general, since prize benefits are linked to the type of prize format being used, messages about those benefits should highlight specific opportunities and incentives to the prize's target audience. For market stimulation prizes, participants have the chance to create new markets. For exposition prizes, participants can receive validation of their ideas, which can enable the pursuit of additional funding for implementation. Beyond being persuasive, message content should contain logistical information about the competition such as deadlines, rules (including how to submit an entry), and judging criteria. Participants should also be informed of the resources (e.g., mentors, tools, testing facilities, data) they will be able to access as they develop their solutions.

Although communication from prize administrators to participants is important, enabling participants to communicate with administrators is equally essential. Often participants raise issues such as rule clarification, which can be handled through various mechanisms, including an online forum. Forums benefit administrators

by notifying them when new questions are posted and aggregating questions in one place, and simultaneously benefit participants by allowing them to see posted questions and administrators' answers. Administrators can also use other mechanisms such as a telephone help line or focus group. The key is to ensure that the information is captured for future reference and made accessible to all participants.

Participant-to-participant communication offers a third potential communications channel for prize administrators. By allowing entrants to learn from one another, exchange feedback, and form teams, this option may foster collaboration. Moreover, participant-to-participant communication promotes community building, thus creating a network that agencies can leverage when recruiting for future prizes.

Idea Generation & Feedback

After a set of participants has been recruited, administrators can facilitate idea generation in several ways. If the prize is being conducted on a recurring basis, an archive of previous winning solutions can inspire new ideas. Administrators can also leverage the prize's official website, mobile phone capabilities, and social media to collect ideas from the public for the benefit of all participants. To complement idea generation tools, competitions can provide feedback mechanisms to help individuals to improve their ideas, via such tools as peer reviews or testing environments to see how well their prototypes perform.

Entry Submission & Evaluation

The method for collecting entries largely depends on the prize format and type of solution being submitted. For software, participants need a way to submit their source code. For physical solutions, participants need to know where to send or bring their solutions for demonstration and evaluation. For ideas, plans, or operating models, administrators must develop the forms each participant must fill out. In creating submission forms, administrators should balance efficiency with comprehensiveness. Forms that are too long may discourage participation and make the selection process longer, requiring judges to absorb more information. However, forms that do not capture enough information or that do not facilitate the side-by-side comparison of submissions make it difficult for judges to accurately select the best solution. In the event that judges would like clarification on certain answers, it is helpful to have a period to confer with participants after forms have been submitted but before the formal judging process begins.

Once entries are submitted, judges are tasked with selecting the winner based on the criteria developed during the Design Stage. After the winner is declared, administrators have several ways they can promote the winner's achievement. Hosting an awards ceremony or similar wrap-up event in the winner's honor and issuing press releases are two examples of how prizes can provide public recognition. In addition to recognizing the prize winners, administrators should acknowledge the effort of all participants, especially for participation prizes.

C. Follow-up

Evaluate Prize Effectiveness

While follow-up activities are often overlooked by prize administrators, this stage is just as important as Design and Operation. Evaluating the prize's effectiveness is critical to sustain it over time. This is true for prizes that repeat successively, as well as for platforms that execute a series of competitions over time. Without having a way to measure a solution's impact after the prize has been awarded, it is difficult to make a case for continued funding or partnerships. According to the 2009 McKinsey report, "And the Winner Is...," 40% of competitions "never" or "very rarely" evaluate the impact of their prizes. However, the report does provide a few examples of competitions that are proficient at post-prize evaluation and lists sample metrics that track performance along different levers.[18]

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[18] McKinsey and Company, *And the winner is...* 72, exhibit 17.

Prize administrators should begin with a clear vision of the end in mind, and plan post-prize activities – potentially through strategic partnerships – that achieve the full goals of the prize (e.g., connecting technology solutions to firms that can manufacture and distribute the solutions on a large scale). This is especially true with regard to participation and exposition prizes, for which sharing the winning solution and best practices with a broader population is central to the prize's objective.

Competition Feedback

As with any effort, collecting and incorporating feedback at the end of the cycle facilitates future improvements. For competitions, feedback should be gathered internally from participants and also externally from partners. Such inputs should assess the prize elements that were executed well and those that could have been executed better. Similar to the rationale behind measuring post-prize effectiveness, incorporating feedback from prize stakeholders is especially important if an agency plans to use prizes repeatedly. Many activities, such as recruiting participants, finding partners, and securing funding, demand significant up front effort. High turnover in any of these areas requires an agency to continuously spend time and effort finding resources. By achieving high retention, an agency can not only lower the amount of effort needed to renew the prize lifecycle, but also maintain resource stability from a marketing standpoint.

D. Infrastructure

Several components make up the competition infrastructure, including funding, facilities, and information. Prize infrastructure is a key enabler of many competition activities. Funding, for instance, is important for both the prize purse and the competition's operations. Funding for operations often exceeds the size of the prize purse by as much as two to one and therefore offers opportunities for partnership opportunities in the form of sponsorships. New operational needs may also vary across competitions; specifically, facilities are necessary for competitions involving physical products, field tests, or lab verification. Data is especially important for software competitions. Given the plethora of publicly available data the government collects and maintains, datasets are a prize administration resource for many agencies.

Informational forms of infrastructure include the competition website and expertise, and other online platforms for the public to learn about the prize. Sites are critical for communication; they should target all competition stakeholders, including participants, the public, and potential sponsors and judges.

Infrastructure can also be intangible, as with expertise, which is particularly helpful for technical topics. Across existing prize efforts involving agencies, infrastructure has been a driver of partnerships either because an agency identified external parties that could use its infrastructure or because the competition needed additional infrastructure that an agency or private sector partner could provide.

Participant communities can influence the competition's development and future deployments. Prize administrators can use various tools to improve communication among participants, including web-based forums, social networking tools, social media platforms, and shared archives of ideas and discussions. These tools can foster participant communities, in which participants can establish identities, build relationships, create shared knowledge and understanding, and develop productive collaborations. Each of these aspects of participant communities can bolster the success of the prize. If participants can build collaborative relationships, for instance, new teams may take shape, and they may develop new, innovative solutions. Or if participants are encouraged to share ideas and experiences, an archive of these interactions may feed thought and novel approaches in future iterations of the prize. The nature of the prize determines the level of administrators' focus on community building, but in general, communities can strengthen competition infrastructure and overall effectiveness.

V. Partnerships

A. Role Spectrum

Government agency involvement in prizes falls along a spectrum, from prizes developed and operated internally to prizes developed by external partners who invite the agency to contribute. Across this spectrum, three broad role profiles emerge that can be useful for thinking about prize partnerships: Host, Coordinator, and Contributor. Within these categories, individual agencies' activities may differ and overlap. **Exhibit 2** captures the role spectrum and the defining characteristics associated with each role.

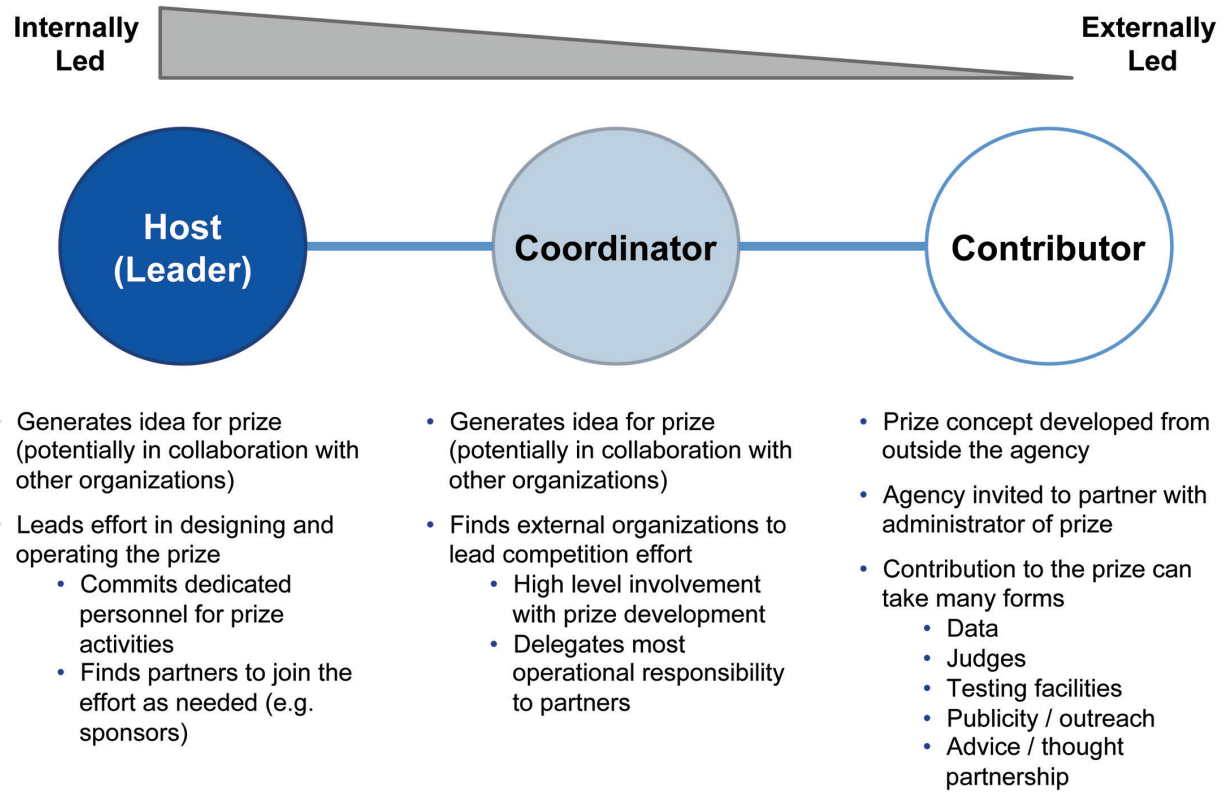

Exhibit 2 - Agency Role Spectrum

Host

Hosts fall on the internally led end of the spectrum. In this capacity, an agency is responsible for coming up with the prize concept and is heavily involved in prize development and operations. Hosts also form partnerships to ensure the entire prize lifecycle is covered.

One example of an agency as Host is the Department of Agriculture's (USDA) Apps for Healthy Kids competition, which challenged innovators and entrepreneurs to build games and tools that motivate kids to eat more healthfully and be more active.[19] With deep expertise in nutrition, yet little experience in game and software development, the USDA collaborated with the Office of Science and Technology Policy to convene a workshop to shape the prize concept, scope, and design.

[19] Apps for Healthy Kids, http://www.appsforhealthykids.com/.

Based on this learning, the agency was able to use a small, dedicated team (~3 people) to design the prize, taking desired timelines (~7 months) and budget constraints into account. To implement this prize design, the USDA made standard nutrition sets available to entrants, led marketing and participant recruitment, and assembled the judging panel, which included members of government agencies, CEOs, and software and gaming experts.

In addition, the competition team forged partnerships to bring in external resources, networks, and expertise. The USDA partnered with General Electric's (GE) Healthymagination program to increase the prize purse and create an additional incentive for college and graduate students to compete.[20] To further attract top talent from across the country and generate high quality submissions, the USDA partnered with the International Game Developers Association to host game jams in major US cities.[21] Finally, to provide competitors an opportunity to test their prototypes with children, the USDA partnered with Whyville to create the Whyville Game Arcade, where the virtual world's hundreds of thousands of users could play, rate, and provide feedback on the entries before they were submitted to the competition.[22]

Another example of an agency as Host is the annual ENERGY STAR Building Competition: Battle of the Buildings,[23] led by the EPA's ENERGY STAR program. The prize advances the goals of the ENERGY STAR program by encouraging businesses to reduce their energy usage, thereby saving money and protecting the environment. As such, the EPA could leverage many of its existing resources to design and operate the prize.

In order to design the prize, which is now in its third year, the EPA leveraged internal technical expertise in energy reduction practices for businesses. As the prize did not offer a monetary award, the agency limited eligibility to existing ENERGY STAR partners, made up of businesses that self-identified as motivated by the competition's incentive structure: goodwill (benefiting the environment), brand recognition (association with ENERGY STAR and winning the competition), and financial incentives (saving money by reducing energy costs). The EPA played a major role in operating the competition by providing tools to help participants monitor their energy usage and by aggregating and analyzing energy data to declare the winner.

As noted earlier, post-prize activities are important, especially for participation prizes like this one. To measure prize effectiveness, the EPA published a report at the end of its 2010 and 2011 competitions, respectively, that provided a profile of the participants and the results they achieved. For example, the 2010 competition featured 14 buildings that in aggregate, reduced energy costs by nearly $1 million.[24] The report also contains successful strategies employed by winners and recommendations from all participants to help buildings continue to reduce their energy usage after the competition concluded.

To strengthen the impact of the competition, the EPA partnered with JCPenney to increase the public profile of the competition. Using a Co-Sponsorship Agreement, authorized under the Energy Star program, JCPenney directly funded a number of media appearances and videos featuring a celebrity spokesperson (actor John Corbett). The media campaign raised public awareness about the competition and encouraged individuals to conserve energy in their own homes and office buildings, thus increasing the prestige of the prize and extending the reach of the prize beyond its direct participants.

An interesting difference between the Apps for Healthy Kids and the ENERGY STAR Building Competition is the use of a judging panel. Since the criteria for Apps for Healthy Kids were largely subjective, naming

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[20] Robert Post, "Apps for Healthy Kids: New Partners and New Prizes," *Office of Science and Technology Policy* (blog), May 18, 2010, http://www.whitehouse.gov/blog/2010/05/18/apps-healthy-kids-new-partners-and-new-prizes.

[21] Robynn Sturm, "Apps for Healthy Kids "Game Jams" Coming to a City Near You," *Office of Science and Technology Policy* (blog), July 11, 2010, http://www.whitehouse.gov/blog/2010/05/11/apps-healthy-kids-game-jams-coming-a-city-near-you.

[22] Post, "Apps for Healthy Kids."

[23] 2011 ENERGY STAR National Building Competition: Battle of the Buildings, http://challenge.gov/epa/168-2011-energy-star-national-building-competition-battle-of-the-buildings.

[24] US Environmental Protection Agency, *The National Building Competition: 2010 Competition Summary,* http://www.energystar.gov/ia/business/buildingcontest/NBC_report_final.pdf?55fd-51d3&29b6-7b4a.

"creativity and originality" and "potential to engage and motivate target audience"[25] as key factors, the USDA used a panel that included many different perspectives. The presence of software and gaming experts from firms such as Google and Zynga on the panel enhanced the prize's credibility. The Battle of the Buildings, on the other hand, largely used numerical data (e.g., percentage of energy reduction) to determine the winner. Because the selection criteria were objective and because the EPA had the internal expertise to interpret the data, a judging panel was unnecessary.

Coordinator

The Coordinator role falls on the spectrum between the internally led Host and externally led Contributor. In this role, an agency may internally develop the prize concept while giving much of the operational responsibility to partner organizations.

The Harvard-NASA Tournament Lab (NTL) provides an example of an agency in the Coordinator role.[26] The Lab's objectives are: 1) to develop a "virtual facility" to enable a community of computational experts to create novel, high quality working software solutions more quickly and less expensively, and 2) to develop an empirically-grounded understanding of prize design parameters (e.g., incentive structures, participation composition, information rules, and economic benefits).[27] NASA has two partners: Harvard University's Institute of Quantitative Social Science, which brings expertise and experience in rigorous empirical evaluation of prizes, and TopCoder, an innovation platform for software and algorithms.[28]

The key element that makes NASA a Coordinator instead of a Host is the degree to which the agency relies on the NTL and the TopCoder platform to administer the prize. NASA managers work closely with the NTL team to source, conceive, and execute a variety of analytical, algorithmic, and software development prizes. The NTL team in turn coordinates with various NASA operational facilities to facilitate challenge identification and problem formulation. Furthermore, posting prizes on the TopCoder website provides access to a community of more than 400,000 developers from around the world. To build a participant community of this magnitude, NASA would have to allocate significant resources, detracting from other agency priorities.

Once a prize is posted, TopCoder monitors the prize process to ensure the competition is receiving an adequate number of entries. TopCoder also provides tools to help coders test their ideas (infrastructure), allows developers to compare performance to other developers (prototype feedback), and helps participants to communicate with one another virtually to promote collaboration. At the completion of the competition, the NTL team and TopCoder personnel work closely with the NASA staff to ensure that the solutions are implemented and lessons learned are documented and applied to the next generation of prizes. Because partners are heavily involved in all aspects of the lifecycle – such as assisting with prize design, administering the prize, providing access to participants, and providing infrastructure – the prize strikes a balance between being internally and externally led.

With an eye towards institutional transformation, NASA has taken proactive steps to engage internal personnel even as it taps external expertise and assets. Recognizing that prizes require unique skills, NASA has used a road show to describe how the Tournament Lab works and to conduct brainstorming sessions with its software community. After road shows, Lab managers follow up with individuals to develop a prize summary and increase Lab utilization.

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[25] Apps for Healthy Kids, "Judges," http://www.appsforhealthykids.com/#judges.

[26] Robynn Sturm, "NASA Tournament Lab: Open Innovation On-Demand," *Office of Science and Technology Policy* (blog), July 13, 2011, http://www.whitehouse.gov/blog/2011/07/13/nasa-tournament-lab-open-innovation-demand.

[27] Federal Business Opportunities, "A-- NASA TOURNAMENT LAB," July 7, 2010, https://www.fbo.gov/index?s=opportunity&mode=form&id=11bbfa22bc73c6e8fb9ea642866d6c45&tab=core&_cview=0.

[28] NASA contracted with Harvard through a sole-source contract authorized under the Federal Acquisition Regulation, which then sub-contracted with TopCoder after empirical analysis of the best platform for NASA needs.

NASA has also played the Coordinator role for its Centennial Challenge program, a series of multimillion-dollar prizes seeking innovative solutions in aerospace research and development. With the Centennial Challenges, NASA identifies prize concepts and then partners with non-profit organizations that take the lead on detailed prize design and operations.[29] This type of relationship highlights a key nuance in the Coordinator role where NASA funds the prize purse but requires its partner to recruit corporate or philanthropic sponsors to cover operations costs. As the Coordinator, an agency does not necessarily have to pay a third party to administer the prize. Rather, the main purpose of the role is to assemble the right resources to implement the prize, regardless of whether those resources are inside or outside the agency.

Another version of the Coordinator is evident in the role played by the US Treasury in the G20 SME Finance Challenge,[30] launched by G20 leaders in June 2010. Seeking big ideas to improve financing for small to medium enterprises (SMEs), especially in the developing world, the competition promised financial commitments from an array of international donors to help the winners scale up their ideas. The scope of the competition was carefully crafted to invite a wide range of proposals, while also yielding submissions that were detailed enough for accurate evaluation.

The G20 partnered with the Rockefeller Foundation, which shared the G20's financial inclusion goals and had experience leveraging open innovation. As the G20 had never before conducted a prize competition, the Rockefeller Foundation offered to fund Ashoka Changemakers to spearhead prize operations. While Ashoka Changemakers led the day-to-day implementation (e.g., creating the website and entry form), the G20 made critical design decisions, especially with regard to selection criteria and judging panel formation. Since large-scale impact was a priority, the G20 made certain that selection criteria included elements such as a proven business model, scalability, and sustainability. To ensure that the outcome was unbiased, five of the eight judges were chosen by non-G20 countries, although the G20 provided candidate recommendations. Ashoka Changemakers selected the five countries from which these five judges came.

In the NASA Tournament Lab, the NASA Centennial Challenges, and the G20 SME Finance Challenge, government agencies partnered with other organizations to administer the prize. In all three cases, while agencies provided prize funding, partners played a large role in administering the prize, through the provision of operational funding and support. Furthermore, being a Coordinator does not require an agency to completely delegate all responsibility to the partner administering the prize. To the contrary, NASA and the G20 were involved throughout the prize lifecycle, actively designing the prize and providing input and infrastructure during the prize's operation.

Contributor

Contributor roles describe scenarios in which the prize is led by a non-governmental organization but an agency takes part in prize design, execution, or amplification. While prize contribution is typically associated with direct funding such as sponsoring the prize purse, it can be applied much more broadly to include non-monetary contributions. In the following examples, the involvement of agencies varied widely, ranging from thought partnership to prize sponsorship to providing judges.

For instance, over the last four years, the DOE has provided technical reviews, judges, and $400,000 in prize funding for the MIT Clean Energy Prize, leading to over $85 million in additional investment capital and research grants. The prize was largely designed by MIT and is operated by MIT students. Although at first glance, the decision to allow students to run the prize may seem risky for an agency, the prize's effectiveness proves that intrinsic motivations (e.g., students' passion for the topic) can be just as effective as extrinsic rewards conferred by hiring an organization to operate a prize at a much higher cost. This decision is also

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[29] Partnerships are formed under Space Act Agreement authorities: http://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPD&c=1050&s=1I.

[30] Robynn Sturm, "Competition Pumps Funds into a Novel Growth Industry," *Office of Science and Technology Policy* (blog), November 19, 2011, http://www.whitehouse.gov/blog/2010/11/19/competition-pumps-funds-a-novel-growth-industry.

consistent with the prize's mission "to provide learning opportunities and reward student ventures that demonstrate a high potential of successfully making clean energy more affordable, with a positive impact on the environment."[31] In addition to the DOE partnership, MIT has partnered with a variety of other organizations to complement the university's resources, including:[32]

- *NSTAR (utility), GM (automotive), and Chevron (oil) for prize funding;*
- *Experts from a range of sectors such as government, utilities, venture capital, and law; and*
- *KPMG (tax and account advisory services) and SVM Public Relations & Marketing Communications (public relations) to assist winners with post-prize implementation, follow up, and continuation.*

As a Contributor, the DOE plays a critical role throughout the lifecycle of this prize, agreeing to fund part of the prize purse on the condition that MIT find a private-sector sponsor to match the contribution. Early on, this commitment led to the partnership with NSTAR, which, in addition to providing prize funding, hosts a networking event at the end of the prize at which the winning teams have the opportunity to meet venture capital firms. Given the reputation the agency has in the energy sector, the DOE's involvement lends credibility to the prize, providing a strong incentive for teams to participate and assisting winning teams in raising additional investment capital post-prize.

Another case in which a government agency played the Contributor role was the Progressive Insurance Automotive X PRIZE,[33] a $10 million prize for clean, production-capable vehicles that exceed 100 MPGe (miles per gallon or energy equivalent). The prize was designed and operated by the X PRIZE Foundation, a non-profit that specializes in large-scale, high profile exposition prizes. In this instance, a company, Progressive Insurance, funded the $10 million prize purse as well as provided partial funding for implementation.

The DOE acted as a contributor in two ways. First, it granted $5.5 million in technical assistance to ensure the competing technologies were rigorously tested, including offering Michigan International Speedway to conduct on-track tests, Argonne National Laboratories for technical validation and a data acquisition system. For the X PRIZE Foundation, the DOE's involvement was invaluable in building trust in the technical validation and judging process (among potential competitors, clean energy venture capitalist firms, and the public). For the DOE, the partnership offered a gold mine of technical data across advanced vehicle technologies (captured in identical, rigorous conditions in their own premier facilities), allowing comparisons among these technologies and informing the DOE's broader clean-tech agenda.

Second, the DOE provided $3.5 million for education programs, including a national student competition and an online platform for the public to learn more about fuel-efficient technologies. With regard to prize sponsorship, the DOE's investment in education and awareness fueled the prize's publicity and increased its prestige; such non-monetary incentives matter a great deal to competing entrepreneurs looking for visibility and validation. For the DOE, the prize increased the impact of dollars already dedicated to fuel efficiency and Science, Technology, Engineering, and Mathematics (STEM) education programs, with the Progressive Insurance Automotive X PRIZE generating more than 10 billion media impressions over the life of the competition. This high level of public exposure, particularly among students, offers agencies the potential to more effectively leverage existing investment.

In addition to the DOE, the X PRIZE Foundation partnered with a variety of other government entities on the Progressive Automotive X PRIZE, including: the US National Highway Traffic Safety Administration (NHTSA),

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[31] MIT Clean Energy Prize, "About Us," http://cep.mit.edu/about-us/.

[32] MIT Clean Energy Prize, "2011 Sponsors," http://cep.mit.edu/sponsor/2011-sponsors/.

[33] Progressive Automotive X PRIZE, http://www.progressiveautoxprize.org/.

to help with prize rules; the US Environmental Protection Agency (EPA), to develop fuel economy and emissions metrics; Consumers Union, to assist with dynamic vehicle testing; and the Michigan Economic Development Corporation (MEDC), to fund state-based competition events.[34]

Notably, government agencies can play the role of Contributor without providing direct funding; the Aspen Prize for Community College Excellence is one such example. After learning of the inclusion of prizes in the President's national innovation strategy, the Joyce Foundation approached the Obama Administration to advance common priorities in education and the workforce. Initial discussions between the Departments of Labor and Education (DOL and ED, respectively), the Office of Science and Technology Policy, the Joyce Foundation, the Lumina Foundation, and the Aspen Institute produced the concept for a community college prize, as well as an understanding of the corresponding partnerships among the stakeholders. They agreed that the Aspen Institute would administer the prize given the Institute's resources and reputation. Other foundations would provide funding for the prize, as well as intellectual property. Government agencies would act as advisors in order to help develop the prize given their expertise with workforce issues, education, and prizes, and would also provide marketing support to promote the prize on a national level.

Although the Aspen Institute was responsible for prize operations, each partner organization contributed a single representative for the competition's design. The six-person design team spent several months working through complex issues such as how to measure the performance and encourage the participation of community colleges. In the end, the design team developed a comprehensive approach to ensure a credible outcome. The prize used a Data/Metrics Advisory Panel comprised of community college researchers and expert practitioners to identify objective ways to assess performance (e.g., student outcomes, change over time). The prize partnered with the National Center for Higher Education Management Systems (NCHEMS) to acquire the data and receive technical assistance. Based on these initial results, 120 community colleges were invited to participate in the prize and submit additional information describing the practices that allowed them to achieve such high performance. A Finalist Committee, consisting of another judging panel with education, research, and policy experts, narrowed the field to a group of finalists. Then, the Prize Jury evaluated all of the data collected in each round of the competition, including a set of site visits to each of the finalists, and chose the winner.

The prize used a comprehensive marketing program to recruit eligible colleges, starting with a kick-off event featuring high-profile speakers from current and past administrations, including former Secretary of Education Richard Riley, current Secretary of Education Arne Duncan, and Second Lady Jill Biden. Each of the 120 eligible community colleges was invited to attend; for those that could not, the event was available virtually on the Aspen Institute website. In addition, the Aspen Institute encouraged participation by joining a series of regional forums hosted by the ED, calling every eligible institution, and partnering with the American Association of Community College Presidents and the Association of Community College Trustees to send letters to their respective members. Reaching out to community colleges with this multi-pronged approach helped motivate remarkable participation rates: 110 out of the 120 (92%) eligible institutions opted in.

In terms of design, the Aspen Prize for Community College Excellence exhibits several key features. First, the use of multiple rounds effectively balanced efficiency and accuracy. With each subsequent round, additional information was gathered to ensure judges had the ability to make an informed decision. The use of a broad filter to determine participant eligibility was another positive feature, as collecting information on and conducting site visits to thousands of colleges would have been impractical. Moreover, judging panels were shaped judiciously; panels' areas of expertise were well matched to the complexity of the entries. Since evaluating education performance is far from straightforward, selecting judges who were experts in the field was especially important in lending credibility to the outcome. Last, the Aspen Prize highlights the importance of inclusion when a prize has multiple stakeholders. Forming a design team of representatives from each partnering organization instilled a sense of ownership and alignment among the stakeholders, which

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[34] Progressive Automotive X PRIZE, "Supporters," http://www.progressiveautoxprize.org/about/supporters.

ultimately enhanced the team's ability to resolve complex issues around measuring college performance.

As a Contributor, agencies have a range of monetary and non-monetary options to assist with a prize. Expertise, data, and forums are just a few examples of pre-existing assets within an agency that can enhance a competition with minimal incremental cost. These types of contributions are as important as prize funding, complementing each other to augment the prize.

Across the Spectrum

The Host, Coordinator, and Contributor are just three points along a rich and complex spectrum of agency roles in public-private partnerships. Agencies play different roles for different prizes and may even move along the spectrum over time. For example, for the Community Health Data Initiative, the role of the Department of Health and Human Services (HHS) shifted over time from Host to Coordinator.

The Community Health Data Initiative aims to catalyze the emergence of a community health data ecosystem, in a way that is similar to how the National Oceanic and Atmospheric Administration (NOAA) sparked useful consumer services (e.g., weather.com) based on its rich supply of high quality weather data. To that end, HHS has embraced prizes and challenges as a key mechanism for inspiring entrepreneurs and innovators to turn recently released health data into applications and products that will help Americans understand – and take action to improve – health and healthcare in their communities.

HHS kicked off the Community Health Data Initiative through an informal competition, for which the agency served as Host. HHS invited a group of about 50 experts in healthcare, technology, and policy to brainstorm high-impact consumer-facing products that could be built based on HHS data. HHS challenged teams to prototype the most promising ideas in 90 days, offering to showcase the most compelling results at an HHS-hosted open public meeting in June 2010. Essential to the launch and sustainability of the effort was the role of the Institute of Medicine (IOM), which hosted the original brainstorming session and remained involved throughout the process. The HHS-IOM effort paved the way for future prize development; indeed, over time, it came to be named the "Health Data Initiative" (HDI) to better reflect its broad and inclusive scope.

Energized by the enthusiastic response to its initial foray, HHS partnered with Health 2.0 to launch the Health 2.0 Developer Challenge,[35] a series of publicly- and privately-sponsored competitions to spur rapid application development based on health data. The transition from Host to Coordinator allowed the agency to scale and evolve: Health 2.0 was selected, in part, because the organization was nimble and able to quickly identify and adapt to changing conditions.

Reminiscent of the role TopCoder plays in the NASA Tournament Lab, Health 2.0 provides access to a community of software developers, and helps to foster relationships that HHS would otherwise have to invest significant time, energy, and resources to developing on its own. To build and nurture this community and to drive participation in Health 2.0 Developer Challenge competitions, Health 2.0 hosts code-a-thons, live events where hundreds of software developers convene to collaborate and create. The Health 2.0 Developer Challenge further strengthens the ecosystem by hosting health-related prizes sponsored by private sector entities, such as the Aetna Foundation and Walgreens.[36]

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[35] Health 2.0 Developer Challenge, http://www.health2challenge.org/.

[36] Health 2.0 Developer Challenge, "Challenges," http://www.health2challenge.org/category/challenges/.

B. Partnering Process: Agency-led (Host, Coordinator)

The examples above show that partners can bring a diverse set of resources and expertise to all stages of the prize lifecycle. To take advantage of the benefits such partnerships can bring, agencies leading the design and implementation of a prize should begin to identify partners very early in the process. Often, major partners want to help design and shape the competition to advance shared goals and – if selected well – will share important knowledge and perspectives. In addition, developing the scope, ambition, and prize design require a sense of the resources, expertise, and networks that new partnerships can leverage. Although additional partnerships may be forged as the prize process unfolds, it is beneficial to involve key stakeholders from the very beginning.

For the purposes of this paper, the term "partner" is defined broadly to include external entities that support any aspect of the prize life-cycle – whether by contributing funds (sponsors) or by contributing with or without a financial exchange (paid vendors or unpaid collaborators). The process for determining which partnerships are needed can be divided into three steps: 1) determining the agency's human capital, financial resources, and experience; 2) identifying resources that complement the agency's assets; and 3) identifying organizations that can provide needed resources. An overview of the partnering process and types of partners is provided in **Exhibit 3**.

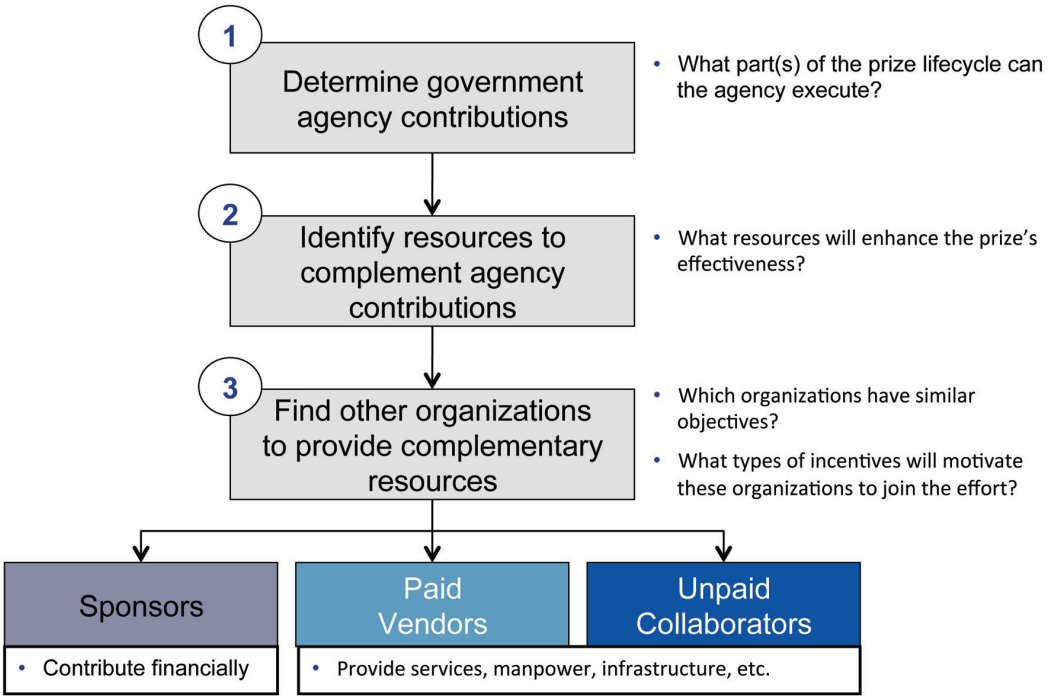

Exhibit 3 - Partnering Process Overview

The partnering process may be iterative, depending on how the prize evolves over time. In the early stages, agencies may primarily want to engage partners to help design the prize by contributing human and intellectual capital. In the later stages, prize administrators may discover additional resources that could increase the prize's effectiveness, such as building a virtual community of participants, connecting prize winners to implementation resources, or providing prize funding. At each stage in the prize lifecycle, agencies are encouraged to think about the appropriate contributions they can make to the prize and then find partners to assist with the remaining activities.

When identifying and pursuing partnerships, it is important to understand why an organization would want to partner with an agency for a prize. Motivations can be separated into three types: alignment with the prize's purpose, goodwill, and brand benefits. In the Apps for Healthy Kids and Battle of the Buildings, GE and JCPenney's objectives were similar to those of the prizes, respectively. GE's Healthymagination program is committed to improving public health, while JCPenney has a corporate commitment to energy management and communicating the value of energy efficiency. Prizes such as the Google Lunar X PRIZE attract partners that believe in the vision of the competition (lunar landing),[37] even though the vision is tangentially related to the objectives of the partnering firm (Google).[38] With the Progressive Insurance Automotive X PRIZE, the competition provided Progressive Insurance with a platform to support innovation and create new marketing campaigns to improve its standing with customers, shareholders, and employees. Although these examples highlight a specific category of motivation, many partnerships are driven by a combination of the three.

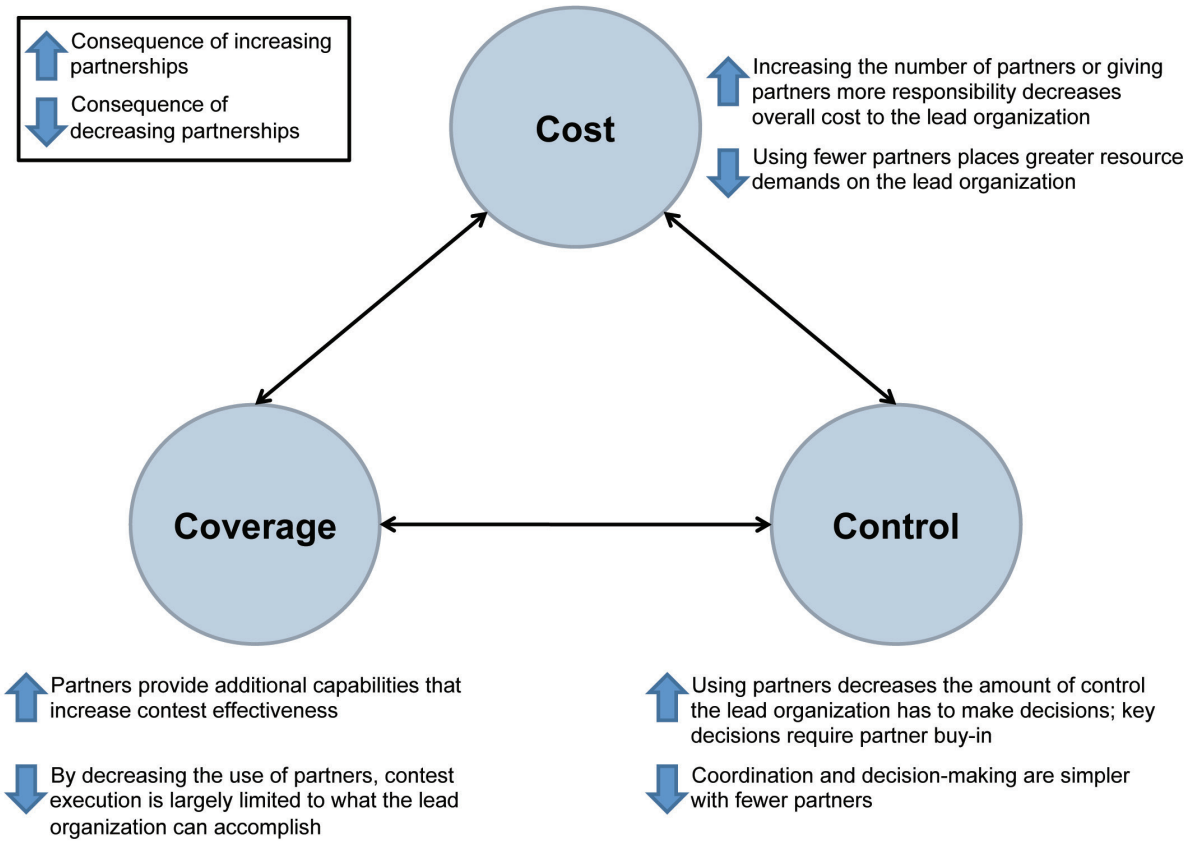

Exhibit 4 - Cost, Coverage, Control Triangle

It is also important to understand the trade-offs in pursuing greater numbers or different types of partners. For example, hiring more vendors to assist with prize execution instead of finding unpaid partners may be faster and allow the lead organization to have more control over decisions. However, the consequence of using more vendors is higher costs, either for the lead organization or for sponsors. Conversely, working with only unpaid

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[37] The formal objective of the Google Lunar X PRIZE is "to safely land a robot on the surface of the Moon and have that robot travel 500 meters over the lunar surface and send images and data back to the Earth," http://www.googlelunarx-prize.org/lunar/about-the-prize/.

[38] Google's stated mission is to "Organize the world's information and make it universally accessible and useful." See http://www.google.com/about/corporate/.

partners may seem attractive from a financial standpoint, yet makes decision-making more complex and time consuming because partners typically must also focus on meeting their internal objectives. Other types of costs, such as transaction costs and coordination costs, increase with the number of partners, be they paid vendors or unpaid collaborators. Transaction costs in this context include the resources and effort required to establish and maintain a partnership throughout the prize lifecycle. Coordination costs are related to the time and effort required to ensure that all partner organizations are aligned in each phase of the prize. A framework for thinking about partnership trade-offs is presented in **Exhibit 4**, the Cost, Coverage, Control Triangle.

Generally, partnerships are advantageous to the lead organization along, at most, two dimensions and disadvantageous along the remaining dimension(s). For example, the MIT Clean Energy Prize has lower costs than typical prizes because it is student-run and because competitors are typically paired with volunteer mentors. Partnering with the student body also provides the prize with talented, motivated people who want the prize to succeed. However, the consequence of this model is less control over the design and operation of the prize. The DOE and NSTAR have the ability to ensure broad objectives are met, such as making sure the prize operates on a national scale, but most of the responsibility is put in the hands of students. The primary reason why this partnership has worked so well for several years is because the partners trust each other's abilities and judgment. Without such a high level of trust, the trade-off between better cost and coverage for less control can be a serious hurdle to the effectiveness of a prize.

C. Partnering Process: Externally-led (Contributor)

When invited to contribute to a prize, an agency should first consider whether the opportunity aligns with their core mission, current goals and program areas, and capacity. Using logic similar to that of external organizations in the reverse scenario, an agency should assess whether the prize's objectives align with its own goals. With the MIT Clean Energy Prize, the DOE had a shared objective to promote energy innovation. In a similar vein, the shared goal of increasing fuel efficiency was important to the success of DOE's partnership with the Progressive Insurance Automotive X PRIZE. Beyond alignment, agencies should determine whether they have adequate capacity to contribute resources to the prize. The most difficult scenario is when an agency is aligned with the prize but does not have the capacity (infrastructure or time) to contribute. In that case, the agency can attempt to shift resources from other efforts or bundle the contribution into an existing effort. For example, the Aspen Institute partnered with the ED to promote the Aspen Prize for Community College Excellence at a series of regional education forums. These forums were part of an existing ED effort. Although alignment with the prize is a prerequisite, the capacity to contribute is the deciding factor in determining whether an agency can partner with a prize.

VI. Summary & Conclusions

Prizes are powerful tools for innovation that can complement the traditional channels used by government agencies to pursue novel approaches to challenging issues. Prizes are well suited to solve a range of problems, from complex aerospace challenges to new market development. They offer many benefits, such as finding solutions quickly and inexpensively and allowing the government to engage the public in new ways.

The prize lifecycle encompasses several elements including scope, rules and guidelines, participant communication, prize structure, and prize effectiveness metrics, all of which require careful consideration and assembling of the resources to execute them. In addition to a general understanding of the prize lifecycle, agencies should be aware of the various roles they can fill and the range of partnerships that can complement the agency's contributions. The examples presented in this paper show that multi-sector partnerships go far beyond funding the prize purse. Partnerships bring additional resources, such as testing opportunities for participants, help with recruiting participants, and expertise and judges to supplement the agency's assets. However, partnerships should be thoughtfully formed and continuously reevaluated. Understanding an organization's motivations – such as align-

ment with the prize, goodwill, and marketing benefits – helps agencies identify and attract effective partners.

Agencies should also be aware of the trade-offs inherent in partnerships, which may result in a choice between cost or control. The time and effort associated with forming partnerships, coordinating efforts across partners, and incorporating partners into the decision-making process should not be underestimated. Identifying partnership opportunities can occur at any stage of the prize lifecycle. In some cases, finding partners in early phases to assist with design is sufficient. In others, finding partners to assist with implementation is more appropriate. To maximize the prize's effectiveness, prize administrators should assess the need for partners at multiple points during the prize lifecycle.

Despite recent progress in multi-sector prize partnerships, the examples in this paper should be viewed as starting points, rather than end points. As government agencies expand their use of prizes and partnerships, new practices and models will emerge. A key area for future research is finding ways to document and share the lessons learned from each prize. Widespread adoption of prizes will facilitate the development of guidelines that can help agencies choose the most appropriate role: Host, Coordinator, Contributor, or some combination of these roles. Greater adoption of prizes and challenges by agencies will also enable researchers to better study the characteristics of effective prizes, especially partnerships. This will assist agencies in structuring future prizes and ensuring that public sector competitions become effective vehicles for furthering each agency's mission and achieving change.