

ideas to impact.

INNOVATION PRIZES:

A GUIDE FOR USE IN A DEVELOPING
COUNTRY CONTEXT



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This document is part of a suite of four papers (a guide and three thematic papers) that capture the learning from the first year of the Ideas to Impact programme. More specifically:

Innovation prizes: a guide for use in a developing country context identifies the stages required to define whether an innovation prize is a suitable instrument to help address a given development problem;



SEE OUR
GUIDE

Can innovation prizes help address water and sanitation challenges?

Introduces the concept of innovation prizes and presents a number of areas where they may have application;



SEE OUR
WASH
REPORT

Addressing problems in energy access through the use of Innovation prizes shows how the guide was applied in a specific context and sets out the challenges faced in using innovation prizes to support improved energy access; and



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ENERGY ACCESS
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A role for innovation prizes to support adaptation to climate change? An analysis of challenges, opportunities and conditions takes a theoretical approach to understanding the effects innovation prizes might have in the climate change adaptation field.



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Where text in this paper makes reference to one of the other papers in this suite, the relevant text will be highlighted and the icon representing the cross-referenced paper will appear in the margin.

At the time of publishing, Ideas to Impact is undertaking the detailed design of five diverse innovation prizes. The team expects to document further findings from this process through follow-up publications that will:

- Extend the Guide to include detailed design;
- Share further learning from experiences across the three themes (thematic papers currently go only as far as Stage 2 of the Guide in their analysis); and
- Provide guidance on how to establish monitoring and evaluation frameworks for innovation prizes.

Visit the Ideas to Impact website www.ideastoimpact.net and sign up to the newsletter to receive updates.

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INTRODUCTION

THIS REPORT OFFERS A
FOUR-STAGE APPROACH TO
DETERMINE WHETHER AN
INNOVATION PRIZE IS A SUITABLE
INSTRUMENT TO DEPLOY

OBJECTIVE

This report presents an analytical guide to assessing whether and why it is appropriate to use an innovation prize – defined as a financial incentive that induces change through competition – to solve a specific and pre-defined problem, with a particular focus on developing country contexts and, especially, supporting the poorest within these countries. The intended audience is potential prize sponsors who have identified a problem and would like to explore whether an innovation prize is a suitable instrument with which to address it. It is likely that this will include governments, both at national and sub-national levels in donor and developing countries, as well as bi- and multi-lateral organisations; NGOs; academic institutions; private foundations; and industry and consumer associations. Beyond the guide's primary focus on establishing whether or not a prize is a suitable instrument for solving a particular problem, it should also help potential prize sponsors or designers refine an initial prize concept and/or the particular problem to which the prize will be applied, so as to maximise the chance of achieving and sustaining development gains.

The guide focuses on the question of whether to use a prize and why, but it is not intended to provide a comprehensive guide to detailed prize design, neither does it consider in detail the selection of an alternative intervention if a prize is not considered appropriate. The guide raises issues that are important for the initial stages of prize design but it is not intended to provide detailed guidance on how prizes should be designed. As a result, it cannot be used to select an optimal prize design from several options. Similarly, while the guide examines the role that innovation prizes can play relative to alternative funding modalities, such as grants, it does not provide guidance on the selection or design of these alternative instruments in the event that a prize is thought unsuitable.

The application of prizes in developing country contexts requires special consideration. Considerable evidence exists on the value and utility of innovation prizes in a developed country context (Adler, 2010; Gök, 2013; Williams, 2012), where good innovation is often able to access affluent markets. However, with a few exceptions (Everett, Wagner, & Barnett, 2012), there is limited evidence on their use in a low income country context, where conditions to create and roll out innovation can often be less supportive. Despite success stories such as the m-pesa mobile money platform – which has grown to over 26 million registered accounts in Kenya in just seven years (GSMA, 2014) – many good innovations often struggle to achieve uptake and scale of use.

The report is intended to be short and practical. As such, it omits discussion commonly found in other material on prizes, such as where they have been used historically or different possible taxonomies for thinking about prizes. Interested readers are invited to consult a range of further publications for this material such as Deloitte (2014), McKinsey and Company (2009) and Nesta (2014).

The guide was produced for the DFID Ideas to Impact programme but is designed to have broader applicability. Ideas to Impact, a programme funded by the UK Department for International Development (DFID), will design and launch a variety of innovation prizes to test their potential to stimulate and incentivise solutions to improve low income communities' resilience to climate change and access to affordable clean energy, safe drinking water and sanitation services.

OTHER PAPERS IN THIS SUITE
provide further detail on the practical application, use, successes and issues of innovation prizes.



**CLIMATE
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WASH



**ENERGY
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WHAT IS AN INNOVATION PRIZE?

An innovation prize is defined for this report as ‘a financial incentive that induces change through competition’. Solvers compete against one another to meet a set of specified criteria which, if met, entitles them to some form of financial reward. The possible range of competition designs and payment structures is large and might include cases where there is only one winner or multiple winners; where the prize is a fixed lump sum amount or is proportional to achievements; and where there is one round or several. While, under our definition, all prizes incorporate some form of financial incentive, there may also be other significant benefits such as recognition value.



ENERGY ACCESS

Section 1

For more on the recent use of innovation prizes.

Within the literature, innovation prizes are often described as tackling barriers within the ‘innovation ecosystem’. In this report, innovation ecosystem refers to the actors and institutions through which ideas develop into socially useful outcomes; it includes both internal and external factors, the latter of which may include legislation, governance and culture, as well as other market actors (or co-innovators) who need to change in order to enable the sustainable use of the innovation at scale. Prizes can target any of these components to help induce change. Box 1 provides further definitions relating to the use of innovation prizes used throughout this guide.



ENERGY ACCESS

Section 3

For more on innovation systems.

BOX 1: SOME DEFINITIONS

Ambiguity exists in the literature among much of the common language used to describe prizes. Throughout this report, the following definitions are used:

- **Beneficiaries** refer to the communities that are intended to benefit from the resolution of the problem.
- **Innovation** is broadly conceived; it includes the application of improved or new products, processes, technologies or services that are either new to the world (novel), new to a region or business (imitative) or new to the field of endeavour, that is, repurposed (adaptive).
- An **intervention** is action taken by government, a development partner or other party to alter the outcomes that would result from the interaction of supply and demand.
- **Market failure** refers to a situation in which market forces do not lead to an efficient (desirable) outcome.
- **Sponsor** refers to the entity or person who is funding the prize.
- **Designer** refers to the entity or person who is responsible for developing the detailed concept of the prize including finances, eligibility criteria, timeline, operating structure and so on. In some cases, the sponsor will also be the designer.
- **Solver(s)** refers to the participant(s) in the prize competition.

OVERVIEW OF GUIDE

Figure 1 presents a four-stage approach to evaluate the suitability of an innovation prize to address a specific problem:

- **Stage 1** assesses whether the problem itself is suitable for an intervention of any form.
- **Stage 2** takes a preliminary assessment of whether the typical circumstances in which a prize is an effective tool are relevant to the given problem.
- **Stage 3** helps the sponsor develop a theory of change underpinning the use of a prize and then examines whether this is sound and whether the context in which the prize may be run supports this theory.
- **Stage 4** makes an assessment of the prize competition's overall net benefits and discusses how detailed design elements can help ensure significant progress towards development goals is made.

FIGURE 1:
A FOUR-STAGE GUIDE TO DISCERN WHETHER A PRIZE IS A SUITABLE INSTRUMENT TO ADDRESS A GIVEN PROBLEM

STAGE 1: PROBLEM IDENTIFICATION

- Would resolving the specific problem lead to the desired development benefits?
- Are available resources sufficient to resolve the problem?
- Is resolving the problem consistent with existing policy, the sponsor's objectives and beneficiaries' needs?
- Is there good reason to believe that the problem would not be resolved without further intervention?

STAGE 2: PRELIMINARY CHECK

Do any of the typical circumstances in which prizes are useful apply to the problem?

STAGE 3: THEORY OF CHANGE IN CONTEXT

- Is it clear how the prize competition will lead to sustainable development benefits?
- Are the conditions for winning the prize clear?
- Is it easy to measure when these have been met?
- Is it unclear to the sponsor how to meet these?
- Is meeting the conditions predominately a function of skill and effort rather than luck?
- Is there a diverse and suitably sized set of solvers with the necessary skills and access to resources?
- Is the theory of change supported by existing:
 - government policies,
 - development partners and stakeholders; and
 - beneficiaries' needs?

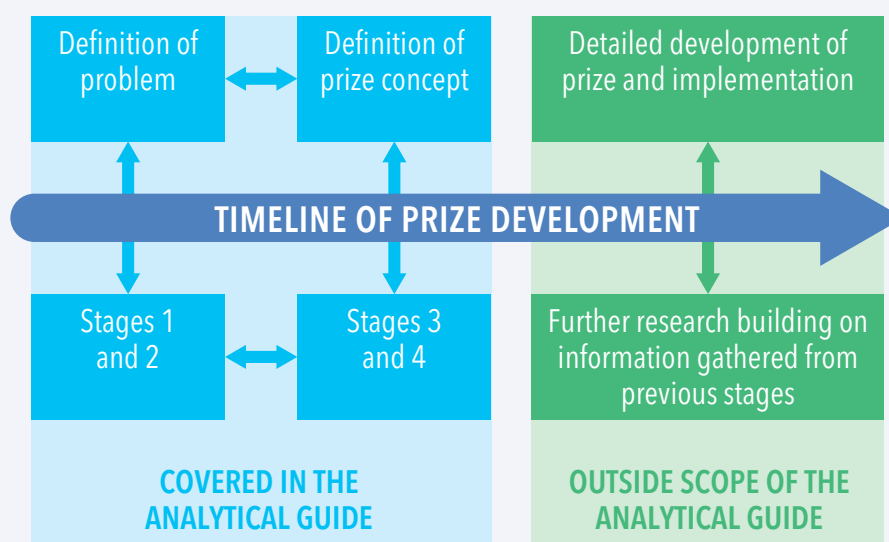
STAGE 4: DETAILED APPRAISAL

- Does the prize competition offer sufficient reward to incentivise entrants without placing inappropriate risks on the losers?
- Do the likely benefits, given the probability of achieving development gains and spillover benefits and the possible impact on beneficiaries and supporting networks, outweigh the risks for the sponsor?

The entry point for using this guide can be at any of the four stages; the appropriate starting point will depend on what stage of the design process the sponsor or designer is at, and which questions have already been asked. If the sponsor wishes to investigate whether they should intervene to address a given problem, they should start from Stage 1. In some cases, a sponsor will have already identified that an intervention is needed and wants to consider whether to use a prize and so should proceed from Stage 2; in other cases they may have taken an early decision to use a prize and have an idea of what the solvers might be asked to do but now want to stress-test that decision and so should proceed from Stage 3. As the sponsor or designer progresses through stages 3 and 4, they may want to change these initial features of prize design. If a prize in general seems unsuitable for the problem at hand, the sponsor can also return to Stage 1 and revise the problem definition.

FIGURE 2:
THE ANALYTICAL GUIDE CAN HELP DEVELOP THE PROBLEM DEFINITION AND INITIAL PRIZE CONCEPT

Source: Vivid Economics



If the sponsor intends to use an innovation prize but does not have a pre-specified problem, the guide can be used to identify and, as necessary, adjust a problem definition to ensure that a prize is suitable. In some cases, including in the Ideas to Impact programme, a decision might be taken to trial the concept of using prizes and hence there is a need to find the most opportune problems for using a prize. In this case, the intention is that Stages 1 and 2 can be used as a preliminary assessment of whether a prize is a suitable instrument to address the given problem, without undertaking a detailed analysis of the potential benefits and costs. If a prize competition appears to fail these stages, the sponsor can either search for an entirely different problem or return to Stage 1 and revise the problem definition using the information and understanding they have gained.



**CLIMATE CHANGE
ADAPTATION**
Section 4

Highlights some particular challenges of using innovation prizes.

STAGE 1

PROBLEM IDENTIFICATION

THE FIRST STAGE ASSESSES
THE APPROPRIATENESS OF THE
PROBLEM FOR ANY FORM OF
INTERVENTION



WASH
Section 3.1
For more
on problem
identification.

Before examining whether a prize is a suitable and effective instrument to solve a problem, the problem itself should first be examined. This involves looking at the context of the problem and ensuring that an intervention to solve the problem is 'FACE':

- Focussed;
- Achievable;
- Consistent; and
- Essential.

Throughout this stage, the appropriate 'counterfactual' is a situation in which there is no intervention.

FOCUSED

Sponsors should have a good understanding of the wider context of the problem, such that they are confident that resolving the problem will lead to development benefits. Often barriers to achieving development goals exist at several points in the innovation ecosystem. While the intervention will tackle some of these barriers, the sponsor should also ensure that those barriers outside the scope of the problem are either low enough not to prevent progress if the problem is resolved or will be addressed through other approaches. Particular attention may need to be given to whether typical barriers to commercialisation and adoption are relevant to the wider context of the problem and, if so, whether these can be addressed by the intervention. Consideration should also be given to how barriers to progress might evolve as the problem is resolved. For example, surveys have revealed that although interventions to build community-maintained irrigation projects in Northern Pakistan successfully overcame key barriers, their ongoing maintenance became challenging due to social fragmentation and a lack of leadership in the community (Khawaja, 2009).

ACHIEVABLE

Sponsors should ensure that sufficient resources are available, considering all relevant sources, to resolve the problem. Some of the key issues that will need to be considered include:

- Whether the timescale over which the sponsor expects to see results is consistent with that over which the problem can be resolved;
- Whether the sponsor has, or has access to, adequate knowledge of the innovation ecosystem to accurately assess the resources required to overcome the barriers to progress;
- Whether the budget and time available to the sponsor is sufficient to undergo the necessary preparatory work to design an intervention with a reasonable chance of achieving development gains;
- Whether the budget and time available to those that may implement an intervention is consistent with the resources required to resolve the problem – as a prize-specific example of this general issue, the Bigelow space prize to design and build a reusable manned capsule expired with no attempts made as potential solvers did not have sufficient funding (Kay, 2012).

CONSISTENT

The resolution of the problem must be broadly consistent with the objectives of three sets of stakeholders: host governments, sponsors and beneficiaries. Any intervention will require the participation of these three groups,¹ recognising that there will often be a significant difference in the objectives of different individuals within these groups. Hence, there is a need for a good understanding of their views and powers as well as a reasonable belief that they will not pose a significant obstacle to the resolution of the problem.

- **Host government.** The extent of consistency with government policy can be a difficult balancing act in any development intervention; however, if overcoming the problem requires direct contradiction of existing government policy, it is unlikely to be sustainable in the longer term.
- **Sponsor.** Resolution of the problem should be consistent with the sponsor's objectives. For example, in the context of Ideas to Impact, DFID anticipates the resolution will lead to improved access to energy and water services for 12 million people and the development of seven new, affordable and accessible technologies.
- **Beneficiaries.** The problem should be defined such that it clearly responds to the actual needs of the beneficiaries. If the sponsor or designer has an incorrect or incomplete perception of the needs of the beneficiaries then any resulting intervention may not yield a successful and sustainable solution. For example, efforts to introduce improved cookstoves and cleaner cooking fuels in sub-Saharan Africa have often been impeded by an insufficient appreciation of the benefits of traditional methods of cooking among the intended beneficiaries (Stockholm Environment Institute, 2013).

Again, consideration should be given to how this context may be dynamic and stakeholders' views may change as the problem is resolved.

1. Recognising that, in some cases, the sponsor will also be the host government



ENERGY ACCESS
Section 2



**CLIMATE CHANGE
ADAPTATION**
Section 3.1

For more on
ensuring consistency
with objectives of all
stakeholders.

ESSENTIAL

The sponsor should be reasonably confident that the problem will not be resolved without further intervention in an adequate timeframe and thus, that the intervention is essential. This is often the case when a market failure prevents the achievement of a desirable outcome. Difficulties in appropriating knowledge and returns from innovation can often provide a strong market failure justification for intervention. The absence of price signals to internalise the costs of greenhouse gases also often impedes low-carbon innovation. Barriers to entry can also make it difficult for new firms or individuals to provide an innovation within a market.

This will require a good understanding of current interventions, research efforts and government policy.

The Archon Genomics XPRIZE, announced in 2006, intended to spur a revolution in fast, cheap and accurate human-genome sequencing. In 2013, only weeks before its official start, the competition was cancelled; in the interim, companies had come to routinely perform sequencing to the specification set out in the victory conditions (Aldhous, 2013).

SUMMARY

Before even considering whether to use a prize, sponsors and/or designers may need to check that any form of intervention would be appropriate in dealing with a particular problem.

This assessment can be facilitated by asking whether an intervention to address the problem is 'FACE':

- **Focused:** is there a good understanding of the wider context of the problem, such that they are confident that resolving the identified problem will lead to development benefits?
- **Achievable:** are there sufficient time and resources available, considering all relevant sources, to resolve the problem?
- **Consistent:** is the desire to overcome the problem shared (or at least not actively contradicted) by host governments, the sponsor and expected beneficiary?
- **Essential:** is it unlikely that the problem will be resolved without intervention?

STAGE 2

PRELIMINARY CHECK

THE SECOND STAGE TRIES TO
IDENTIFY SIMILARITIES BETWEEN
THE PROBLEM AND THE WAYS IN
WHICH INNOVATION PRIZES CAN
SUPPORT INNOVATION

This section of the guide sets out the types of effects or outcomes that prizes have been documented to achieve in order to help sponsors and designers undertake a preliminary assessment as to whether they are likely to be a suitable tool to address a particular problem. Evidence on the types of effects that prizes can have is still limited, and we work with the current thinking to help decide if prizes can be a useful tool over, or in collaboration with, other forms of intervention. If there is a clear connection between the problem identified in Stage 1, taking into account the constraints facing the sponsor, and the outcomes and effects presented in Figure 3, then there is merit in investigating the use of prizes further. If there are no clear connections, it may be that an innovation prize is not a suitable instrument to address the problem.

Previous prize studies have identified a range of prize types and/or uses for prizes. Deloitte (2014) refer to two broad classes of prize outcomes:



**CLIMATE CHANGE
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Section 2.1

For more on different prize types.

1. GENERATING NEW IDEAS, TECHNOLOGIES, PRODUCTS OR SERVICES

Competitions can be structured to incorporate an open call for ideas, or to build prototypes or launch pilots that attempt to address a problem in a new way. Media attention can amplify this benefit by increasing awareness of the competition and by enhancing the recognition value in winning making entry more attractive. This may also redirect existing research and innovation from adjacent fields.

2. ENGAGING PEOPLE, ORGANISATIONS AND COMMUNITIES

The process of participating in a prize competition can educate solvers as they gain new skills and knowledge from exploring and developing innovations. The media attention a prize can attract may help spread awareness of a particular issue and also of the winning innovation to wider communities including both consumers and producers.

To these two classes of outcome, we would add a third.

3. STIMULATING MARKETS

The financial reward of a prize can be structured such that it mimics market incentives and induces the deployment of a given product or service by overcoming market imperfections. An example is when a payment is made proportional to a given output making it more attractive for the solver to produce. This increases the profitability of producing a product or service desired by consumers, in much the same way as a higher market price would. This can be particularly useful in a fluid and nascent market as solvers are paid solely for the output and can hence adapt their approaches to emerging market conditions. The distribution of a given product or service can also be boosted by media attention increasing the development impact for the intended beneficiaries and possibly leading to new applications and uses.



ENERGY ACCESS
Section 4.1 & 4.2

For more on
stimulating markets

For a more detailed classification of prize outcomes, we find it useful to look at the McKinsey model (2009). Note that we have changed the original model slightly by replacing the term "prize type" with "prize outcome", which we feel better reflects what is being classified.

FIGURE 3: POTENTIAL PRIZE OUTCOMES – CURRENT THINKING

Source: Adapted from McKinsey, And the winner is... (2009)

Intended prize outcome (prize type, rephrased)	Specific objective	Potential change levers
Raise awareness	Recognition prize to focus attention on, set standards in, and/or influence perception of a particular field or issue	Identify excellence; Influence perception
Promote best practice	Recognise best practices, ideas, or opportunities, and provide support for growth/development Recognise and draw support to local innovation	Media attention; Identify 'excellence'; Mobilise capital
Strengthen networks	Celebrate and strengthen a particular community Integrate local innovation into innovation systems	Identify 'excellence'; Strengthen community; Mobilise capital
Improve participation	Educate and/or change behaviour of participants through the prize process Enhance transfer of existing technology, behaviours or processes into the mainstream Stimulate local innovation	Strengthen community; Educate/improve skills
Community action	Stimulate community action Enhance transfer of existing technology, behaviours or processes into the mainstream Stimulate local innovation	Generate innovative ideas; Mobilise capital and effort towards community issues; Strengthen community
Point solution	Solve a challenging, well-defined problem requiring innovation	Focus a community; Mobilise talent
Market stimulation	Emulate market incentives, driving costs down through competition and exposing latent demand	Identify excellence; Mobilise talent, capital; Focus a community; Influence perception

To these seven more nuanced outcomes, we would add two more:

1. LOCAL (GRASSROOTS) INNOVATION

Local innovation plays a crucial role in modifying and adapting to local conditions and priorities as well as ideas or technologies developed elsewhere, and is often a critical source of ideas. The importance of local innovation has been highlighted in the manufacturing sector where innovation, particularly by early users, is often critical to making the manufactured, 'hard' parts of a technology work. The software development sector is another example where the manufacturer–user distinction is breaking down (von Hippel, 2006).



CLIMATE CHANGE ADAPTATION
Section 3.1 & 3.3



ENERGY ACCESS
Section 4.1 & 4.2



WASH
Section 3.2.2

For more on grassroots innovation

2. ALTERING THE POLICY ENVIRONMENT

As discussed in Stage 3, understanding the innovation ecosystem is a critical part of the thinking and research that is required for detailed prize design. Ideas to Impact will test the potential for innovation prizes to alter this ecosystem by encouraging policy makers and implementers, as solvers in their own right, to proactively create an environment more conducive to innovation in a desirable direction by other actors.



CLIMATE CHANGE ADAPTATION
Section 3.1 & 4.1



ENERGY ACCESS
Section 4.4



WASH
Section 3.2.5

For more on changing the policy environment

BOX 2: EXAMPLES OF THE MULTI-DIMENSIONAL OUTCOMES OR EFFECTS THAT PRIZES CAN ACHIEVE

Nesta's Big Green Challenge in the UK – a £1 million prize competition designed to encourage and support community-led responses to climate change – demonstrates how most prizes typically cover both areas and aim to achieve a number of outcomes, including exposure of innovation, mobilising community action and promoting participation to achieve carbon savings (Brook Lyndhurst, 2010). The challenge set out to tackle a lack of interest in, and knowledge of, low-carbon technologies and activities at the local community level. Teams had to propose community projects to reduce carbon emissions, with the top 100 teams being supported through expert mentorship to achieve their goals. Through participating in the competition, these communities drove engagement among their peers which built lasting knowledge in how to run effective green projects.

The \$2 million Wendy Schmidt Ocean Health XPRIZE to develop low cost innovations to improve the efficiency and accuracy of technology to monitor ocean acidity (XPRIZE Foundation, 2014) also covers both areas aiming to achieve point solution (the technology) and exposition to increase awareness of the issue and raise capital. Though higher levels of acidity are threatening ocean ecosystems, the high cost and inaccuracy of existing data is a key bottleneck in making informed policy decisions. The prize will be awarded for breakthroughs in the affordability and precision of sensors that will enable researchers, policy makers and industry to build data to catalyse better investment in the management of these ecosystems.

SUMMARY

As a preliminary check, sponsors and/or designers should confirm whether any of the potential prize outcomes detailed in Figure 3 will help address the problem defined in Stage 1. It is important to prioritise outcomes so that detailed design can appropriately target these.

Where this alignment exists, sponsors and designers can proceed to consider whether some of the key characteristics of prizes – for instance, that they transfer risk to potential solvers, or that they can leverage large amounts of spending by competing solvers – make them appropriate to use in a particular context. The sponsor also needs to consider whether a prize alone, even one with multiple outcomes, will be sufficient to solve the defined problem. These issues are discussed in the next two sections.

In practice, it is an iterative process between the different stages of this guide and the application of extensive development experience has been critical to decision making:

It is not simple to map problems identified in Stage 1 and consider if any of the effects and outcomes mentioned above (Stage 2) have relevance to the given problem. In many cases you will not be wholly clear of the answer until you have done detailed assessment of the ecosystem as required in Stage 3. It is an iterative process. Ultimately the final selection of problems taken through to Stage 3 was based on the extensive knowledge and experience of the team.

STAGE 3

THEORY OF CHANGE IN CONTEXT

THE THIRD STAGE DEVELOPS
AND ANALYSES THE THEORY
OF CHANGE UNDERPINNING
THE PRIZE WITH CAREFUL
CONSIDERATION OF
THE CONTEXT

To explore the use of a prize in more detail, Stage 3 guides the sponsor or designer to further develop their understanding of how running the prize will result in development gains. It can be useful to start with the development impact and work backwards to identify the changes needed and how these can be enabled. This theory of change – that is, the mechanism by which the prize leads to development gains – should explicitly take into account the context in which the prize competition is run. The following sections discuss the theory of change and the context. Readers should note that although these issues are presented sequentially, this does not indicate a linear relationship between the two, and the issues should be considered together (see Figure 1).

If it is difficult to develop a credible theory of change within a particular context, one or the other may need to change. Stage 3 is an iterative process in that, as the theory of change becomes more detailed, the sponsor or designer will have a more detailed idea of the appropriate context in which to run the prize (and how this may or may not change as a result of the prize). Equally, as more is learnt about the context (and how this may or may not change as a result of the prize), it may be that certain steps in the theory of change no longer seem feasible. This iterative process of development and research should continue until the sponsor or designer is satisfied that the theory of change is both comprehensive and feasible in the suggested context, accounting for changes anticipated as a result of the prize. Ideally, it should also be developed in close collaboration with key stakeholders, especially intended beneficiaries. Box 3 provides an example from the Ideas to Impact programme of how this process can work in practice.

BOX 3: AS UNDERSTANDING OF THE CONTEXT DEVELOPS, THE THEORY MAY REQUIRE ADJUSTMENT

Within the climate change adaptation work stream of the Ideas to Impact programme, a greater understanding of the context and the issues present in the innovation ecosystem led to an adjustment of the theory of change. Initially, the theory focussed on the need to provide higher quality climate information. However, research into how climate information was being used for adaptation revealed a lack of collaboration among the private sector, meteorological offices and adaptation actors such as NGOs. The theory of change was adjusted to promote further interaction between these groups to help make existing information more useful and improve the link between the supply of and demand for climate information.

THEORY OF CHANGE

To assess the likelihood of achieving progress towards development objectives, it is necessary to identify how running and/or awarding an innovation prize would produce an impact, and how running and/or awarding an innovation prize would lead to such change. To a significant extent these will depend on whether it is possible to determine appropriate victory conditions for the prize. This sub-stage examines these issues through five questions:

- Is it clear how running and/or awarding the prize will lead to sustainable development benefits, taking into account, as necessary, the other actions needed to link the prize to development outcomes?
- Is it unclear to the sponsor and designer how they could achieve the outcome without using a prize?
- Is it possible to specify the conditions for winning the prize clearly?
- Would it be easy to measure when these conditions have been met? Would meeting the victory conditions for the prize predominately be a function of skill and effort rather than luck?

It is crucial to assess whether there is a compelling theory of change to explain how running and/or awarding the prize will lead to sustainable development benefits. A compelling theory of change rests on being able to identify how the status quo will have been altered after the prize intervention has been concluded. The demonstration of a compelling theory of change is particularly important in a development context as years of development research and evidence illustrate the challenges of achieving sustainable change. This is often due to problems such as poor access to knowledge, lack of producer and consumer finance, weak infrastructure and the benefits to stakeholders of maintaining the status quo. Given this, it is necessary to identify all preconditions or barriers to progress in the innovation ecosystem and how the prize, plus related interventions, will reduce or remove these barriers. This will often be easier to demonstrate if the prize competition is expected to change the context of the problem, for example by reducing costs, changing consumer preferences, improving the quality of a product or service or some combination of the above. The necessary requirements for sustained change will vary considerably between problems.

The tighter the causal link between the victory conditions and the development goals of the intervention, the more likely it is that the prize will lead to sustained development gains. This should be assessed by explicitly identifying the assumptions linking attainment of the victory conditions to the overall development objective and testing their plausibility. The fewer the assumptions and the more likely these are to be satisfied, the more likely that development impacts will be achieved if a solver meets the victory conditions. If it seems plausible that one or more of these assumptions may fail to hold, the sponsor or designer may wish to redefine the victory conditions. For example, victory conditions linked to the distribution of clean cookstoves would rely on the continued use of the cookstoves to generate the health and other development objectives being sought. If there is good reason to believe that the cookstoves may not be used, then a prize that provides rewards for the dissemination of cookstoves may need to be reconsidered.

BOX 4: ENSURING THE THEORY OF CHANGE IS ROBUST

The Bright Tomorrow Lighting Prize (L Prize) competition, run by the US Department of Energy, aims to spur development of ultra-efficient solid-state lighting products to replace common lighting products (US Department of Energy, 2014). To win the prize, entries must be both efficient and cost effective. Winning products will be eligible for federal purchase agreements and 30 L Prize partners across the USA will provide ready-made markets and product promotions such as utility incentives, collaborative marketing and educational campaigns, retail partnerships and demonstrations. Together, these measures are expected to ensure the widespread deployment of winning technologies and thus, a tangible reduction of greenhouse gas emissions.

Often innovation prizes will need to be supported by complementary interventions in order to provide a compelling theory of change. In some cases, the detailed design of the prize itself can do much to support sustainable change; Box 4 provides an example. However, in other cases, complementary action may be required. Typically development problems have multiple dimensions and a prize is likely to be only one element of a broader set of interventions to achieve development goals. In order for the theory of change to be completely addressed it may be necessary to work in partnership with other programmes of activity to address different elements in **tandem**. Box 5 illustrates a case where this was not achieved. This highlights that any assessment of the risk that a prize fails to achieve development goals must also account for the risk that parallel actions fail to deliver.



WASH

Section 3.2.5 & 5

For more on using prizes in tandem with broader support programmes.

BOX 5: THE SUNNIGHT SOLAR CHALLENGE DEMONSTRATES WHY COMPLEMENTARY ACTION CAN BE NECESSARY

To address the problem of the millions of people without the means to light their homes, SunNight Solar posted a challenge to the InnoCentive prize platform to engage its global community of solvers (InnoCentive, 2008). An engineer from New Zealand delivered a design that not only met the specification of a solar powered flash light capable of lighting an entire room but which also had a 20-year life span. While the product met commercial success in the USA, its uptake by markets in the developing world was limited by poor access to finance and a lack of awareness. Research by SunNight Solar in Kenya identified that women in the slums of Nairobi did not have sufficient credit to buy the lights at the wholesale cost of \$15 despite the 3 month payback relative to current expenditure on Kerosene for lighting (Everett, 2011). If the prize had been coupled with complementary interventions addressing these barriers to distribution, the innovation would have had a greater chance of achieving a widespread impact.

AWARDING THE PRIZE

Prizes are more appropriate when the sponsor and designer do not know how to achieve the victory conditions. Prizes can overcome uncertainty both in terms of the method by which to win the prize and the quality of the solvers. If the sponsor or designer knows the best solution, it would be best to contract someone directly to do it. If they know the quality of each competitor, it would be best to give a grant to the highest quality competitor.



CLIMATE CHANGE
ADAPTATION
Section 3.4

[For more on award criteria.](#)

The conditions for winning the prize need to be sufficiently clear, and be relatively easy and low cost to measure, in order to make a prize cost effective, and to attract entrants. If measuring the attainment is very costly then it will not be an attractive approach for sponsors or designers. Potential solvers are also likely to be concerned if it is likely to be difficult to assess whether the prize has been won and who to award it to. It also risks embarrassment to the sponsor if there are subsequent disputes over the award of the prize. These challenges are more likely to arise where prizes are used for complex problems, where the prize competition aims to tackle several issues at once and, therefore, there are several dimensions to the victory conditions. While this need not prevent the use of a prize, it may make it more difficult for judges to retain objectivity and discretion as value judgements may be required to rank the importance of multiple objectives. Ensuring value judgements are transparent and scrutinised for prejudice can mitigate this risk.

If there is a significant element of chance to winning the prize and it is not mostly within the control of prospective solvers, they will be unlikely to enter. If luck plays a large role in the award of the prize, it is more likely that the best solvers (in terms of skill and effort and thus, overall ability to meet the victory conditions) will not win and that poor quality solvers will be rewarded. As they have less control over the outcome, entrants will be less certain of their ability to win and thus, have less of an incentive to exert effort or even enter at all. Clist and Dercon (2014) note that “in highly risky environments (ones in which there is a large variation in the outcomes a solver might achieve even with a given level of skill and effort), PbR [and other prize competitions] would be very costly as a large prize would be needed to incentivise effort”. The design of the prize might be adapted to mitigate this risk by setting an intermediate objective that the solvers have more direct control over, for example, the submission of a proposal or proof of concept. The prize competition could then be run in two stages and only the most promising solvers would proceed to the second stage. However, there will be more steps or assumptions between any intermediate objective and the development impact and so the designer must be aware of this trade-off when setting the victory conditions.

CONTEXT

The geographical location, development partners and surrounding innovation ecosystem of a prize can support or impede its development impact. The assumptions underpinning the theory of change must still hold in light of these:

- Is there a diverse set of solvers with the necessary skills and access to resources to enter the competition?
- Is there a suitably sized set of solvers with the necessary skills and access to resources to enter the competition?
- Is the theory of change supported by existing:
 - Government policies;
 - Development partners and stakeholders (especially if these are required to help run the prize); and
 - Needs of the beneficiaries?



ENERGY ACCESS
Section 4.1

[For an example of context consideration](#)

POTENTIAL SOLVERS

The more diverse the potential pool of solvers able to enter the competition, the greater the probability that one of the entrants will achieve success. If all solvers have similar skills and characteristics then there is a much greater risk that the prize will lead to the duplication of cost and effort; providing a grant to one company or person may be more cost effective. Depending on the nature of the problem, the diversity of the pool of potential solvers may be restricted by issues such as potential solvers' income, work commitments, social status (taking into account possible discrimination) and access to finance.

A suitable number of potential solvers can increase the leverage from a given prize pool. With only a small number of potential solvers, the risk of collusion in the prize competition is high, undermining the competition benefits that prizes otherwise bring. A large number of potential solvers removes this problem and also increases the probability of sufficient diversity. On the other hand, too many potential solvers may inflate administrative costs for the sponsor as more time and effort would have to be spent in managing the competition. What is an 'appropriate' number will differ from case-to-case.



CLIMATE CHANGE
ADAPTATION
Section 3.1

For more on the
benefits of a diverse
range of inputs.

SUPPORTING THE THEORY OF CHANGE

Sponsors should be confident that existing government policies do not conflict with the theory of change. For example, a prize may only be effective if participation is open to international innovators, but this may be inconsistent with domestic content regulations. In other cases there may be government policies encouraging innovation in a particular sector, so that the prize fills a niche within a broadly supportive environment.

They should also consider whether other development partner interventions and stakeholders support the theory of change. For example, a prize may not be an appropriate instrument for one development partner if other development partners are already working closely with particular parties on addressing the issue through another instrument. In other cases, running and managing the prize may need engagement from complementary development partners. If this is the case, it is crucial that legitimate partners with the appropriate skills and capacities are present and willing to work with the sponsor. Another important consideration is whether the sponsor's objectives rule out 'double-funding' of development initiatives or beneficiary communities, that is, providing funding where other organisations have already done so. If so, it should be certain that the prize competition does not undermine this objective.

Importance should be given to assessing whether any required complementary actions are probable in a given context. Successful intervention within an innovation ecosystem can often require action from a wide range of stakeholders including those not within the immediate sphere of influence. These actions may be more or less probable in different contexts. For example, sales of enhanced clean cooking solutions may require complementary innovation by consumer finance organisations as well as distribution, storage, parts and maintenance agents. Understanding the wider ecosystem and its actors is a key element in completing the picture that makes up the theory of change.

Finally, sponsors should assure themselves that the use and outcome of the prize is socially acceptable. In some cases, the use of prizes in relation to solving particular problems may not be supported due to cultural sensitivities. For example, the Mo Ibrahim award is purposefully funded with African-sourced wealth to avoid the damaging impacts of introducing Western judgement on African governance (Mo Ibrahim Foundation, 2007). In other cases, there may be a strong tradition of using innovation prizes and similar tools, and stakeholders are aware of and comfortable with the approach.

Note that the issues raised here are similar to those in Stage 1 regarding consistency but need to be revisited in light of the decision to proceed with investigating the use of a prize.



ENERGY ACCESS
Section 4.2

For more on considering
obstructive policy
environments.

SUMMARY

To develop a nuanced understanding of whether and how running the prize will result in expected development gains, it is useful to start with the development impact and work backwards to identify the changes needed and how these can be enabled.

This theory of change – that is, the mechanism by which the prize leads to development gains – should explicitly take into account the context in which the prize competition is run. The geographical location, development partners and surrounding innovation ecosystem of a prize can support or impede its development impact. Answering the following questions can help establish an understanding of this context:

- Is there a diverse set of solvers with the necessary skills and access to resources to enter the competition?
- Is there a suitably sized set of solvers with the necessary skills and access to resources to enter the competition?
- Is the theory of change supported by existing:
 - Government policies;
 - Development partners and stakeholders (especially if these are required to help run the prize); and
 - Needs of the beneficiaries?

TABLE 1: THE SPONSOR SHOULD BE AWARE OF THE RISKS SURROUNDING EACH ISSUE

Source: Vivid Economics

Questions to consider	Sub-questions	Potential risk
Is there a robust theory of change such that it is clear how running and/or awarding the prize will lead to sustained development benefits?	Is there a sufficiently close link between the plausible victory conditions of the prize and the desired development benefits? Are the necessary complementary interventions in place (or likely to be in place?)	Awarding the prize may not lead to sustained development benefits
Is the sponsor itself uncertain how or who can solve the problem?		A grant or private contract may be more efficient than an innovation prize
Will it be easy to specify the victory conditions?		Solvers may be discouraged to enter The prize may not be awarded or award may be subject to dispute
Is it likely that those who have the most skill and apply the most effort are likely to win the prize?		Solvers may be discouraged to enter
Will there be a sufficiently diverse pool of entrants?		Inefficient duplication of effort Solvers may be unable to meet the victory condition
Will there be an appropriately large pool of entrants?		Solvers collude (if too low) High administrative costs (if too high)
Do existing government policies support the theory of change (or at least not entirely conflict with it)?		Government policy limits development benefits
Do the activities of other development partners support the theory of change?		Duplication of effort with other development partners Complementary support is not available Breach of 'double-funding' rules
Will the use of a prize be appropriate in the cultural context?		Lack of interest in and criticism of the prize

STAGE 4

DETAILED APPRAISAL

THE FOURTH STAGE
WEIGHS THE BENEFITS
AGAINST THE RISKS FOR
BOTH THE SPONSOR AND
THE SOLVERS

It is important to weigh the overall risks against the likely benefits of using a prize. Stage 4 considers a wide range of issues that influence the size of these risks and benefits. In some cases, consideration of these issues may lead to a decision to reject the use of a prize. In other cases, they may raise important issues that will need to be addressed when undertaking detailed prize design.

The potential costs and benefits need to be considered for both the solver community and the sponsor. In each case, an overarching question is relevant:

- Does the prize competition offer sufficient reward to incentivise solvers without placing inappropriate risks on the losers?
- Do the likely benefits, given the probability of achieving development gains and spillover benefits and the possible impact on beneficiaries and supporting networks, outweigh the risks for the sponsor?

Some of the issues explored in previous stages may help inform the assessment in this stage.

FOR THE SOLVERS

The potential benefits from the prize must be large enough to make entering the competition and winning the prize attractive. This will largely be determined by external constraints such as the level of budget available to the sponsor and the importance of non-monetary recognition drivers. Box 6 illustrates the importance of the size of the prize fund.

Impacts on the losers should be limited to avoid 'damaging losses'. Prizes allocate risk to solvers; those who fail to win the prize may have incurred time, and other resources costs that cannot usually be recovered. It is particularly important in the development context that these costs are not 'too large' as this could compromise development objectives (and/or deter entry in the first place, also rendering the prize ineffective).

Four key questions can help assess how much losers might lose and how well they can absorb those losses.

These questions should help the sponsor or designer to assess what is an 'inappropriate' risk for the solvers, with particular attention on the poorest among the potential pool of solvers warranted.

1. Do solvers require pre-finance to enter the competition, for how long might they need to pre-finance and how much would this cost? In the case where pre-finance is required, unsuccessful solvers may have difficulties in repaying the finance.
2. How significant a proportion of the solvers' overall activities would be consumed by entering the competition? If a solver foregoes work or other economic activities to enter and compete, their overall resource cost will be significantly higher than their monetary expenditure.
3. Are costs associated with entering the competition 'sunk' or could they be partly recovered? If solvers can receive some form of compensation for unsuccessful efforts, for example through selling materials on second hand markets or gaining skills relevant to their work, this will partially offset the total cost of entry.
4. Is it plausible that there will be spillover benefits to unsuccessful entrants? Spillover benefits could provide solvers with useful skills, ideas and contacts that could lead to financial returns in the future.

Prize design can help attenuate these downside losses but this may carry costs. For example, one method to minimise the costs of supporting solvers in this way is to run the competition in stages such that there are fewer competitors in each successive stage. This reduces the financial burden on both those solvers who do not progress past the initial stage(s), as they no longer compete, and also the sponsor, as there are fewer solvers to compensate. However, this type of prize will require higher administrative costs.

BOX 6: INCREASING THE REWARD CAN ATTRACT SOLVERS OF THE REQUIRED QUALITY

Only after the reward was significantly increased did the AHS Igor I. Sikorsky Human Powered Helicopter Competition attract solvers of the required quality (Wise, 2013). The competition to build a successful human powered helicopter was launched in 1980 with an initial prize of \$10,000. Only two attempts managed to leave the ground in the first 29 years. In 2009, the prize fund was raised to \$250,000 sparking new interest in the competition; there were more solvers from 2010-12 than in the first 30 years. The winning team claimed the prize just 4 years later.



CLIMATE CHANGE
ADAPTATION
Section 4.2



WASH
Section 2.3

For more on the risks to solvers

FOR THE SPONSOR

Sponsors should consider whether there is reasonable probability that significant progress will be made towards achieving development gains. To a significant extent this will depend on the theory of change and how collection of the prize will lead to a long-term shift in behaviours. The probability that other complementary and necessary interventions will succeed will also play a role. These issues were discussed in Stage 3. However, it is also important for the sponsor to explicitly account for spillovers or positive learning benefits from the prize competition – which may arise regardless of whether the prize is won – in its overall assessment. Spillovers may be high for a number of reasons:

- If the innovation is expected to have multi and general purpose attributes and uses, as the winning entry of the 2009 Global Security Challenge (discussed in Box 7) did.
- If there is likely to be a large amount of **media attention** as it will both facilitate the dissemination of the resolution and attract more entrants.
- If the prize competition can create strong relationships (or networks) between solvers after the conclusion of the prize competition; this is easier to achieve when the pool of solvers is relatively small as they can interact and get to know each other during the prize process.



WASH
Section 2.3

For more on
[media attention](#).

Prize design can help attenuate these downside losses but this may carry costs. For example, one method to minimise the costs of supporting solvers in this way is to run the competition in stages such that there are fewer competitors in each successive stage. This reduces the financial burden on both those solvers who do not progress past the initial stage(s), as they no longer compete, and also the sponsor, as there are fewer solvers to compensate. However, this type of prize will require higher administrative costs.

BOX 7: SPILLOVER BENEFITS CAN BE FOUND IN ADJACENT INDUSTRIES

After winning the Global Security Challenge in 2009, Agnitio SL's innovation in voice biometric technology fostered significant spillover benefits (OmniCompete, 2011). The technology, originally designed for authentication and fraud prevention, found wider applications in military surveillance and forensic precision increasing its benefit.

The sponsor should consider the probability and magnitude of impact if progress is not made.

In many cases, the failure to award the prize will hamper progress and may even impose costs on the beneficiaries of the intervention. This can occur as it is likely that an innovation prize requires both sponsors and solvers to redirect considerable effort and resource from other activities they could have undertaken which could have otherwise achieved development impact. It may also place strain on wider support networks beyond the sponsor and solvers, for example, by redirecting the efforts of development partners; Nesta recognises the existence of this risk to wider communities when running innovation prizes (Gök, 2013). It can also cause embarrassment to the sponsor that no one has won; that ultimate development goals have not been met; that all entries are of poor quality; or that there are disputes over the winner. As discussed in Stage 3, clear specification of when the prize will be awarded and focussing prizes in situations where there are sufficient and diverse potential solvers will help to reduce this risk.

In some cases, this risk can be attenuated with careful detailed prize design. The Haiti Mobile Money Initiative offered a total of \$10 million in incentive funds to entities that delivered mobile money services in Haiti (USAID, 2012). To ensure the widespread use of the technology, the prize was awarded in several stages. The first two operators to launch a service in the country received an initial prize and were then subsequently rewarded at specific transaction milestones in proportion to the transactions they provided. A sponsor may also favour the use of prizes in situations where it is able to monitor solvers in their attempt to win the prize so that it can make adjustments to the prize design over time.

SUMMARY

Considering the detailed risks and benefits to the sponsor and solvers, it is important to ask whether the innovation prize is likely to deliver a net benefit. Drawing on the information gleaned from the previous stages and the specific risks and likely benefits discussed in Stage 4, it is necessary to weigh these against each other as a whole. Table 2 summarises the different elements that should be considered. To be confident that the use of an innovation prize is suitable to address the problem, the potential benefits should, on balance, clearly outweigh the potential costs for both the solvers and the sponsor.

TABLE 2: THE AGGREGATE POTENTIAL BENEFITS SHOULD BE COMPARED TO THE AGGREGATE POTENTIAL COSTS

Source: Vivid Economics

Party	Potential benefits	Potential costs
Solvers	Prize fund award (conditional on probability of winning)	Sunk financial and resource entry costs
	Non-monetary recognition	Cost of pre-financing
	Spillover benefits (network connections, skills gained etc.)	Displacement of economic activity
Sponsor	Significant progress towards development goals (conditional on probability of preconditions being met)	Administrative costs
	Overall benefit to beneficiaries	Prize fund award (conditional on probability of being awarded)
	Spillover benefits (wider purposes for innovation, exchange of ideas etc.)	Possible costs to beneficiaries and wider support networks
		Embarrassment if no award or poor quality entrants, etc.

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