

# The craft of incentive prize design

Lessons from the public sector



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# About the authors

**Jesse Goldhammer** is a principal at Dublin, Deloitte's innovation advisory practice. He develops prizes and transformational innovation programs for public and private sector clients.

**Kwasi Mitchell** is a senior manager at Deloitte Consulting LLP. He leads client engagements focused on strategy development across national security and non-profit sectors.

**Anesa “Nes” Parker** is a manager and former GovLab innovation fellow at Deloitte Consulting LLP. She leads engagements for government, nonprofit, and philanthropic clients focused on innovation strategy.

**Brad Anderson** is a senior consultant at Deloitte Consulting LLP. He provides innovation and strategy advisory services to public sector organizations with a primary focus on US federal government agencies.

**Sahil Joshi** is an analyst at Deloitte Consulting LLP. His work focuses on developing innovation strategy for philanthropic, public, and inter-governmental organizations.



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# Executive summary

**I**n the last five years, incentive prizes have transformed from an exotic open innovation tool to a proven innovation strategy for the public, private, and philanthropic sectors. Incentive prizes seem deceptively simple: Identify a problem, create and publicize a prize-based challenge for solving that problem, sign up diverse participants, and offer a reward to the winner. In practice, designing prizes that target the right problem, attract the most capable participants, and capture the imagination of the public to successfully achieve a desired outcome involves a complex set of design choices. This report aims to help prize designers organize and master those choices.

In the past, designers thought of prize types as distinct tools, often seeking to match the right tool to the problem they were seeking to address. Now, prize design has become a craft. Experienced designers help their organizations achieve a range of outcomes by building highly customized prizes and deploying them in concert with other problem solving and public engagement strategies. They focus less on what type of prize to use and more on how to assemble the fundamental elements of prize design through a series of integrated design choices informed by research and analysis. While this approach is understandably more complex than simply pulling a prize out of a toolbox, it also enables more sophisticated prize designs, allowing organizations to more effectively get what they need.

*The craft of incentive prize design* offers practical lessons for public sector leaders and their counterparts in the philanthropic and private sectors. It helps them to understand:

1. What types of outcomes incentive prizes help to achieve
2. What design elements prize designers use to create these challenges
3. How to make smart design choices when launching an incentive prize to achieve a particular outcome

This report treats prize design not as a linear, step-by-step process, but rather as an iterative activity that requires making integrated choices to solve a carefully defined problem and then generating outputs that achieve a larger set of outcomes. By synthesizing insights from recent literature, expert interviews, and analysis of over 400 prizes, we identify six outcomes that designers commonly seek (individually or in combination), falling along two dimensions:

## Developing ideas, technologies, products, or services

- Attract new ideas
- Build prototypes and launch pilots
- Stimulate markets

## Engaging people, organizations, and communities

- Raise awareness
- Mobilize action
- Inspire transformation

The first dimension captures the range of conceptual and tangible things which designers

are trying to develop. The second reflects how prizes can incent individuals, groups, organizations, and institutions to get involved in solving important public sector problems. In most cases, incentive prizes aim for outcomes on both dimensions. Looking at prizes through the lens of outcomes allows designers to establish a stronger link between what their organizations are trying to do and the benefits that prizes can help generate.

We use the phrase “elements of prize design” to describe and organize the strategic choices that designers should consider when crafting incentive prizes. There are five core design elements: resources, evaluation, motivators, structure, and communications. The heart of this report features practical decision-oriented frameworks for designers, helping them

understand how they can tailor prize design elements to facilitate different outcomes and increase the effectiveness of their challenges.

Through decision-oriented frameworks that link outcomes to design elements, *The craft of incentive prize design* enables public, philanthropic, and private sector leaders to build better prizes. The report helps these leaders benefit from the recent experiences of designers who are advancing the art of incentive prize design in the service of the public good. By accessing these experiences, illustrated with recent examples of successful prizes, designers can more effectively harness the ingenuity of the public to address their most vexing challenges.

# Introduction

**D**N January 12, 2010, a 7.0-magnitude earthquake devastated Haiti, affecting three million people and destroying significant portions of the nation's fragile infrastructure. Many organizations flooded Haiti with support, offering different forms of assistance to rebuild the country.<sup>1</sup> Among them were USAID and the Gates Foundation, which recognized the critical need for jump-starting financial services, the backbone of any functioning modern economy. Working together, they designed a prize that incented new mobile money service providers to launch in Haiti and achieve specific operational and transactional milestones.

Called the Haiti Mobile Money Initiative, this incentive prize helped stimulate a new mobile money market in Haiti, where, before the earthquake, only 10 percent of the population used traditional banks. It featured \$10 million in awards, broken into different-sized purses, some to incent first-to-market services and others to encourage scaling customer adoption. To increase the initiative's

effectiveness using more traditional sources of aid, USAID contributed \$5 million in technical and management assistance. Within six months of launch, two mobile banking service providers were up and running. By October 2011, both participants won scaling awards for more than 100,000 transactions;<sup>2</sup> less than a year later, one participant achieved the 5 million transaction milestone.

The Haiti Mobile Money Initiative powerfully illustrates how the craft of prize design has rapidly evolved in recent years, thanks to public, private, and philanthropic organizations that are using prizes to innovate in the service of the public good. Leaders and prize designers in these organizations are learning through experience that incentive prizes can meaningfully advance their missions. In the process, they are also discovering that successful prize design involves a complex series of choices to attract the right competitors with the knowledge and experience needed to solve a wide range of complex problems.

While prizes confer many benefits, their primary appeal is allowing leaders to pay *only* for satisfactory results. Competitors receive compensation, in whatever form it may take, only if they meet the evaluation criteria established by the prize's designer. That is not to say that incentive prizes can or should be used only when results can be guaranteed. Some designers are following a higher-risk, higher-reward strategy of using prizes to achieve goals that cannot be specified in advance. As budgets tighten in every sphere while the demand for innovation is rising, prizes are becoming recognized as a promising method to address an array of problems, often more efficiently and effectively than traditional approaches.

From the development of new technology prototypes to the reduction of energy consumption to challenges that help prevent child slavery, prize designers are capturing the public's imagination and unlocking their creativity.

Government and philanthropic leaders view prizes as a vehicle to drive change and describe the experience of implementing a prize to be a valuable problem-solving exercise in and of itself.

While prizes are not new, the idea that prize design is a craft that organizations should master to launch successful challenges has gained significant currency. The White House's Office of Science and Technology Policy dedicates personnel to help federal departments and agencies design effective prizes. More than 50 federal departments and agencies have offered prizes and some federal agencies have added dedicated staff for prize design as well.<sup>3</sup> Many major US philanthropies are using prizes to advance their missions, as are dozens of state and local agencies throughout the United States. Organizations with an international focus, such as the World Bank, use prizes to drive innovation in the developing world. Specialized advisory service firms now provide prize technology platforms and strategic guidance to organizations that lack the skills and capabilities needed to design and implement their own challenges.

All of this activity has yielded lessons and strategies that can help designers make choices about what kinds of prizes can generate specific outputs in the service of larger outcomes. They are learning to use prizes to achieve different but mutually reinforcing outcomes and finding ways to match prizes with other complementary problem-solving strategies. By experimenting with the elements of prize design and building on what they learn, designers have begun creating more sophisticated prize structures that can engage a broader group of qualified participants through multiple stages of competition. From the development of new technology prototypes to the reduction of energy consumption to challenges that help prevent child slavery, prize designers are capturing the public's imagination and unlocking their creativity.

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### Engaging people, organizations, and communities

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The first dimension captures the range of conceptual and tangible things which designers are trying to develop through incentive prizes. The second reflects how prizes can incent individuals, groups, organizations, and institutions to get involved in solving important problems. These dimensions represent intermediary and complementary outcomes that can be achieved during and after the execution of a prize. Looking at prize design through the lens of outcomes allows designers to establish a stronger link between what their organizations aspire to do and the specific outputs that prizes can generate.

By using prizes to achieve these outcomes, designers are generating whole innovation ecosystems. Prizes build and maintain communities of interest that help organizations address complex, ambiguous problems. Prizes educate the public and encourage citizen participation in new and dynamic ways. Prizes create opportunities for public organizations to share costs with private and philanthropic partners. They foster collaboration among government, academia, the private sector, and individuals.<sup>4</sup> Some organizations even use prizes to shape commercial markets, either to develop technologies, goods, and services directly or to bring innovative prototypes to market for the first time. Most importantly, prizes also demonstrate that government can innovate in service of the public good and open up problem solving to leverage the ingenuity of citizens and businesses.

As the use of prizes grows, the language of prize design is becoming more specialized. One important and increasingly common distinction involves “outputs” and “outcomes.” Prize designers use “outputs” to describe the specific end results of a prize, such as a software application (app) with particular functionality, the formation of a technical community around the development of that app, and even insights about how to improve that type of prize implementation. In contrast, prize designers use “outcomes,” as we’ve described above, to reference more general and aspirational goals, which can be fulfilled by a prize as well as other approaches. For example, an agency may wish to pursue the outcome of building prototypes and launching pilots by designing and executing a prize that generates an app as an output. To achieve that outcome, the

same agency may need to find ways to generate other, complementary outputs, such as a marketing campaign that introduces the app to target audiences. In sum, “output” and “outcome” help designers to distinguish tactical results from strategic objectives.

The growing appeal of prizes has also generated definitional confusion. “Prize” and “challenge” are often used interchangeably, making it difficult to distinguish between how these terms represent different ways to solve problems and, in the US government context, what legal authority permits an agency to solve a problem in a particular way. In this report,

we will treat “challenges” as an umbrella term for a variety of problem solving approaches, including incentive prizes, grants, direct investments and partnerships, to name a few. While incentive prizes will be our focus, we will also draw lessons from different types of challenges, such as competitive grants, that can be applied to the craft of incentive prize design. We recognize that these distinctions are further complicated by the fact that US government agencies must conduct different types of chal-

lenges under specific legal authorities, such as the America COMPETES Act.<sup>5</sup> Federal leaders should consult their offices of general counsel to determine what legal authorities govern their ability to stimulate innovation, acquire particular goods or services, conduct research for the public good, or work with private organizations for mutual benefit.

It has been five years since the advisory services firm McKinsey &

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Co. published the first major report on the use of prizes for philanthropy.<sup>6</sup> Since then, the US government alone has administered over 350 prizes. The prize typology featured in McKinsey’s report had a significant influence on the first generation of public sector and philanthropic prize designers who needed an organizational structure to understand what kinds of prizes were possible to implement and when to use them. Because many designers still reference McKinsey’s typology, this report seeks to build on it by focusing on the overarching outcomes that designers are trying to achieve and the fundamental elements of



prize design that experienced designers use. By drawing upon the rich challenge activity of the past five years, we aim to help designers understand what they can do with prizes, and how—practically speaking—they can assemble prize design elements in different ways to achieve these outcomes.

This report explores the craft of designing incentive prizes and shows how design choices can influence a prize's ability to solve vexing challenges by drawing links between outputs, outcomes, and the elements of prize design. While we focus on public sector incentive prizes in the United States, many of the trends and design lessons reported here are drawn from and are applicable to challenges launched by philanthropic and private organizations. In that spirit, we highlight examples from these sectors to illustrate how designers make strategic choices, and how those choices represent leading practices in this growing field. In the course of our research, we also evaluated challenge-related documents and interviewed prize experts from outside the United States. Our findings encompass these insights as well.

We intend the guidance featured in this report for all leaders interested in prize design, from neophytes to those who have already integrated prizes into their problem solving strategies. To appeal to this broad

audience, the main body of this report will give an overview of prizes, their design, and the outcomes that they can achieve. Appendix A will provide additional guidance for more advanced designers.

Recognizing the diversity of experiences of prize designers, the report features decision-oriented frameworks that organize the now vast array of complex and distributed prize information. We deliberately created these frameworks to support iterative prize design, because many other excellent reports, such as Harvard Berkman Center's *Public-private partnerships for organizing and executing prize-based competitions* or Nesta's *Challenge prizes: A practice guide*, already take process-oriented approaches.<sup>7</sup>

While we have drawn useful information from recent academic literature, articles, and published commentary, much of our data is derived from in-depth interviews with experienced prize designers in government and philanthropy, as well as a proprietary database of over 400 challenges from Challenge.gov and select philanthropic, state, local, and international competitions. The result is a rich compendium of practical guidance for prize designers in the United States and around the world.

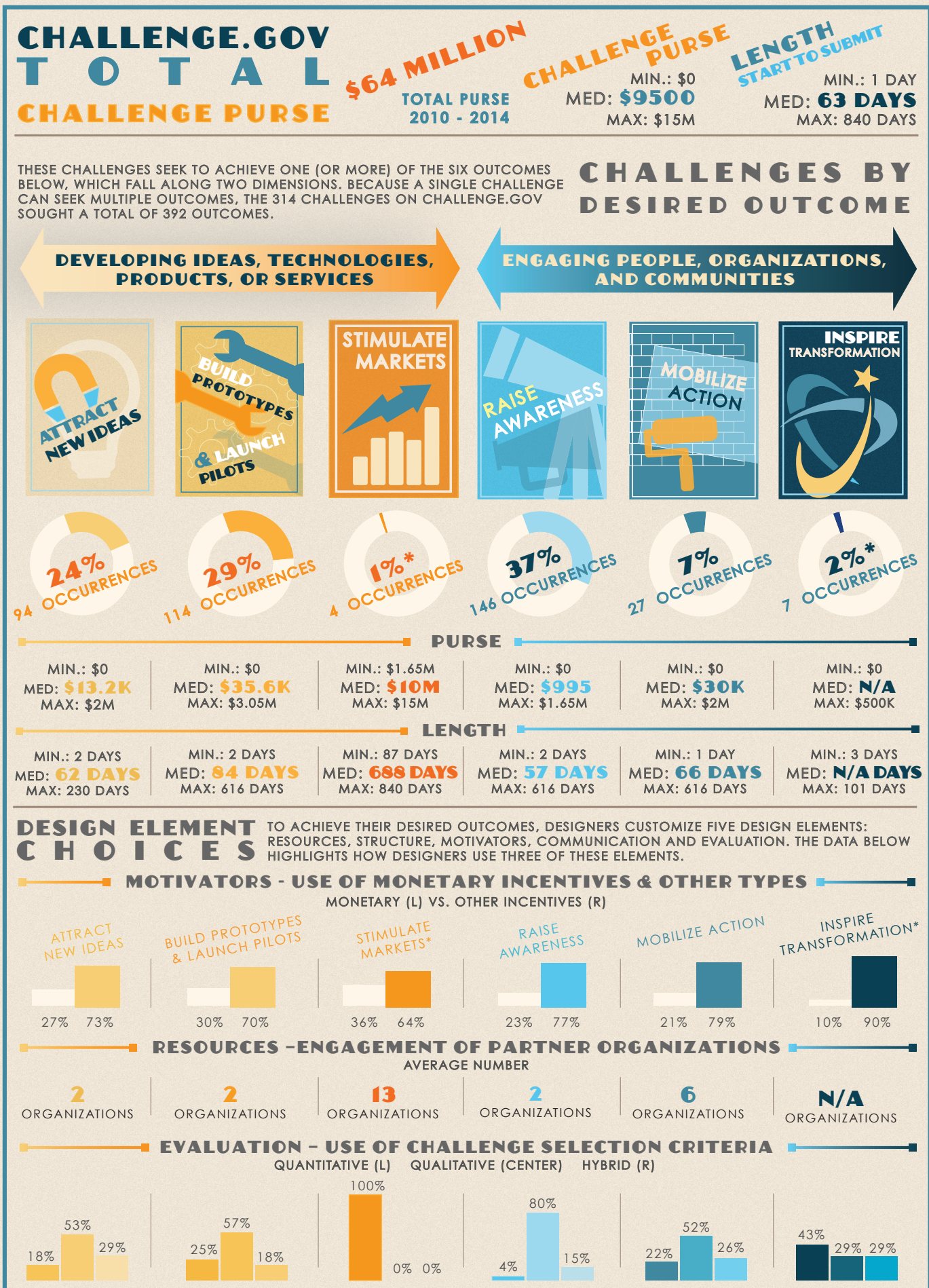
# Public sector challenges by the numbers

**T**HESE data summarize and characterize mainly public- and philanthropic-sector prize activity based on the analysis of 314 challenges found on Challenge.gov and validated through a secondary dataset of 89 philanthropic, state, local, and international challenges. In coding this data, we found that

individual challenges often sought to achieve simultaneously more than one of the six outcomes discussed in this report. Our analysis of challenges by outcome illustrates how prize designers are prioritizing the elements of prize design to achieve certain results. Additional information on our data analysis methodology can be found in Appendix B.



Figure 1. Public sector challenges by the numbers



\*Because prize designers seek this outcome infrequently, this data is mostly anecdotal

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# Getting started with incentive prizes

**P**UBLIC, private, and philanthropic leaders are wrestling with technological, economic, environmental, and societal problems that seem to get more complex each day. Public leaders, moreover, must consider these multifaceted problems with limited resources that often prevent them from developing innovative solutions quickly and effectively. This is why government leaders in particular are turning to incentive prizes to advance their missions through incentives and the ingenuity of the crowd.

Leaders who use prizes effectively take a strategic approach. They work with colleagues, partners, and subject-matter experts to carefully *select and define problems* likely to be solvable through prizes. They collaborate with stakeholders inside and outside their organizations to *determine the outcomes* they wish to achieve—and then use those decisions to drive a prize design process that will yield specific outputs. Because public organizations must adhere to specific legal requirements, government leaders determine what *legal authority* will allow them to achieve their desired outcomes. These leaders *publicize the challenge*, its requirements, and its results in language that will resonate with the audiences they seek to engage. Finally, to realize the full benefits of the prize, leaders initiate legacy activities to provide resources and support to the prize participants who remain engaged after the challenge comes to a conclusion.

## Problem definition

Because problem definition involves grappling with a great deal of ambiguity, it is arguably the most difficult part of prize design.

It sounds deceptively simple: What problem should the challenge address? Answering that question, however, requires clarity about *the outcomes sought and the ways to achieve them* as well as a *specific problem statement* that succinctly describes the fundamental difficulty to be overcome. Designers often initiate these definitional discussions with a diversity of internal and external experts and stakeholders, because they can bring valuable perspectives and ultimately need to be aligned around the final problem statement.

To manage the ambiguity of problem definition, designers often start by developing a clear understanding of the outcomes they seek and the different ways they can achieve them. Because prize design varies, sometimes dramatically, depending upon the outcomes selected, careful definition of these outcomes is critical. These early-stage problem definition discussions help to establish the causal and logical linkages between the specific difficulty to be addressed and the outcomes selected. They help to surface the kinds of challenges (for example, incentive prize, grant, investment) that are best suited to address the problem. These discussions reveal ways in which the designer's organization may or may not have the legal authorities, resources, skills, and capabilities to address certain facets of its own problems. Finally, by refining their understanding of the outcomes sought and ways to achieve them, designers can explore whether a prize is likely to produce results more effectively than other possible approaches.

Outcome specification establishes the broad set of aspirations, whereas problem statement definition more narrowly frames the need that the prize will ultimately address.

Developing a problem statement helps designers craft a need that is not too hard (because no one will win the prize) and not too easy (because the prize will be won too quickly and not necessarily with the optimum solution). Prizes need a problem statement that will be attractive to a broad selection of potential competitors (because greater diversity can lead to more innovative solutions), but not too broad (because an overly broad net can erode submission quality). And, the problem statement must describe a challenge whose scope is appropriate for the types of participants sought: A problem that requires years of work to solve or specialized facilities or high capital expenditure may not fit well with certain target participant groups.

Making these decisions often requires tapping into different types of expertise and devoting a considerable amount of staff time, depending upon the complexity of the problem. Technical experts can be valuable for grappling with the science and technology underlying the problem. Academics and industry representatives can be highly useful for evaluating the time, expertise, and expense needed to solve certain kinds of problems. Designers and strategic thinkers can help refine and reframe problems in ways that are conducive to prize-based solutions. Finally, a gifted facilitator can help to ensure that these different types of professionals have the right conversations and make progress toward a workable problem statement.

All manner of problems may be amenable to prize-based solutions, if defined properly. Consider, for example, the range of problems defined by USAID for its Tech Challenge for Atrocity Prevention. For one of the five components of this challenge, USAID defined the “problem” as *third parties who enable or contribute to genocide, consciously or inadvertently*. To solve this problem, they sought technologies and innovations that “identify, spotlight, and deter” these enablers. For another component of the prize, USAID identified the *unpredictability* of genocide as the problem. This led the agency to seek algorithms that could

forecast potential hot spots based on socio-political indicators and historical trends.<sup>8</sup>

According to Jason Crusan, who directs the National Aeronautics and Space Administration’s (NASA) Center of Excellence for Collaborative Innovation (CoECI), problem definition entails “hav[ing] to deconstruct the problem into bite-sized pieces, and abstract[ing] [each] to understand how it’s just one piece of the larger puzzle.”<sup>9</sup> Indeed, it can take up to a year to wrestle with problem definition.<sup>10</sup> During this time, designers typically conduct a detailed landscape analysis, meeting with internal and external experts as well as partners to define and digest the scope of knowledge applicable to the problem and its surrounding issues. As designers begin to prioritize specific areas of the problem for research, they can also begin evaluating what combination of potential solutions may best achieve their desired outcomes.

An example from CoECI emphasizes this point. Every year, fraud, waste, and abuse in the health care industry accounts for hundreds of billions of dollars in losses.<sup>11</sup> The US Centers for Medicare and Medicaid Services (CMS) wanted to apply new tools to their ongoing efforts to address this challenge. The agency partnered with CoECI, the state of Minnesota, Harvard Business School, and TopCoder to find a more efficient and effective way to help states spot medicaid fraud.

Given the challenges associated with identifying fraud, the partners took time to define the problem, which focused on how current software systems could not effectively screen risk scoring, validate credentials, authenticate identities, or sanction checks. To tackle this problem, they launched the Provider Screening Innovator Challenge, which sought screening software that could help ensure that medicaid funds are not spent fraudulently.<sup>12</sup> To make sure the overarching challenge would generate a workable solution, the design team broke it into four components and 124 separate challenges. As a result, the partners were able to obtain an ecosystem of solutions based on submissions from more than 1,600 participants

from 39 countries. The software applications developed as a result of the challenge series are being compiled into an open-source solution for the state of Minnesota—and perhaps the nation.<sup>13</sup>

## Push versus pull: Is a prize appropriate?

Problem definition discussions inevitably raise important questions about which approach—a challenge, a prize or some other mechanism—can generate the best solutions. Experienced prize designers have learned that incentive prizes are not appropriate for every type of problem and are not a silver bullet even for the right problems. One valuable way to navigate this strategic choice is to consider the distinction between “push” and “pull” mechanisms, a reference to how different types of rewards, placed at different points in a solution development process, can create unique incentives.

- **Push mechanisms** include traditional grants and contracts, such as fixed price or time and materials contracts or research and development grants. These provide vendors or grant recipients with payments or incentives to develop and deliver specific services or technologies, in effect paying for the *effort* involved, but leaving the risk that the product may not meet expectations. Push mechanisms can be used to generate a range of outputs, from purchasing services or technologies that are well-understood to supporting early-stage research and development efforts that have uncertain outputs.
- **Pull mechanisms, including incentive prizes**, reward participants not for their efforts per se, but for their *outputs*, such as ideas, prototypes, pilots, or commercial products and services. Leaders use pull mechanisms to encourage participants to experiment with innovative and, sometimes, risky approaches, while paying only for results that meet predetermined rules

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## WHEN SHOULD YOU NOT USE A PRIZE?

Prizes cannot solve every type of problem. Here are a few considerations:

**Prizes should not be used when there is a clear, established, effective approach to solve a problem.**

A prize’s strength comes from its ability to incent participants to create novel solutions. Using a prize to create solutions already available in mature markets may simply waste participants’ efforts.<sup>14</sup>

**Prizes should not be used when potential participants are unwilling or unable to dedicate time and resources to solve the problem.**

For instance, as appealing as start-up companies may be as prize participants, they are rarely able to shift their commercial focus to a challenge. Prize designers need to understand the risk tolerance and capabilities of their potential participants before committing to the use of a prize that requires their engagement to be successful.

**Prizes should not be used when there are only a limited number of participants who can address the problem.**

If the universe of participants is small and known, then a prize may not be necessary. Instead, leaders should use other types of challenges, such as “pay for performance” approaches that issue grants or contracts with milestone-based payment terms. One example of this approach is NASA’s Commercial Orbital Transportation Services program in which industry agreements with certain companies provide for fixed-price payments only when performance milestones are met.<sup>15</sup>

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or specifications. For some pull mechanism prizes, if no one wins, the sponsoring organization is responsible for only its administrative costs.

Experienced designers often combine prizes with push mechanisms to achieve their goals more quickly and effectively. For example, in 2013 the Army Research Laboratory ran five prizes that successfully identified new methods for generating energy from a walking hiker and new ways to produce potable water for humanitarian missions. The winning solutions came from individuals from around the globe—many of whom would have not had the opportunity to work with the army through other means. The Army Research Laboratory plans to continue developing these ideas through traditional push mechanisms such as testing at laboratory facilities and future small business funding opportunities.<sup>16</sup>

Despite the fact that extensive consideration may be required to determine the suitability of a prize, this preparatory requirement has not put a damper on experimentation in the past five years. Many agencies, such as NASA, embrace prizes and translate their growing confidence and experience into policies that codify and explain their problem-solving strategies.<sup>17</sup> The White House Office of Science and Technology Policy provides [annual progress reports](#) on prize competitions offered by federal agencies, and the Office of Management and Budget offers detailed legal guidance to prize designers. This work can be immensely helpful for less experienced organizations considering similar approaches.

Most experienced designers consider prizes to be just one important problem-solving approach in a larger portfolio that includes challenges and other, traditional approaches as well. In some cases, for example, NASA

program managers have folded challenge outputs into grants or in-house R&D efforts. In other cases, the agency uses traditional contract arrangements to implement designs solicited from prizes. NASA's designers view push and pull mechanisms not in isolation, but in varying combinations custom-designed to achieve their desired outcomes.<sup>18</sup>

## Evaluating legal options

Public sector leaders can't simply design and execute a prize without first evaluating their legal authority to do so, particularly when it involves paying cash to winners. US government prize designers, in particular, must look carefully at the legal constraints they face. Typically, this involves early liaison with general counsel to avoid unwelcome surprises.

For federal agencies, several laws can affect incentive prizes. The most well-known is the America COMPETES Reauthorization Act of 2010, which provided broad authority for every

federal agency to conduct prizes in the service of their missions. America COMPETES created a clear, simple legal path for using these tools and complemented other pre-existing agency-specific prize authorities.<sup>19</sup> One key aspect of the prize authority provided by America COMPETES is that federal agencies are able to co-fund prizes

(both the prize purse and administration costs) with other agencies as well as private sector and philanthropic organizations.<sup>20</sup>

In 2010, the Office of Management and Budget issued guidance on various legal authorities and provisions, intellectual property considerations, and other issues affecting prizes in a memorandum called "Guidance on the use of challenges and prizes to promote open government." This memorandum

Experienced designers often combine prizes with push mechanisms to achieve their goals more quickly and effectively.



provides prize designers and their legal counsel with a useful starting point for developing their own legal strategies.<sup>21</sup>

Building a legal strategy applies to state and city prizes as well, because legal requirements must be considered in light of desired outcomes. For example, designers of the New York City Big Apps Challenge intended to spur the development of tech businesses and therefore opted to let participants retain the intellectual property rights of the apps they created.<sup>22</sup>

The conclusion of a prize also poses legal considerations that should be addressed early in the design phase. Perceptions of faulty evaluation criteria or unfair judging procedures can lead participants to take legal action, especially if the stakes are high. Committing to the transparency of the judging process and ensuring that participants can view scoring

and selection criteria when they register for the prize can ameliorate such issues.

In the federal context, the Government Accountability Office recently ruled that it did not possess the legal authority to adjudicate a dispute related to a prize offered by the Federal Trade Commission, despite its well-established ability to do so for contracts.<sup>23</sup> This ruling raises important questions about how the federal government will handle prize-related conflicts in the future.<sup>24</sup> It also underscores how important it is for prize designers to build prizes that are highly transparent, with independent judging panels and, for worst-case scenarios, conflict resolution processes.

After reviewing these considerations and engaging in an iterative problem definition process, designers will be ready to begin building a prize.

# Linking prize outcomes to prize design

## Prize design elements: Definitions

Designing a successful prize can be a daunting task. No one formula is adequate because each prize addresses a unique problem and set of potential participants whose incentives must be carefully understood.

Many public organizations do not possess all of the skills and capabilities needed to design an effective prize, such as online platform development or marketing expertise. In some cases, the necessary abilities involve distinct and highly specific insights into market dynamics or participant incentives. And in almost all cases, designers need help with problem definition, because a poorly defined problem statement can make it extremely difficult to achieve the desired outcomes.

Despite the unique nature of each problem, designers can rely on certain common elements. These can be thought of as ingredients, combinable in various ways to design prizes that generate specific outcomes. All of the elements matter, together forming an integrated and often complex set of strategic choices. How designers assemble and use them is at the heart of prize design.

There are many ways, for example, to craft a communications strategy to draw the attention of potential participants to a prize. But who should develop the communications campaign and its messaging? What channels should be used? How much time and money can be spent on the campaign? How can we measure its success? These are just some of the questions that designers must answer.

The strategic choices involved in challenge design can be grouped into five core design elements:

- **Resources:** Funding, labor, open datasets, online platforms, testing protocols, facilities, and partnerships—the infrastructure of the prize
- **Evaluation:** Selection criteria, judging protocols, and winner selection as well as measurement of the prize's impact and long-term legacy
- **Motivators:** Cash purse and other non-monetary incentives that can attract and reward participation, such as mentorship, collaborative opportunities, public recognition, validated performance data, and exposure to experts and luminary judging panels
- **Structure:** Rules that shape the prize's operations, classes for different types of participants, eligibility requirements, intellectual property requirements, timeline, stages, and other parameters
- **Communications:** Marketing and stakeholder management methods used to reach potential participants and partners and to raise awareness of the goals, progress, outputs, and outcomes of the prize

Designers consider these elements of prize design from the very early stages of problem definition to the period after the prize concludes, when sustaining participants' energy and focus can significantly help to achieve outcomes. Below we discuss these elements and

**Figure 2. The architecture of prize design**



Graphic: Deloitte University Press | DUPress.com

feature examples of how designers use them to create, implement, and ensure the legacy of their prizes.

## Resources—You don't have to do it alone

There are four critical resource phases: design, implementation, award, and post-prize “legacy” activities. Depending on the desired outcome, these phases can be quite variable in terms of length, cost, and demand on resources. They can involve a few or many small contracts for vendor services as well as different types of partnerships. Most importantly, as each of these phases unfolds, designers learn a wealth of new information about what successful execution will require, with inevitable impacts on resource requirements and timing.

One major resource requirement, of course, is funding for the *purse*.<sup>25</sup> Since the purse is often relatively small, it can be tempting to view prizes as less-expensive alternatives to more traditional grants and contracts. Even if no one wins the prize, however, its *administration costs* can be substantial, particularly if the goal is to achieve outcomes that could require significant commitments to marketing, mentorship, and networking. LAUNCH, for example, a global challenge led by NASA, USAID, the Department of State, and NIKE Inc., is intended to identify and support innovative work contributing to a sustainable future. The initiative focuses on spurring collaboration among innovators; it offers no monetary incentives, but instead invests its resources in helping participants develop and scale their solutions.<sup>26</sup>

Furthermore, prize administration involves significant costs that fall into different categories including, but not limited to, labor, technology platform, marketing, events, travel, and testing facilities.<sup>27</sup> It requires a diverse set of abilities and experiences, obtained in-house or through in-kind support from partners and paid vendors. Each designer must define the right mix of in-house and external support by first assessing the organization's abilities.

*Labor costs* are involved in developing prize rules, advertising the prize, connecting with participants, administering interactions among stakeholders, judging entries, and evaluating the success of the prize after award. These activities will require a diverse team, with subject-matter experts to develop, advertise, and judge the prize, and experienced administrators to run it.<sup>28</sup> Effective designers should consider the labor resources required for each phase of the prize, such as estimating the number of potential submissions to ensure the availability of a sufficient number of judges. Bloomberg Philanthropies' Mayors Challenge, for instance, assessed how many submissions it might receive by sending RSVP cards to potential competitors.<sup>29</sup> The challenge also planned for and included labor costs that extended beyond award to establish a lasting legacy for the prize. For example, post-award coaching, technical assistance, and networking were provided in order to continue to spur action following the award.

The technology *platform* used to facilitate certain prizes also represents a major cost, as well as a critical component for success. Such online platforms can help target the right audiences, enforce rules, and standardize submissions. NASA's Mapping Dark Matter challenge, for instance, sought an algorithm for mapping dark matter, an elusive task that has stumped astronomers for years. NASA partnered with the online challenge platform Kaggle, using its leaderboard feature to offer an environment allowing data scientists and mathematicians to collaborate and compete. Kaggle's platform enabled the creation of a specialized community that ultimately included 73 teams. Within

10 days, a doctoral candidate in glaciology from Cambridge University had built an algorithm that outperformed NASA's existing one.<sup>30</sup> When considering different platforms, designers can evaluate a few key cost elements such as platform access fees and design consulting.<sup>31</sup> Appendix D offers more information on online challenge platform vendors.

Additionally, certain administrative costs may be directed toward activities to improve or strengthen submissions, including standard, accessible data, consulting/coaching support, and testing facilities. For example, a number of US government agencies have provided easy access to data and data standards for developers to improve entries in apps challenges such as DOE's Apps for Energy and Apps for Vehicles challenges.<sup>32</sup> This support structure was provided more directly in the Progressive Insurance Automotive X PRIZE where semi-finalist teams were given vouchers for consulting services from private consulting firms and national laboratories in order to allow participating teams to improve their designs.<sup>33</sup> Testing facilities are also resources that many participants will not have access to when developing their prototypes; the provision of these places will help to improve and iterate participant designs in a laboratory setting. For example, the US government has been a key source for providing these facilities. In the Wendy Schmidt Oil Cleanup X Challenge, a Department of Interior testing facility was used to host physical and laboratory testing of finalist prototype designs for high-performing oil cleanup equipment, and in the Progressive Insurance Automotive X PRIZE, the Argonne National Laboratory provided dynamometer testing of the super-efficient finalist vehicles.<sup>34</sup>

Because prizes are still relatively novel, designers must often commit resources to *mobilize their own organizations*. Most champions are senior executives, but they can be other employees who have the networks and political capital needed to generate momentum. Champions can clear away significant internal barriers by clearly communicating to employees how solutions derived from the prize will



## Because prizes are still relatively novel, designers must often commit resources to *mobilize their own organizations*.

supplement and support those developed within the organization.

Finally, designers should expend resources to find *partners* that can help fund prizes and play various strategic roles in execution. Many designers carefully assess their own internal capabilities to understand the kind of partner support they may need. As categorized by Raymond Tong and Karim Lakhani, partners can play a variety of roles across a spectrum: a “host” who develops and oversees the prize, a “coordinator” who solicits others to develop operational components, or a “contributor” who assists the hosts with these tasks.<sup>35</sup> For example:

- **Host**—Ashoka Changemakers has teamed up with the LEGO Foundation to seek educational innovations through the Re-imagine Learning Challenge. The challenge is hosted on the Ashoka Changemaker website and uses its infrastructure. The three-year partnership includes a pledge of more than \$200,000 from LEGO Foundation to support the challenge.<sup>36</sup>
- **Coordinator**—Humanity United convened the Partnership for Freedom, with sponsors including the White House, the Department of Justice, the Department of Health and Human Services, and the Department of Housing and Urban Development. This partnership launched Reimagine: Opportunity, the first of three challenges designed to improve the support infrastructure for survivors of modern-day slavery, resulting in more than 160 applications and 12 highly innovative solutions.<sup>37</sup>

- **Contributor**—The UN Development Program provided funding and guidance to Nesta for a challenge focused on developing sustainable, cost-effective, off-grid renewable energy supplies in rural Bosnia and Herzegovina.<sup>38</sup>

Many designers believe that partners from the private, public, and philanthropic sectors can help unleash the full potential of prizes.<sup>39</sup> For example, the Hurricane Sandy Task Force launched Rebuild by Design, a multi-stage challenge to create designs that increase the resiliency of those regions affected by Hurricane Sandy. The challenge administration involved a mixture of partners from federal (Department of Housing and Urban Development, National Endowment of the Arts), academic (New York University Institute for Public Knowledge), and non-profit (Regional Plan Association, Municipal Art Society of New York, and Van Alen Institute) organizations. The \$2,000,000 purse was funded entirely by the Department of Housing and Urban Development’s philanthropic partners, led by the Rockefeller Foundation. Through this integration of partners, the challenge resulted in the participation of 148 teams from more than 15 countries. Ten finalists received \$200,000 and met with community leaders and stakeholder groups to receive feedback and compete for the opportunity to implement their designs.<sup>40</sup>

When selecting partners, designers often consider a number of factors, including what control may be ceded to partners in prize administration, and how their brands and support can help the prize succeed.



## Evaluation—Building a road map, checking progress, determining impact

Evaluation includes a broad set of assessment and measurement activities that occur during every stage of a prize. It involves the initial determination of whether it is likely to be effective and appropriate, assessment of the quality of implementation processes, development of the criteria and mechanisms used to select winners (including providing feedback to participants during and after the prize), and evaluation of impact and overall value. Proper evaluation is critical because it can affect whether participants view the prize as fair, shape the validity of the results, and, thus, ultimately determine its success. Effective evaluation is also an essential input to strong prize management, both to improve implementation processes and to inform decisions about whether to use a prize again.

In the early stages of design, there are two useful evaluative techniques. The first, sometimes called “theory of change,” involves identifying how the prize, through its structure, rules, and activities will incentivize participants to engage in the behaviors that will help solve the defined problem. For example, a monetary reward may prove to be a stronger incentive for some participants than the opportunity for professional networking or coaching. This is also a good time to determine how prize-generated incentives may be influenced by the external environment (that is, incentives from other domains, such as the market) and other interventions, such as previously existing challenges seeking similar outcomes.

Second, using research and logical analysis, it is important to check whether *the planned challenge activities and outputs are likely to achieve the desired outcomes*. This evaluative technique includes identifying other factors that would be likely to help or hinder the achievement of these outcomes. The major benefit of this early assessment is that the design can still be changed to address these factors, including adding activities to reduce

risks or reinforce positive outputs, such as adding additional elements of a broad program that supports scaling up once the prize has identified winners. To properly evaluate the prize, designers should develop indicators consistent with their theory of change for the prize’s activities, milestones, outputs, and outcomes.

The *quality of the implementation processes* should be evaluated during and after the prize to determine whether discrete activities were actually successful. For example, some designers undertake special efforts to identify participants with particular characteristics. In some cases, this recruitment involves finding participants with specific technical expertise; in others, the goal may be to engage new and diverse individuals and organizations in the problem-solving space. In all cases, capturing good information about these processes during implementation can guide efforts to iteratively improve engagement activities for the current prize and provide insight into more effective engagement efforts for future prizes. Similarly, evaluation should include looking for patterns of who initially engages but then drops out or fails to continue through several rounds. It may be that the prize needs to be redesigned to provide additional support or that the current process is effectively winnowing out those who are unlikely to provide useful ideas or results.

A unique element of evaluation in prizes is *defining the criteria used to select winner(s)*. In creating these criteria, designers are shaping how participants will work, preventing unintentional and undesirable outcomes and curbing potential fraud. Appropriate selection criteria are grounded in and consistent with the overarching view of how the prize will generate change or solve a problem. Because the wrong criteria could lead participants to submit solutions that do not actually address the fundamental problem, designers often review their selection criteria repeatedly, working with internal and external stakeholders to anticipate and account for all possible responses.

One helpful practice for designers to follow is to open up draft rules for a period of public

## One of the important elements of high-quality evaluation is to revisit the criteria at the end of the prize and assess whether they were appropriate.

comment, as was done by USAID recently for its potential challenge for desalination technologies, by the Department of Energy for its potential challenge on home hydrogen refueling technologies, and by NASA for its various Centennial Challenges.<sup>41</sup>

Designers should also carefully consider whether to use *quantitative* or *qualitative criteria*, or a mix of both. The Department of Defense's HADR challenge, which seeks a kit for use in humanitarian assistance and disaster relief, sets specific quantitative criteria for acceptable solutions—weight of less than 500 pounds, constant one-kilowatt power production, production of 1000 gallons of water per day, and so on.<sup>42</sup>

When quantitative criteria are not applicable or relevant, clear parameters and appropriate evaluation arrangements become even more critical. In the case of the Prize for Community College Excellence, the Aspen Institute needed to find a way to evaluate qualitative data about US community college performance. To make this process as rigorous and independent as possible, the institute employs a third-party evaluator that specializes in evaluation criteria framework design and in collecting and analyzing such data to ensure a strong basis for evaluation.<sup>43</sup>

To ensure validity and objectivity in the evaluation process, designers should determine who will *judge submissions*. Expert judging can be effective when the desired solution is highly technical, while crowdsourced voting is valuable when the goal is to engage public participation.<sup>44</sup> Some organizations have begun to examine how crowdsourced selection can lead to viable solutions. For example, DARPA's Experimental Crowd-Derived Combat-Support Vehicle Design Challenge solicited vehicle concepts from the public for different missions. The challenge also sought

to examine the question, "How could crowdsourced selection contribute to the goals of defense manufacturing?"<sup>45</sup> While crowdsourcing the evaluation of winners can work and, at the same time, draw publicity, expert judging provides two distinct benefits. Judges with particular domain expertise can lend credibility to the challenge results and can improve submission quality through formal and informal feedback, if it is built into the prize structure.

One of the important elements of high-quality evaluation is to revisit the criteria at the end of the prize and assess whether they were appropriate: Did they lead to the selection of the best winning solution(s)? If the winner did not perform well, and some unsuccessful participants seemed stronger, it might be that the criteria were not right or were not operationalized correctly. For example, if simple weighting is used to derive an overall score, a proposal which scores badly on one criterion and well on another might end up the winner overall, even though it was inadequate in a vital area.

Another major component of evaluation is *measuring prize impact*. Designers should develop measurable indicators of success before launching the prize. Without these indicators and corresponding impact evaluation approaches, the prize may conclude without producing a clear understanding of whether it achieved or at least advanced the organization's goals, which can be disheartening to participants and designers alike. Thus "evaluability" should be an explicit objective of prize design.

Developing measures of success during the design phase can be helpful in several respects. It reinforces discipline in the design team to ensure that design elements link to desired outcomes. It shows skeptical stakeholders that the prize's effectiveness can be gauged objectively. And it assists the organization in assessing its overall return on investment. In anticipation

of end-of-prize impact evaluation, measures of success can be deployed for intermediate outcomes, such as milestones for building prototypes or website page impressions for raising awareness. In addition, designers can evaluate other important intermediate outcomes, such as strengthening the community of participants, improving their skills and knowledge, and mobilizing capital on their behalf.

Because measures of success can be both quantitative and qualitative, effective evaluation will typically include systems to gather both kinds of data systematically and also capture unexpected data, such as wider impacts of the prize process. Common approaches include:

- **Measuring funds leveraged.** The MIT Clean Energy Prize, for example, distributed \$1,000,000 to its winning teams. The teams were asked to develop business plans for the prize and submissions generated \$85,000,000 in capital and research grants.<sup>46</sup>
- **Comparing outcomes with alternatives.** The Talent Dividend Prize sponsored by CEOs for Cities and the Kresge Foundation, for instance, supports college graduation with a \$1,000,000 prize. The designers measured returns by comparing the results with the opportunity cost of four fully funded college scholarships. In this case, the prize produced more than four college graduates and was therefore judged a success.<sup>47</sup>
- **Assessing reach and influence.** For certain outcomes, such as raising awareness and mobilizing action, evaluation can involve tracking net new followers and activities undertaken by participants during and after the prize to build on what they produced. The EPA ENERGY STAR National Building Competition, Battle of the Buildings, used the “Biggest Loser”-style competition to save energy and reduce greenhouse gas emissions. To make their results more meaningful and measurable, the EPA asked participants to find creative ways to

contextualize how much energy their buildings were saving. Some of these submissions went viral and grabbed the attention of Good Morning America and *The New York Times*.<sup>48</sup>

To create these metrics, designers should consider what evaluation indicators and measures can be collected during the prize (that is, media impressions or surveys of competing teams that collect information regarding dollars/hours spent preparing solutions), and what outputs and outcomes should be assessed in the months and years following the challenge (that is, follow-on investment, change in public opinion, market adoption, scale, and behavior change decay rate). The latter measures may require significant investment of time and resources during the “legacy” phase post-award. Designers should also note that getting post-award data from participants may necessitate building reporting requirements into the prize rules to enforce compliance or allow access.

The use of objective, third-party data such as government statistics can increase the credibility of the prize evaluation process, but in almost all cases it is necessary for designers to obtain new data. The Aspen Prize for Community College Excellence, for instance, first worked with a data/metrics advisory panel to develop a model for selecting the top 120 US schools. The institute then asked the eligible institutions to submit applications featuring data about how they were advancing student learning. Working in tandem with the data/metrics advisory panel, the institute organized and analyzed these data to determine winners.<sup>49</sup>

There should be an overall evaluation of whether the prize was worth it. This is not a simple matter of comparing the direct cost of running the prize to the value of the solution produced. In some cases, a prize might have been unnecessary, and the solution would have come about through other means. In other cases, the wider impact on participants who don’t win, including those who go on to

develop new innovations because of what they learned during the prize, will be significant.

Measuring changes should not only be limited to positive impacts. Particularly for government agencies, there should be follow-up to explore whether there have been unintended negative impacts of the prize implementation. Return on investment calculations often leave out the wider costs incurred by other parties in the process. An overall “value for effort” calculation, taking into account positive and negative impacts on winners and losers as well as resources used by other parties, provides a more reliable and comprehensive view of the merit, worth, and value of a prize. In particular, such an analysis would be helpful in checking for wider potentially negative impacts—such as organizations becoming less inclined to participate in prizes because of the low return on their investment.

In addition to measuring the changes that have occurred, there should be some investigation of the extent to which change can be attributed to the prize. Experimental and quasi-experimental designs, involving a control group or comparison group of participants may be feasible in some circumstances, but they are unlikely to be cost effective or ethically acceptable given the human subjects that need to be involved. Instead, rigorous non-experimental approaches to causal attribution and contribution are useful to identify possible alternative explanations for the impacts, and whether they can be ruled out.

These various approaches to evaluation need more than a few simple metrics to track. Designers need to think carefully about what they are trying to assess, when and how, so that they can surface the most helpful insights for their current and future prizes. Designers sometimes create independent teams to assess the success of their work, as illustrated by the Rockefeller Foundation, which uses an evaluation group to study the impact of its innovation projects.<sup>50</sup>

## Motivators—You get what you incent

Motivators spur participation and competition. These incentives should encourage the right participants in the right ways to do the work required by the prize. Successful designers use motivators to increase the participants’ return on their investments of time, effort, and resources.

The prize award itself is, of course, the most visible motivator, encouraging participation and channeling competitive behavior toward the desired outputs and outcomes. Historically, awards have included cash purses, public recognition, travel, capacity building (that is, structured feedback and skills development), networking opportunities (that is, trips to conferences), and commercial benefits (that is, investment and advance market commitments). Public sector challenges often feature diverse awards. At one end of the spectrum is the Department of Energy’s L-Prize, which offers a \$10,000,000 cash award and an advance market commitment to those who develop the next-generation light bulb. At the other end is the Department of Health and Human Service’s Apps Against Abuse, which targets domestic violence and motivates participants with an award solely of a public winner announcement by government leaders.<sup>51</sup>

The size and type of award provides designers with important signaling effects and leverage opportunities. Designers typically try to ensure that the purse is commensurate with the magnitude of the problem, the types of participants required, the amount of time likely to be involved in reaching a solution, and the amount of media and public attention desired. Qualified participants are unlikely to compete if the prize offers a small purse but requires a year or more of effort on a hard problem. For prizes that require commercial participants, such as established companies or startups, the purse must be economically interesting in the sense that it could defray research and development costs, pay for certain types of risks and opportunity costs, or

provide something companies can highlight for branding purposes, such as third-party validated performance data or a “badge” marking the company’s submission as successful in the prize. Large purses are also more likely to encourage the formation of new teams including both technicians, experts from relevant disciplines, and investors. For prizes seeking outcomes such as development of prototypes, pilots, or market stimulation, this element of design is critical because it helps designers attract outside capital.

*Mentorship* also can be a motivator and is used increasingly in prize design.

Designers can incorporate mentorship in the prize structure, providing participants with access to experts, tools, leading practices, and other resources to accelerate the development of high-quality solutions and support the formation of communities of interest around the problem.<sup>52</sup> Participants do not

need to win to benefit from this experience.

Some designers pair winners with industry leaders to drive post-award momentum. The Apps 4 Africa challenge, established by Appfrica (one of Africa’s oldest acceleration programs), provides winning African technology entrepreneurs with mentors who help them with business development and product design. This mentorship has helped 11 new companies raise an average of more than \$90,000 each in follow-on funding.<sup>53</sup>

Many designers are developing *collaborative environments*, enhancing knowledge sharing among participants by developing rules and evaluation criteria that encourage them to work together. Some intentionally develop opportunities for traditional participants to collaborate in problem solving, using virtual

and in-person team summits and participant “bootcamps.”<sup>54</sup>

But collaboration in prizes is not always useful. Intentional matchmaking among participants can be tempting, but it can also lead participants or observers to think the prize is fixed or that its administrators are interfering too much in the prize’s outcomes. Furthermore, while collaboration may be appropriate for achieving certain outcomes, fierce competition can *also* be useful, particularly for shortening product development timelines. Designers should carefully evaluate

Designers should carefully evaluate this trade-off between collaborative and competitive motivations when thinking about the best path to a particular outcome.

this trade-off between collaborative and competitive motivations when thinking about the best path to a particular outcome. For example, if seeking a new prototype, the intensity of competition may need to be high to accelerate prototype performance on an aggressive timescale. If, however, the designer is seeking increased engagement among a population, then more

collaboration may inspire others to begin participating in the prize.

Finally, for certain outcomes, *intellectual property rights* can serve as a powerful motivator. The prize sponsors’ degree of ownership over submissions is a key design consideration. Do they want to use the solution in a proprietary manner, require that solutions be made available to the public through an open source license, or just to have access to it in the marketplace? The options range from full retention of rights by participants to full retention of rights by the organization running the prize. One important consideration for US government leaders interested in stimulating innovation is how the America COMPETES authority protects participants’ intellectual property.<sup>55</sup> Regardless of where the prize falls on this



spectrum, clear, upfront terms of ownership are critical. The rules for the US Air Force's Fuel Scrubber challenge, for example, clearly stated that winners will retain their intellectual property rights, signaling in advance that challenge participants can commercialize their winning solution and profit from it in the market.<sup>56</sup>

## Structure—Your boundaries set the frame

Structure, or prize architecture, is the set of constraints that determines the scale and scope of the prize, as well as who competes, how they compete, and what they need to do to win. A competition period that lasts too long risks losing participant interest and one that ends too quickly may not give participants enough time to develop solutions. Winner-takes-all prizes can discourage participants with low risk tolerance. Those with well-defined phases and milestones can modulate competition, winnow participants at different stages, and reward only the most innovative solutions. Due to such considerations, successful designers devote significant time and effort to prize architecture.

*Eligibility requirements* shape the population of participants. Which participants should designers target—individuals, teams, organizations, established institutions, or even political entities such as cities or states? The choice involves at least two considerations. First, given the desired outcome, who is best positioned to solve the problem? Who has the right skills, resources, and interests? Second, if the desired outcome includes a form of engagement extending beyond the immediate pool of potential participants, how can they influence the larger community or stakeholder group? It is worth noting that in the case of challenges sponsored by the US government, participant eligibility is shaped by the authorities under which the challenge is administered.

The Georgetown University Energy Prize, sponsored by the Joyce Foundation, the American Gas Foundation, and the Department of Energy, among other partners, challenges communities “to work together with

their local governments and utilities in order to develop and begin implementing plans for innovative, replicable, scalable and continual reductions in the per capita energy consumed from local natural gas and electric utilities.”<sup>57</sup> This example provides insight into how designers can structure eligibility requirements to shape team formation and expand the influence of the prize beyond individual citizens.

Successful designers often try to define their prizes in ways that will attract the largest and broadest pool of participants, as the most innovative solutions often come from those without previous exposure to the underlying problem. Even when casting a wide net, however, designers should be careful about eligibility. For some, the quality of submissions is more important than their quantity, or resource constraints may dictate a smaller participant pool, making restricted eligibility the best choice. For others, the variety and sheer quantity of submissions that can be obtained from broad eligibility requirements are more desirable. Narrow eligibility requirements thus may be best for a prize seeking a handful of thoughtful concept papers about a technical solution, while broad requirements could be better for a challenge seeking a new logo design.

If multiple types of participants are desired, designers should consider whether a certain team profile increases the possibility of a successful outcome. Additionally, designers must think about whether different types of participants should compete in one pool or be separated into different categories. For example, the US FIRST Robotics Competition hosts four age-based classes of challenges for students aged 6-18: Junior FIRST LEGO League, FIRST LEGO League, FIRST Tech Challenge, and FIRST Robotics Competition. The FIRST Robotics Competition requires a minimum of 15 high school students and 3–6 professional adult mentors per team.<sup>58</sup>

*Prize length* typically consists of two time periods, those for submission development and for judging. The former requires designers to determine the appropriate time likely to be needed to reach a particular outcome. For example, the Case Foundation's Finding Fearless competition was focused



on generating ideas to solve chronic social challenges and gave participants only 20 days to submit their ideas. DARPA's UAV Forge competition, by contrast, gave participants 152 days to showcase a working prototype of an unmanned aerial vehicle.<sup>59</sup> Data on prize length is detailed in the following sections by outcome. Designers should note that the lengthier the prize, the higher the likelihood of administrative staff turnover. It is critical that designers document their rationale and assumptions behind key design decisions and desired outcomes for any potential staff transitions.

Designers often engage with subject-matter experts or potential participants to develop a realistic assessment of the time needed for solution development and the likely number of submissions. This information can also be used to estimate the appropriate number of judges needed to ensure a timely review. The selection of judges with the appropriate technical expertise and availability to commit their time for thorough reviews is critical for outcomes focused on developing prototypes and stimulating markets. Designers should estimate the time required for an individual judge to assess submissions or the time for a panel of judges to reach consensus on the relative merits of prize submissions, and use those estimates to determine the number of part-time judges needed. If the number of part-time judges becomes unwieldy for challenge administrators based on this approach, designers should consider compensating judges to receive full-time evaluation support.

Designers also consider various forms of *challenge segmentation* to encourage certain kinds of behavior. Dividing the challenge into rounds can allow participants to modify and improve their submissions, thus increasing their quality. As an example, the Institute of Justice's Ultra-High Speed Apps challenge has two phases, the first solely for the generation of the app ideas and the second for actual software development.<sup>60</sup>

Some designers segment their prize structure by *topic*, with multiple related sub-challenges taking place concurrently. This can increase the prize's impact by elevating the

importance of certain topics and attracting a broader set of solutions. The EPA's Campus RainWorks Challenge, for instance, invites students to design an innovative green infrastructure project for their campus, offering two topic areas. One category involves designing a master plan for a broad area of campus; the other seeks designs for a smaller location.<sup>61</sup>

Designers can also segment prizes by *geography*, with simultaneous challenges in separate locations (such as state challenges leading to a national final round). The Strong Cities, Strong Communities (SC2) Challenge is a federal interagency initiative seeking innovative ideas to incent economic development. The challenges are customized to the areas they are designed to help: Las Vegas, Nevada; Hartford, Connecticut; and Greensboro, North Carolina.<sup>62</sup> Such a strategy can help manage larger-scale challenges and focus attention on site-specific solutions for targeted areas.

## Communications—If you build it, they may not come

Communications serve several different strategic goals. They can attract participants, spur them to compete, and maintain their interest afterward. Also, communications keep partners and stakeholders informed about the purpose and progress of the prize, helping to secure their support and, in some cases, funding. For many designers, communications are also a mechanism for achieving certain specific outcomes, such as building market awareness of new capabilities or public enthusiasm for new behaviors that further the public good. Because communications are so important, designers should plan and invest carefully to build the right buzz.

Effective prizes use *robust branding* plans to build recognition and credibility among the participant and stakeholder communities. This can be achieved through press releases, social media, and targeted invitations, using the organization's and partners' networks where appropriate. During Bloomberg Philanthropies' Mayors Challenge, for instance, challenge administrators sent personalized invitations

to eligible cities outlining the challenge's importance.<sup>63</sup> Establishing a clear and powerful brand is critical to the post-award legacy of the challenge and will significantly impact the challenge's sponsors' ability to attract public attention and the desired participants to future rounds. Many broadly recognized challenges dedicated significant time and resources to building a lasting brand including but not limited to the Mayors Challenge, XPRIZE, and the NASA Centennial Challenge.

To build credibility, designers should *clearly publicize rules and evaluation criteria* and regularly update participants and stakeholders on the process. To facilitate these communications, external partners can provide expert advice and support. For example, Nesta has partnered with the UK Department for Business, Innovation and Skills and made use of their combined networks to market its Open Data Challenge Series to potential participants.<sup>64</sup>

Strong communications help designers to *manage relationships with participants and partners* during prize implementation. It's useful to create regular check-ins with participants and provide them with effective communication channels to discuss any issues that may arise. Check-ins also provide participants with feedback that can lead to more effective solutions. For example, the Department of Energy's National Geothermal Student Competition featured two phases. The first 30-day phase required an initial concept paper. Teams chosen for advancement were then required to participate in three biweekly review meetings and submit regular reports documenting their progress over the course of the challenge to ensure they were progressing toward a final product.<sup>65</sup>

Designers attempting to build communities or markets typically establish *post-award messaging capabilities*. This may involve periodic post-award webinars; publications summarizing lessons learned, data captured, and aggregate outputs from the prize; "road shows" to visit relevant conferences, agencies, legislators,

and other stakeholders; and reunion conferences that encourage participants to discuss their progress or even online collaborative spaces. For example, the International Space App Challenge was a two-day "hackathon" that included 9,000 people who met at 83 locations as well as 8,300 remote participants. Together, they worked on 50 different NASA challenge topics and developed 770 solutions in the course of one weekend. After the global awards, local leads from each location facilitated the creation of Google Groups to serve as a medium for ongoing communication and idea sharing between the participants.<sup>66</sup>

## Prize design outcomes

In the last five years, public sector prize design has become increasingly diverse and sophisticated, with a shift in focus from prize types to outcomes. In the past, the selection and use of a prize type, such as a "point solution" prize for new technology, reflected a somewhat rigid belief that prize types and outcomes should match exactly. As designers have become more comfortable and flexible in crafting prizes, they are finding that it is better to begin with the outcomes they want to achieve and then assemble the right mix of design elements to achieve them.

In this section, we examine the six key outcomes designers most often pursue as well as the prize design elements that are critical for achieving these outcomes. While designers should recognize that prizes usually require all five of the elements of design introduced above, we highlight those elements that are most important to get right to ensure that the prize achieves its intended outcome. We also know that many prizes seek and achieve multiple outcomes. Consider the MIT Clean Energy Prize, which distributed \$1,000,000 to its winning teams. While the prize explicitly solicited business plans, it has *also* stimulated the market by generating \$85,000,000 in capital and research grants.<sup>67</sup> Many advanced designers attempt to use prizes both to develop markets for a technology, good, or service *as well*

Figure 3. Getting started with the elements of prize design



Graphic: Deloitte University Press | DUPress.com

as to create social impact. Appendix A offers more detailed guidance.

Advanced prize designs can reach a range of actors. For outcomes aligned to developing ideas, technologies, products, or services, designers typically focus on the participants who are creating models or tangible items to achieve a particular outcome. For prizes aimed at engaging people, organizations, and communities, designers are generally concerned with participants as well as a *broader* audience that may include people, groups, organizations, or even institutions.

As designers work with the elements of design to build a prize, they also consider its legacy. Using prizes or challenges more generally to achieve certain outcomes requires taking the long view. Designers evaluate how a prize will work with other problem-solving

approaches, which their organizations may be able to deploy. They make plans to engage participants and broader audiences after the prize concludes to reinforce key messages, branding, or desired behaviors. They build post-prize activities and foster networking and learning opportunities to help participants strengthen and refine the innovations that were incented by the prize. When designers want to simulate markets, they may develop a series of challenges that pull participants through different stages of the innovation process—first a prize to produce, test, and improve a model and then perhaps an advanced market commitment to help winning participants gain traction in an emerging market. Designers who ignore their post-prize legacy when trying to assemble the elements of design risk undermining their own desired outcomes.



Figure 4. Major outcomes for incentive prize design



## Developing ideas, technologies, products, or services

### Attract new ideas: Solicit concepts and techniques

Prizes allow designers to identify and expand on fresh, innovative ideas. They can focus the efforts and ideas of lots of different people with widely varying viewpoints on a broad range of public problems. The prize can gather existing ideas, expand existing ideas, or help create new ones, especially if new participants are brought into the solution space, given additional resources, or stimulated with new ideas and connections. As Michael Smith from the Corporation for National & Community Service and formerly of the Case Foundation put it, “Prizes give you a way to lift up an idea.”<sup>68</sup> Idea outcomes may take the form of:

- Pithy taglines, such as the Federal Voting Assistance Program’s Slogan Contest, whose submissions could not exceed 15 words<sup>69</sup>
- Theoretical concepts, such as the Department of Defense Humanitarian Airdrop Prize, which sought white papers on how to drop food and water out of planes safely and effectively<sup>70</sup>
- Actionable business plans and detailed technical design specifications, such as the Institute of Justice Body Armor Challenge, which sought 30-page technical approaches for testing the integrity of body armor<sup>71</sup>

In order to generate useful submissions, effective designers often provide participants with context about why they are seeking ideas and what they intend to do with them. For example, the Rebuild by Design competition administered by the Hurricane Sandy Task Force used a multistage challenge to attract design proposals that increase the resiliency of regions affected by Hurricane Sandy. The designers quickly and effectively solicited

concepts and communicated the end goal of employing the solutions to rebuild the Tri-State area.<sup>72</sup> But, *caveat emptor*: The quality and workability of submissions will depend *strongly* on the selected design elements. The fundamental design challenge for this outcome is to strike the right balance between numbers of concepts and techniques solicited, processes used to review them, and plans for what happens to winning ideas.

### Outcome benefits

- **Tap the wisdom of the crowd:** Prizes focused on attracting new ideas can allow organizations to quickly obtain new concepts from a broad community and provide a broad survey of possible approaches to solving a problem. As Guido Joueret of Cisco Systems explained, “We believed that by opening ourselves up to the wider world, we could harvest ideas that had far escaped our notice and in the process break free

#### BY THE NUMBERS ATTRACT NEW IDEAS<sup>73</sup>

- Total prize purse ( $n = 94$ )
  - Minimum: \$0
  - **Median: \$13,250**
  - Maximum: \$2,000,000
- First place prize purse ( $n = 77$ )
  - Minimum: \$0
  - **Median: \$5,000**
  - Maximum: \$100,000
- Start to submission length ( $n = 77$ )
  - Minimum: 2 days
  - **Median: 62 days**
  - Maximum: 230 days
- 22% had multiple rounds

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## G-20 SME FINANCE CHALLENGE

Leaders of the G-20 countries in partnership with Ashoka Changemakers launched the Small and Medium Enterprise (SME) Finance Challenge to solicit groundbreaking ideas on how public interventions can unlock private finance for SMEs across the world.

Designers knew how these new ideas would be used after the challenge—the G20 countries created a \$558 million fund to scale and support these new ideas. The short time period between start and submission (only 41 days) as well as a \$1,000 early entry prize maintained momentum to increase the number of participants.

Challenge designers lined up eight well-respected judges to work through the 333 participant submissions. As a non-monetary reward, the challenge winners attended the G-20 Seoul Summit as well as an SME conference in Germany.<sup>74</sup>

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from the company-centric ways of looking at technologies, markets and ourselves.”<sup>75</sup>

- **Take a big challenge in small bites:** These prizes can be used to break a complex, ambiguous problem into smaller, less daunting parts. In some cases, prizes focused on attracting new ideas can help designers define the problem statement for a subsequent, bolder challenge.
- **Customize problem solving:** Prizes that reward ideas can be tailored for specific types of participants and problems. For example, the designer can use a broad problem statement, with open eligibility and robust marketing, to tap a large population of participants or opt for a specific problem statement with restricted eligibility to attract a highly skilled technical community.

### Critical design elements



#### Structure—Select your competitors

Designers typically seek one of three types of participants: the public; a broad mix of expertise; or specialized, often scientific, communities of interest. This choice strongly influences the quality and diversity of participant submissions, with the risk that a mismatch

between the problem and participant pool may generate few workable ideas.

To manage this problem, it can be helpful to use a technology platform associated with specific types of participants. Today, multiple online platforms can help facilitate and run prizes, such as InnoCentive, which solicits ideas from the scientific community, and Ashoka, which engages social entrepreneurs. Such platforms can tap into particular communities of interest, facilitate collaboration among participants, and support prize-related communications. (See Appendix D for a list of technology platforms.)



#### Evaluation—Determine how you'll use the idea

It's tempting to measure challenge success simply by the number of responses. While it's true that a large number of responses increases your odds of finding a good idea, the workability of those ideas is even more important. In the *Stanford Social Innovation Review*, Kevin Starr warns designers: “Most crowdsourced ideas prove unworkable, but even if good ones emerge, there is no implementation fairy out there, no army of social entrepreneurs eager to execute someone else's idea.”<sup>76</sup>

The Air Force Research Lab (AFRL) provides a strong example of translating submissions into workable solutions. Specifically, AFRL challenges include submission

evaluation criteria that can be validated and further refined through laboratory testing with a focus on the ultimate use of the idea.<sup>77</sup> Additional examples for designers include criteria to evaluate the maturity of submissions, the speed at which the submissions can be developed into prototypes or pilots, and the cost and ease of implementing submissions given an organization's resource constraints.



**Resources—Be prepared to assess submissions efficiently**

Good designers typically match the anticipated volume of submissions with an appropriate number of properly resourced judges. Given the relatively low barriers to entry for prizes seeking ideas, however, the sheer volume of submissions can sometimes surprise and even overwhelm. Designers can forecast the likely number of submissions by examining trends from past prizes, surveying the potential participant community, and sending invitations requiring RSVPs to targeted groups.

To maintain credibility with participants and sustain interest in the prize, successful designers often seek to reduce judging time. Many employ a two-step screening process: a larger, less specialized staff conducts an initial review before passing on the most promising ideas to expert judges. This review process, however, must be transparent to avoid perceptions of unfairness.

## Recommended design tactics

- **Standardize submissions and clearly weight judging criteria:** A common failure point of prizes seeking new ideas is unclear criteria for picking a winner. If judges must pick between apples or oranges, there is a higher risk that participants will dispute the results. In contrast, the FTC Robocall challenge made judging criteria especially straightforward. The three evaluation questions and corresponding weighting included: 1) Does it work? (50 percent), 2) Is it easy to use? (25 percent), and 3) Can it be implemented? (25 percent). To level the playing field with individual participants, the FTC developed a separate track for organizations with 10 or more employees.<sup>78</sup>
- **Use multiple rounds:** Prizes that focus on attracting new ideas increasingly feature multiple rounds to winnow the best submissions before final award.
- **Consider shorter and smaller challenges:** Prizes seeking new ideas typically employ smaller purses and shorter competition lengths than those seeking other outcomes. This is justifiable to participants due to the lower level of effort required.
- **Design the prize with the end use in mind:** Clearly communicating how winning ideas will be used can improve participation and spur participants to generate particular types of ideas. By linking ideas to the organization's larger mission, designers can build stronger, deeper, and more lasting connections with the communities that generate them.

## Build prototypes and launch pilots: Produce, test, and improve models

For prizes seeking to build prototypes or launch pilots, the goal is not simply to generate an idea that addresses an important public problem, but rather to realize a *functional version* of a technology, product, or service, and sometimes test it with its intended customers.

Building prototypes or launching pilots often entails the creation of new technologies and can be particularly effective for shepherding them through late-stage research and early-stage development, a difficult part of the innovation lifecycle sometimes called the “valley of death.”<sup>79</sup> For example, the My Air, My Health Challenge run by the EPA and the HHS spurred the creation of sensor prototypes measuring pollution's health impacts, but also



required participants to demonstrate how environmental agencies and individual citizens could put these systems into practical use.<sup>80</sup>

## BY THE NUMBERS

### BUILD PROTOTYPES AND LAUNCH PILOTS<sup>81</sup>

- Total prize purse ( $n = 114$ )
  - Minimum: \$0
  - **Median: \$35,644**
  - Maximum: \$3,050,000
- First place prize purse ( $n = 98$ )
  - Minimum: \$0
  - **Median: \$15,000**
  - Maximum: \$2,000,000
- Start to submission length ( $n = 101$ )
  - Minimum: 1 days
  - **Median: 84 days**
  - Maximum: 616 days
- For evaluation criteria ( $n = 114$ )
  - 57% of prizes used subjective criteria
  - 29% used objective criteria
  - 18% used a hybrid of subjective and objective criteria
- 14% of prizes used a leaderboard, and 12% were hackathons ( $n = 114$ )
- For motivators ( $n = 114$ )
  - 86% of prizes used monetary incentives
  - 82% used recognition
  - 49% involved commercial benefits

This outcome is particularly attractive because it can provide access to a new range of useful products and services, while requiring the organization to pay only for those that meet its needs. Prizes leading to products have the added benefit of relatively quantifiable and objective metrics of success.

Designers focused on services can also require practical demonstrations of success. For example, in New York City, a School Choice Design Challenge recently asked participants to develop a new software application to help families select high school programs. If a winning app is selected, it will make it easier for New York City eighth graders to choose among more than 700 high school program options each year.<sup>82</sup>

An important consideration for designers focused on this outcome is providing participants access to facilities to test prototypes. The cost and logistical challenges of creating an environment to iterate upon solutions is a significant barrier to entry that can stifle innovation. Designers focused on this outcome should consider providing access to testing facilities in order to place the focus of participants on research, innovation, and ideally future commercialization.<sup>83</sup> For example, the Wendy Schmidt Oil Cleanup X CHALLENGE asked participants to develop solutions to clean surface oil from seawater. The challenge was valued at \$1,400,000 and provided participants an opportunity to test their work at the National Oil Spill Response Research & Renewable Energy Test Facility.

Designers seeking to build prototypes or launch pilots should pay careful attention to problem definition as well as particular elements of design, such as *motivators* and *structure*. Expert designers can spend months in defining the technical problem, so that the prize is appropriately bounded. The Centers for Medicare and Medicaid Services's Provider Screening Innovator Challenge, which asked competitors to develop screening software programs to help ensure that Medicaid funds are not diverted from the most vulnerable Americans, required more than a year to

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## NEW YORK CITY—BIG APPS 2012

New York City's Big Apps Challenge sought innovative software applications that made municipal data more accessible to city residents.

Designers tapped into the developer community to access external expertise. They considered analogous challenges to help set the \$50,000 purse. Designers broke the challenge into 10 topics (for example, green, health and safety, and mobility) and posted clear requirements for each category. They included commercial benefits, inviting investors such as BMW to help judge the challenge. Finally, New York City included an "Investor's Choice Winner" and allowed the grand prizewinner to demo the app at the New York Tech Meetup.

The Big Apps Challenge spurred the development of 96 apps using municipal data in new and innovative ways.<sup>85</sup>

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develop and ultimately involved 124 "mini-challenges" to attract the right solutions.<sup>84</sup>

Motivators and structure also matter because prize designers need to ensure that they attract the right kinds of participants, and that those participants are encouraged to compete in the right ways. Designers will often carefully study the motivations of distinct participant groups, including startup companies, large corporations, and academics, to ensure the challenge appeals to those most likely to compete.

### Outcome benefits

- **Develop new intellectual property:**

Building prototypes or launching pilots can require significant time and money, especially when designers seek solutions that serve a public good, but are not attractive to commercial markets. Designers can overcome these barriers through a variety of incentives, including attracting investment capital, encouraging merger and acquisition activity, and building market awareness. One of the winners of the USDA's Healthy Apps for Kids challenge used the momentum of the prize to develop a commercial opportunity. The media coverage surrounding his winning solution led to a for-profit version, with partners providing licensing and advertising opportunities.<sup>86</sup>

- **Engage external viewpoints to test ideas:**

A prize can be a valuable tool for organizations that lack the internal capabilities to develop a prototype or pilot. Such prizes allow public agencies to tap into a diverse array of experts, tinkerers, inventors, and investors to achieve results beyond their own means.

Consider the daunting task of designing dexterous, yet durable gloves for spacewalks. In 2009, NASA's Astronaut Glove Challenge asked participants to improve space suit glove design to reduce the effort needed to execute tasks and improve the durability of the glove. Using a challenge allowed NASA to engage external participants to reimagine design and build a proof of concept.<sup>87</sup>

- **Clarify your requirements:** The design process for prizes that build prototypes or launch pilots can involve a broad community of potential participants (for example, companies, nonprofits, universities, and individuals), spurring them to examine technical requirements and determine the breakthroughs needed to achieve them. By defining success for a specific problem, prize designers can help a community of participants coalesce around critical technical or programmatic specifications.

## Critical design elements



### Resources—Be prepared with market analytics

Organizations often seek technical solutions unavailable in the commercial market. In these cases, prize development may require a relatively high operational budget to conduct a landscape review of immature market players, craft the problem statement, and design selection criteria. Partners that could make money from winning prototypes and are willing to invest in the prize can help cover some of these costs.



### Motivators—Tailor the purse to competitor risk and market conditions

To set the purse appropriately, designers typically investigate the costs of solution development as well as the potential market value of the new product or service. This requires economic and market analysis, a capability many public organizations lack and therefore engage vendors to complete.

The purse does not need to cover the entire cost of development, particularly if outside investors are interested in supporting participating teams, but it does need to cover at least some of the risk participants assume. If only a small purse is possible, designers can supplement it with other non-monetary benefits, such as access to data, strong intellectual property protections, and introductions to venture capitalists. Remember, though, that commercial participants are unlikely to devote money or time to develop new products or services unless they believe they can sell them into an existing or emerging market.



### Evaluation—Make sure the winner selection is unambiguous

The selection criteria for the winning submission should be quantitative, rigorous, and testable, particularly for prizes with a technological focus. In the course of prize design, it is helpful to develop, vet, and test criteria with

outside experts and potential participants and partners to avoid having to revisit selection criteria during the course of the prize.

## Recommended design tactics

- **Hold mini-challenges:** Challenges for new algorithms are common and are increasingly being split into measurable mini-challenges that build upon one another. These challenges often employ a contract with vendors, such as TopCoder, to administer the effort. These mini-challenges can be hosted on a single microsite, allowing participants to see how sequential milestones fit together. At the conclusion of the challenge, agencies can make use of the winning algorithm.
- **Use public leaderboards:** For longer challenges requiring rapid, iterative development, public leaderboards reporting participants' progress can create an increasing sense of urgency among teams while generating publicity. As one team comes closer to the required performance criteria, others increase their efforts and investments to catch up. For example, DARPA's Shredder Challenge focused on developing tools to piece together shredded documents and used a public leaderboard to display all participants and their points. DARPA periodically used press releases to announce the top teams on the leaderboard.<sup>88</sup>

## Stimulate markets: Create and scale new markets

If building prototypes or launching pilots seeks new technologies, products, and services, market stimulation seeks their *commercialization*. Public organizations often want to develop products or services not yet available in the market, or want to broadly encourage markets to sell innovative products or services that can achieve a public good. Using prizes to simulate markets can be a powerfully and positively disruptive force. It can, for example, lead

to new cybersecurity capabilities, or foster the creation of next-generation sustainable energy technologies that governments and ordinary citizens can buy.

One example of a challenge that stimulated a market was the NASA/Google Green Flight Challenge, which sought to create emission-free flight vehicles, and led participants to invest more than \$6,000,000 in pursuit of a purse of only \$1,650,000. The Green Flight Challenge energized this nascent market; the two winning companies continue to make waves in the industry.<sup>89</sup> The first-place winner, Pipistrel, has developed additional ultralight aircraft models, with more than 350 of them flying around the world.<sup>90</sup>

## Outcome benefits

### • Usher new ideas into the market:

Mechanisms such as advance market commitments and large purses can be effective incentives. For example, the Department of Energy's L-Prize is designed to develop a more efficient light bulb. The L-Prize is structured to provide the winner with an advance market commitment, a government promise to purchase a certain number of the bulbs at a guaranteed price, thus helping the market grow and become self-sustaining. Advance market commitments have also been used effectively to bring vaccines to populations that previously could not afford them.<sup>91</sup>

- **Redefine markets:** Prizes can spur private sector participants to commercialize technologies previously limited to government. For example, the now-classic Ansari XPRIZE created a rapidly growing market for private space vehicles, a domain previously dominated almost exclusively by government. They can also help to mature or refine existing markets. The Progressive Insurance Automotive XPRIZE sought to drive industry progress toward higher fuel efficiency standards. The challenge helped to demonstrate the commercial feasibility

and desirability of automotive technologies that enable cars to go much further using less fuel.<sup>92</sup>

## BY THE NUMBERS: STIMULATE MARKETS<sup>93</sup>

- Total prize purse ( $n = 4$ )
  - Minimum: \$1,650,000
  - **Median: \$10,000,000**
  - Maximum: \$15,000,000
- First place prize purse ( $n = 4$ )
  - Minimum: \$6,000,000
  - **Median: \$1,300,000**
  - Maximum: \$10,000,000
- Start to submission length ( $n = 4$ )
  - Minimum: 87 days
  - **Median: 688 days**
  - Maximum: 840 days
- For marketing ( $n = 4$ )
  - 100% of prizes used partner outreach, press releases, and websites
- For targeted communications ( $n = 4$ )
  - 75% of prizes targeted engineers
  - 75% targeted industry professionals
- For motivators ( $n=4$ )
  - 100% of prizes used monetary incentives
  - 75% used commercial benefits
- Recognized winners ( $n=4$ )
  - Minimum: 2
  - **Median: 3**
  - Maximum: 6

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## THE PROGRESSIVE INSURANCE AUTOMOTIVE XPRIZE

Oil dependence and the impact of burning fossil fuels on climate change have long stirred concerns about the sustainability of US transportation infrastructure. The Progressive Insurance Automotive XPRIZE, supported by the Department of Energy, sought to address these issues by reshaping the automotive industry. The challenge incented companies to create a new generation of viable, energy-efficient vehicles. Designers attempted to transform the market by using the prize as an opportunity to create and popularize a new consumer metric called MPGe (miles per gallon gasoline equivalent), which offers consumers a way to compare new vehicles that use a variety of energy sources with conventional vehicles. Using this metric and a series of other clearly defined technical specifications that integrated notions of safety, affordability, and desirability, designers created a multiple-round challenge, which allowed a wide range of participants to embrace different kinds of technology, yet still be judged in a transparent and fair manner. Designers awarded \$10,000,000 to the top three companies—all of their vehicles had over 100 MPGe—to ensure that the new market would have multiple players.<sup>94</sup>

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- **Reduce the price of new technologies:** Due to high production costs, early innovations typically are out of reach for most consumers. Large-scale market adoption may not happen if production costs stay high. Prizes can help overcome this problem by creating incentives that target production costs or efficiency. The Department of Energy recently announced a prize focused on lowering the costs of energy produced by wave energy conversion devices.<sup>95</sup> Additionally, the Department of Energy, together with a coalition of over 200 major commercial building sector partners, developed the Wireless Meter Challenge. The effort engaged US manufacturers to build wireless sub-meters that cost less than \$100 a piece, helping the government identify opportunities to save money by saving energy and giving coalition members the ability to buy lower-cost energy measurement tools.<sup>96</sup>

prototypes or launching pilots), the purse should be structured to provide a substantial benefit for multiple winners. In fact, the size of the purse needed to stimulate a market can be over two orders of magnitude larger than those for challenges focused on building prototypes or launching pilots as an outcome.<sup>97</sup> By ensuring that multiple participants receive economic benefit and recognition as a part of the challenge, designers can encourage a larger, more diverse group to submit entries.

As noted previously, designers can incorporate commercial and networking benefits into their prize structures, such as inviting participants to trade conferences, promising advance market commitments and engaging end users and investors (such as venture capitalists) as judges. Doing so can expand participants' long-term stakes in the prize, encourage them to compete again, and attract others to the new space.

### Critical design elements



**Motivators—**Make rewards large enough to sustain a business and stimulate the market

A large purse is required to support the high costs of market entry. Because market stimulation requires multiple participants to invest for an extended period (that is, the start to submission time is on average 604 days longer than challenges focusing on building



**Evaluation—**Balance technical performance with the ability to implement and scale

When evaluating prize submissions focused on market stimulation, it may be necessary to look beyond technical performance to a more qualitative, nuanced assessment of how a given solution might perform in a market setting. Thus evaluation criteria should include considerations of market entry, adoption, implementation, scaling, and firms available to



exploit the opportunity over the long term. As an example, the Gates Foundation and USAID Haiti Mobile Money Initiative offered financial rewards for companies reaching certain transaction milestones in creating a market for mobile money services in Haiti.<sup>98</sup>



#### Structure—Sustain your efforts with post-prize momentum

To stimulate markets beyond the conclusion of the challenge, designers use post-award features such as communications, marketing, support, and incentives that can help participants continue to grow the market or scale solutions. Leading practices include promoting partnerships with key stakeholders interested in scaling solutions, hosting follow-up webinars, distributing regular email newsletters, and building mentorship programs. Mentorship can take many different forms, including pairing winners with more established players in the business community to help them build their networks.<sup>99</sup>

### Recommended design tactics

- **Ensure regular touchpoints between designers and participants:** Regular interaction can help ensure participants continue to develop the market. Multiple rounds and milestone payments provide designers and judges with opportunities to ensure that participants maintain momentum in the newly formed marketplace.
- **Keep the customer involved:** When seeking solutions for a particular set of customers, designers should carefully consider their needs and requirements. One effective tactic is to create opportunities for participants to demonstrate their solutions to and receive feedback from the customers themselves. This provides critical user information and can identify key design flaws in the product or service before the challenge concludes. The Qualcomm Tricorder XPRIZE is using this practice.

The challenge is focused on improving public health through a futuristic solution—a palm-sized wireless device that can monitor and diagnose health conditions. The designers are planning consumer tests and have engaged in a partnership with the FDA for regulatory reviews.<sup>100</sup>

- **Establish advisory boards:** Leverage diverse industry stakeholders and organizations that can:

1. Provide input on prize design, administration, and legacy activities
2. Help the prize sponsors navigate the changing regulatory and market landscape over the long period of time these challenges usually run
3. Prepare key industry stakeholders for embracing the outcomes of the challenge if successful

### Engaging people, organizations, and communities

#### Raise awareness: Enhance exposure and educate on an issue

For many public organizations, raising awareness of the public or key stakeholder groups is a central part of their mission. This can be part of a series of integrated goals or a primary objective, such as increasing public knowledge of a particular service, topic, or issue. Successful designers who wish to raise awareness typically choose design elements that engage large populations, involve robust marketing plans, and feature clear metrics for evaluating success.

To raise awareness using prizes, designers find it helpful to get specific about who is in their audience. For some challenges, such as the SunWise with Shade Poster Contest, the

## BY THE NUMBERS:

### RAISE AWARENESS<sup>101</sup>

Total prize purse ( $n = 146$ )

- Minimum: \$0
- **Median: \$955**
- Maximum: \$1,650,000

• First place prize purse ( $n = 121$ )

- Minimum: \$0
- **Median: \$1,000**
- Maximum: \$1,300,000

• Start to submission length ( $n = 130$ )

- Minimum: 2 days
- **Median: 57 days**
- Maximum: 616

• For motivators ( $n=144$ )

- The top incentive was recognition (used by 94% of the prizes) followed by monetary (48%)

• For selection criteria ( $n = 142$ )

- 80% of prizes used subjective criteria
- 4% used objective criteria
- 15% used a mix of the two

• For judging ( $n = 144$ )

- 69% used expert judging
- 6% of prizes used public voting
- 26% used both

audience was quite focused—children under the age of 13. Effective design requires highly targeted marketing and communications to reach an audience like this.<sup>102</sup> In other cases, however, the audience can be quite broad, such as for the Famine, War and Drought (FWD) Relief campaign sponsored by USAID, which generated awareness and donations for these types of crises.<sup>103</sup> Designers are typically careful not to view broad audiences as undifferentiated or consisting of like-minded individuals who all have similar interests and goals. Rather, the larger the audience, the more important it is for designers to undertake audience segmentation, a type of marketing analysis that breaks large audiences into pieces, each of which has a common set of characteristics that can be targeted through specific media channels and with tailored messaging.

## Outcome benefits

- **Raise topic awareness:** Prizes focused on raising awareness as an outcome can put new topics on the public's radar and educate people about critical issues. Designers can use these prizes to target the general population or specific communities of interest.
- **Garner collateral for future campaigns:** Prizes that raise awareness are sometimes used to obtain marketing materials, such as videos, artwork, or stories, from target populations. Prizes focused on these outcomes may also recognize excellence in a specific field.

## Critical design elements



**Motivators**—Use a big megaphone as a reward

Challenges for raising awareness often have small purses because recognition is the primary reward. Successful designers use recognition to motivate participants by clearly



## STOP BULLYING VIDEO CHALLENGE

The Health Resources and Services Administration's (HRSA) Maternal and Child Health Bureau, located within the Department of Health and Human Services (HHS), launched the Stop Bullying Video Challenge to help prevent and end bullying in schools and communities nationwide.

They worked with the Federal Partners for Bullying Prevention, an organization comprised of 9 departments and 34 different offices, to tap into a diversity of experiences and take advantage of local outreach capabilities. They also made peer-to-peer communication an explicit goal of the challenge to build community and foster positive exchange. Finally, all videos became part of a larger tapestry of ideas and solutions for future campaigns to prevent and end bullying through the [www.stopbullying.gov](http://www.stopbullying.gov) website.<sup>104</sup>

communicating the types of acknowledgment winners will receive. The Small Business Administration's (SBA's) Small Business Week Video Challenge helped educate the public about how its programs and services can help entrepreneurs and small business owners start, scale, and succeed. Participants, in turn, used the challenge as an opportunity to market their small businesses and highlight how they had leveraged useful SBA programs. While no purse was offered, participants were incented to enter the challenge by the possibility of being profiled by both SBA Administrator Karen Mills and the White House through a Google + Hangout session.<sup>105</sup>



**Evaluation**—Check whether the intended awareness is being achieved

Maintain a concerted focus on evaluating the demographics and characteristics of participants during the entire prize. While it's important to select a winner, it is equally valuable to ensure that the appropriate participants and stakeholders are engaged and energized following award. Designers should develop metrics specific to the prize to confirm that their communication, marketing, and outreach efforts are working.



**Communications**—Partner with others to maximize reach

Successful designers invest time and money in marketing to build a prize's profile. Often, this involves partnering with an organization

whose network can promote the prize within a target community. Strategic marketing can further the positive perception and prestige of the prize, thereby enhancing the value of its award and the recognition winners receive.

### Recommended design tactics

- **Publicize awards:** Treat recognition as a reward and make it a centerpiece of your prize. Create and cultivate networks that will generate winning solutions through public events, social media, press releases, and organization websites. Offer certificates or virtual "badges" for websites and social media.
- **Maintain regular communication:** Invest time and resources to continue communicating with key participants and stakeholder communities after the prize concludes. Consider developing a blog or a newsletter to maintain engagement.
- **Evaluate impacts:** During and after the prize, measure participant demographics and evaluate how submissions are being used. For example, one useful measure could be how many individuals not previously engaged in a particular topic area became involved as a result of the prize. Such metrics can be incorporated into participant evaluation. For example, video challenges can be evaluated through crowd-sourced voting or a page view count.

## Mobilize action: Spark engagement and build skills

While raising awareness is essential for driving change, mobilizing action is a more ambitious outcome. This outcome achieves multiple goals: It helps participants interact in ways that improve submissions; generates

enthusiasm and publicity for the prize; and builds community among diverse groups. As John Bracken from the Knight News Challenge put it, the human network that comes out of a challenge is the “currency we care most about.”<sup>107</sup> Designers can use challenge mechanisms to encourage participation in capability building, networking events, mentorship activities, and workshops.

Just as designers identify audience segments when trying to raise awareness, they also carefully consider whom they are trying to mobilize, because different actors are compelled to behave in distinct ways. The “unit of mobilization” can vary dramatically, from individuals, teams, and groups to organizations, institutions, and subnational governments. Using different forms of analysis—consumer, market, regulatory, and organizational, to name a few—designers must evaluate the incentives and barriers to action for each of these actors to craft a prize that will mobilize them effectively. This analysis then informs the prize structure and, most importantly, its rules.

Action-oriented challenges are not necessarily trying to create collaboration among participants, unless it is useful for another outcome, such as developing a model or stimulating a market. In these cases, mobilizing action can look a little bit like private sector “coopetition,” in which participants are simultaneously rivals and peer mentors.

Mobilizing action can be especially valuable for designers trying to build networks or communities of participants. A good illustration is the Department of Veteran’s Affairs’ Blue Button for all Americans providers contest, which sought to encourage of the use of Blue Button personal health records. The purse offered \$50,000 to the first developer who coordinated the installation of Blue Button personal health records on the websites of 25,000 physicians and other clinical professionals.<sup>108</sup> RelayHealth won the challenge by making a Blue Button personal health record system available to all patients, including veterans, for more than 25,000 physicians across America.<sup>109</sup>

### BY THE NUMBERS

#### MOBILIZE ACTION<sup>106</sup>

- Total prize purse ( $n = 27$ )
  - Minimum: \$0
  - **Median: \$30,000**
  - Maximum: \$2,000,000
- First place prize purse ( $n = 27$ )
  - Minimum: \$0
  - **Median: \$3,000**
  - Maximum: \$100,000
- Start to submission length ( $n = 23$ )
  - Minimum: 1 day
  - **Median: 66 days**
  - Maximum: 616 days
- For motivators ( $n=27$ )
  - The incentives were recognition (96% of prizes), monetary (67%), networking (44%), commercial benefits (37%), and capacity building (33%)
- 22% of prizes provide mentorship opportunities ( $n = 27$ )
- Top marketing strategies ( $n = 27$ )
  - Website (100%)
  - Press releases (96%)
  - Social media (74%)
  - Blogs (70%)

## Outcome benefits

- **Connect communities:** Challenges that mobilize action bring together different groups of participants and can help them forge new identities associated with the challenge. For example, NASA's Zero Robotics Challenge, focused on student STEM engagement, requires individual teams to form alliances, fostering community building among the larger body of participants.<sup>110</sup>
- **Develop strategic partnerships and connections:** Action-oriented challenges can help designers create partnerships that can be used to advance their mission after prize implementation. Ashoka Changemakers accelerates lasting social change by bringing together high-potential social entrepreneurs through collaborative challenges.<sup>111</sup>
- **Enhance solution quality through collaboration:** Prize structures can yield higher-quality submissions by creating collaborative experiences that enhance participants' skills and abilities. For instance, if multiple rounds of the prize entail mentorship, feedback sessions, or even training, participants can use what they learn to improve their offerings in preparation for their final submission. Bloomberg Philanthropies' Mayors Challenge offers a particularly good example of this dynamic: 20 city finalists learn about innovative techniques and work together during Ideas Camp, while competing for the purse.<sup>112</sup>
- **Promote organizational change:** Action-oriented prizes also can be used by organizations seeking solutions from their own personnel. These prizes can help agencies find innovative ways to implement and scale solutions to organizational problems crafted by the people who understand them best. Prizes can spur participants to develop creative ways to roll out technological solutions across the organization, as illustrated

by the Blue Button for All Americans providers contest.<sup>113</sup>

## Critical design elements



### Motivators—Amplify purses with recognition and networking benefits

Many prizes focused on mobilizing action and developing skills deemphasize the purse as the most important motivator. Instead, they find ways to highlight multiple participants in addition to winners, because recognition and network access also provide strong incentives to compete. For example, Facebook and the Gates Foundation hosted the HackEd 2.0 Hackathon, which assembled 24 teams of developers and educators to build educational applications addressing college readiness, social learning, and out-of-school learning.<sup>114</sup> The event showcased the developers' skills and gave them the opportunity to meet and interact with driven and passionate peers in an intense shared experience.



### Structure—Help participants compete

Building adequate support structures for participants may require a larger operational budget. Funds can be allocated for workshops and conferences, mentorship resources during or after the challenge, and feedback sessions with partners who may also serve as judges. These interactions can provide powerful motivation, not only to get involved in the prize in the first place, but also to compete more intensely.



### Communications—Start with a blitz and maintain communications post-award

To mobilize action and maximize impact across audiences, mount a branding, marketing, and media campaign focused on delivering the right messages to the right populations. Public organizations often lack the skills for this kind of strategic marketing and sometimes



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## NASA'S ZERO ROBOTICS CHALLENGE

NASA's Zero Robotic Challenge encourages high-school student STEM engagement. While the prize solicits algorithms to optimize the International Space Station's solar energy collection, it is primarily focused on developing acumen and excitement for STEM research.

It achieves this goal by working to create an enriching experience for student participants, so they can leverage their new skills and networks to excel in STEM courses. Students gain access to MIT resources throughout the challenge and cultivate a community by allowing the teams from various schools to interact through formal alliances. Finally, the winning team gets its algorithm deployed on the International Space Station.<sup>115</sup>

Through the use of these elements, designers have managed to make Zero Robotics an annual prize in both Europe and the United States. Several of the teams repeatedly participate—an indicator of the challenge's brand strength and the health of the communities it fosters.

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even the culture to embrace it. Without it, however, designers risk creating a powerful prize for which no participants, or the wrong ones, show up. Post-award communications are also critical, because a central output of most prizes is building community. Nurturing and championing this community will keep participants focused on the original problem well after the prize is awarded. Failing to continue the conversation and channel their energy will compromise the prize's lasting impact.

### Recommended design tactics

- **Encourage teams:** Forums that provide public leaderboards, coupled with communication features that encourage teams to collaborate and share information, increase the likelihood of more robust solutions. Kaggle, for example, allows individuals to meet through their forum and create new teams to continually test problem-solving approaches and solutions.<sup>116</sup>
- **Manage communities:** Limiting participant eligibility can increase the exclusivity of the prize and make the participants feel special for being involved. The EPA's Green Power Community Challenge, for instance, encourages communities to compete to achieve the highest green energy percentage of total electricity use. Eligibility for

this prize, however, is limited to those the EPA has already designated as Green Power Communities.<sup>117</sup>

- **Promote your competitors:** Designers should consider marketing on behalf of participants. The Knight Foundation, for example, openly promotes finalists. By profiling finalists on its websites as well as blogging and tweeting about them, the foundation creates "a meaningful bump in credibility and attention [for] these applicants."<sup>118</sup> In addition to promoting finalists, designers also can highlight the larger participant community, demonstrating goodwill and building interest in the next challenge.

### Inspire transformation: Organize for sustained change

As the craft of incentive prize design becomes more nuanced and sophisticated, so too do the outcomes to which designers aspire. Perhaps the boldest involves inspiring transformation. While some might argue that the distinction between mobilizing action and inspiring transformation is simply a matter of degree, designers who build transformation-oriented prizes more often have grand visions about how to address complex, seemingly intractable problems.

Few prizes seek this outcome. The Aspen Prize for Community College Excellence,

however, clearly illustrates how a refined design can generate fresh, powerful, and scalable ideas for reshaping community college education throughout the United States.<sup>119</sup> Bloomberg Philanthropies' Mayors Challenge, recently expanded to Europe, offers another excellent example, with an emerging, potentially global platform for driving municipal innovation and connecting innovative public officials.<sup>120</sup> Both challenges inspire transformation by targeting participants—community colleges and city leaders, respectively—that can take significant action and develop new models for change ready for adoption by others.

To inspire transformation, designers typically focus on a few, critical design elements, in a multiple-round process that helps to amplify the fundamental vision of the prize.

## Outcome benefits

- **Mobilize scalable change:** Prizes focused on inspiring transformation seek to mobilize broad communities to engage in lasting change. Nesta's Big Green Challenge encouraged hundreds of groups to develop plans for reducing carbon dioxide emissions in their communities.<sup>121</sup> Once developed, these solutions will help other communities reduce their carbon footprint. Additionally, the Rebuild by Design competition provides an excellent example of mobilizing a community of leading engineering, architecture, and design firms, as well as highly regarded research institutions from around the world, to innovate on an important regional issue: the development of scalable, resilient design solutions for communities impacted by Hurricane Sandy.
- **Encourage collaboration to address large-scale problems:** Transformation cannot happen unless many different types of organizations work together. For instance, the Georgetown University Energy Prize encourages diverse communities and local governments to work together to reduce energy consumption.<sup>123</sup>

## BY THE NUMBERS

### INSPIRE TRANSFORMATION<sup>122</sup>

- Total prize purse ( $n = 7$ )
  - Minimum: \$0
  - **Median: \$0**
  - Maximum: \$500,000
- First place prize purse ( $n = 7$ )
  - Minimum: \$0
  - **Median: \$0**
  - Maximum: \$100,000
- Start to submission length ( $n = 5$ )
  - Minimum: 3 days
  - **Median: 60 days**
  - Maximum: 101 days
- 57% of prizes were recurring ( $n = 7$ )
- Average number of judging partner organizations ( $n = 6$ )
  - Federal: 0.43
  - Non-profit: 1.67
  - Private: 2.67
- Social media (74%) top marketing strategies ( $n = 7$ )
  - Website (100%)
  - Press releases (96%)
  - Social media (74%)

## Critical design elements



**Structure—Demonstrate performance through multiple rounds of competition**

Successful designers use multiple competitive rounds to winnow the playing field. The Aspen Prize for Community College Excellence uses three rounds, employing

quantitative and qualitative assessments as well as a finalist selection committee to reduce the field of entrants to one winner and four finalists with distinction. Because this process helps the institute gather and analyze a remarkable amount of educational data about community college performance, it can select winners whose educational solutions are proven to make a difference.<sup>124</sup>



#### Communications—Publicize the underlying issue

Those seeking to transform communities rely on robust marketing and communication plans that target different participant populations as well as the public through appropriate media channels.

The Knight Neighborhood Challenge is a case in point. When the Community Foundation of Central Georgia first launched the Knight Neighborhood Challenge competitive grant program to revitalize the College Hill Corridor neighborhood in Macon, Georgia, it thought that the challenge itself would have enough brand recognition to attract a range of viable applications. After initial enthusiasm for the challenge faded, however, the foundation

ran two marketing campaigns with a public relations firm to spread the word about the prize through social media. The challenge is now in its fifth year.<sup>125</sup>



#### Evaluation—Recruit the right judges

To inspire transformation, designers often ask for innovations whose performance may not be easily or quantifiably measurable. While this poses a challenge, selection of the right judges can help. Designers typically look for high-profile judges—public officials, authors, well-known scientists, and even celebrities. The star power of the judges' panel can help to establish the authority required to definitively select a winner. Famous judges also bring greater media attention to the prize, increasing its impact among participants as well as the public.

#### Recommended design tactics

- **Create a series of challenges:** Recurring prizes build brand recognition, attracting increasingly diverse groups of participants. Over time, they help to grow a community

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## ASPEN PRIZE FOR COMMUNITY COLLEGE EXCELLENCE

Community colleges provide most of the nation's continuing education and skills development. The Aspen Prize for Community College Excellence attempts to improve outcomes for community college students by identifying best practices and replicating them across the country.

To achieve this goal, Aspen's team worked with data experts to create clear metrics (for example, labor market and learning outcomes) that helped colleges prioritize certain objectives. By tapping the expertise of former community college experts as judges, Aspen added credibility to its measures. Aspen's competition involved three rounds: The first scoped eligibility, the second winnowed 120 candidates to 10 finalists, and the third chose a winner. This structure allowed Aspen to focus on collecting different kinds of qualitative and quantitative data at different stages, leading to a valuable dataset for future use. It also chose to make its prize recur every two years, extending stakeholder engagement and continuously promoting the new metrics. Aspen also invested heavily in communications, working with the major community college associations to broadcast to their networks, build credibility, and publish reports that aggregated best practices identified during evaluations of competing schools. In addition, Aspen focused on raising the profile of every participant. For example, it sent model press releases and helped colleges publish these in local newspapers to build participant profiles within their communities.

With these steps, Aspen was able to elevate the profile of community colleges, redefine excellence for them, and disseminate leading practices that can drive success across the education sector.<sup>126</sup>

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of interest to drive change. The prizes themselves can become more sophisticated and targeted as the designers learn what works to achieve the best outcomes.

- **Obtain expert advice early:** Effective designers involve experts early in the design process to define problem statements for complex prizes and carefully develop metrics aligned with the transformation desired. The process often involves multiple stakeholders and may require a lengthy review period.
- **Provide post-award marketing for participants and the public:** A robust post-award communications plan increases participants' accountability, so they will continue to work on their ideas after the prize is awarded. Designers can use webinars and conferences to encourage collaboration and communication within the participant community. They can also take advantage of multichannel media communications to highlight successes to a broader audience.

# Trends and insights

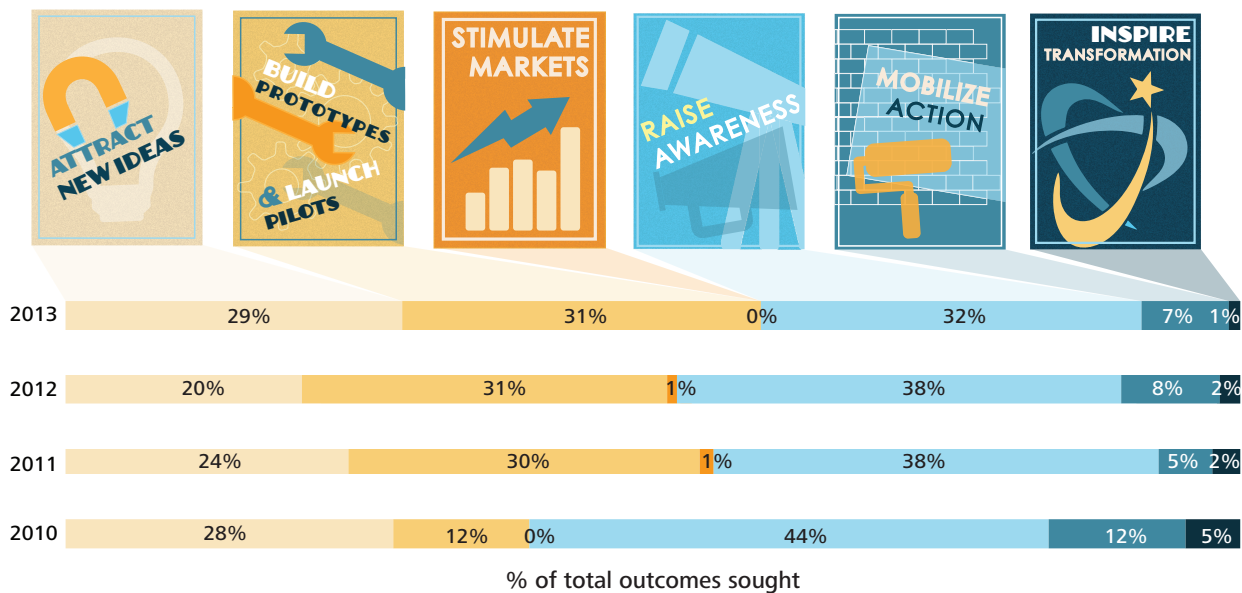
**B**ASED on the analysis conducted for this report, three trends have emerged over the past five years that provide insight into how designers are building effective challenges and focusing their time, energy, and creativity to get the greatest return from their investments. All of this activity is helping prizes become a standard part of the challenge landscape and an important innovation tool that public sector leaders can use to pursue their missions. In the future, prizes will likely become commonplace and will be integrated even more tightly with challenges and other complementary problem solving strategies that public sector leaders use to drive change.

## 1. Challenges are becoming bolder and more sophisticated

Within the US government in particular, designers are increasingly expanding the scope, scale, and complexity of challenges and dedicating additional resources to fuel their ambitions.<sup>127</sup> These designers are using challenges to achieve multiple outcomes, experimenting with customized designs, and seeking to engage ever-larger audiences in public sector-focused innovation.

The growing popularity of complex challenges can be seen in the shifting mix of desired outcomes over time. While designers have never sought outcomes in equal

Figure 5. Prize outcomes over time as a percentage of total outcomes sought by designers (n = 43 (2010); n = 87 (2011); n = 119 (2012); n = 108 (2013))<sup>128</sup>





proportion, there has clearly been growth in the pursuit of bolder outcomes that require more complex design. After America COMPETES Reauthorization Act passed in 2010, public sector challenges focused on raising awareness and attracting new ideas as outcomes dominated the landscape. More recently, designers have been increasingly trying their hand at producing models, such as prototypes and pilots.

While challenges are becoming more complex on the whole, the most ambitious outcomes on both spectra—market stimulation and inspire transformation—continue to make up a very small percentage of challenges on Challenge.gov, comprising less than 2 percent of outcomes sought in the last three years. Nonetheless, certain designers, including philanthropic, international, state, and local organizations, have been pursuing challenges that are larger in scope, targeting the more ambitious ends of the outcomes dimensions in greater percentages. As designers continue to experiment with increasing levels of complexity, there is an opportunity to capitalize on these more ambitious outcomes.

## 2. Challenge designers are partnering in new ways

Designers have focused on achieving these more complex outcomes by maturing their interactions with external organizations. In part, these collaborations help to reduce the risk of taking on challenges alone, because designers often need to supplement their own capabilities with outside partnerships. To obtain this kind of support, novice designers are moving beyond their organization's traditional partnerships and looking to experienced designers for support and guidance. Such experienced designers frequently come from organizations that have developed extensive design expertise through execution over the years

and are willing to share both guidance and resources.

NASA, HHS, and USAID provide examples of how agencies are partnering in new ways to improve challenge design and administration.<sup>129</sup> US government agencies are collaborating with each other to share insights and best practices as well as increase the impact of their challenges.<sup>130</sup> For example, NASA has consistently brought its deep design expertise to its partners, such as in the LAUNCH challenge with USAID, Department of State, and NIKE Inc. Additionally, the My Air, My Health challenge, which is jointly administered by the HHS and the EPA, relies on each organization's particular expertise to incentivize solvers to develop sensors that track pollutant effects on individual health.<sup>131</sup> These agencies also worked with non-profits and private enterprises to capture key information critical to certain elements of the challenge. USAID's Technology Challenge for Atrocity Prevention included Humanity United in the task of problem definition and then worked with InnoCentive to translate their technical requirements into something a broader external audience could understand.<sup>132</sup> All of these efforts illustrate how cross-government and cross-industry collaboration can yield stronger challenge design and broader reach than challenges pursued by organizations alone.

As major advocates for the use of challenges in driving innovation and improved outcomes for social policy issues, philanthropic organizations will continue to play a major role in the public sector challenge design space. Because they are dedicating significant resources to challenges and are achieving successful outcomes, philanthropies have become one of the most important repositories of design knowledge. This expertise, coupled with philanthropies' politically unconstrained focus on the public good, puts them in a unique position to serve as engines of challenge design

innovation in the future.<sup>133</sup> New designers will continue to rely on these leading organizations for partnerships, guidance, and advice as they embark on building their first prizes and challenges.

3. Challenge designers are expanding their view of incentives and challenge structures that can attract participants

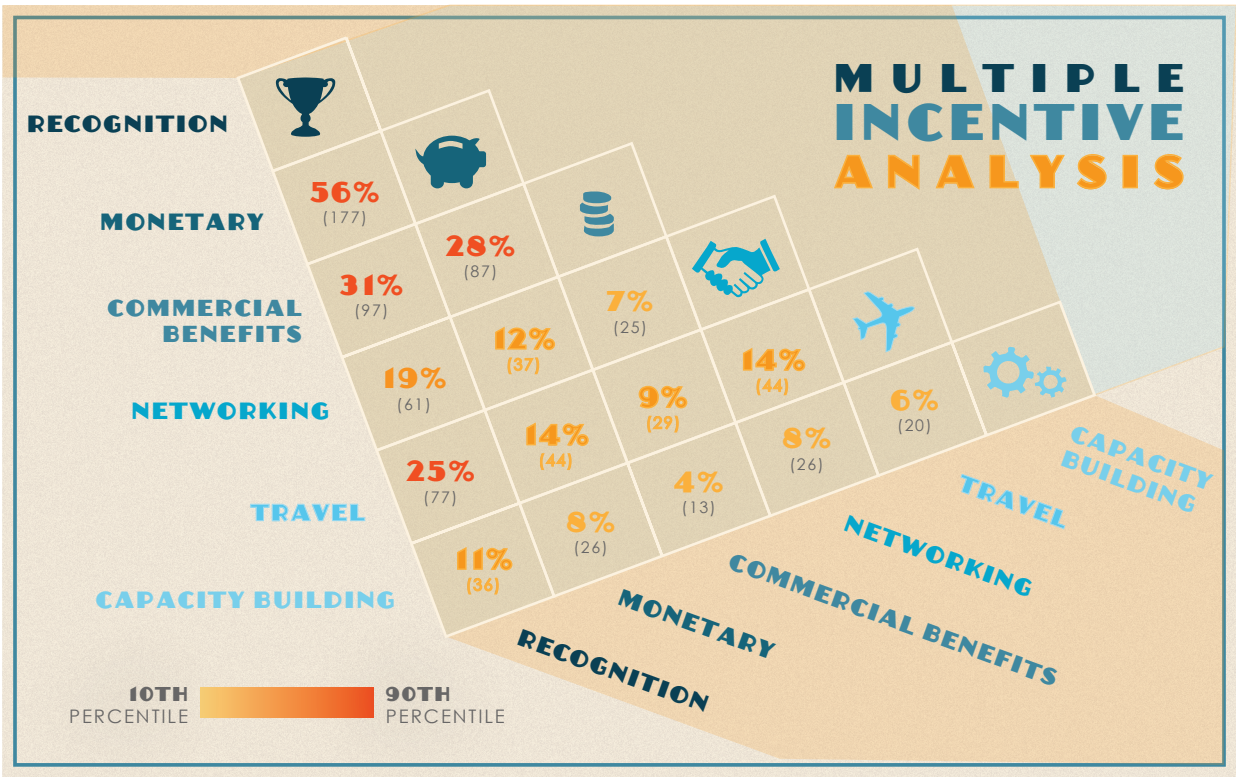
In recent years, there has been significant experimentation with incentive structures to attract participants. While discussions with successful designers reveal that monetary and recognition incentives remain important, there is a movement to expand the universe of what organizations can offer to participants. Incentives such as an advanced market commitment, travel, commercial benefits, and capacity building

are less frequently used, but can be just as powerful for attracting participants as monetary rewards.

Designers use multiple incentives to motivate participants. The Federal Virtual Challenge run by the US Army, which is focused on producing functioning prototypes of virtual environments while also mobilizing and supporting participant communities, provides a strong example of this trend. While the challenge includes a significant monetary purse (over \$50,000), it also features other rewards, such as public recognition, travel to a demonstration conference, and networking and business opportunities among the virtual software community.<sup>134</sup> These non-traditional incentives illustrate how prize designers can creatively mix different types of motivations to attract the right participants.

While our Challenge.gov and supplemental data analysis shows that recognition

Figure 6. Multiple incentive analysis of Challenge.gov (n = 314 prizes)<sup>135</sup>



Graphic: Deloitte University Press | DUPress.com

and monetary incentives were used in the majority of challenges, there were also many challenges that featured alternative motivations and combined multiple incentives to create a more effective draw (see figure 6).

While the use of monetary awards may not be the only incentive that designers use, there are some trends specifically related to this incentive that illuminate how designers approach their purse decisions. Over the past few years, there has been a jump in large purses. In 2010, there were only two federal challenges with a total purse over \$100,000. In 2012 and 2013, this number increased to 13 and 9 challenges, respectively. This sustained growth, however, has not been as consistent for the median purse size.

There was a large median total prize purse increase from 2010 to 2011 (with a 543 percent

increase from \$1,750 to \$9,500), but since then, the amount has hovered between \$8,000 and \$10,000. Our secondary dataset also suggests a similar plateauing effect (increasing from around \$30,000 in 2010 and plateauing around \$100,000 between 2011 and 2013). The disparity in purse size between the two datasets is likely due to the types of organizations (for example, philanthropies) in the second dataset (see appendix B for further details).

Over the coming years, this focus on blending incentives to achieve outcomes will likely continue. Many expert designers believe that the incentives focused on bringing together and building communities will provide strong draws for participants.<sup>136</sup> The convening of participants through the phases of a challenge can be transformative for both the participants and the designers themselves, as both groups ultimately learn a great deal about the ability of a challenge to effect change.

Figure 7. Median over time<sup>137</sup>



Graphic: Deloitte University Press | DUPress.com



## STATE- AND LOCALLY FOCUSED CHALLENGES

Public sector leaders at the state and local levels are increasingly finding opportunities to compete in challenges as participants.<sup>138</sup> These challenges hold the promise of helping public sector leaders to advance their innovation agendas. Notable examples include the US Department of Education's Race to the Top Fund and Bloomberg Philanthropies' Mayors Challenge, which feature state and city government participants, respectively.

Challenges that engage government participants seek outcomes that range from hyper-local to broadly national:

- **Using challenges to create local solutions:** The CoolCalifornia City Challenge,<sup>139</sup> a partnership among the California Air Resources board, the University of California's Renewable and Appropriate Energy Laboratory, and the Energy Upgrade California™ Initiative, is a competition between cities to reduce their carbon footprint. California cities win sustainability funding if they successfully lower household energy use and transportation emissions through personal and team-focused initiatives and solutions.
- **Launching challenges to garner national attention:** The Talent Dividend Prize, sponsored by CEOs for Cities and the Kresge Foundation, will be awarded to the metropolitan area that exhibits the greatest increase in the number of post-secondary degrees granted per one thousand people over a four-year period. As part of the award, there will be a national promotional campaign featuring the winner to showcase the value of local talent development for other metropolitan areas. Currently, the prize has drawn participation from over 50 local governments.

As more governments participate in challenges, public sector leaders will need sound advice to determine when and how engage in these efforts. We offer below some general guidance based upon several high-profile examples, professional expertise, and inferences from our broader public sector challenge research.

1. **Find a senior leader to sponsor challenge participation.** While several challenges, such as Bloomberg Philanthropies' Mayors Challenge, target public sector leaders as their principal participants, most are not so specific. In these cases, government employees who wish to participate in a challenge will find that securing a senior government sponsor brings many advantages. From committing resources to managing stakeholders to communicating with the public, senior sponsors can help to create the conditions in which a state or local government can compete effectively. Through leadership and the power of convening, sponsors can also foster innovation and drive change. In fact, winning the challenge may not be the most urgent priority for sponsors who are willing to play this role. Challenge participation can focus government and citizens on innovative solutions that can still be pursued no matter who wins. Without the right sponsor, state and local challenge participants can have great difficulty translating their effort to compete into meaningful outcomes for their citizens.



2. **Engage constituents in solution development.** There are several reasons why government participants should seek opportunities to engage their constituents. Engagement drives citizens' awareness and buy-in that their tax dollars are being spent wisely to compete in a challenge that will bring tangible benefits. It helps to improve solution quality, as citizens can offer their governments ideas, expertise, and feedback about how best to develop the most powerful submissions. Finally, for some challenges, engagement is a formally evaluated requirement. Many challenge designers are now including community engagement and ease of implementation as part of their evaluation process. For example, the Georgetown University Energy Prize evaluates how participants demonstrate success in engaging their communities.<sup>140</sup> What better way to address such criteria than with a solution co-designed and/or approved by the very constituents who will be impacted?
3. **Plan for the work required to compete.** Because challenges designed for state and local government participants often seek bold outcomes, it can be difficult for participants to simply bootstrap their submissions with just a few resources. Rather, submission development can involve full-time staffs that will need to develop and launch new programs through intra-governmental collaboration and public-private partnerships. To understand what it will take to compete, participants should engage challenge designers to understand how the incentives and scoring are tied to desired outcomes. These conversations can lead to practical insights about how much time and effort will be required and how best to commit scarce resources. For recurring challenges, participants should also consider networking with winners from prior years to better appreciate the day-to-day requirements for competition. Ideas Camp, a key design feature of Bloomberg Philanthropies Mayors Challenge, provides participants with all of these opportunities, allowing them to interact with and learn from designers, competitors, and prior finalists over the course of a two-day workshop, well in advance of the final submission deadline.
4. **Include the office of the general counsel and the tax department.** Before registering for a challenge, it is critical to evaluate laws and regulations that may impact participation or winning. Challenge designers may not fully take into account how state and local laws impact participants' ability to receive or use a prize purse or non-monetary incentives. Consultation with the office of general counsel and the tax department can not only prevent unwelcome surprises, but can also help government participants evaluate how best to leverage the post-challenge period for achieving their innovation goals. For challenges that require public-private partnerships or teams, this consultation can be especially valuable.
5. **Focus on challenges that build capabilities.** As the number of government-focused challenges grows, state and local participants will want to selectively decide when to undertake the effort to compete. In certain cases, the challenge award and associated publicity may be sufficient incentives. In other cases, however, participants should consider whether their investment to compete will build lasting capabilities that benefit the government and its citizens. Many challenges now feature non-monetary rewards, such as mentorship and coaching, collaboration with peers, and networking or partnerships with industry, investors, and/or research institutions. For example, the Obama Administration's Strong Cities, Strong Communities (SC2) initiative focuses on assisting US towns, cities, and regions in advancing their economic agendas by enhancing the capabilities of local governments via technical assistance, access to federal agency expertise, and the formation of public and private sector partnerships.<sup>141</sup> By taking advantage of these opportunities, government participants can become better innovators and problem solvers.

# Conclusion

**I**n researching and writing this report, the Dublin team thought we had a straightforward goal: Evaluate the range of incentive prize activity over the past five years and distill it into practical advice that designers could apply to their own prizes. The volume and richness of the design activity that we discovered during this time period fundamentally challenged how we thought about prizes. With so much experimentation happening, it became hard to match prize types to actual prize activity, difficult to fit standard prize development processes to the range of actual designs, and challenging even to maintain a clear definition of challenges and prizes. In sum, incentive prize design for the public good turned out to be a brisk, messy business.

To make this complexity manageable for designers, we borrowed, synthesized, and organized the language and concepts used by the most able at this craft. We quickly learned that successful designers talked first about their goals and outcomes, which became their north star for building prizes. We also heard them describe the elemental activities in which they engaged to assemble prizes that achieved these

outcomes. These are the core ideas featured in this report. Our contribution is to explain and illustrate them, show their connections and, if we were successful, make them practical and digestible for a broader audience of public, philanthropic, and private sector leaders and designers. More work is certainly needed to investigate the combinations of design elements that can increase the likelihood of success for the most ambitious outcomes: stimulating markets and inspiring transformation. Additional research and analysis are also necessary to better apply robust evaluative techniques and principles to incentive prizes and better measure their impact during and after prize implementation.

Incentive prizes are powerful tools of change. In the public sector, they're particularly valuable because they help leaders demonstrate how governments can successfully innovate and engage citizens. The risk takers who wish to use this problem-solving strategy for the first time and the designers who are already at work building prizes for their own organizations now have a wealth of detailed guidance from which they can draw.

# Appendix A

## Advanced prize design guidance

**T**HIS appendix provides additional guidance on how to link outcomes with challenge design, including tactical considerations for each of the six outcomes. Designers are more frequently structuring prizes for multiple outcomes, which requires blending of design elements and recognizing the trade-offs between the elements and the outcomes themselves. The US Department of Labor's Equal Pay App Challenge is a good illustration of a multiple-outcome prize. It encouraged the development of a web application and seeks to raise awareness about differing levels of pay between men and women. This challenge offered an interesting mix of incentives: a grand prize of five scholarships, an immersive program for digital entrepreneurs, and three other recognition prizes—conversation with an eminent social enterprise leader, nonprofit adoption of the app, and an accelerator program to launch the app publicly. This

mix of incentives drew app developers to the challenge but also raised public interest in this issue. The challenge is a part of a larger portfolio approach that the US government is pursuing to raise awareness about the pay gap through legislation, executive orders, and task forces.

Our Challenge.gov data analysis revealed a pattern of challenges that seek a combination of outcomes across the two dimensions discussed in this report—developing ideas, technologies, products, or services and engaging people, organizations, and communities. More specifically, designers often pair attracting new ideas with raising awareness and developing prototypes and pilots with mobilizing action. When designers create these pairings, they often focus on evaluation criteria and prize structure as the most important design elements.

## Attract new ideas: Solicit concepts and techniques

**Common pitfalls:** Poorly structured problem statements, lack of planning, and solicitation of non-workable solutions are common pitfalls associated with the design of challenges focused on attracting new ideas. Designers should adopt the mentality that the solutions generated are the first step in a series of portfolio prizes and other tools for driving innovation that will advance in maturity and complexity toward stimulating markets.

Design element	Design strategic considerations	Tactical guidance
Resources	<ul style="list-style-type: none"> <li>Guard against the development of overly narrow problem statements. Use external expertise to design problem statements that will lead to broadly workable solutions.</li> </ul>	<ul style="list-style-type: none"> <li>Create an advisory board of potential end users from the private sector, trade associations, philanthropies, academia, etc., and solicit input on how to design the challenge in order to generate desirable solutions.</li> <li>Test the problem statement with the advisory board through targeted interviews and ideation sessions to generate a list of likely responses based upon variations of the problem statement.</li> </ul>
Evaluation	<ul style="list-style-type: none"> <li>Structure format of participant submissions for ease of evaluation. Given the low barriers to entry for the submission of new ideas, work to ensure that the evaluation period is not so lengthy that it deteriorates the experience of the participants.</li> </ul>	<ul style="list-style-type: none"> <li>Use word limits and structured response templates to guide participants toward desired solutions and simplify the evaluation process. For example, a challenge focused on generating slogans should be limited to 25 characters while a challenge for a technical proposal should include an example submission on the current industry benchmark.<sup>142</sup></li> <li><i>Dual outcome guidance with raising awareness: Use public voting to engage a broader audience beyond the competitor community. This approach does involve a trade-off, because the final ideas may be of lower quality without vetting by better-informed judges.</i><sup>143</sup></li> </ul>
Motivators	<ul style="list-style-type: none"> <li>Plan in advance for future rounds of the challenge, which will focus on outcomes of increasing complexity. Create excitement around the problem by guiding the formation of a vibrant community of participants.</li> </ul>	<ul style="list-style-type: none"> <li>Incorporate mechanisms into design that encourage and reward participant interaction and collaboration. This can include leveraging a platform with dedicated collaboration space, using rules to mandate cross-fertilization at certain points in the challenge, and including evaluation criteria that reward the organic formation/combination of teams with similar solutions.</li> <li>Create motivators for future rounds of the challenge to prevent participant fatigue. Consider the broader cost of the challenge to participants (that is, resources invested in the challenge prevent investment in other areas) and develop motivators that will benefit the broader goals of the participant pool. As an example, mentoring will benefit the broader capabilities of a participant in comparison to a minor increase in purse size.</li> </ul>



Design element	Design strategic considerations	Tactical guidance
Structure	<ul style="list-style-type: none"> <li>Develop mechanisms prior to the launch of the challenge to support participants in revising ideas if initial submissions do not meet expectations.</li> </ul>	<ul style="list-style-type: none"> <li>Hold working sessions with the advisory board to evaluate the diversity and maturity of solutions throughout the submission period. Use this information to provide guidance for other participants and restructure eligibility requirements (that is, participant expertise and/or experiences) for future rounds.</li> <li><i>Dual outcome guidance with raising awareness: Use a multi-round or mini-challenge approach to allow open engagement and exposure to the topic in early rounds and down-selecting the best ideas through the later and final rounds. This will allow designers to reach participants most likely to provide high-quality ideas while also expanding engagement across a broader community. For example, NASA's Zero Robotics Video Challenge uses open eligibility in its first round to capture ideas for a video that promotes the student robotics challenge. In later phases, these ideas are pitched and the winners receive \$500 to turn their ideas into videos that help raise awareness for the larger robotics challenge.<sup>144</sup></i></li> </ul>
Communications	<ul style="list-style-type: none"> <li>Focus on building a strong brand around the challenge from the outset. A strong brand will increase the size and diversity of the participant community and the value of recognition to winners.</li> </ul>	<ul style="list-style-type: none"> <li>Determine the types of media valued by the target audience (that is, traditional press, social media, etc.) through interviews with potential participants. Use this information to target marketing efforts in order to build a brand around the challenge and create broad public awareness.</li> </ul>

#### Additional examples

- National Institute of Health, "Challenge to Identify Audacious Goals in Vision Research and Blindness Rehabilitation," <https://www.nei.nih.gov/challenge/additionalinfo.asp>.
- European Commission, "The Job Challenge," [http://ec.europa.eu/enterprise/policies/innovation/policy/social-innovation/competition/challenge\\_en.htm](http://ec.europa.eu/enterprise/policies/innovation/policy/social-innovation/competition/challenge_en.htm).
- City of New York, "Young Men's Initiative – My Voice Our City," <http://www.nyc.gov/html/ymi/html/home/home.shtml>.
- USAID, "FWD – Famine, War, Drought," <http://action.usaid.gov/>.

Build prototypes and launch pilots: Produce, test, and improve models

**Common pitfalls:** Relying on the purse—even a large one—as a sole means of motivating participants is a common pitfall of designers seeking to build prototypes or launch pilots. There should be significant emphasis on complementary motivators (for example, the recognition, networking opportunities, and investment counseling) that will encourage participants to put their own capital at risk. Designers should recognize that they will need to study their potential participants to understand their constraints, opportunities, and impact on outcomes. Designers should also consider customizing communications to particular participant communities.

Design element	Design strategic considerations	Tactical guidance
Resources	<ul style="list-style-type: none"><li>• Build an understanding of the landscape of potential challenge participants, in order to appropriately shape purse size and problem statements.</li><li>• Develop detailed plans for the use of testing facilities early in the design process to fully understand the impact on the cost, length, and fairness of evaluating solutions.</li></ul>	<ul style="list-style-type: none"><li>• Conduct landscape analysis prior to completing detailed design. The analysis should consist of an economic and technical assessment:<ul style="list-style-type: none"><li>– Economic assessment: Identify and assess potential participants and their likely fixed and variable costs for developing a solution through interviews and financial modeling. Structure a sufficiently sized purse and additional incentives based upon the forecasted economics. If the challenge entails high fixed costs, the purse should be large enough to justify the investment required to build a prototype and reduce participant risks.<sup>145</sup></li><li>– Technical assessment: Identify state-of-the-art prototypes and pilots related to the problem statement. Interview the developers of these prototypes and pilots to determine the technical challenges in achieving the desired outcome. Refine the problem statement based upon the identified challenges to create realistic goals for the challenge.<sup>146</sup></li></ul></li><li>• For challenges that require the physical testing and demonstration of prototypes, designers must consider the cost, logistics, and impact of testing facilities on design. Considerations include testing location, validation protocols, cost/length of test, safety, and acts of God.</li></ul>

Design element	Design strategic considerations	Tactical guidance
Evaluation	<ul style="list-style-type: none"> <li>Focus on identifying and rewarding both the best technical solution and the solution with the best commercialization prospects. They are not always the same and both are necessary for long-term success of the prize.</li> </ul>	<ul style="list-style-type: none"> <li>Expand the impact of the challenge by including a requirement for the submission of a scaling plan for the prototype or pilot in addition to the technical design. The plan should identify the requirements for bringing the prototype or pilot to full-scale production. Use this tactic to identify the most viable long-term commercial solutions in addition to the best technical solutions.</li> <li><i>Dual outcome guidance with mobilizing action: It is critical to maintain rigorous, quantitative evaluation standards for these prototypes. Balance the inclusion of more qualitative criteria (for example, those rewarding teaming, which will be important for commercialization) to link the evaluation of submissions to the goal of mobilizing action.</i></li> </ul>
Motivators	<ul style="list-style-type: none"> <li>Vary motivators based upon the community of participants. Designers should ensure that they build an understanding of the potential participants and adjust motivators as necessary.</li> </ul>	<ul style="list-style-type: none"> <li>Tailor the motivators to the target community of solvers. For example, networking with the venture capital community to provide funding to bring prototypes to market is ideal for start-ups and entrepreneurial participants. In contrast, academic participants are likely best motivated through grants, publicity, and conference networking opportunities. Designers should be prepared to provide additional motivators (beyond increasing the purse) throughout the registration process, if the community of participants is smaller than anticipated or varies significantly from their projected participants. The added motivators can drive additional excitement around the prize.</li> </ul>

Design element	Design strategic considerations	Tactical guidance
Structure	<ul style="list-style-type: none"> <li>Structure the challenge around the technological maturity of the desired outcome. Less mature models will require additional challenge rounds and development time.</li> </ul>	<ul style="list-style-type: none"> <li>Design the structure of the challenge based upon the maturity of the technology of the prototype or pilot, including research and development, small-scale proof-of-concept, or commercial prototype. Each stage of technological maturity requires different rules and evaluation criteria. For example, a research and development prototype will likely require an extended multi-stage challenge to mature the associated technology to the desired outcome. In contrast, a challenge focused on the development of a small-scale, proof-of-concept prototype as an outcome will likely consist of fewer phases but focus more heavily on meeting objective performance criteria at lower cost.</li> <li><i>Dual outcome guidance with mobilizing action: Multiple rounds or mini-challenges can encourage competitors to work with one another and lead to the development of better prototypes. Breaking the challenge into rounds can provide opportunities for judge feedback that can improve participants' skills. Build participant communities by inspiring both challenge (for example, leaderboards) and collaboration (for example, teaming). Striking the right balance is important so that participants continue to work together after the challenge concludes.</i></li> </ul>
Communications	<ul style="list-style-type: none"> <li>Develop a targeted and extended communication strategy that consists of multiple channels and outreach methods. Length of the communications strategy is longer than challenges focused on attracting ideas and must sustain excitement.</li> </ul>	<ul style="list-style-type: none"> <li>Sequence communications to recruit potential participants, share information with participants, and keep the broader community engaged throughout the challenge. Due to the extended length of the challenge, leverage diverse channels to drive momentum and build engagement and anticipation throughout the challenge. Designers should also develop metrics early to assess the effectiveness of their communication strategy within their target participant community. If the communication strategy is not successful, designers can supplement it with personal appeals to specific participants identified during the landscape analysis.</li> </ul>

*Additional examples*

- DTRA, "Identifying Organisms from a Stream of DNA Sequences," <https://www.innocentive.com/ar/challenge/9933138>.
- Department of Energy, "Apps for Energy," <http://appsforenergy.challengepost.com/>.
- Commerce, "Census Return Rate Challenge," <https://www.kaggle.com/c/us-census-challenge>.
- Department of Energy, "Solar Decathlon," <http://www.solardecathlon.gov/>.
- Department of Defense, "Federal Virtual Challenge," <http://fvc.army.mil/>.

## Stimulate markets: Create and scale new markets

**Common pitfalls:** Designers working on challenges to stimulate markets should have a clear understanding of market gaps or failures, and what would motivate new or existing market actors to fill or overcome them. Without understanding how these markets work, designers risk incenting participants to engage in market behaviors that are unrealistic, unprofitable, and unscalable.

Design element	Design strategic considerations	Tactical guidance
Resources	<ul style="list-style-type: none"> <li>Engage a broad community of external experts through an advisory board to design a challenge focused on addressing specific challenges preventing market development or growth.</li> </ul>	<ul style="list-style-type: none"> <li>Expand advisory board composition from that developed for challenges focused on attracting new ideas. Since challenges seeking to stimulate markets frequently address market failures, unrecognized market requirements, or transformational technologies, it is important to understand operational demands from producers, requirements from regulators, and global consumer requirements. These considerations should be included in problem statement design. Representation from each of these stakeholder groups is advised.</li> </ul>
Evaluation	<ul style="list-style-type: none"> <li>Create mechanisms to avoid potential conflicts of interest between sponsors and participants and limit gaming of the rules and evaluation criteria from participants.</li> <li>Engage the broader public in the design of the challenge to generate interest in the broader problem/challenge.</li> </ul>	<ul style="list-style-type: none"> <li>Establish an independent evaluation board. This group of experts should be distinct from the advisory board and focus solely on vetting evaluation criteria for potential flaws and assessing submissions. The independence of the evaluation board from the advisory board and potential participants is critical so that unbiased feedback may be provided.<sup>147</sup></li> <li>Consider holding a public comment period on the draft rules and evaluation criteria to identify potential issues before the challenge begins. This approach may be used to create early excitement from potential participants and the broader public.</li> </ul>



Design element	Design strategic considerations	Tactical guidance
Motivators	<ul style="list-style-type: none"> <li>• Create motivators for the participants, judges, and experts due to the heavy cost and time investment for all.</li> </ul>	<ul style="list-style-type: none"> <li>• Similar to challenges focused on developing models as an outcome, a detailed understanding of participant cost structure is required in order to determine the appropriate size of the purse to defray the investment costs and risks for the participants. In contrast to the aforementioned challenges on this spectrum, the purse may need to be larger than simply the costs of the participants. The purse must also be large enough to attract broad public attention and create demand for the solutions.</li> <li>• Due to the complexity of challenges focused on this outcome, numerous industry experts are likely needed at different points in time during the challenge. In order to defray additional costs for this expertise, reward market experts by offering “no-cost or low-cost” sponsorship opportunities, exclusive access to participants, and public recognition at different points in the challenge process (for example, launch, judging, and award).</li> <li>• Structure the post-award phase of the challenge focused on scaling the winning solution. Use additional funding mechanisms and partnerships to motivate participants to continue to refine promising solutions and maintain broad participant interaction following award.</li> </ul>
Structure	<ul style="list-style-type: none"> <li>• Establish a structure that permits iterative feedback between designers and participants. Reward participants for successfully achieving technical and economic milestones to maintain interest and reduce risk.</li> </ul>	<ul style="list-style-type: none"> <li>• Use multiple rounds or stages to support the scaling of the product and actual market testing. Provide milestone payments or advanced market commitments for achieving specific technical proficiency or sales targets. Both the market testing and payments will keep participants engaged, celebrate successes, and demonstrate impact.<sup>148</sup></li> </ul>
Communications	<ul style="list-style-type: none"> <li>• Hire expertise needed to drive a successful public relations campaign and create an appealing narrative around the challenge to gain public interest.</li> </ul>	<ul style="list-style-type: none"> <li>• Engage public relations experts to design marketing messaging and create a grand narrative around the challenge. Focus the narrative more broadly than the actual desired outcome to appeal to the general public and create demand and interest around the outcome.</li> <li>• Use stories about the participants to amplify sustained marketing communications. Video highlights of the first and second rounds or participant testimonials can provide opportunities to build the grand narrative of the challenge. Public tracking of progress through social media feeds or other mechanisms can sustain media interest after the excitement of the launch has concluded.</li> </ul>

*Additional examples*

- XPRIZE, “Wendy Schmidt Oil Cleanup X Challenge,” <http://www.iprizecleanoceans.org/>.
- Department of Energy, “Sunshot Prize – Race to the Rooftops,” <http://energy.gov/eere/sunshot/sunshot-prize-race-rooftops>.

## Raise awareness: Enhance exposure and educate on an issue

**Common pitfalls:** In a crowded media environment, designers seeking to use challenges to raise awareness about an issue face the difficulty of customizing their messages and getting them to the target audience. Often, these designers fall into the trap of merely targeting the broadest possible audience in the hope that their target audience will somehow catch on. It is critical for designers to appropriately segment the audience for their challenge and build campaigns specifically related to the media consumed by that audience. Additionally, designers ignore post-award communications at their own peril, as they may represent the greatest opportunity to achieve the desired increase in awareness.

Design element	Design strategic considerations	Tactical guidance
Resources	<ul style="list-style-type: none"> <li>Build communications and marketing capabilities into administration staff core capabilities.</li> </ul>	<ul style="list-style-type: none"> <li>Prioritize efforts on identifying design and administration staff with expertise leading marketing campaigns, crafting targeted messaging, and community outreach and organization. In particular, identification of resources with experience evaluating the impact of messaging on the target audience is critical.</li> </ul>
Evaluation	<ul style="list-style-type: none"> <li>Focus evaluation criteria on selecting participants that aid in increasing problem awareness rather those that solely deliver the best or most-refined solution.</li> </ul>	<ul style="list-style-type: none"> <li>Increase the number of winners to gain broad exposure and expand the incentives to participate. This can be accomplished without an increase in the purse by expanding the number of “recognized” winners in different categories. While not every winner will receive a monetary prize, this approach will help to engage more participants.</li> <li><i>Dual outcome guidance with attracting new ideas: Use public voting to engage a broader audience beyond the competitor community. This approach does involve a trade-off, because the final ideas may be of lower quality without vetting by better-informed judges.<sup>149</sup></i></li> </ul>
Motivators	<ul style="list-style-type: none"> <li>Develop understanding of the non-economic incentives that drive the target audience participation.</li> </ul>	<ul style="list-style-type: none"> <li>Build a profile of the target audience and compare the impact of formal marketing campaigns and a challenge on that audience. This analysis can include discussions with public relations firms, measurement of benefits to running campaigns, and comparisons of the differences in costs across marketing channels.</li> </ul>

Design element	Design strategic considerations	Tactical guidance
Structure	<ul style="list-style-type: none"> <li>Pair challenge outcomes with an additional target outcome to maximize reach and impact.</li> </ul>	<ul style="list-style-type: none"> <li>Structure the challenge to include additional outcomes or as part of a larger group of challenges. Break the problem into multiple topics, including those concerning further engagement with individuals, organizations, and communities.<sup>150</sup></li> <li><i>Dual outcome guidance with attracting new ideas: Use a multi-round or mini-challenge approach to allow open engagement and exposure to the topic in early rounds and down-selecting the best ideas through the later and final rounds. This will allow designers to reach the competitors most likely to provide high-quality ideas while also expanding engagement across a broader community. For example, NASA's Zero Robotics Video Challenge uses open eligibility in its first round to capture ideas for a video that promotes the student robotics challenge. In later phases, these ideas are pitched and the winners receive \$500 to turn their idea into videos that help raise awareness for the larger robotics challenge.<sup>151</sup></i></li> </ul>
Communications	<ul style="list-style-type: none"> <li>Create a multi-channel marketing campaign to account for crowded media markets.</li> </ul>	<ul style="list-style-type: none"> <li>Create a plan for publicizing the challenge and the results within the targeted audience to amplify understanding of the problem. This will involve communications through a number of platforms and across partner networks to account for the different methods in which the target audience accesses and internalizes information. Extend marketing beyond a designated website or targeted email communications to other forums including social media and print media campaigns. Designers must also account for regional and international differences in communications and media markets.</li> </ul>

*Additional examples*

- NSF/AAAS "International Science & Engineering Visualization Challenge," [http://www.nsf.gov/news/special\\_reports/scivis/challenge.jsp](http://www.nsf.gov/news/special_reports/scivis/challenge.jsp).
- USDA, "Fruit and Veggies Video Challenge," <http://fruitsandveggies.challengepost.com/>.
- City of New York, "Young Men's Initiative – My Voice Our City," <http://www.nyc.gov/html/ymi/html/home/home.shtml>.
- USAID, "FWD – Famine, War, Drought," <http://action.usaid.gov/>.

## Mobilize action: Spark engagement and build skills

**Common pitfalls:** Designers should be careful not to believe that recruiting participants into a challenge is sufficient to mobilize action. Getting participants and larger audiences to act typically requires facilitating the formation of new communities. Designers also need the credibility to incent participants to act in new ways. For this, branding and clear messaging are critical.

Design element	Design strategic considerations	Tactical guidance
Resources	Capitalize on the energy of existing movements, initiatives, and partners to supplement challenge infrastructure.	<ul style="list-style-type: none"> <li>Leverage infrastructure from established communities with a focus aligned with the target outcome, such as conferences and community initiatives. Designers can reduce cost and improve their understanding of target participants by engaging with leaders of initiatives that complement the problem.</li> <li>Select and engage partners that can increase the level and depth of interaction with the communities of participants before, during, and after the challenge. Specifically, identifying and engaging partners with prior success in mobilizing action in communities similar to the target participants is advantageous.</li> </ul>
Evaluation	<ul style="list-style-type: none"> <li>Create definitive measures of progress to determine success of the challenge and provide opportunities to revise and improve future challenges.</li> </ul>	<ul style="list-style-type: none"> <li>Develop metrics that record progress for each phase of the prize challenge. Metrics must extend beyond participant counts and include ways of measuring the sustainability of relationships or the number of new entrants. Metrics will vary by challenge but core items should include new entrants within target communities of interest and include an assessment of activity/action following the completion of the challenge.</li> <li><i>Dual outcome guidance with building prototypes or launching pilots: It is critical to maintain rigorous, objective evaluation standards for submitted solutions. Balance the inclusion of more subjective criteria (for example, those rewarding teaming which will be important for commercialization) to link the evaluation of challenge submissions to the goal of mobilizing action.</i></li> </ul>
Motivators	<ul style="list-style-type: none"> <li>Incorporate a high degree of competitor collaboration while recognizing the trade-off between encouraging teams and maintaining challenge.<sup>152</sup></li> <li>Incorporate incentives that will build the skills of participants (for example, expert coaching, speaking opportunities, etc.).</li> </ul>	<ul style="list-style-type: none"> <li>Use existing challenge participants to recruit new ones during the signup period. Embed recruitment of new participants in the scoring system. Trust that competitors will assist in developing and extended community that will last well after the challenge.</li> <li>Engage independent coaches to serve as a team resource during participant progression throughout the course of the challenge. Assist participants in developing skillsets to mobilize others that are tangentially connected to the challenge after the challenge has completed. Many prize designers use judges to provide the same coaching opportunities, but making coaches separate from the evaluation process may provide added benefits, such as allowing participants to be more candid because they know they are not being judged.</li> </ul>

Design element	Design strategic considerations	Tactical guidance
Structure	<ul style="list-style-type: none"> <li>Structure forums for meaningful personal interaction. Mobilizing action requires trust and commitment that may be best suited for direct contact. Structure forums for meaningful personal interaction. Mobilizing action requires trust and commitment that may be best suited for direct contact.</li> </ul>	<ul style="list-style-type: none"> <li>Identify a set of possible locations for participants to interact. In-person conferences or meetings can create networking opportunities that also provide incentives for participants to enter the challenge. For example, the US Army's Federal Virtual Challenge showcased the competitors at an in-person conference where the winners were not only crowned, but also able to network with other colleagues in their field.<sup>153</sup></li> <li><i>Dual outcome guidance with building prototypes or launching pilots: Multiple rounds or mini-challenges can encourage competitors to work with one another and lead to the development of better prototypes. Breaking the challenge into rounds can provide opportunities for judge feedback that can improve competitors' skills. Build competitor communities by inspiring both challenge (for example, leaderboards) and collaboration (for example, teaming). Striking the right balance is important so that competitors continue to work together after the challenge concludes.</i></li> </ul>
Communications	<ul style="list-style-type: none"> <li>Create an environment to generate a dialogue between participants and the broader community.</li> </ul>	<ul style="list-style-type: none"> <li>Develop communications that elicit responses from participants to encourage dialogue around a problem. Unlike challenges focused on ideas, products, or services as an outcome, mobilizing action requires communication between designers, participants, and the public to advance the discussion on the target issue rather than simply relaying information to participants and announcing the winners to the public. For example, designers can send out a weekly question through social media that allows participants to broadcast their progress or provide thoughts and feedback to administrators.</li> </ul>

#### Additional examples

- EPA, "ENERGY STAR National Building Competition," [http://www.energystar.gov/buildings/sites/default/uploads/tools/2011\\_NBC\\_Report.pdf?149d-5071](http://www.energystar.gov/buildings/sites/default/uploads/tools/2011_NBC_Report.pdf?149d-5071).
- NASA, "Balloonsat High Altitude Flight Student Competition," [http://www.nasa.gov/home/hqnews/2010/jan/HQ\\_10-018\\_Balloonsat.html](http://www.nasa.gov/home/hqnews/2010/jan/HQ_10-018_Balloonsat.html).
- Department of Energy, "Solar Decathlon," <http://www.solardecathlon.gov/>.
- Department of Defense, "Federal Virtual Challenge," <http://fvc.army.mil/>.



## Inspire transformation: Organize for sustained change

**Common pitfalls:** Inspiring transformation requires scaling and institutionalizing behavioral change. This can often be achieved through centralized coordination and a top-down approach. On the other hand, transformation can also be achieved through decentralized or grassroots action. Effective designers are aware of both means, do not conflate them, and are intentional about which elements they use to evoke change.

Design element	Design strategic considerations	Tactical guidance
Resources	<ul style="list-style-type: none"> <li>Select partners with significant public recognition and the ability to capture attention on a broad scale.</li> </ul>	<ul style="list-style-type: none"> <li>Engage partners with strong brands to raise the challenge's profile and reach a larger audience. Select partners with missions or heavy investment/perspective on the desired transformation. Leverage these partners to engage the targeted participants through their existing networks. Use the combined reach of your partners to create interest at the regional level, national level, etc., by highlighting that the problem is significant enough to bring together a group of preeminent partners.</li> </ul>
Evaluation	<ul style="list-style-type: none"> <li>Develop meaningful measures to act as the new basis for discussion and progress around the problem.</li> </ul>	<ul style="list-style-type: none"> <li>Use the challenge as an opportunity to refine and define metrics for the entire community and issue area. These metrics can set expectations and encourage sustained behavior change. The challenge can act as the forum for setting a de facto standard on how the issue should be monitored and addressed going forward.</li> <li>Develop measures of success to help communities understand the scope and impact of the challenge. This context can provide a starting point for future marketing and participant interactions throughout the course of the challenge.<sup>154</sup></li> </ul>
Motivators	<ul style="list-style-type: none"> <li>Engage neutrally viewed surrogates or spokespeople to promote the challenge. Look to reduce potentially divisive politics around the problem being addressed and focus on transforming behavior.</li> </ul>	<ul style="list-style-type: none"> <li>Use surrogates and other community leaders to promote the brand of the challenge, broadcast desired outcomes, and motivate participants. Communications from these individuals may be viewed more impartially than messages communicated in an official capacity from the administrators. Also, the use of surrogates or community leaders as the face of the challenge may reduce the politics or emotions surrounding the problem and enable the engagement of a broader audience.</li> </ul>

Design element	Design strategic considerations	Tactical guidance
Structure	<ul style="list-style-type: none"> <li>Develop a reoccurring challenge to maximize impact by continuing broad dialogue around the transformation outcome and through progressively more competitive evaluation criteria.</li> </ul>	<ul style="list-style-type: none"> <li>Due to the complexity of transformative outcomes, a recurring challenge can allow competitors to continue momentum and understand how their work is moving the field forward. For longer challenges, the design should be restructured to prevent community burnout and sponsor fatigue.<sup>155</sup></li> <li>After the first challenge, evaluate which aspects of the challenge to maintain for future challenges and determine potential areas for revision. Change the evaluation criteria to keep it interesting and perhaps more competitive. Test these potential changes with the past participants to understand if new approaches will energize and resonate with those competing.</li> </ul>
Communications	<ul style="list-style-type: none"> <li>Plan on a sustained marketing effort that includes traditional and non-traditional marketing tactics.</li> </ul>	<ul style="list-style-type: none"> <li>Determine the community you want to reach and the behaviors you want to change. The marketing effort should revolve around this community for a sustained period of time. In order to prevent messaging fatigue with the target community, identify potential viral or guerilla marketing tactics to vary the delivery and impact of the messaging.</li> </ul>

*Additional examples*

- Bloomberg Philanthropies, "Mayors Challenge," <http://mayorchallenge.bloomberg.org/index.cfm?objectid=7E9F3B30-1A4F-11E3-8975000C29C7CA2F>.
- EPA, "Gameday Challenge," <http://gamedaychallenge.org/>.

# Appendix B

## Data analysis methodology

**T**HE amount of available data on challenges has increased exponentially and tracks with the increase in the overall number of challenges. Even with this flood of data, the publically available information on challenges is inconsistent in terms of quality, difficult to categorize given varying challenge terminology, incomplete for all design elements, and not easily accessible from one centralized location. Because of these limitations, there are few data-driven studies that connect the strategic choices of challenge design with the outcomes sought by designers. This report tries to fill that gap with a deeper data analysis that incorporates new challenges from recent years, decomposes challenges into their design elements, and links this data to desired outcomes. Given the imperfect nature of the data, the primary goal of this analysis is to provide a rough starting point for designers, as they consider how to design their own challenges.

The following sections explain the data source selection approach, data collection process, analysis method, limitations, and opportunities for further research.

### Data source selection

There is a wide range of public sector challenge data sources available to researchers. This report draws on two major sources: 1) challenges listed on Challenge.gov, and 2) challenges found on a select set of philanthropic, state, local, and international organizations' websites. This second dataset serves primarily as a way to validate the patterns of the Challenge.gov dataset and to identify the extent to which challenge insights relevant to these challenges may also be applicable to

the larger challenge community. The second dataset includes challenges involving philanthropies and non-profits. These organizations were selected because they are established design experts, but this data collection method also captured some state and local organizations, as they frequently served as partners, competed as participants, or served as hosts. For example, the Talent Dividend focuses on improving educational outcomes in US cities and represents collaboration between the Kresge Foundation, CEOs for Cities, and over 57 local governments.<sup>156</sup> In addition to these two datasets, the authors used primary interviews and challenge summary reports from the White House Office of Science and Technology Policy (OSTP) to validate data points.<sup>157</sup> The final dataset includes 314 challenges collected from Challenge.gov and 89 challenges collected from the secondary dataset.

### Data collection

Data collection involved three steps: 1) cataloguing all challenges found on the Challenge.gov and non-federal government websites; 2) identifying prize design elements and other data points for analysis, including: challenge title, type of organization, sub organization (if applicable), type and number of partners, challenge description, platform used, selection criteria (subjective, objective, hybrid), selection process (expert judging, public voting, hybrid), total prize purse, 1st place prize amount, prize awarded (Y, N), number of 1st place winners, number of recognized winners, prize start date, prize end date, submission date, multiple submission dates (Y, N), number of submissions, outcome, targeted audience, collaboration

allowed, mentorship provided (Y, N), segmentation elements (multi-round, multi-voting, etc.), other structural elements (leaderboard, reoccurrence, etc.), limited eligibility (Y, N), incentive type, and marketing approaches; and 3) validating data with information from primary interviews and White House OSTP challenge implementation reports.

## Data analysis

Data preparation and organization for analysis included several steps: 1) conducting aggregate and time series analysis of specific data elements (for example, prize purse, prize length, etc.) for both the Challenge.gov and the secondary dataset; 2) conducting secondary aggregate analysis for each of the six outcomes identified in this report using the various data elements; 3) comparing analyses of both datasets to identify discrepancies and confirm cross-dataset trends; and 4) summarizing results in charts, graphics, and tables in the body of the report.

## Limitations

The volume of challenge data represents a challenge for researchers. They can choose from a diverse set of data sources from different sectors and organizations. Even after identifying the right data source, researchers face issues with ensuring consistency in data quality and devoting enough time to collect information from the dispersed data spread across different sources. Additional challenges include the fact that data on design elements are not easily accessible and that different terms are used to reference similar challenges

(for example, inducement prize, challenge prize, grand challenges)

Given these limitations, Challenge.gov was used as the primary data source because this website provides the most centralized location of public sector challenges available to researchers.<sup>158</sup> Recognizing the larger universe of challenges outside of those associated with the US government, the research team gathered the secondary dataset to provide a rough check on the trends and insights identified from this first source. From this data analysis, our goal was to provide descriptive statistics and trend analysis and was not intended to provide a more robust statistical analysis. The primary intention of this analysis is to demonstrate a new approach to categorize challenge-related data by highlighting emerging patterns and trends that emerge when design elements are analyzed by desired outcomes.

## Future research

There are opportunities to expand on this data analysis and conduct studies that are more specific or larger in scope. One area of interest for future study is the quantification of return on investment for these different prizes. Additional research could expand the number and breadth of challenges included in this type of analysis to validate that Challenge.gov is an effective representation of the larger body of public sector challenges. Finally, local and state organizations, which are increasingly experimenting with their own challenges and participating in challenges run by others, could present another interesting area for study as more data becomes available.

# Appendix C

## List of interviews

**D OBLIN** conducted 27 interviews with 25 organizations and 45 individuals between February 5, 2014 and April 29, 2014. The following sections explain the data source selection approach, data collection process, analysis method, limitations, and opportunities for further research.

Name	Title	Organization
James Anderson	Lead for Government Innovation Programs	Bloomberg Philanthropies
Beverly Blake	Program director	Knight Foundation
John Bracken	Director, Journalism and Media Innovation	Knight Foundation
Erich Broksas	Senior vice president, Strategy & International Investment	Case Foundation
John Clarke	Government Innovation Programs	Bloomberg Philanthropies
Jason Crusan	Director of the NASA Center of Excellence for Collaborative Innovation	National Aeronautics and Space Agency
Alok Das	Senior scientist for Design Innovation	Air Force Research Laboratory
Jeff Davis	Deputy Director of the NASA Center of Excellence for Collaborative Innovation	National Aeronautics and Space Agency
Kathryn Dennis	President	Community Foundation of Central Georgia
Cristin Dorgelo	Assistant director, Grand Challenges	White House Office of Science Technology and Policy
Greg Downing	Executive director for Innovation	Department of Health and Human Services
Jonathan Greenblatt	Special assistant to the president and director of the Office of Social Innovation and Civic Participation	White House Domestic Policy Council
Jenn Gustetic	Prizes and Challenges program executive	NASA



Name	Title	Organization
Joseph Heaps	Deputy chief, Information and Sensors Technology Division	National Institute of Justice, Department of Justice
Steven Hodas	Executive director	Innovate NYC Schools
Kippy Joseph	Associate director, Innovation	Rockefeller Foundation
Tom Kalil	Deputy director for Technology and Innovation	White House Office of Science Technology and Policy
Maurice Kent	Agency lead, Prizes	United States Agency for International Development
Elizabeth Kittrie	Senior policy analyst	Department of Health and Human Services
Sarah Koch	Director, Social Innovation	Case Foundation
Kevin Kuhn	Innovation Team, Office of Research and Development	Environmental Protection Agency
Karim Lakhani	Associate professor of Business Administration	Harvard Business School
Bob Lee	Open Innovation project manager	Wright Brothers Institute
Xavier Le-Mounier	Directorate General for Enterprise and Industry	European Commission
Katie Leonberger	Government Innovation Program	Bloomberg Philanthropies
Tammi Marcoullier	Program manager, Challenge & Prize Competitions	General Services Administration
Nancy Merritt	Senior policy advisor	National Institute of Justice, Department of Justice
Bill Moses	Managing director, Education Program	Kresge Foundation
Clare Newman	Government Innovation Programs	Bloomberg Philanthropies
Anil Rathi	CEO and founder	Skild
Euan Robertson	First deputy commissioner	New York City Department of Small Business Services
Brian Sasscer	SVP, Strategic Operations	Case Foundation
Denice Shaw	Project lead, Office of Research and Development	Environmental Protection Agency
Ariel Simon	Chief strategy officer and deputy to the president	Kresge Foundation

Name	Title	Organization
Gretchen Crosby Sims	Vice president, Programs	Joyce Foundation
Michael Smith	Director, Social Innovation Fund, Corporation for National & Community Service	Corporation of National and Community Services
Michael Timmons	Director of Marketing & Client Services	Skild
Katheryn Viguerie	Office of Engagement and Communication, US Global Development Lab	United States Agency for International Development
Adam Wong	Management and program analyst	Office of the National Coordinator, Department of Health and Human Services
Julia Wood	Director of Donor Services	Community Foundation of Central Georgia
Josh Wyner	Executive director of the Aspen Institute College Excellence Program	Aspen Institute
Emily Yu	VP, Marketing & Partnership	Case Foundation
Marco Zappalorto	Program manager, Center for Challenge Prizes	Nesta

# Appendix D

## Technology platform vendors

**T**HIS appendix lists a selection of prize technology platform vendors commonly found in our research.

Company name	Target audience	Example challenge	Website
ChallengePost	General	Apps for Healthy Kids	<a href="http://challengepost.com/">http://challengepost.com/</a>
Health 2.0	Health care technologists	EPA/HHS: My Air, My Health Challenge	<a href="http://www.health2con.com/">http://www.health2con.com/</a>
InnoCentive	Scientists (physical, biological, chemical, etc.)	Department of State: Innovation in Arms Control	<a href="https://www.innocentive.com/">https://www.innocentive.com/</a>
Kaggle	Data scientists	US Census Return Rate Challenge	<a href="http://www.kaggle.com/">http://www.kaggle.com/</a>
OpenIDEO	General	Knight's News Challenge	<a href="http://www.openideo.com/">http://www.openideo.com/</a>
Skild	General	NSF International Science & Engineering Visualization Challenge	<a href="http://www.skild.com/">http://www.skild.com/</a>
Tongle	Video makers	NASA Zero Robotics Video Challenge <sup>159</sup>	<a href="http://tongal.com/b/home">http://tongal.com/b/home</a>
TopCoder	Computer scientists, programmers, developers	NASA International Space Station Challenge Series	<a href="http://www.topcoder.com/">http://www.topcoder.com/</a>

For US government designers, additional information on vendors can be found in General Services Administration (GSA) Schedule 541 4G, Challenges and Competition Services.

# Appendix E

## Acronyms

Acronym	Meaning
AAAS	American Association for the Advancement of Science
AMC	Advanced Market Commitments
America COMPETES Act	The America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Act
CMS	Center for Medicare and Medicaid Services
CoECI	Center of Excellence for Collaborative Innovation
DARPA	Defense Advanced Research Projects Agency
DoE	Department of Energy
DTRA	Defense Threat Reduction Agency
EPA	Environmental Protection Agency
FWD	Famine, War, Drought
GAO	Government Accountability Office
HADR	Humanitarian Assistance and Disaster Relief
HHS	Health and Human Services
MIT	Massachusetts Institute of Technology

Acronym	Meaning
NASA	National Aeronautics and Space Administration
NSF	National Science Foundation
OMB	Office of Management and Budget
OSTP	White House Office of Science and Technology Policy
SBA	Small Business Administration
STEM	Science, Technology, Education, Mathematics
SC2	Strong Cities, Strong Communities
UN	United Nations
USAID	United States Agency of International Development
USDA	United States Department of Agriculture



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# Contacts

**Jesse Goldhammer**

Principal

Deloitte Consulting LLP

+1 415 932 5348

[jgoldhammer@deloitte.com](mailto:jgoldhammer@deloitte.com)

**Kwasi Mitchell**

Senior manager

Deloitte Consulting LLP

+1 703 945 7951

[kwmitchell@deloitte.com](mailto:kwmitchell@deloitte.com)





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