ideas to impact.

USING INNOVATION INDUCEMENT PRIZES FOR DEVELOPMENT: WHAT MORE HAS BEEN LEARNED?

DISCUSSION PAPER

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Disclaimer

Contents

List of acronymns

DFID	Department for International Development
E&L	Evaluation and Learning
I2I	Ideas to Impact
IIPs	Innovation Inducement Prizes
RBF	Results-Based Finance
RQs	Research Questions
USAID	United States Agency for International Development
WASH	Water, Sanitation and Hygiene

Executive summary

In 2013, the Department for International Development (DFID) proposed creating a new innovative programme, that would launch a number of innovation prizes to encourage research to develop and deploy technologies that would improve poor people's access to affordable clean energy, safe drinking water and other climate/environmental services. Now known as Ideas to Impact (I2I), the programme is an action-research programme designing, implementing and testing innovation prizes, to induce innovative solutions to development challenges in Climate Change Adaptation, Energy Access and WASH (Water, Sanitation and Hygiene). To avoid confusion with other types of prizes, I2I refers to them as 'innovation inducement prizes' or IIPs.

As the programme's Evaluation and Learning (E&L) team, Itad carried out a literature review on the use of IIPs in development to put I2I's learning into context. When weighing up the final evaluation findings, the findings from the literature review will help the E&L team gauge how I2I's results and experiences compare to what other people have found. What do they confirm or contradict? Does I2I have anything new to say?

The main purpose of I2I's evaluations is to find out for what purposes and in which settings IIPs are particularly useful in development, and what their strengths and weaknesses are, compared with other funding modalities available to funders.

Related to this, we had five research questions (RQs) we wanted the literature review to answer (see Summary of findings). We undertook wide-ranging Google Scholar searches, reviewed the references we had compiled since 2014 while working on the programme, and separately drew up a list of IIPs to help us look for any associated evaluations or reports (see Section 2.3 and Annex 1 for more details of the methods). While there is a lot of literature on prizes, we found little evidence to answer our questions.

Definitions from I2I

Innovation: a new process, technology or service, and often a blend of all three, and includes:

- New to the world – NOVEL
- New to the location or firm – IMITATIVE
- New to the field of endeavour, i.e. repurposed – ADAPTIVE

Innovation inducement prize (IIP): Sometimes referred to as simply an 'innovation prize', an IIP rewards whoever can first or most effectively meet a predefined challenge. The reward is often financial but can also include additional support, such as technical assistance. This type of prize incentivises innovation rather than rewarding past achievement (prizes that do this, such as the Nobel Prize, are referred to as recognition prizes).

Summary of findings

RQ 1. Can we reach a common definition of an IIP?

There is little consensus in the literature on what an IIP is beyond a very broad definition. Between them, authors use various names for innovation prizes and these are sometimes interpreted differently.

RQ 2. What support, if any, do others running IIPs offer to solvers?

While the norm may be to provide no support to Idea Awards and Point Solution Challenges, the review found that prizes targeting developing country solvers may choose to provide more support (e.g. reporting templates, feedback opportunities, etc.). Evidence from Social Prizes, however, is that solver support may be both necessary to achieve the prizes' intended outcomes and beneficial to solvers as a non-financial incentive.

RQ 3. What are IIPs particularly useful for when applied to development goals?

The literature supports I2I's assumptions about what effects IIPs can be used to achieve in theory, although some effects received more support than others. However, there was little new evidence on how IIPs have delivered those effects and this is something that was referred to several times in the literature.

RQ 4. What are the strengths and weaknesses of IIPs for development versus other funding modalities?

A number of general advantages of IIPs compared to other funding modalities have been identified in the literature, building on those put forward by Everett et al. (2011). These include distributing risk among participants, avoiding the incentive in grant-making systems of potential grantees overpromising on what they can deliver, and removing need for background research into how a solution is solved or to identify who is best situated to solve it. There is, however, a lack of detail and supporting evidence of the type we anticipate funders require to decide on using specific prizes, over other funding options, to achieve their goals.

RQ 5. How are IIPs for development evaluated?

The lack of available evaluations of IIPs for development means discussions on how to measure their success remain largely theoretical. While some broad categories of indicators are suggested, there is no clear guidance available to those running prizes on how to evaluate IIPs for development, although there is some acknowledgement of the difficulty and cost of doing so.

Discussion points

Innovation prize terminology and definitions: Given the profusion of definitions and confusion over prize types, we think a practical guide to prize types would be useful to help funders, and others using prizes for development, to navigate the complexity. What should the boundaries of this be? Is anyone already working on such a guide to which I2I could contribute its learning?

Support to solvers: Do IIPs that focus on inducing implementation require too much solver support to make them worthwhile? Are there situations where all that is needed is some encouragement, in the form of a prize, to spur people on to do something they had in mind to do anyway?

Risks and 'costs' of using IIPs in a development context: Is there a need for a code of conduct for using IIPs in development? Are new tools required to help prize sponsors and managers mitigate the risks of unintended consequences? Or guidance and encouragement to apply the existing tools?

Lack of available evidence on IIPs: Can we agree on standard indicators that IIPs can use to draw meaningful conclusions about their effectiveness and contribution to solving the target problem? What can be done to encourage prize sponsors to speak more openly about their failures, as well as their successes, and to exchange learning with others?

Conclusions and implications for the E&L team

There has been no shortage of IIPs since 2011 but we do not think that the data we were seeking in the literature review is hidden behind paywalls. Although we restricted our search to publications available to access freely online, the few results that were excluded on that basis (i.e. required subscriptions or payment to access) were also not sufficiently relevant to our questions to be included in the review. So why were we unable to find enough evidence on IIPs to answer all our questions satisfactorily? Our conclusion from this exercise is that there are two main reasons for this:

1) I2I is unusual in running prizes that follow the Social Prize model, i.e. those that rely on people implementing something new, (if only new to them), while building little or no assistance to solvers into the design. I2I's prizes[1] were designed to comprise two or more stages, typically an Ideas Award (participants invited to submit a concept note, business plan, etc.) followed by one or more prizes focused on incentivising implementation (scaling up a climate change adaption project, for example, or implementing a sanitation plan). These implementation prizes place substantial demands on their

[1] The I2I portfolio includes three energy access prizes that have slightly different models however, the LPG (liquefied petroleum gas) Cylinder prize, although single stage, was conceived as being joined by two further prizes that did not run. And the Global Leap Off-Grid Refrigerator Challenge and the Off-Grid Cold Chain Challenge are made up of two stages in which innovations identified through the first, are applied by the solver in a new developing country context, sometimes with a contribution towards part of the cost of transportation and installation of the equipment.

participants, not least in terms of finding sources of finance, persisting with the prize process for over a year, sending in regular progress reports, etc. And participants are expected to do this with little technical support and no seed funding to get them started; while winners of the first in a multi-stage prize may elect to use their cash reward for this purpose, they are under no obligation to do so. This sets I2I's IIPs apart from the majority of prizes we have discovered during the literature review.

2) Not enough evaluations are happening – especially those that look beyond the awards ceremony – or they are not being made public. I2I is something of an outlier here too in terms of commitment of resources to evaluation and publication, and what it is interested in finding out. This literature review has helped us identify some key gaps in what is currently known (and shared) about IIPs for development, which we will help to fill with our final prize evaluations, not least how prizes compare to alternatives available to funders. Where we were able to track down evaluations or internal reports on prizes, these tended to take the awarding of prize money as the end of the story. I2I is collecting data at: each stage of prizes that have more than one stage; shortly after the prizes are awarded; and several months afterwards (e.g. a follow-up evaluation of the final Climate Information Prize is scheduled to take place nine months after the awards were made).

I2I was set up to test IIPs as a tool to help solve a range of development challenges for the purpose of understanding, in particular, their value to funders when compared to the other funding modalities available to them. From the literature review, we believe that what we learn from I2I will fill gaps in the existing literature, and there is value in making the full evaluation reports widely available, however there are some things we need to bear in mind when communicating our findings externally:

We need to be specific about the type of prize the learning comes from. For readers to assess the value of our findings to their interests and to apply them, we will need to describe clearly the prize design and not assume that the innovation prize language we use will mean the same thing to others in the innovation prize community.

We may need to use prize type as a way of packaging our findings. Given the popularity of prizes to source ideas and point solutions, there is value in sharing the findings we have on the first stages of our prizes as these may have wider appeal. However, the focus of our evaluation has been on the implementation stage prizes, which may appeal to a niche audience and could lend itself to more targeted dissemination.

We should consider exchanging learning with others who are interested in incentivising behaviour change for social good. One of our working hypotheses is that prizes which are designed to incentivise a target group of participants, such as local government officials, to work differently for a period of time will require different conditions to be effective than those that are focused on generating new ideas from citizens (Ideas Awards). We think there would be value in reaching out to those working in social marketing and behaviour change and reflecting with them on the potential IIPs have as financial incentives for behaviour change,[2] and how IIPs can learn from that sector's insights.

We invite you to direct us to any publication we might have missed that could help us answer our questions further. If you are running prizes, we also encourage you to publish your evaluations and final reports.

Contact us at info@ideastoimpact.net

[2] Prizes are already considered as a tool for incentivising behaviour change in the literature, within the umbrella of Financial Incentives, (see for example, Michie et al., 2011) however our early conclusions are that these tend to fall into the 'prize draw' category.

2. Introduction

2.1 The rise of IIPs for development

In the broadest terms, an IIP offers a reward to one or more solvers who first or most effectively solve a predefined challenge. They act as incentives for future innovation, rather than rewarding past achievement (prizes that do this, such as the Nobel Peace Prize are referred to as 'recognition' prizes).

In 2008, Brunt et al. examined IIPs using what was then a novel dataset of awards for inventiveness that had been offered by the Royal Agricultural Society of England from 1839 to 1939. The study concluded that 'prizes do work' to achieve innovation, having found that the monetary prizes had resulted in several large effects on the quantity of contest entries and on the quality of the inventions being submitted. As a result, it was argued that prize awards could be both:

a) A powerful mechanism for encouraging competition; and,
b) A particularly effective inducement for innovation.

In 2011, in an evidence review commissioned by DFID, Everett et al., continued to discuss the value of prizes to innovation. They argued that added incentives were not just of value to innovation, but were needed to achieve it. Taking the discussion one step further still, in 2012, Everett et al. went on to highlight the value and need of prizes, specifically in helping to achieve the Millennium Development Goals.

DFID drew on its commissioned reports, including Everett et al. (2011), heavily in its business case for the Innovation Prizes for Environment and Development programme. This subsequently became known as I2I and is an action-research programme testing the value of using innovation prizes to achieve international development outcomes.[3] There is an upward trend in using prizes (of any kind) for social and development goals (Evanoff, 2018). In the USA, for example, 41 government agencies self-reported a total of 116 prizes conducted under all authorities in the 2015 financial year, compared to 2012, in which 16 agencies reported running 49 prizes that year (Office of Science and Technology Policy, 2016). During the searches for this literature review, the authors identified many prizes stating their main objectives as being directly in line with the Sustainable Development Goals.[4] The United States Agency for International Development (USAID) has also started using IIPs, although these appear to be limited to early stages of innovation[5] or Grand Challenge-style prizes.[6]

2.2 About the literature review

Working in parallel with the Prize Teams I2I's E&L team, Itad, is evaluating the programme's IIPs to add to the existing body of knowledge on how and when prizes work in development and their added value over other forms of funding. A literature review was carried out to contextualise and strengthen the evidence that we anticipate coming from these prize evaluations, building on the work of Everett et al. (2011). We sought to avoid replication by mainly reviewing documentation published from 2012 onwards. The literature review was carried out by Cheryl Brown, Coordinator of the E&L team, and Dr. Jessica Roberts, Research Assistant on the E&L team.

The primary focus of the review was: **For what purposes and in which settings are prizes understood to be particularly useful for inducing innovation?** And**: What are the strengths and weaknesses of prizes, compared with other funding modalities?** Within this, we had five key questions we hoped to answer through reviewing the literature:

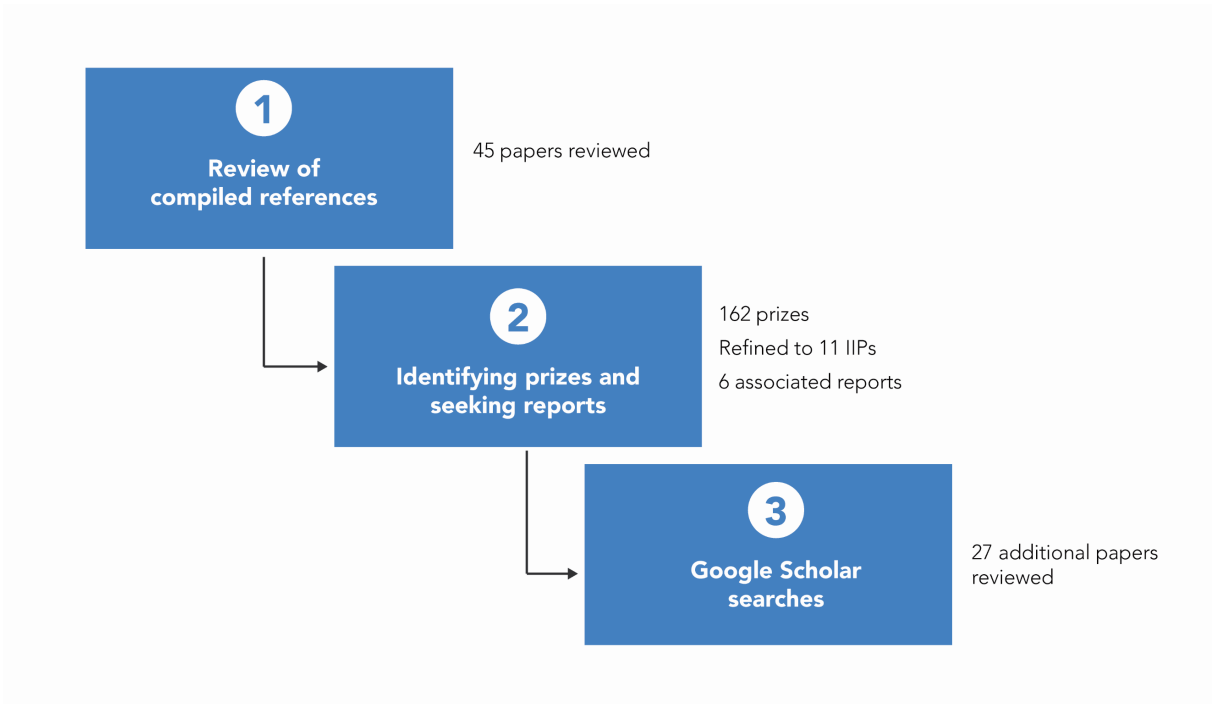
[3] I2I's portfolio of prizes can be accessed at http://www.ideastoimpact.net/iti-themes
[4] See for example https://www.elsevierfoundation.org/isc3-joins-the-elsevier-foundation-green-sustainable-chemistry-challenge/, https://www.news.uct.ac.za/article/-2018-06-15-value-added-toilet-hub-wins-global-sustainability-award
[5] See for example https://allchildrenreading.org/challenge/grant-prizes/
[6] I2I will be evaluating the USAID-sponsored Global LEAP Off-Grid Refrigerator Competition as a follow-up to Nesta's evaluation. The prize, which is smaller in scale and cash award size than is typical with Grand Challenge Prizes, sought to stimulate the market for off-grid refrigerators.

- **Can we reach a common definition of IIPs?** During the course of the I2I rollout, we have observed people describing prizes differently, disagreeing over what makes something an 'innovation inducement prize', introducing the concept of pure and hybrid prizes, etc.
- **What support, if any, do others running IIPs for development offer to solvers?** Linked to the debate over pure and hybrid prizes, we have often discussed within I2I what level of support prizes should offer to solvers, especially in a development context, and at what point the level of support provided changes an IIP into another form of hybrid prize.
- **What are IIPs particularly useful for when applied to development goals?** Building on the work of Bays et al. (2009), I2I uses a set of 'Prize Effects' to define the intended outcomes of its prizes during the design phase and when developing each of the prizes' theory of change (i.e. a narrative and diagram of how the prize will contribute to the desired development outcomes). In the I2I prize evaluations, this set of Prize Effects is used to report on the prizes' results, including those that were not the primary aim of the prize. We used the same Prize Effects as a common framework for presenting the results of prizes uncovered through the literature review.
- **What are the strengths and weaknesses of IIPs for development versus other funding modalities?** It is our experience that IIPs tend to be discussed in terms of their individual success or failure in finding a solution, or in incentivising people to participate in a competition. I2I's research, however, is focused on establishing prizes' relative merit for funders and helping them to assess whether they represent better value for money, than a grant, for example, in achieving a particular development outcome.
- **How are IIPs evaluated?** The approach to evaluating the I2I prizes has evolved since the programme began and the team will be sharing what it has learned about how to evaluate IIPs. This question was included to help us set our learning alongside that of our peers.

2.2.1 Methods

The resources did not allow for a full systematic review as it is typically defined, rather our intention was to ensure that when we presented our evaluation findings and learning from I2I, we would do so with a comprehensive understanding of what others in the innovation and development sectors had discovered.

Figure 1 Search strategy for literature review



A three-stage approach was taken to the literature review as illustrated in Figure 1 and summarised below (see Annex 1 for fuller details).

Stage 1: The authors reviewed a list of references that the E&L team had compiled through targeted Google Scholar searches since 2014. They added to the sources cited in the 2011 Everett et al. evidence review. 45 papers were reviewed at this stage, however little data on specific and relevant prizes emerged.

Stage 2: Having discussed the results of Stage 1, the authors decided to move the focus to searching Google more broadly to identify IIPs that had been applied to development goals and, from there, to track down publicly available evaluations of them. This acknowledged that in the prize world, the academic literature captured little evidence of Prize Effects, and that some evidence of prize performance was reported through grey literature including reports, annual reviews, promotion material and on blogs. We had already observed by this point that we would need to widen our search terms to find what we understood to be IIPs. From this exercise, we produced a list of 162 prizes to investigate, of which 151 were filtered out as not relevant due to:

- Not being an IIP even in its broadest understanding, e.g. described as a challenge prize but in design is a *de facto* challenge fund (funding awarded to deliver a project identified through an open competition)[7]
- Still being open and having not announced winners
- On closer inspection having no genuine link to a development theme.

Of those 11 prizes that remained, six reports were available, although only one contained evaluative data. This last report (DREAMS Challenge Prize) was later excluded during review when it became clear it awarded grants rather than being an IIP.

Stage 3: Having studied the literature obtained from these two approaches, and using what had been discovered about the varied ways IIPs are being defined and described, the authors searched Google Scholar,[8] again limiting the searches to papers published from 2012 onwards.

This activity generated 5,032 results from which 27 papers were identified as relevant for inclusion in the review. Of those 27, nine were reports or articles reviewing the effectiveness of one or more prize, and of these, five were independent evaluations or objective assessments. The inclusion criteria used to identify the 27 papers were that they were:

- available to access freely online either through Open Access or as a pre-print version
- published in English
- relevant to a discussion of IIPs for development based on our operational definition of them, i.e.:
- Rewards one or more participants who first or most effectively meet a predefined challenge connected to a development or social issue (not necessarily in a developing country)
- A public prize open to all members of a large community of potential solvers (not a prize run by an organisation for its staff, but may have some eligibility criteria)
- Any cash reward is set as an incentive, not based on the assumed cost of implementation and not tied to any purpose, i.e. if awarded at the end of the first stage of a multistage prize, winners can do what they want with the money, and if awarded at the end of an implementation stage, it may be more or less than the full cost to the solver of implementation
- Providing minimal support to solvers – no seed-funding, no mentoring, no matchmaking with investors, for example.

[7] A fuller definition is provided by O'Riordan et al. (2013): 'provides grants or subsidies with an explicit public purpose between independent agencies with grant recipients selected competitively on the basis of advertised rules and processes who retain significant discretion over formulation and execution of their proposals and share risks with the grant provider'.

[8] For example: allintitle: innovation prize OR challenge OR contest OR tournament OR award OR competition (and their plurals).

This final criterion was considered important given the purpose of the literature review was to provide a backdrop against which I2I's evaluation findings about its own IIPs could be presented i.e. I2I's IIPs provide little or no support to solvers beyond providing information, or allowing submissions to be sent in the local language if writing in English would be too much of a barrier.

In practice, applying this operational definition as a criterion too strictly would have left the authors with little to review and it was relaxed to allow in those references that were very close to meeting it and which held relevant findings for I2I: the Naples 2.0 social innovation contest (Addari and Lane, 2014), the Healthiest Cities and Counties Challenge (Benjamin, 2016), the Bloomberg Philanthropies' European Mayors Challenge (Burdett et al., 2015) and insights from the US Federal Prize Authority (Office of Science and Technology Policy, 2016).

2.3 About the results

Our intention had been to open each of the following sub-sections with a summary of the discourse before examining the evidence available to support these wider opinions from examples of prizes, and the learning that has been drawn from that evidence. The reality has been that whilst the discourse about the value of prizes within the literature was quite prevalent, specific evidence of impact proved far more deficient. This next section then, summarises what we were able to find under each of our key questions and to comment, briefly where appropriate, on how this compares to I2I's approach.

We start with a discussion of how IIPs are understood, i.e. whether there is consensus on the boundaries of an IIP including the role of providing support to solvers. We then move on to explore for what purposes and in which settings prizes have been understood to be particularly useful when inducing innovation. We then explore the strengths and weaknesses of IIPs as compared with other funding modalities. Finally, we ask how the success of past IIPs has been judged.

3. Findings

3.1 Can we reach a common definition of IIPs?

There is little consensus in the literature on what an IIP is beyond a very broad definition. Between them, authors use various names for innovation prizes and these are sometimes interpreted differently.

[Sources: Six peer-reviewed articles, 19 reports/conference papers/theses]

The short answer to the question 'What is an innovation inducement prize?' tends to be some version of: a type of competition that offers a reward to whoever can first or most effectively solve a predefined challenge (Conrad et al., 2017; Engage 2020, 2014; Burstein and Murray, 2015; Soares Braga et al., 2015, Ballantyne, 2014).

Everett et al. (2011), distinguish the inducement (or *ex-ante*) type of innovation prize from a recognition prize; an inducement prize being one that defines award criteria in advance in order to spur innovation towards the predefined goal. This distinction is important and something that I2I often makes when communicating about its prizes, but was sometimes lacking in the literature about prizes. A key exception is Nesta, e.g. Ballantyne (2014) when writing about challenge prizes.

Two further distinctions are important when defining IIPs. While prizes have been described as a type of **results-based finance** (RBF) (Vivid Economics, 2013), they do not share all the characteristics of RBF. For example, while RBF incentivises the achievement of desired outcomes and payment is based on results (Eldridge and TeKolste, 2016), similarly to prizes, the financial reward of a prize (where cash rewards are used) is not a function of the expected cost to the winner, of implementation.

Challenge funds open to civil society, or social development challenge funds, can seem at face value to be the same as IIPs, not least when referred to as 'challenge prizes' such as the World Bank's 'Pro-Poor Innovation Challenge'. These allocate donor funds for specific purposes (SIDA, 2014; Pompa, 2013) in order to stimulate, support and test innovation, particularly among new groups of people (Junge and Schreiner, 2016). However, there are important differences. Challenge funds:

- Provide grants or subsidies upfront to the winner/s of the challenge, and these are tied to implementation (O'Riordan et al., 2013)
- Tend to be focused on innovation in technology or products rather than social innovation (or behaviour change among communities) (Engage 2020, 2014) with the aim to improve market outcomes, through their potential for commercial viability (Pompa, 2013).

Table 1 summarises the points Everett et al. (2011) identified when defining IIPs.

Table 1: Everett et al. (2011) defining IIPs

What is an IIP?	• Something offered or won for **renewing**, **advancing** or **changing** the way things are done • Does not have to be a technical solution • Could be a new process, a change in behaviour or approach, or new ways of working with others

Timing of award	
	• **At any point along the innovation chain** from first awards to the achievement of tangible results • Different to 'recognition' where prizes are awarded for specific or general achievements made in advance of nominations for the prize being requested • IIPs are established from the outset by defining award criteria in advance to spur innovation towards a predefined goal

Our aim within this research question was to identify how other authors have defined IIPs for development in publications since Everett et al.'s 2011 report, where even then assigning individual IIPs to a type of prize had been identified as 'problematic' with the distinction between prize types being 'at best blurred'. Our expectation was that innovation prize language may have 'bedded down' in the intervening years, and some consensus about terminology and the boundaries of an IIP in development would be evident.

Instead, we discovered a proliferation of terms that on examination of how the prize was designed, seemed to describe a form of IIP:

- Challenge prize (Soares Braga et al., 2015)
- [Social] innovation competition (Addari and Lane, 2014; De-weija and Babirye, 2019)
- Innovation contest (Goeldner et al., 2017)
- Innovation challenge (Münster et al., 2018; Oost, 2015).

Equally, the same language was used to describe other forms of prize or funding. Bernier et al.'s (2015) 'innovation awards' (used by Everett et al. in 2011 to describe a type of IIP) are actually recognition prizes, while Baastell's (2018) 'innovation challenges' are, in their design, challenge funds.

Why does this matter? While it is often common for different funders and prize promoters to use different terminology, there is value in reaching a consensus around a typology and definition – to better understand differences in substance versus differences that are purely in name, and also to aid the development of the innovation prize ecosystem and exchange of learning.

3.1.1 What is an IIP for development?

In terms of the boundaries of what makes something an IIP for development, we did find some common elements that authors used to expand on the basic definition outlined above:

Mechanism: Competitions, contests and institutional settings that offer incentives, which are usually, but not always, in the form of a lump-sum cash payment, based on criteria set before any investments are made and solvers compete; Burstein and Murray (2015); Kunaratnam (2017); Soares Braga et al. (2015); Vaessen and Raimondo (2012); Vivid Economics (2013).

Purpose: To induce investment or attention to a specific goal or technology that delivers outstanding achievement and successful breakthroughs in social and economic development. Gök (2013); Vaessen and Raimondo (2012); Galasso (2017); Burstein and Murray (2015); Kunaratnam (2017); Vivid Economics (2013); and Baastel (2018).

Who: Aimed at multiple participants – either individuals or institutions – particularly including people who the sponsor would not normally reach (new entrants). Burstein and Murray (2015); Conrad et al. (2017); Soares Braga et al. (2015); Vaessen and Raimondo (2012); Lee (2014); and Engage 2020 (2014).

We however noted an absence of the following specific points which I2I holds to be important elements of IIPs for development:

- That the size of the financial prize that teams are offered is a reward intended to generate excitement and interest, and not a payment to cover the costs of implementing their innovation.

- That teams either need to self-fund their activity while participating or to identify and secure alternative sources of funding.

Within these boundaries, the authors noted a range of designs, including prizes which some (including I2I) might argue are not a true IIP. Ballantyne (2014) accommodates this flexibility in a report for Nesta by distinguishing between 'pure' or traditional, and the 'grant/incubation hybrid' forms of challenge prize. The latter, providing development support such as interim grants, training and skill development, and networking, collaboration and peer-learning. This theme is picked up by Gabriel et al. (2017), again writing for Nesta, between 'pure' challenge prizes and 'hybrid' prizes, such as the example of the USAID Grand Challenge Prizes, which fund the development costs of several shortlisted submissions. We return to this discussion later in this paper (Section 4.2.2).

3.1.2 How are IIPs for development categorised?

When looking at how authors categorise different types of prizes, we have not found a step-change improvement on the typology of prizes presented by Everett et al. in 2012, which themselves were based on those proposed in 2011 by Everett et al. (see Box 1) in response to lack of consensus in earlier literature. We were able to map I2I's prizes against the four types, although in doing so, we identified that the definitions would need to be adapted to accommodate the way prizes have evolved since 2011. For example, I2I's portfolio includes prizes whose primary aim is to stimulate the market but on a smaller scale than a Grand Innovation Prize. From this exercise we also noted that the bulk of I2I's efforts centre on Social Prizes. Bearing this in mind, we have found it useful in this report to use these four types when distinguishing between examples of prizes.

Box 1: Four types of IIP (Everett et al., 2012)

Idea Awards: Prizes typically awarded for best new ideas for start-up businesses, for technologies (beyond the concept stage), or for solving social problems.

Point Solution Challenges: Prizes that seek to reach a broader pool of external solvers for specific research or development challenges; typically using open innovation platforms such as InnoCentive.

Market Stimulation Prizes: Also known as Grand Innovation Prizes, these large purse prizes are intended to change the way we live by stimulating the development of innovation ecosystems and catalysing new market growth.

Social Prizes: Also often known as Participation Prizes, these prizes are designed to engage with and benefit communities and are focused on the uptake and impact of innovation.

The tendency in the literature is not to use categories or to inconsistently use them. For example, Desouza (2012) draws on the 'archetypes' proposed by Bays et al. in an article for McKinsey (2009), of Exemplar, Exposition, Network, Participation, Market Stimulation and Point Solution,[9] and the example used of a Participation Prize (a type that Bays et al., say will educate and change the behaviour of participants through the prize process) is the Let's Move Video Challenge. However, the success of this competition was reported as the number of submissions of promotional videos about becoming more active, rather than adoption of physical activity itself and the authors of this review would argue that this does not qualify as a Participation Prize.

This diversity and disparity in rationales and mechanisms as well as the absence of any agreed dominant rationale was highlighted by Gök (2013), who described such increasing levels of flexibility involved in prizes as having led to a 'vast number of prize typologies, based on many different prize characteristics'. Burstein and Murray (2015) argue that the disparity of viewpoints found in the discussion of prizes is particularly evident between theory and practice. They claim that this disparity has led to actual prizes being both 'under-studied and undertheorized, leaving policy makers with a range of implementation and

[9] Ward and Dixon (2015), in an I2I publication, argue that it is more appropriate to call them prize outcomes, rather than types, and with some adaptations, these new outcomes became the basis for the 'Prize Effects' that I2I uses, often in combination, to describe their prizes.

governance challenges'. The results of our literature review reaffirm this point of view, given the few examples of literature pertaining to the evaluation, results or impacts of IIPs for development, that were publicly available.

3.2 What support, if any, do others running IIPs for development offer to solvers?

While the norm may be to provide no support to Idea Awards and Point Solution Challenges, the review found that prizes targeting developing country solvers may choose to provide more support (e.g. reporting templates, feedback opportunities, etc.). Evidence from Social Prizes however, is that solver support may be both necessary to achieve the prizes' intended outcomes and beneficial to solvers as a non-financial incentive.

[Sources: No peer-reviewed articles were found relevant to this question; references come from consumer press, prize websites and eight reports.]

A persistent concern of I2I and its partners has been how and when to support those potential participants with limited capacity to self-finance their applications or to participate fully in a prize. Depending on a prize's goals (e.g. Social/Participation Prizes), success depends on the efforts of many solvers rather than the excellence of a few. Furthermore, the equity of who participates and benefits within a development context is especially pertinent.

The effect that solver support (or lack of it) has on the success of a prize for development is the subject of an evaluation question being asked of all of I2I's prizes. Is it necessary to 'level' the playing field and ensure all solvers are equally capable of completing the challenges set? Solver support has been provided for I2I prizes where developing country solvers are required to move to implementation but even here this has tended to be limited to workshops (the Adaptation at Scale prize, run in Nepal, also allowed submissions in Nepali for subsequent translation into English and altered its plans after the Stage 1 prize, to include a greater focus on outreach to engage community-based organisations and 'Learning and Encouragement' visits). For those prizes that provided no support, did that have a negative effect on its success? Where I2I has provided additional support to solvers, was this necessary and did it go far enough?

Prior to this literature review, the E&L team looked into what is 'normal' in terms of capacity building or providing support to solvers among IIPs for development.[10] At that time (2017), we did not find solver support being discussed in peer-reviewed sources and evidence came from prize websites, blogs and grey literature. This literature review has identified five further papers that are relevant to this question, but no peer-reviewed journal articles.

3.2.1 The norm among short-term innovation prizes for development is to provide little support to solvers.

Ideas Awards and Point Solution prizes, including those used as the early stages of multistage prize, tend to require solvers to follow simple guidelines to submit their business plan or concept note. This can be the case even among some prizes targeted at developing country solvers, such as the African Innovation Prize Business Plan Competition (Konyanga, 2016) and the Africa Prize for Engineering Innovation (Royal Academy of Engineering, 2019). This is the model that I2I's LPG Cylinder Prize adopted, running on the InnoCentive platform, a Point Solution prize that was open to solvers worldwide but did make efforts to

[10] This rapid scan of the literature and informal online publications such as blogs, prize websites, etc. is written up in an internal I2I document and the key points shared through a blog post http://www.ideastoimpact.net/content/innovation-prizes-and-support-solvers-how-much-how-little This exercise was also useful in helping I2I progress its thinking about assessing the value for money of prizes.

encourage solvers from sub-Saharan Africa. Ballantyne (2014) notes that in solver support ('developmental support') is probably not relevant for prizes looking for technical and highly specialised solutions, as the target innovators are likely to understand the context of the challenge already.

If innovators are likely to understand the context of the challenge already (for example, an engineering challenge to build a solar powered car) or if they are not really required to understand the context (such as an algorithm challenge, where competitors need only to 'crack the code') then developmental support is probably not required.

We, however, found examples of a greater level of solver support among two Ideas Awards targeted at developing country solvers; ones where we might expect the solvers to be less familiar with the demands of a prize modality. Nesta's Data-Driven Farming prize, for example, has a Solvers' Handbook on its prize website,[11] among other resources, and organises a co-creation event where finalists can get feedback from farmers. The Namibia Business Innovation Institute's annual business plan competition provides entrants (Namibia University of Science and Technology students) with a detailed business plan template.[12]

Mihm and Schlapp (2015) investigate the effect that feedback during a contest, given privately (direct to the solver) or publicly (all solvers see it), has on solvers' performance. The authors found that when solvers have a high level of uncertainty about how well they are doing, and the prize sponsor wants to improve the average quality of all solutions, they should provide public or no feedback at all; but if their goal is to identify the best solution, in the same situation, private feedback is more effective.

In the I2I evaluations we refer to this as solver support. Orcik et al. (2013) citing Bullinger's framework for describing innovation contests, refer to it as 'community functionality', which in their case study (a student prize), was provided through discussions and information exchange over email or face-to-face.

3.2.2. Social Prizes are more likely to assume that support to solvers will be necessary and desirable

Where authors have written about the need and value of providing support to solvers, it has tended to be with reference to prizes that have a social or developmental purpose (Social Prizes). Here, solver support, has been described as means of providing non-financial incentives and capacity building that solvers need to complete the tasks of the prize. Gök (2013), for example, highlights that quite apart from whether they win or lose, a potential benefit for prize participants is education and improvement of skills, particularly those new to the subject area of the prize.

During the first stage of its Big Green Challenge, Nesta provided support in the form of advice and asking challenging questions during the application process, and identified some benefits of providing this support (Bunt and Harris, 2010). First, they could consider a wider range of proposals and avoid extensive auditing processes until further into the challenge. Second, a significant number of applicants continued progressing their projects, despite not competing beyond the first stage. Nesta attributes this to the applicants finding the advice and challenge valuable. Everett et al. in 2011 referred to this prize when noting the value of solver support in some of the Evidence Review case studies, finding that the project and business planning support provided to Nesta's Big Green Challenge finalists 'played an important role in helping the projects deliver and is also likely to have helped with the sustainability of community initiatives'.

The team behind the Naples 2.0 social innovation competition, Addari and Lanex, 2018, write with refreshing frankness about discovering the need to provide solver support if the winning plans were to have a chance of being implemented. They write that 'little did we realize the difficulties that this phase of the project would entail, such as, for example, the need to provide personalized support to each winner, to train innovators in the basics of business, promote relationships between innovators and local organizations, and all the other obstacles faced by a project in a city like Naples'.

[11] https://datadrivenfarming.challenges.org/resources/

[12] http://nbii.nust.na/sites/default/files/NBII%20Business%20Plan%20Template%20-%20Copy.doc

Desouza (2012) posits, in reference to the US Challenge Prizes targeted largely at US citizens, that 'participants will rise to the challenge of developing innovative solutions if they are provided with the necessary resources and have the right incentives to work toward a solution'. Benton and Glennie (2016), in their review of innovation challenges for refugee integration, warn however that even with support and a substantial cash prize, winners can contribute to the 'pilot and crash' phenomenon without follow-up funding and incubation support. I2I's prizes assume that the situation would be even more stark in developing country contexts.

3.3 What are IIPs particularly useful for when applied to development goals?

The literature supports I2I's assumptions about what effects IIPs can be used to achieve in theory, although some effects received more support than others. However, there was little new evidence on how IIPs have delivered those effects and this is something that was referred to several times in the literature.

[Sources: Four peer-reviewed articles, with most evidence coming from reports, thesis, online articles and other pieces of grey literature[13].]

Building on the work of Ward and Dixon (2015) in a guide to IIPs produced for the programme, I2I uses one or more of the 'Prize Effects' to define the intended outcomes of its prizes during the design phase (see Box 2). This list of effects and their definitions (which are presented in the section below) is periodically reviewed as I2I develops its prize theories of change and learns more from its implementation experience.

For this research question we examined the literature for evidence of the contribution IIPs can make to achieving development goals using the I2I Prize Effects as a structure. We found this structure worked – we did not identify any evidence in the literature on effectiveness that could not fit under one of the effects. We did, however, find difficulty in assigning an effect to some of the evidence because the means through which effects are achieved can create overlaps between them. For example, if the effect of raising awareness is achieved primarily from participation in the prize (as is the case with Zhang et al., 2017) the boundaries between the effects of 'raise awareness' and 'maximising participation towards the sponsor's aims' become blurred.

In practice, we found that there was more literature on assumptions of how prizes *could* be used for development, based on how they have been used by others, rather than from the authors' own experiences. Gök (2013), in a synthesis on the effectiveness of IIPs, observes that while a broad number of *ex ante* assessments consider the viability of a prize before it is put into practice, much less is available after the prize has completed.

Box 2: I2I's Prize Effects

Intended effects for I2I prizes
Point Solution
Facilitate and strengthen partnerships and networks
Raise awareness
Promote best practice
Maximising participation towards the sponsor's aims
Community action
Open innovation
Market stimulation
Altering the policy environment

[13] Note that many references consider the potential use of IIPs in general, rather than focusing on those targeted at social or economic development in developing countries, and/or do not make direct reference to evaluation data from individual prizes when drawing conclusions about what IIPs can be useful for.]

3.3.1 Most commonly observed effects

First, we present what was found on the effects that were best supported by the literature in the review:

- Point Solution (and wider idea generation)
- Facilitate and strengthen partnerships and networks
- Raise awareness.

We have previously observed in this paper that Ideas Awards and Point Solution Challenges are more visible in the literature (compared to Social Prizes and Market Stimulation Prizes) and are also the prize types where it is normal to provide little or no support to solvers. This may be the reason for the greater visibility in the literature of Point Solution (and wider idea generation).

Point Solution (and wider idea generation): *Finding a solution to a problem that has been broken down to a component part. For example, a new product or process. Problem is highly specified.*

There is general consensus in the literature that prizes work to stimulate innovation and support new ideas (Brüggemann, J. and Meub, L., 2017; Engage 2020, 2014; Ramalingam and Bound, 2016; Vivid Economics, 2013). Gök (2013) argues that such innovation is a result of intense competition, the engagement of a wide variety of actors, the distribution of risks to many participants and the exploitation of more flexible solutions through a less prescriptive definition of the problem (this relates to Ideas Awards rather than Point Solution Challenges).

Facilitate and strengthen partnerships and networks: *Raises visibility and brings those working in the space to the attention of others, helping to establish new networks and strengthening partnerships towards a common goal. Some prizes may require new partnerships through criteria or conditions.*

Prizes are noted as useful for encouraging network building, new partnerships and collaboration among stakeholders and attracting the attention of investors (Engage 2020, 2014). Vivid Economics (2013) describe prizes being able to bring together investors, entrepreneurs, inventors, and potential future customers. By not introducing any finance into the process until the end, prizes often set out to leverage investment ahead of the award. The literature review finds that this success in leveraging investment may come in various ways from different sources. Vivid Economics (2013) and Bays et al. (2009) note that prizes perform well in leveraging funds from the private sector that use them as part of their strategy, while Lee (2014) describes their ability to 'stimulate philanthropic investments… to augment the cash value of a prize'.

Raise awareness *Either brings something to someone's/some people's attention or increases their understanding of something. Often about increasing awareness and knowledge of an issue (especially one that is neglected or has not been previously communicated to that group of people).*

There is evidence that IIPs can raise awareness on development issues, for example, Gök (2013) notes that prizes can increase awareness on specific technology issues and Zhang et al. (2017) find evidence of this in sexual health promotion. Engage 2020 (2014), drawing on Ballantyne (2014), discuss the use of inducement prizes as a public engagement tool and highlight their value in raising awareness. Further, Soares Braga et al. (2015) argue that prizes (in this instance, sustainability-oriented challenge prizes) can themselves facilitate learning about the topic and in a way that is different to traditional education. As a result, they can engage people that would not normally be interested in taking part in courses or formal education about sustainability.

3.3.1 Other effects of IIPs

The remaining six effects are presented in no particular order as there is little difference between them in terms of the strength of evidence available for each. The Office of Science and Technology Policy (2016), citing a Deloitte report from 2014, notes that 'ambitious' outcomes (or effects) such as Market Stimulation, are uncommon on the Challenge.gov site (being less than two per cent of the outcomes sought by prizes between 2011 and 2014). It is perhaps unsurprising then that we have found less

evidence of the effectiveness of prizes that are more ambitious in terms of what they try to achieve and who they work with.

Market Stimulation: *Helps to increase economic activity in an existing market or starts a new one for a particular good or service through a high value prize that, as a result of all of the other effects, results in a changed market. It can also be to open up a new market.*

Prizes are recognised as useful for stimulating technological development. Gök (2013) notes that implementing demonstration projects under IIPs is useful not only for creating specific technologies, but also to demonstrate the feasibility of the technology; while Vivid Economics (2013) notes that prizes can deliver specific results able to fill gaps in technology or provisions. Linked to this, Gök (2013) also argues that by creating an incentive for the development of a technology or technology application, prizes can work as innovation policy instruments to help overcome market failure.

Open innovation: *Open innovation enables new solvers to enter the field of endeavour. For some prizes this could include local and grassroots innovators, e.g. small community organisations, students, etc.*

Two authors note the value of a prize in bringing in new solvers to address a problem. Lee (2014) notes a prize's ability to stimulate non-traditional participants, who would not normally vie for public grants, to contribute fresh ideas. Similarly, the Engage 2020 factsheet on tools for public engagement (2014), describes how challenge prizes can stimulate and support new groups to become active problem-solvers, highlighting that solvers of these prizes have included civil society organisations, researchers, citizens, employees and industry.

Maximising participation toward the sponsor's aims *Benefits to the sponsor are provided by all effective participants not just by the winners.*

Zhang et al. (2017) present the research findings of an Idea Award which solicited images that could be used to promote sexual health among youth in China. Another goal of the prize was to use the competition itself as a means of promoting sexual health and the study showed that it was successful in this area. Among non-expert participants, engaging in the contest increased knowledge and healthy attitudes, and empowered participants to share ideas about safe sex with others outside of the contest. The Healthiest Cities and Counties Challenge (Benjamin, 2016), albeit a hybrid prize, with 50 winners receiving a share of the prize money to implement their strategy, could be argued to fall into this category, as every community participating was anticipated to benefit from the process regardless of whether they won a prize or not.

Best practice: *A prize can do this by: identifying best practice in a certain field (through solutions submitted) and encouraging adoption (through publicising the winning solutions or making potential solvers aware of current best practice as part of the prize application process).*

We identified two examples of prizes whose purpose was to uncover and draw attention to examples of best practice that would inspire others to take the ideas up. Both of these were aimed at local government: European cities (Burdett et al., 2015), and US cities and counties (Benjamin, 2016). Commenting in 2019 on the winners of the Healthiest Cities and Counties Challenge, the Executive Director of the American Public Health Association said: 'It is our hope that these two programs, along with the rest of the Challenge participants, will inspire others and serve as models of success and progress for communities around the country who face similar health issues'. But while both prize schemes have been awarded, at the time of this review, no reports could be found to determine whether the demonstration effect of either prize had had the desired results.[14]

Community action: *Incentivising communities (broadly defined as people living in the same place/sharing a communal interest), to take action, encouraging ownership of the problem and solution.*

[14] The evaluation of the Healthiest Cities and Counties Challenge appears to be ongoing https://www.rand.org/about/people/w/williams_malcolm_v.html

Gök (2013) observes that prizes are increasingly being organised for community and leadership building, however the literature review did not find any other sources providing evidence of this (published since 2012).

Altering the policy environment: *Raised awareness, Market Stimulation, etc. can lead to corresponding policy change in reaction to the other Prize Effects.*

By looking at how this effect was defined by Ward and Dixon (2015) in a guide to IIPs produced for I2I, we found that this effect originally referred to the ecosystem in which innovation can take place i.e. that prizes can encourage policy makers as solvers themselves to 'to proactively create an environment more conducive to innovation in a desirable direction by other actors'. Gök (2013) notes that prizes create opportunities for experimentation in innovation policy. Interpreting the effect more broadly, prizes can work in different ways to support policy processes. In an earlier report, Vivid Economics (2013) notes that prizes are well suited to achieving certain public policy goals, in particular 'triggering key bottleneck innovation that may be held back by a variety of market failures at low costs'.

3.3.3 The limits of Prize Effects

We noted four references that brought in the question of value for money when discussing what prizes can and cannot make happen. Burstein and Murray (2015) comment that despite their effects, the use of IIPs are 'rarely justified' given the costs to sponsors of prize award, prize commitment and administrative costs. In an article cautioning against the use of IIPs, Wright (2013) argues that innovators are not motivated by competing against each other and suggests that 'real innovation' comes from other processes. Regarding the various complexities of IIPs, Lee (2014) warns that 'prizes are best suited for "pie in the sky" leaps in innovation and may be too tenuous to satisfy human needs for health, shelter and social services'. In 2013, Gök observed that 'evidence on the effectiveness of prizes is scarce'. During this review, we experienced great difficulty in locating open-access evaluations or objective reports of IIPs for development since 2011, to help us identify examples of effectiveness and return on investment. As such, we concur with Burstein and Murray (2015) who comment that discussions of effects are largely still based on contemporary discourse about prizes, which in turn are based predominantly on assumption rather than proof or evaluation.

3.4 What are the strengths and weaknesses of IIPs for development versus other funding modalities?

A number of general advantages of IIPs compared to other funding modalities have been identified in the literature, building on those put forward by Everett et al. (2011). There is, however, a lack of detail and supporting evidence of the type we anticipate funders require to decide on using specific prizes over other funding options, to achieve their goals.

[Sources: Six peer reviewed articles and 10 grey literature publications.]

The literature examined argues several comparative strengths of using IIPs to solve development problems. These strengths, however, largely remain theoretical rather than evidential, with little empirical data found to support discussions. Furthermore, IIPs are discussed as a single entity to be compared to a research grant, for example, which overlooks the differences between prize types (as discussed in Section 4.1).

Alongside these strengths, we also identify weaknesses in terms of risks and ethical issues that have been associated with IIPs. Despite their popularity, IIPs are not the only innovation mechanism available. During the design phase of any initiative, 'appropriateness' and 'fit' should both be questioned, and where required an alternative initiative applied. However, Desouza, writing in 2012, noted that staff in US

agencies struggled with understanding if and when prizes might replace more traditional forms of funding and lacked adequate guidance. From our exploration of the Agency Toolkit at https://challenge.gov/a/buzz/pages/toolkit, this detailed guidance is still lacking.

3.4.1 Benefits of IIPs over alternatives

Research on innovation has often discussed which funding instruments may better foster innovation, with one of the instruments most easily accessible to policy makers being innovation prizes (Brüggemann and Meub, 2017). In 2011, Everett et al. identified several benefits of using prizes (Box 3). Not all of these are unique to prizes; as has been highlighted earlier, for example, RBF programmes also allow sponsors to only pay for results.

From the literature review we sought to further refine the list of benefits that set IIPs apart from other funding modalities:

Distributed risks: Prizes 'distribute the risks to many participants' (Gök, 2013). Similarly, Engage 2020 (2014) argue that challenge prizes can help funders 'maximise value and manage risk' i.e. transferring the risk to participants. However, a report on innovation prizes in the social economy (what we would describe as Social Prizes) notes that sharing the risk between funder and solvers, rather than shifting the risk is more appropriate in this setting (Norman et al., 2013).

Avoid overpromising: According to Lee (2014), prizes avoid the incentive in grant-making systems of potential grantees overpromising on what they can deliver; participants in IIPs only receive the rewards if they complete the task set.

Box 3: Benefits of IIPs

Benefits of using prizes (Everett et al., 2011)

Prizes can….

- Establish an important goal without having to choose the approach or the team that is most likely to succeed
- Allow sponsors to pay only for results
- Highlight excellence in a particular domain of human endeavour to motivate, inspire, and guide others
- Increase the number and diversity of the individuals, organisations, and teams that are addressing a particular problem or challenge of national or international significance
- Improve the skills of the participants in the competition and create communities of practices and solver networks
- Stimulate private sector investment that is many times greater than the cash value of the prize
- Attract more interest and attention to a defined programme, activity, or issue of concern
- Capture the public imagination and change the public's perception of what is possible
- Showcase multiple approaches to the resolution of a problem

Reduce background research: As opposed to grant funding, Lee (2014) highlights that prizes do not require a sponsor to determine how a solution is solved or to identify who is best situated to solve it, as prizes tend to be open to all who want to enter. However, from our experience with I2I, we might argue that prizes, if they are to be effective, still require background research, but of a different nature in order to define the problem precisely and establish if a prize is the most appropriate mechanism.

Share data: Prizes can offer a means to inspire those with data to collaborate with those who require data, such as charities, researchers, and government, to enable them to solve complex problems (Junge and Schreiner, 2016).

Generate greater media attention: By their nature, prizes require a different approach to communications than grants and other funding options targeted at a specific group of potential participants. Award ceremonies are common, for example, and the resulting media coverage can benefit the sponsor by bringing attention to the development challenge being addressed (Vivid Economics, 2013).

Create new standards for the field: In order to evaluate solutions submitted by prize participants, managers may find themselves producing clearer success metrics, validation protocols, and standards than are currently available in a given industry (Office of Science and Technology Policy, 2016).

3.4.2 What are the risks associated with IIPs?

Gök (2013) argues that in selecting a financing mechanism, innovation prizes should not be a substitute for other innovation policy measures but a complementary instrument that can be used under certain conditions. He warns that even though innovation prizes can be used to overcome some of the inherent barriers of other instruments, the effectiveness of such prizes is still dependent on prizes being well designed, managed and awarded. If not, prizes may be ineffective and even harmful.

Despite the arguments that prizes distribute risk, the important thing to note is that there remain risks that need to be mitigated if IIPs are to be successful. Although prizes, if making a cash award, only do so if the challenge is successfully met, the process of designing and running a prize incurs costs, regardless of its success or failure. The Saltire Prize for example, which when featured in the 2011 Evidence Review for DFID was showing a strong return on investment for the Scottish Government, received negative media coverage in 2018 for spending close to £400,000 of taxpayers' money on a prize that did not make an award.[15] Innovation is an 'inherently uncertain activity' – associated experiences and successes of solutions cannot be determined ahead of time (Burstein and Murray, 2015).

The roots of this risk are argued in part to be due to mistakes being made when teams define the goals and rules of the challenge (Lee, 2014). Burstein and Murray (2015), use the example of the Auto X Prize to illustrate the uncertainty in innovation. The prize designers wanted the Auto X Prize to lead to the development of cars that could achieve much greater fuel efficiency than was available at the time, but could only use guesswork to set a target because it was impossible to predict *ex ante* the course of technological development they were incentivising. Regarding risk mitigation, Engage 2020 (2014) reasons that both the problem and solution must either be defined appropriately or left open in a way that allows for unpredictable effective solutions to emerge. Here we highlight the various risks of IIPs as identified in the literature:

Excluding potential participants: Zhang et al. (2015), while only comparing the results of an Idea Award to promote sexual health in China in theory to the more traditional, expert-led method of designing behaviour change communications, the authors noted a number of disadvantages to prizes. The main drawback being that Idea Awards are commonly run via online platforms and these risk excluding certain sections of the population. For Social Prizes and those where the participation in the prize itself is expected to confer benefits to the participants, who *is* excluded, becomes important, and especially so in a development context.

Risks experienced by participants: Engage 2020 (2014) highlight risks to participants in engaging in prizes with an uncertain reward. Acar (2015) argues the risk of opportunism, where those that receive the information generated by the prize use it opportunistically; something I2I, among others, obviates through its Terms and Conditions. This, in turn, can make investors fearful of disclosing knowledge. Acar describes how some participants in science contests experience fear of opportunism, although goes on to note that female and older participants have significantly less fear of disclosing their scientific knowledge. They also note that people with less self-interest may be less worried, and instead satisfied, if their knowledge benefits others. Acar (2015) also highlights the need to take differences of risk into account when designing global prize-based contests, so that the potential of contestants for 'reaching solutions to important and challenging problems can be used more effectively'.

Duplicating resources: The multiplier effect of prizes – i.e. there being more than one solver – whilst having benefits to the funder, can represent duplicative and potentially wasteful efforts by solvers (Lee, 2014). In a development context, the risk of local people drawing on their own resources to support their participation in a prize becomes a greater concern. While the only evidence found for this in the review

[15] The prize has now been redesigned and relaunched. See for example, https://www.bbc.co.uk/news/uk-scotland-47183119

relates to winners (de Weija and Babirye, 2019), do prize programmes in development have a duty of care towards participants who invest their time and money in something from which they may not receive tangible benefits in return?[16] The number of solvers can also bring risks in terms of motivation for future prizes. Desouza (2012), drawing on survey data among US citizens who participated in government IIPs, warns of the risk of reducing the pool of potential future solvers if prize managers fail to communicate effectively with participants after the prize ends.

Power imbalance: The literature on prizes has little to say on ethical issues associated with IIPs beyond this, however there is relevant material in the literature in related areas, such as social marketing (given the similarities between Social Prizes and community-based behaviour change interventions). While it is beyond the scope of this literature review to undertake such a review, Eagle (2009), for example, observes that criticisms of social marketing include being patronising and manipulative, appealing to people's base instincts, extending the power imbalance between the state and individuals, and assuming that people act rationally 'when there is much evidence to suggest this is not the case'. Similarly, within the literature on innovation and research funding, questions have been asked about possible exploitation of solvers (Deng and Joshi, 2013) and increasing inequality in research funding distribution (Hick and Katz, 2011).

3.5. How are IIPs for development evaluated?

The lack of available evaluations of IIPs for development means discussions on how to measure their success remain largely theoretical. While some broad categories of indicators are suggested, there is no clear guidance available to those running prizes on how to evaluate IIPs for development, although there is some acknowledgement of the difficulty and cost of doing so.

[Sources: Few references available. One journal article focusing on the Auto X Prize (a Grand Innovation Challenge) and four reports and working papers.]

This question set about exploring how the success of IIPs is typically measured and therefore how the impact of different prizes can be compared. When I2I's evaluations are synthesised and published, our intention is to present them in the context of the prizes that have gone before, and particularly Social Prizes. Having already noted the growing popularity of prizes as a tool for development goals, the aim of this part of the review was to find out what is known about the success past IIPs have had and, therefore, what justification there is for their future use in the same arena.

This section remains the lightest in terms of content, indicative once again of the lack of evaluation and evidence-based literature on IIPs. It should also be noted that more references would have been available to the review if we had considered hybrid prizes and extended the period to pre-2012, such as Nesta's Big Green Challenge whose final evaluation was undertaken in 2010, but our aim here was to be able to compare like with like at the end of the I2I programme. Even here, we were only able to locate online the summary of the final evaluation of the Big Green Challenge, rather than the full evaluation report.

Despite the recommendation that US Government agencies should work with scholars to study the impact of their competitions, and to share lessons learned between agencies to avoid repeating mistakes, for example (Desouza, 2012), we have not been able to locate evaluations associated with these challenges in the literature. Despite this deficiency, we have identified categories of indicators that are used in reports that look at the effectiveness and success of prizes. Again, given the popularity of prizes for development, questions remain, including how success is being measured, and what levels of success past prizes have achieved.

[16] This has been a concern for I2I and something we have tried to mitigate, for example, through independent ex ante evaluations of some prizes, and which we are including in evaluations to get a fuller picture of the return on investment and true costs of prizes.

In their theoretical framework for evaluating innovation challenges, Conrad et al. (2017), identify four areas of evaluation:

- Challenge performance (the participants and the solutions obtained)
- Challenge cost
- Challenge design and implementation
- Challenge impact.

While several indicators are proposed under each of the four headings, the framework appears to only be applicable to Idea Awards and Point Solution Prizes, rather than the Social Prizes that I2I's evaluations are more heavily focused upon. The framework gives the reader some starting points, however they would need to investigate for themselves whether reporting to each indicator, such as undertaking a quantitative analysis of solver costs, is worth the cost involved or is indeed possible.

Indicators for a prize prior to the award being made (**process indicators**) are easier to obtain and often based on data that is easily available to evaluators (reach of prize promotion activity, number of registered participants, number of solutions submitted, etc.). At the point of award, after judging, Prize Teams can also easily report on the content and quality of the submissions. The report on the European Mayors Challenge (Burdett et al., 2014), for example, provides details of who participated and the extent to which solutions focused on five core themes (Economy, Civic Engagement, Social Inclusion, Health and Well-being, and Environment). This has some value in increasing understanding of the concerns of the cities who participated.

However, the cost and difficulty of obtaining data, after awards have been made, increase substantially. Gök (2013) notes the difficulty and cost of measuring impact in prize competitions and also points out that additionality is relatively more difficult to assess with prizes. As an example, post-award data collection for the same European Mayors Challenge report appears to be limited to interviews with the winners on their motivation for participating and their experience of the prize.

Innovation output: With the creation of innovation output as the main goal of most IIPs (although not the main goal for most of I2I's prizes), Gök (2013) says we should look for innovation that leads to further innovation or innovation outputs. Prize managers may often conclude the award of a prize itself as proof that the prize has achieved its overall goal. However, this alone is not sufficient evidence that the observed solutions to problems targeted have resulted because of the IIPs or if they would have been developed without the prizes over a similar period (Conrad et al., 2017).

Efficacy: Burstein and Murray (2015) use efficacy as a measure of success when applied to prizes aimed at solving technological solutions. They note, however, that the extent of efficacy achieved is dependent on whether the goal or pathway to it has been clearly identified, as sometimes a goal can be articulated but the pathway to it is unclear, whilst other times neither the goal nor path have been defined. Where a desired outcome has been specified, conventional approaches can be used to assess effectiveness. Gök (2013) for example, points to the DARPA Prize Authority who used the extent to which the prize attracted solvers who had not worked with DARPA before, as an indicator of the prize's effectiveness in raising awareness of the agency.

While evaluations were lacking, reflection is going on, and there appears to be an appetite for learning about how to improve prizes for the future such as Adari and Lane (2014) and several reports published for Nesta (e.g. Ballantyne, 2014) but the question remains, why is there so little evaluation data being published or discussion on how to evaluate IIPs?

4. Discussion and conclusions

4.1 The continuing lack of data on IIPs for development

The aim of this literature review was to build on the work of Everett et al. (2011) to provide a backdrop against which to present the findings of the I2I prize evaluations and research papers. In 2011, Everett et al. commented on the lack of available data on prizes. With their continued popularity, we anticipated finding evaluations or case studies of IIPs with which we could draw comparisons with the results of I2I's IIPs. One of our key conclusions, however, is that this 'resurgence' of IIPs is coupled with distinct data deficiency when it comes to evaluating the progress, success and impact of these initiatives, particularly those that require implementation of their solvers. Without such data, it remains a challenge to confidently identify whether IIPs have been successful in their attempts at achieving innovation, and if they *have* been successful, what the outputs of those innovations have been and what part of that can be attributed to the prize.

Brunt et al. highlighted, back in 2008, that in their search for economic theory and empirical justification for their use of inducement prizes, people drew conclusions from 'limited historical case studies'. Burstein and Murray, in 2015, support this point by observing that existing theoretical literature had previously mostly ignored actual contemporary innovation prizes, instead often 'invoking historical prizes in their introductions'.

In 2013, Starr, writing for the Stanford Social Innovation Review, argued that only one in-depth analysis of social impact contests had been undertaken, the 2009 McKinsey report. He added that even this report remained largely lacking in evidence; it confused, Starr said, as many reports had done before, 'anecdote with evidence' and assumed that, because certain things happened when prizes were run, these were directly down to the prize rather than any other cause. In response, Starr argued the need for a 'real study' to be undertaken. Also in 2013, Gök, repeated Brunt et al.'s argument, that despite the growing popularity of IIPs, the impact of this innovation policy was still not understood.

There has been no shortage of IIPs since 2011 but we do not think that the data we were seeking in the literature review is hidden behind paywalls, based on the small number of results we had to exclude from our review on this basis. So why were we unable to find enough evidence on IIPs to answer all our questions satisfactorily?

Our conclusion from this exercise is that there are two main reasons:

1) I2I is unusual in running prizes that follow the Social Prize model, i.e. those that rely on people implementing something new, (if only new to them), while building little or no assistance to solvers into the design. I2I's prizes were designed to comprise two or more stages, typically an Ideas Award (participants invited to submit a concept note, business plan, etc.) followed by one or more prizes focused on incentivising implementation (scaling up a climate change adaption project, for example, or implementing a sanitation plan).[17] These implementation prizes place substantial demands on their participants, not least finding sources of finance, persisting with the prize process for over a year, sending in regular progress reports, etc. Participants are expected to do this with little technical support and no seed funding to get them started; and while winners of the first in a multi-stage prize may elect to use their cash reward for this purpose, they are under no obligation to do so. This sets I2I's IIPs apart from the majority of prizes we have discovered during the literature review.

2) Not enough evaluations are happening, especially those that look beyond the awards ceremony - or they are not being made public. I2I is something of an outlier here too, in terms of commitment of resources to evaluation and publication, and what it is interested in finding out. This literature review has helped us identify some key gaps in what is currently known (and shared) about IIPs for development,

[17] The I2I portfolio includes three energy access prizes that have slightly different models however, the LPG Cylinder prize, although single stage, was conceived as being joined by two further prizes that did not run. And the Global Leap Off-Grid Refrigerator Challenge and the Off-Grid Cold Chain Challenge are made up of two stages in which innovations identified through the first, are applied by the solver in a new developing country context, sometimes with a contribution towards part of the cost of transportation and installation of the equipment.

which we expect to be able to help to fill with our final prize evaluations, not least how prizes compare to alternatives available to funders. Where we were able to track down evaluations or internal reports on prizes, these tended to take the giving out of prize money as the end of the story. I2I is collecting data at: each stage of prizes that have more than one stage; shortly after the prizes are awarded; and several months afterwards (e.g. a follow-up evaluation of the final Climate Information Prize is scheduled to take place nine months after the awards were made).

I2I is committed to publishing its final evaluation reports and sharing its findings through research papers and other publications.[18] This resourcing of evaluation and approach to sharing is no doubt due in part to being funded by the Research and Evidence Division of DFID, but it has been disappointing not to be able to find more data against which to benchmark I2I's prizes.

While innovation prizes are often promoted as a means of reducing the sponsor's financial risk if the desired results do not materialise, prizes are not a 'safe' option. Some innovation prizes fail, or provoke unexpected and unwelcome consequences. From what we have seen through this research, we suspect that too few innovation prizes include a budget for evaluation, or for their publication; US Government agencies running prizes, for example, have been recommended to put more effort into communicating the impact of their prizes to the public and to conduct a lessons-learned review after each competition (Desouza, 2012). There may also be few organisations prepared to share stories of failure.

4.2 What can I2I learn from the literature review?

In this section, we reflect on the findings of the literature review and propose discussion points for others with an interest or experience in using prizes for development. Some of these questions we expect to take forward through I2I's learning activities.

4.2.1 There is a broad range of innovation prize terminology and little consensus on definitions.

From reviewing the references we had previously compiled (Stage 1 of our search), we discerned that one author's 'innovation prize' was another's 'innovation contest'; searches limited to 'prizes' would miss out what I2I understood to be prizes. Our Google Scholar searches had to include the terms 'innovation prize OR challenge OR contest OR tournament OR award OR competition' (and their plurals) for example, if they were to be of service to us. In fact, we found some benefit in excluding the word 'innovation' from the search in order to identify prizes that induced innovation as I2I defines it, but which were not described as such by authors, e.g. India's Clean Village Prize.

This lack of consistency slowed down our literature review considerably;[19] a promising evaluation of an 'innovation prize' would, after closer reading, turn out to be what we understood to be a challenge fund and not relevant to our literature review, while another organisation's 'social innovation competition' was much closer to the I2I model and made it into the review.

In mapping I2I's prizes against the four categories presented by Everett et al. (2012) we found the programme's primary focus is on social change via a prize (i.e. Social Prizes), which, from this review appears to be a category of prize which is less commonly used and especially not without substantial solver support (e.g. seed funding, mentoring, etc.). I2I's prizes tend to take the form of a prize scheme with two consecutive prizes (or stages). The first stage typically falls into the category of increasing the funnel of solvers, ideas and solutions (e.g. Ideas Awards) while the second, and more substantial stage requires some form of behaviour change over time. The Sanitation Challenge for Ghana, for example, invited local governments to submit plans for managing liquid waste for the first stage, while the second stage has required them to implement their plans. Without providing the same level of solver support as others have, it seems that I2I is using Social Prizes as a behaviour change tool to incentivise communities, or the intermediaries that reach them, into adopting new behaviours (such as liquid waste management

[18] I2I publications are available from http://www.ideastoimpact.net/research

[19] Even restricted to publications from 2012 to 2019, with the search terms only in the title, this gave us 4,620 results to assess.

activities) or increasing existing ones (such as scaling up or out activities that help communities adapt to climate change). This both marks I2I as somewhat of an outlier in the field of innovation prizes for development, and links it more closely to the social marketing and behaviour change sector with which it might usefully exchange learning and insights.

Discussion points: Given the profusion of definitions and confusion over prize types, we think a practical guide to prize types would be useful to help funders and others using prizes for development to navigate the complexity. What should the boundaries of this be? Is anyone already working on such a guide to which I2I could contribute its learning?

4.2.2 Innovation prizes targeted at development tend to offer solvers more support than I2I's prizes do.

We had hoped to find, if not journal articles, at least grey literature from recent years on how other organisation's prizes had induced people to do something new and make progress in solving challenges in climate change adaptation, sanitation, access to energy, etc. We found prizes that incentivised people to come up with ideas and plans, similar to the first stages of I2I's prizes, but very few that required them to implement them, without financial and technical support. A key point of distinction then, among IIPs, appears to be the extent to which solvers are provided with any support (mentoring, training, networking, seed funding) as part of the IIP process.

As noted above, several of I2I's prizes fall into the category that Everett et al. call Social Prizes (see Box 1) where tangible results are rewarded. The intention being that the winners of the implementation stage of these multistage prizes would be those who have moved beyond the 'pilot and crash' stage, as Benton and Glennie (2016) term it. What appears to be distinctive about I2I is that these prizes, targeted at developing country participants, assume that solvers will be able to find the investment they need, and have the capacity required to get them to the finishing line –without personalised support from the prize team.[20]

While we found examples of Social Prizes targeted at the public sector in Europe and the US during the literature review, we failed to identify any equivalents in developing countries. Our emerging evaluation findings from I2I lead us to think that it *is* possible to use a prize to incentivise people in developing countries to do something new (at least new to them), even over a long period and with no financial support or mentoring (making the IIP more akin to behaviour change interventions). But we are aware that I2I invested considerable time and resources into identifying an 'enabling environment' for this kind of prize[21] which may not have been possible for other organisations.

Discussion points: Do IIPs that focus on inducing implementation require too much solver support to make them worthwhile? Are there situations where all that is needed is some encouragement, in the form of a prize, to spur people on to do something they had in mind to do anyway?

[20] Questions have been raised within the I2I programme on several occasions about solver support, for example within the Climate Change Adaptation theme, the need for extra support to avoid excluding those who lack the capacity and resources to take part and win competitions.
[21] See for example one of the thematic research papers I2I produced during its design phase http://www.ideastoimpact.net/sites/default/files/doc_research/iti-energy-digital.pdf

4.2.3 As prizes are used more in development, the notions of risk and cost take on new meanings.

A prize may be designed with the intention of incentivising people to pursue a particular course of action, but that catalyst can lead to some additional unexpected results. Furthermore, some of the anticipated risks to solvers (investing their own resources into pursuing a prize, for example) may be a higher concern for prizes targeting developing countries.

A focus for I2I's evaluations is on identifying unintended consequences of the prizes and if they outweighed the benefits. Again, the literature had little to offer in terms of evidence, however, we did notice some disquiet or words of caution coming into more recent discussions about the pros and cons of prizes, in terms of the ethics of transferring the risk from prize sponsor to prize participant, for example. While these tended to be opinions and theories, we suspect that as innovation prizes become more used in development, they may attract the attention of those who are already critics of funding mechanisms such as RBF and may hold prize organisers to account for the risks and costs borne by solvers and other prize stakeholders.

Discussion points: Is there a need for a code of conduct for using IIPs in development? Are new tools required to help prize sponsors and managers mitigate the risks of unintended consequences? Or guidance and encouragement to apply the existing tools?

4.2.4 Evaluation and learning is a low priority for IIPs for development; failure is rarely talked about and success tends to be limited to reporting on having made awards.

During this review, one of our themes has been the paucity of publicly available evaluation data about IIPs for development, without which those interested in prizes cannot make evidence-based decisions about whether a prize may be of value to them for a given situation. While some publications referenced in this review have written about what IIPs are useful for, the tendency is for this to be about their potential rather than reporting on what outcomes were aimed for and the extent to which the prize succeeded in reaching them. We are hopeful that more evidence will be available in the near future as some of the IIPs we identified during our research draw to a close or enough time elapses after their awarding for evaluations to emerge.[22]

With only a few examples of prize evaluations to draw on at this time, what we can say about how prizes are judged to be successful is limited, however this in itself seems important. Why are there so few evaluations? Our experience with evaluating I2I has already highlighted a few reasons and we may uncover more as we continue with our work, for example:

- There is no incentive for solvers (particularly those who did not win) to participate in evaluations after the awards have been made, especially when data collection happens months after the event.
- Prizes often change from start to end; closing dates are extended (the Longitude Prize, for example),[23] additional support provided, judging criteria adapted and the numbers of solvers

[22] For example, the Empower A Billion Lives competition http://empowerabillionlives.org/ and the Horizon Prize for Social Innovation https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/prizes/horizon-prizes/social-innovation_en

[23] The Longitude Prize was intended to run until September 2019, but has extended its deadline to at least the end of 2020 as the prize committee determined participants required more time to meet the goal. https://longitudeprize.org/applying-support/longitude-prize-extension-faqs

available to collect data from is unknown. This all has implications for the evaluator and their resources.

- Prizes often depend on media attention to succeed, attracting potential solvers and rewarding them with publicity when they win. In this context, a report that talks about failing to succeed in meeting objectives, risks getting wider notice than a similar report about research grants, for example.
- Social Prizes focus on behaviour changes which may take time to realise and the full value obtained from the prize may only be known after it has been awarded; compared to those prizes that are able to provide evidence of success through the judging and verification processes i.e. at the point that awards are made.

Discussion points: Can we agree on standard indicators that IIPs can use to draw meaningful conclusions about their effectiveness and contribution to solving the target problem? What can be done to encourage prize sponsors to speak more openly about their failures, as well as their successes and exchange learning with others?

4.3 Implications for the E&L team

I2I was set up to test IIPs as a tool to help solve a range of development challenges for the purpose of understanding, in particular, their value to funders when compared to the other funding modalities available to them.

From this review, we believe that what we learn from I2I will fill gaps in the existing literature, and there is value in making the full evaluation reports widely available. However, there are some things we need to bear in mind when communicating our findings externally:

We need to be specific about the type of prize the learning comes from. For readers to assess the value of our findings to their interests and to apply them, we will need to describe clearly the prize design and not assume that the innovation prize language we use will mean the same thing to others in the innovation prize community.

We may need to use prize type as a way of packaging our findings. Given the popularity of prizes to source ideas and point solutions, there is value in sharing the findings we have on the first stages of our prizes as these may have wider appeal. However, the focus of our evaluation has been on the implementation stage prizes, which may appeal to a niche audience and could lend itself to more targeted dissemination.

We should consider exchanging learning with others who are interested in incentivising behaviour change for social good. One of our working hypotheses is that prizes which are designed to incentivise a target group of participants, such as local government officials, to work differently for a period of time will require different conditions to be effective than those that are focused on generating new ideas from citizens (Ideas Awards). We think there would be value in reaching out to those working in social marketing and behaviour change and reflecting with them on the potential IIPs have as financial incentives for behaviour change,[24] and how IIPs can learn from that sector's insights.

We invite you to direct us to any publication we might have missed that could help us answer our questions further. If you are running prizes, we also encourage you to publish your evaluations and final reports.

Contact us at info@ideastoimpact.net

[24] Prizes are already considered as a tool for incentivising behaviour change in the literature, within the umbrella of Financial Incentives, (see for example, Michie et al., 2011) however our early conclusions are that these tend to fall into the 'prize draw' category.

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Annex 1: Full methodology

This report aimed to bring together the existing evidence available on the effects of IIPs for development. It planned to do this first by reviewing literature collated during the I2I programme published in open access research journals, or elsewhere online and secondly by locating and examining several publicly available ex-ante and ex-post evaluations of prizes which have been applied to development goals. As this review aimed in part to build upon discussions had in the evidence review undertaken by Everett, Barnett and Verma in 2011, we sought to avoid replication by mostly only reviewing documentation published post 2012.

Underpinning both parts of the review were five key RQs:

- Can we reach a common definition of an IIP?
- What support, if any, do others running IIPs for development offer to solvers?
- What are IIPs particularly useful for when applied to development goals?
- What are the strengths and weaknesses of IIPs for development versus other funding modalities?
- How are IIPs for development evaluated?

Stage 1: Searching the IIP literature

The process taken to identify the academic literature was undertaken in three parts.

Part 1 – Identification of background literature

- An initial reference list was compiled by the E&L team of papers, grey literature and blog posts accumulated during the last four years of working on the I2I programme and rapid reviews undertaken previously using Google Scholar and Google on specific topics related to IIPs.
- A total of 45 publications were compiled for review.
- A database was built to record the review results.

Part 2 – Identification of potential case study prizes

- A Google search was undertaken to explore the use of specific IIPs used in a development context, and to identify case studies for review.
- The following search terms were used to identify case study prizes for review – 'innovation inducement prize' OR 'innovation inducement challenge' AND 'sustainable development'.
- A second broader search was then completed using both Google and Google Scholar, to identify any further prizes or challenges with a focus that aligned to all or any of the 17 sustainable development goals. The following search terms were used to identify any potential literature: The theme of each goal e.g. 'WASH OR 'water' OR 'sanitation 'and 'innovation prize OR innovation challenge'.
- A total of 162 different 'prizes' and 'challenges' were identified through the two searches.
- Each of the 162 prizes was then examined to see if it qualified for the review. 151 were rejected for the following reasons:

- The prize identified was something other than an IIP, e.g. a challenge prize that turned out to be a challenge fund.
- The prize identified had not closed and announced winners.
- The aim of the prize identified did not have a link to one or more development themes.
    - The 11 prizes below were those that qualified for review (at least from initial reading) and publications related to them were sought and reviewed.

- AidEx2019 Aid Innovation Challenge: **Aid Ex**
- Dreams innovation challenge: **ViiV Healthcare**
- Ebbe Nielsen Challenge: Global Biodiversity Information Facility
- Facebook Internet.org Innovation Challenge: **Facebook**
- Reed Elsevier Environmental Challenge: **Reed Elsevier**
- WASH innovation challenge: **UNICEF**
- Water innovation challenge: **Worldskills**
- SDG and HER competition: **World Bank**
- Shield in the cloud innovation challenge: **C5 Accelerate**
- Urban drinking water challenge: Imagine H20, **11th Hour Racing and Bluewater Group**
- Water services trust fund - innovation challenge: **Water Services Trust** Fund (Kenya)

- A database was built to compile the review results

Part 3 – Identification of evaluation results

- For each of the 11 prizes identified in Part 2, a further search was undertaken to identify any publications [websites, blog posts, grey literature or open access journal article] pertaining to any evaluation activities that had been undertaken or each.
  - The following search terms used were the name of the prize e.g. 'DREAMS innovation challenge AND 'evaluation' OR 'results' OR 'impact'.
  - Of the 11 prizes reviewed, publicised discussions of results, impact or evaluation results were found for only five, of which only one (DREAMS Challenge Prize) contained evaluative data; This last report was later excluded during review when it became clear it awarded grants rather than being an IIP.
- A second search was then undertaken to capture any additional evaluation material relating to any prizes that had not been identified in the first search.
  - The following terms were used: 'innovation inducement prize' AND 'evaluation' OR 'results' OR 'impact' AND 'report'.
  - An additional 25 publications were found.
- These 25 publications were subjected to the same qualification process outlined above.
  - At this stage, 20 publications were rejected.
  - A total of six publications were then reviewed and data entered into the database.

In total, both searches undertaken in Part 3 resulted in a total of 17 [11+6] prizes being identified [that met the criteria set] and were reviewed.

Stage 2: Reviewing the evaluation material

This literature review sought to review any literature that captured evaluations of IIPs with an aim to target development focused challenges on a global scale.

The three-part search process outlined above identified:

a) 45 general publications on prizes.

b) Web page discussions, blog posts and grey literature on 17 different prizes.

Each publication was examined for content pertaining to the RQs. Any relevant content identified was captured in the database in its original form. All content captured was then analysed per individual research question [as listed above]. Both individual perspectives and evaluation results were outlined and discussed, as well as any key themes that emerged from the data as a whole.

Stage 3: Building on findings of Stages 1 and 2

Having studied the findings of Jessica Roberts' review of the literature obtained from these two approaches, and using what had been discovered about the varied ways IIPs are being defined and described, Cheryl Brown searched Google Scholar, again limiting the searches to papers published from 2012 onwards and using the following searches:

- allintitle: innovation prize OR challenge OR contest OR tournament OR award OR competition
- allintitle: innovation prizes OR challenges OR contests OR tournaments OR awards OR competitions
- allintitle: prize social OR health OR climate OR energy OR sanitation OR water OR sustainable OR development
- allintitle: prizes social OR health OR climate OR energy OR sanitation OR water OR sustainable OR development
- allintitle: innovation contest social OR health OR climate OR energy OR sanitation OR water OR sustainable OR development
- allintitle: innovation contests social OR health OR climate OR energy OR sanitation OR water OR sustainable OR development
- allintitle: innovation prize social OR health OR climate OR energy OR sanitation OR water OR sustainable OR development
- allintitle: innovation prizes social OR health OR climate OR energy OR sanitation OR water OR sustainable OR development
- social OR health OR climate OR energy OR sanitation OR water OR sustainable OR development 'challenge prize' [anywhere in article].

This activity generated 5,032 results from which 27 papers were identified as relevant for inclusion in the review. Of those 27, nine were reports or articles reviewing the effectiveness of one or more prize, and of these five were independent evaluations or objective assessments. The exclusion criteria used to identify the 27 papers were:

- Available to access freely online either through Open Access or as a pre-print version.
- Published in English.
- Relevant to a discussion of IIPs for development based on our operational definition of them:

rewards whoever can firstHVT business card_Bernard_v2 (500x double sided business cards)
HVT business card_programme_v2 (2000x double sided business cards)
HVT-2-pager_v1A (1000x double-sided A4).

- or most effectively meet a predefined challenge connected to a development or social issue (not necessarily in a developing country)
- a public prize open to a large community of potential solvers (e.g. not a prize run by an organisation for its staff)

- any cash reward is only an incentive, it is not designed to cover the cost of implementation i.e. if awarded at the end of the first of a multistage prize, winners can do what they want with the money, and if awarded at the end of an implementation stage, it is not intended to cover the full cost to the solver of implementation.
- Providing minimal support to solvers – no seed-funding, no mentoring, matchmaking with investors, for example.

This final criterion was considered important given the purpose of the literature review was to provide a backdrop against which I2I's evaluation findings about its IIPs could be presented. In practice, applying this operational definition as a criterion too strictly would have left us with very little to review and it was relaxed to allow in those references that were very close to meeting it and which held relevant findings for I2I, for example the Naples 2.0 social innovation contest (Addari and Lane, 2014), the Healthiest Cities and Counties Challenge (Benjamin, 2016), the Bloomberg Philanthropies' European Mayors Challenge (Burdett et al., 2015) and insights from the US Federal Prize Authority (Office of Science and Technology Policy, 2016).

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