



Technology for Philanthropy under the  
**Sustainable  
Development Goals**



民強國盛



CHINA GLOBAL  
PHILANTHROPY  
INSTITUTE  
國際公益學院



健坤慈善基金會  
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## Technology for Philanthropy under the Sustainable Development Goals

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Technology for Philanthropy under the Sustainable Development Goals

# Preface





In September 2015, the global community committed itself to the 2030 Agenda for Sustainable Development, which included the 17 Sustainable Development Goals (SDGs), covering a comprehensive set of interconnected social, environmental and economic targets. The SDGs provide an overarching framework for all global development efforts, and have spurred a rapid increase in innovative partnerships, financing and knowledge generation and sharing, all aimed at achieving the SDGs by 2030. The global philanthropic sector is playing an important role in this effort, and has begun carrying out relevant research, conducting advocacy, and developing action plans for SDG localization. In 2016, the Chinese government issued “China’s National Plan on Implementation of the 2030 Agenda for Sustainable Development” and “China Construction Plan for the Innovation of the 2030 Sustainable Development Agenda,” as part of their response and commitment to the 2030 Agenda. SDG localization in China, if it is to be effective and sustainable, requires extensive partnerships between the public and private sectors and amongst civil society at large.

In response to the growing role of new partnerships to achieve the SDGs, the United Nations Development Programme (UNDP) Office in China, in partnership with the China Global Philanthropy Institute and JK Foundation, jointly launched a project titled, “Technology for Philanthropy Under the Sustainable Development Goals”. As an essential output of the project, this report takes “technology for philanthropy” as an entry point for identifying solutions that effectively apply technology to philanthropic activity. The content of these solutions is summarized in case studies. Each case study presents a different project, inclusive of a project matrix, description of the SDGs the project is contributing to, and breakdown of the technologies being used to achieve the project objectives. The core content of each case study includes a project description, impact assessment, enumeration of challenges, and description of future trends. Concerning the case study selection criteria, in-depth analysis was conducted to evaluate five key elements: technical, innovative, sustainable, scalable, and referable. Based on the above and following the innovation strategy advocated by UNDP for development work, each case study summarizes its key findings and recommends future action plans to stakeholders. The “Technology for Philanthropy Under the Sustainable Development Goals” report intends to help the Chinese philanthropy sector understand and use relevant technologies, enhance the technical capabilities of Chinese civil society organizations (CSOs), and encourage CSOs and the Chinese private sector to collaboratively take part in the process of SDG localization. It is also intended to introduce Chinese technologies and programs to the global community, assist in the globalization of Chinese technology and CSOs, and promote international technological exchange.

It is worth noting that the term “philanthropy” is used in this report consistently with the Chinese use of the term “慈善” (cishan). The scope of its meaning is not limited to the traditional

western concept of monetary giving by private individuals or organizations, but instead covers a broad set of activities that advance social interest. Therefore, the activities presented are not limited to those of foundations or funding organizations, but also other organizations that are working on social and environmental issues. For example, case studies were selected to present private business activities, UN projects, government projects, and some NGO activities, any that could embody the most useful experience in applying technology to solve social problems.

In summary, by exploring the social benefits generated by technology in China and around the world, the projects described in this report can clarify the role and illuminate the significance of technology in promoting impact investment. They are also a firm basis for advocating that Chinese philanthropists use their capital to invest in projects and startups that espouse technology to solve social problems. Such investment will have the effect of encouraging commercial forces to participate in philanthropic activity and thus promote sustainable development and the common good.

## Foreword

The UN 2030 Agenda for Sustainable Development is dedicated to sustainable development and collective action to promote sustained and inclusive economic growth, social development and environmental protection. To achieve this, active engagement between the UN and the philanthropic sector is critical. Philanthropic organizations can support development projects with funding, expertise, access to cutting-edge technology, and new perspectives on development. At this time, we see in China and around the globe a growth in the involvement of corporate foundations and homegrown philanthropy in work that will support the realization of the 2030 Agenda.

China currently has an unprecedented opportunity to expand its philanthropic sector, in line with its economic growth and fast development of technology. “Technology for Philanthropy under the Sustainable Development Goals,” initiated by UNDP China and our partners China Global Philanthropy Institute (CGPI) and Jiankun Charity Foundation (JK), shows the exciting and diverse ways that technology can be used for social good and SDG attainment, in fields ranging from biotechnology to artificial intelligence. These technological developments, especially those closely related to sustainable development, are found in China and in other countries around the world. Our team has put together a portfolio of case studies that details success stories of the intersection of philanthropy and technology. With two case studies for each SDG, you will find stories on medical instruments made from paper that can help doctors diagnose disease, artificial leaves that can photosynthesize and produce oxygen in space, biodegradable products made of cassava or sugarcane that can replace single-use plastics, and a trendy virtual forest with a physical, desertification-reducing counterpart. We hope you find this project on technology and philanthropy to be interesting, instructive, and inspiring.

Agi Veres  
Country Director  
United Nations Development Programme, China



## Foreword

### Technological innovation and cross-border force in a strong economic era

Chinese society is experiencing an era of strong economic growth, marked by high productivity and a flourishing financial industry. One of the country's core objectives is to support social innovation for public welfare and social development. At present, there are several challenges facing China's public good: how to integrate public welfare objectives seamlessly with the aims of social and economic development, how to promote the common good as a "new normal," and how to become a driving force for social progress and civilizational transformation. With the development and progress of modern science and technology, conventional methods of operation, historically present across a range of industries, have been replaced. "Internet + charity" has become a new trend. Blockchain technology, cloud computing, artificial intelligence, and other technical means have created impact and changed how people think about public welfare. With the promulgation of China's Charity Law, the charity industry has been given a renewed trajectory, one empowered by innovation and various applications of science and technology.

It is important to remember that science and technology have inherent social value, and that such social attributes should not be or remain eclipsed by science and technology's more utilitarian functions. Thus, charity is not simply a donation, but social action, based on equality and ethics, and focused on solving social problems. If technological innovation affects the visible or tangible dimensions of society, charity work affects the invisible or intangible ones. The integration of science and technology with charity is a process directed at solving the most urgent problems facing both Chinese society and the global community writ large; such an integration has the potential to bring about authentic progress and achieve sustainable prosperity for all.

According to the I Ching (易經, Book of Changes), "saints view astronomy, observe time and change, observe humanity, and become the world." A truly forward-looking and strategic entrepreneur or philanthropist should have the vision of a "grand philanthropy," regard science and technology as important tools for solving social problems, and be a leader in the construction of a philanthropic culture rooted in the innovative spirit of the Chinese people. Let us all look forward to an increase in scientific and technological philanthropists, both in China and around the world, who are concerned about the future of mankind.

Wang Zhenyao

Dean

China Global Philanthropy Institute

## Foreword

### The future is coming

Speaking at the Ninth National Congress of the Chinese Association for Science and Technology, General Secretary Xi Jinping stressed that "science and technology are the sharp weapons of the country, the country needs it, enterprises rely on it, and the people depend on it. For China to become stronger and for the Chinese people to live better, there must be strong technology." In other words, to the extent that technology in China is advancing, the country will be prospering.

To achieve the goal of "integrating philanthropic concepts into science and technology, helping science and technology achieve greater value, and introducing the glories of human nature into the soul of science and technology," the Jiankun Charity Foundation, a state-level charitable foundation registered with the Ministry of Civil Affairs, actively works toward the realization of the United Nations Development Programme's (UNDP) Sustainable Development Goals (SDGs). In so doing the foundation aims to explore the role of science and technology in sustainable development through a series of project activities, such as writing best practice case studies and conducting field visits. Such exploration is meant to advance scientific literacy, enhance the application capabilities of social organizations, encourage social organizations to pay attention to and support the integration of science and technology within the field of charity, and empower all levels of society to work toward the common good.

Predictably, society in the future will see the adoption of blockchain technology across practically all areas of our lives. "Artificial intelligence +" will eventually change our way of life and life science research, rooted in technological innovation, will increase our living standards.

This is our future. We look forward in anticipation.

Qiao Qian  
Founder of Jian Kun Charitable Foundation



## Acknowledgement

The “Technology for Philanthropy Under the Sustainable Development Goals” report was jointly initiated by the United Nations Development Programme (UNDP) China, China Global Philanthropy Institute (CGPI), and Jiankun Charity Foundation (JK). The Chinese report was drafted by UNDP China and the CGPI team and co-authored by: Rui Wang, Philanthropy Consultant at UNDP China; Haixia You, Deputy Director of the Domestic Development Department of the CGPI Cooperative Development Center; Nan Yao, Analyst at the CGPI Philanthropy Research Center; Longsi Xu, Qun Wang, interns at UNDP China; and Linjing Su, intern at CGPI. Special thanks to Mr. Mark Pufpaff and Mr. Bradley Wo for proofreading and editing the report’s English version.

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## I. Background

### 1. The 2030 Agenda

#### 1.1 Sustainable Development Goals

The United Nations' (UN) 2030 Agenda for Sustainable Development (2030 Agenda),<sup>1</sup> which was unanimously adopted by 193 member states in September of 2015, commits all peoples and institutions to work together in promotion of sustainable and inclusive economic growth, social development, and environmental protection. More importantly, the 2030 Agenda aspires to benefit all population groups – including women, children, persons with disabilities, and future generations. This new and universal development agenda uses a comprehensive approach to sustainable development and collective action to address contemporary and future challenges at all levels. “Leaving no one behind” is its overarching imperative and defining characteristic.

The 17 Sustainable Development Goals (SDGs) of the 2030 Agenda build upon the successes of the Millennium Development Goal (MDG) agenda proposed by the UN in 2000. However, the SDGs expand the scope of the MDGs to address issues pertaining to inequality. A sampling of such goals including economic growth, decent jobs, cities and human settlements, industrialization, ecosystems, climate change, sustainable consumption and production, and peace and justice. Most importantly, these new goals are the first to call for action from all countries – poor, rich and middle-income – to promote prosperity while simultaneously protecting the planet. The SDGs use an innovative approach that relies on a commitment to involve every sector of society, thereby forming an interconnected and global partnership inclusive of the public and private sectors as well as civil society as a whole. The aim is to achieve the SDGs by establishing a plan for all countries to follow. National governments are responsible for reviewing their own progress in implementing the goals and are expected to establish national frameworks for their achievement.



<sup>1</sup> United Nations, 2017.

## 1.2 Sustainable Development Goals in China

On September 19, 2016, China released its “National Plan for Implementing the 2030 Agenda”<sup>2</sup> at the UN Headquarters in New York. The plan consists of five parts, including China’s achievements and experience in implementing the MDGs, as well as the challenges and opportunities, guiding principles, roadmap, and plans for implementing the SDGs. China has also included the SDGs in its 13th Five-Year Plan and is actively promoting the achievement of the SDGs internationally. China has proposed a series of interconnection and intercommunication initiatives – e.g. “The Belt and Road Initiative” and “Silk Road Fund” – to promote multilateral cooperation mechanisms and form regional cooperation, an effort that will play an important role in driving other countries to achieve the SDGs domestically. Since the adoption of the September 2015 Sustainability Agenda, China has taken a series of measures to integrate the 17 SDGs and their corresponding 169 indicators into its domestic, regional, and global policies.

## 2. Technology, philanthropy, and sustainable development

### 2.1 Technology and philanthropy

Society is accustomed to linking science and technology together. The two terms are closely related but also have important differences. Science refers to theoretical issues while technology refers to practical issues. This report spotlights the practicality of technology as used in sustainable development. In Chinese, the word for technology is “keji.”<sup>3</sup>

Technology is changing the world and is having unprecedented effects on human production and life. The modern scientific and technological revolution is also a revolution in human thinking. Frontier technologies such as artificial intelligence, biotechnology, and interstellar exploration are reshaping social forms. However, it must be stated that technological development has also produced a series of negative effects, such as natural resource and environmental pollution and the expansion of consumerism. The social and ethical risks of technology have become alarmingly prominent, which has led to a reaction, in which technology is being increasingly developed for humanistic ends. The application of technology in the field of social development reflects the focus of philanthropy to solve social problems.

In the field of philanthropy, the introduction of technology is bringing about subversive changes, especially surrounding the Internet and related digital technologies. Technology in philanthropy is eliminating industry restrictions, such as time, space and resource imbalances, and improving solutions to issues such as poverty and education. The ability to address pressing social issues – e.g. resource shortages, widespread environmental damage, etc. – has changed the way the public participates in charitable activities and has also increased the amount of people getting involved. Globally, governments, the private sector, CSOs, and philanthropists are cooperating to effectively

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<sup>2</sup> Ministry of Foreign Affairs, 2016.

<sup>3</sup> “Technology is machinery and devices developed from scientific knowledge”. (Oxford Dictionary, 2018)



apply technology in the practice of philanthropy.

In China, the development and application of contemporary technology in philanthropic activity includes not only industry-level attempts to improve business infrastructure, such as data transparency and disclosure and industry credit ratings, but also to use technologies, such as drones, satellite remote sensing, and artificial intelligence, in projects.

Technology and philanthropy are mutually reinforcing and inseparable in practice. On the one hand, technology allows for those conducting philanthropic activity to be innovative in their solving of social problems; on the other hand, the philanthropic community is investing in the development of new technologies to better reflect and support the humanistic character of their work. Technology for philanthropy is a growing trend worldwide and the rise of global, technologically-savvy philanthropists has not only fast-tracked the development of new technology, but has also promoted an increase in philanthropic activity. Concerning the 2030 Agenda, the application of technology in philanthropy is an important pillar for achieving the 17 SDGs.

## **2.2 Philanthropy and sustainable development**

To advance the 2030 Agenda, governments need the assistance of CSOs and the private sector to promote sustainable development and shape a more inclusive world. Many SDGs – e.g. ending poverty, increasing livelihoods, raising quality of life standards, and creating a more equitable society – are consistent with the kinds of issues the philanthropic community has perennially focused on and worked to address. All organizations, regardless of type, volume, or focus area, can and should find their own ways of aligning with and contributing to the SDGs by sharing resources and pursuing win-win cooperation. The philanthropy sector is able to provide funding for the SDGs, take calculated risks, provide technical and personnel know-how for development work, and utilize its localization capabilities and experience to align philanthropic activity with the achievement of the goals.

In 2017, in order to more effectively support China's 2030 Agenda implementation strategy, UNDP China and its partners launched the "Philanthropy for SDGs in China" <sup>4</sup> project. This project established the SDG discourse system as an international standard for categorizing, analyzing, and evaluating the development of China's philanthropic activity. It was designed to promote individual and collective action in support of the SDGs in China. The "Philanthropy for SDGs in China" project was the first attempt to connect technology and philanthropy for purposes of advancing progress toward the fulfilment of the SDGs.

## **2.3 Technology and sustainable development**

The rapid advancement of scientific discovery and technological development has had and will continue to have a profound impact on the delivery of the SDGs. Given their breadth, the range of possible technological applications is practically endless. The 2030 Agenda provides a comprehensive

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<sup>4</sup> UNDP, 2017.

application framework for technology. One example is the Multi-stakeholder Forum on Science, Technology and Innovation for the SDGs, which has been hosted annually at the UN since 2016.<sup>5</sup>

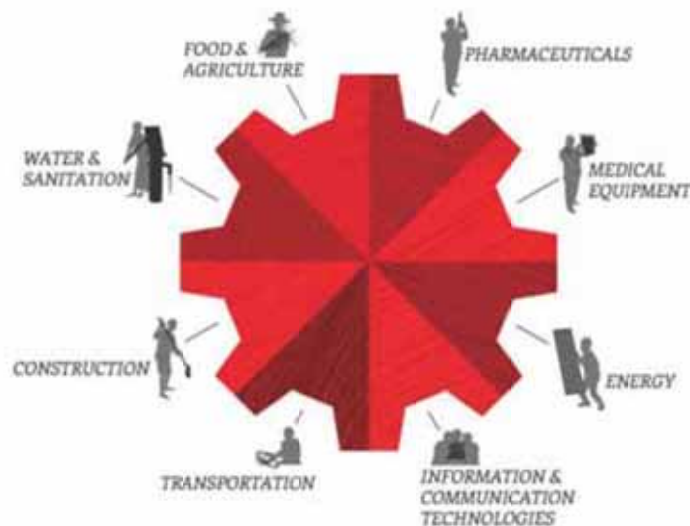
## II. Technology for Philanthropy under the SDGs

### 1. Project positioning, objectives and outputs

#### 1.1 Project positioning

The purpose of the “Technology for Philanthropy” project is to assemble a collection of innovative solutions, from China and elsewhere, as an answer to the question of how to integrate technology with philanthropic activity aimed at achievement of the SDGs. Featuring a wide range of case studies, the “Technology for Philanthropy under the SDGs” report was drafted to promote the use of technology in philanthropic work and to advance knowledge about how to do so through channels such as forums, philanthropy-focused online courses, and impact investment in the 2030 Agenda.

The “Technology for Philanthropy under the SDGs” report uses the “Technology Innovation for Sustainable Development” framework developed by the EssentialTech program at the Swiss Federal Institute of Technology in Lausanne (École Polytechnique Fédérale de Lausanne).<sup>6</sup> Essential technologies are defined as “technologies which can expedite the achievement of the Sustainable Development Goals” and include energy technology, water and sanitation technology, food and agricultural technology, information and communication technology, transportation technology, construction technology, medical and pharmaceutical technology, and other technologies.



©EPFL/EssentialTech

<sup>5</sup> UNDP, 2018.

<sup>6</sup> École Polytechnique Fédérale de Lausanne, 2018.

### 1.2 Project objectives

The project aims to help the Chinese philanthropy sector understand and apply relevant technology, enhance the technical capabilities of Chinese CSOs, encourage Chinese enterprises and CSOs to participate in the process of SDG localization, and introduce Chinese technologies and programs globally. It also intends to help Chinese CSOs and technology firms going abroad and promote international exchange. Finally, by exploring the social benefits generated by technology in China and around the world, the project will clarify the role and significance of technology in the promotion of SDG-related impact investment and advocate for Chinese philanthropists and capital providers to focus on projects that apply technology to solve social problems. Such investment will encourage commercial forces to participate in philanthropic activity and thus promote sustainable development and the common good.

### 1.3 Project output

Given the objectives of the project, the team started its work by summarizing more than 100 initial cases. They then selected 34 cases as the project's preliminary results and through expert consultation, case interviews, and forums, revised them and drafted the present report. The case studies are to form the basis for the second phase of the project, which will possibly include multi-channel promotion and impact investment advocacy. Throughout phases one and two, keynote speeches and international exchanges have been and will continue to be organized to encourage participation. Using the 2030 Agenda framework, case studies and related projects will be evaluated, and relevant know-how and tools will be introduced. Phase 3 is currently in planning. The outputs from each phase will be communicated through online and offline channels, using multi-dimensional and multi-angled promotion techniques. International exchange platforms will be used to further "Technology for Philanthropy Under the SDGs" localization. All elements are intended to complement each other.



## 2. Project team

UNDP is the UN's global development network, an organization advocating for change and connecting countries to knowledge, experience, and resources to help people build a better life.



In China, UNDP works with the people and the government, as well as other partners, to pursue equitable and sustainable human development both at home and overseas. UNDP helps China develop and implement policies, nurture institutional capabilities and partnerships to achieve the SDGs domestically, and connect with other countries to share knowledge and advance sustainable growth worldwide.

The China Global Philanthropy Institute was founded by five Chinese and US philanthropists: Bill Gates, Ray Dalio, Niu Gensheng, He Qiaonyu, and Ye Qingjun. The Institute established an education system focused on cultivating exemplary philanthropists, both executive and otherwise. It is committed to building a knowledge system to support the development of philanthropy in China and around the world and creating a professional think tank to lead its creation.

Approved by the Ministry of Civil Affairs, the Jiankun Charity Foundation was one of the first state-level charitable foundations in China rooted in traditional Chinese culture. The founder, Mr. Qiao Qian, has extensive business experience, especially in technology companies, which inspires the Foundation's focus on "technology and philanthropy" and desire to promote sustainable development through impact investment.

These three parties agreed on the "Technology for Philanthropy Under the SDGs" topic and established their cooperation at the end of 2017.

#### **JK Foundation, UNDP, and CGPI launch the "Technology for Philanthropy Under the SDGs" project**

2017-12-19 09:10

On the afternoon of 15 December 2017, the launching ceremony of the "Technology for Philanthropy Under the SDGs," jointly sponsored by the JK Foundation, CGPI, and UNDP China, was held in Beijing. Mr. Qiao Qian, Chairman of the JK Foundation, Professor Wang Zhenyao, Dean of CGPI, and Mr. Patrick Haverman, Deputy Country Director of UNDP China, signed the agreement. The three parties agreed that the 2030 Agenda is the primary discourse system for the international community. The national philanthropic community has carried out research advocacy and action plans for SDG localization. The future development of China's philanthropic sector will follow the pattern of technological development. The integration of technology with philanthropy, and especially the rise of philanthropists

in the scientific and technological community, has brought about needed innovation in how philanthropic work is carried out worldwide. Effectively incorporating social goals into the use of technology will be a common problem facing countries worldwide.



*FROM LEFT TO RIGHT: Mr. Patrick Haverman, Deputy Country Director of UNDP China; Professor Wang Zhenyao, Dean of CGPI; Mr. Qiao Qian, Chairman of the JK Foundation*

### III. “Technology for Philanthropy Under the SDGs” case studies

#### 1. Case selection criteria

Under the framework of the 2030 Agenda, in order to facilitate comparison and exchange between China and foreign countries, two case studies (one Chinese and one foreign) were included under each goal. Their selection was based on five key elements:

- **Technological elements:** The cases present a wide range of technologies, including aerospace technology, new materials technology, biomedical technology, and big data and artificial intelligence technology. Such a range demonstrates the number of different technological applications in the field of development. For example, the application of satellite technology can enhance disaster management capabilities and address climate change, while the use of new construction materials technologies can promote sustainable infrastructure, reduce environmental pollution, and encourage sustainable community development.

- **Innovative elements:** The innovative elements of the case studies were determined by a development concept identified by UNDP: “Innovation for development is about identifying more effective solutions that add value for the people affected by development challenges – people and their governments, our users and clients.”<sup>7</sup> The choice of each case was not limited to technical innovation, but primarily based on how the innovation influenced change. For example, under SDG 2, new food storage technology helped reduce food shortages in the sub-Saharan Africa region. Although the technical element is not overly sophisticated, it nonetheless helped farmers reduce losses by 98%.

- **Replicable/scalable elements:** These elements focus on the replicability and/or scalability of the technology and model in each case, regardless of domain, geographical, or cultural differences. Cases were chosen based on the application of technology and on how CSOs enhance innovation and create influence in their fields through cooperation. For example, ICT is a component widely used in current technology to solve social problems. It is also a technology with high participation and cooperation opportunities for CSOs. In the case studies, big data is shown to help poverty alleviation (SDG 1), food safety (SDG 2), long-distance education (SDG 4), and provide education and job opportunities for women through e-information (SDG 5). These examples show how CSOs use information technology to successfully solve development problems and provide learning and reference material for other institutions.

- **Sustainability elements:** The sustainability focus of the cases considers the effectiveness of the solution, the sustainability of the model, the iteration of the project, and the sustainability of the funding. For example, under Goal 17, the SDG Philanthropy Platform ([www.sdgphilanthropy.org](http://www.sdgphilanthropy.org)) is a multi-participation, multi-country, online and offline combination model that attempts to align the practice of philanthropy with the achievement of the SDGs.

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<sup>7</sup> UNDP, 2018

- **Referable elements:** There are two considerations. First, Chinese CSOs can refer to advanced foreign cases and actively seek cooperation to solve social problems using high-tech means, such as the development of low-cost and manual paper centrifuges under Goal 3. Such cases provide inspiration and reference material for CSOs in China's healthcare field. Second, Chinese cases can be used by other countries, while mature China-based technologies and solutions help domestic institutions go abroad. For example, China's attempt to recycle e-waste has provided a reference for many developing countries to deal with their own. Another example is the cooperation between the technology companies presented under Goal 13; "Ant Forest" prevents desertification through green finance and may provide a reference for such work worldwide.

## 2. Case selection process

According to the above criteria, the project team selected 34 cases in China and abroad and conducted preliminary writing. Based on the case studies' first drafts, the project team held an expert consultation and invited representatives from academia, business, and CSOs to collect suggestions. Then the cases were revised, and some ended up being replaced, and the project was fully presented. The integration of technology with philanthropy used the ideas and practices that were presented.

### Seminar on "Technology for Philanthropy Under the SDGs"

2018-6-18 12:00

On the afternoon of 27 June 2018, the seminar, "Technology for Philanthropy Under the Sustainable Development Goals" was held at UNDP China. Representatives from the China Science Research Institute, Asia Foundation, JD, ADream, Ant Financial, Enqi, and Jiage Technology attended the conference, which focused on the collection of "technology for philanthropy" case studies. A discussion on topics such as case inclusion criteria, the promotion of communication, application scenarios, and effects evaluation was conducted.



*The seminar was a result of the "Technology for Philanthropy Under the SDGs" project, funded by the Jiankun Charity Foundation and initiated by the China Global Philanthropy Institute's (CGPI) Good Finance Leader, Mr. Qiao Qian, and UNDP China.*



### **3. Case content and presentation**

The content of each case includes three parts: case introduction, case description, and case evaluation. In addition, the pictures representing the characteristics of each case and showcasing the development process were also selected.

The case studies include: 1) the sustainable development goal(s) involved in the case, many of which include multiple objectives; 2) the key technology used in the case, based on the “Technology Innovation for Sustainable Development” online course. The summary and description of the technology focuses on the development area in which the technology is located, rather than the technical classification based on the usual case. The case description section includes: 1) Introduction; 2) Description; 3) Impact.

The description section includes: 1) background; 2) project team and project development; 3) characters/features. The impact section includes achievement; limitations, challenges and recommendation; and recommendation index. Among them, the impact of the project’s influence is evaluated based on its data compliance and social value (including awards received and third-party investment, which are important references). Project limitations concern the factors prohibiting replication or long-term development, as well as barriers to improvements based on local conditions. The project recommendation index is based on five project selection criteria, namely, technology, innovation, scalability, sustainability and reference, and includes a recommendation scale from 1 to 5 stars.

### **4. Case Studies**

The Chinese case studies are based on direct interviews and first-hand information provided by the project team and supplemented by desk research and open source materials. The foreign case studies were selected from UN development projects that were implemented or supported by UN agencies. The original content of the cases has been preserved to the extent possible. The remaining cases were drafted based on desk research and expert consultation. Based on the data source and method of data collection, 34 cases were selected and included in the report. A full list of sources is presented in the appendix.



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## Goal 1 –

# Tropical Weather Forecast Ignitia: Precision Satellite Positioning for African Farmers

### Matrix:

Related SDG: 1, 2



#### Essential Technologies:

Information and  
Communication Technology  
(ICT)



#### Recommendation Index:

5 stars

Impact	5
Scalability	5
Sustainability	5
Technology	4
Innovation	5

## I. Introduction

Africa's agriculture production considerably depends on the weather. Ignitia began as a research project in forecasting tropical weather events and created a model to improve accuracy. Ignitia has worked closely with small-scale farmers to provide them with reliable forecasts, resulting in improved farming methods and yields.

## II. Description

### 1. Background

In sub-Saharan Africa, the number of people in extreme poverty is approximately 414 million and accounts for half of the world's extreme poor according to the World Bank in 2013. Africa's agriculture is still at a stage where production depends on the weather. However, farmers are struggling to precisely time their farming activities according to weather forecasts. Moreover, there is a general lack of accurate weather forecasting models upon which to base such activity. Because of the variability of the weather in sub-Saharan Africa, the yield and quality of crops cannot be guaranteed.

Over the past century, weather forecasting in Europe and the United States has made significant progress and can accurately predict weather conditions up to seven days in advance. However, forecasting in the tropics is still a problem. The current prediction model is based on mid-latitude regions such as Europe and the United States and designed for the large-scale tracking of weather. In contrast, weather changes in the tropics are usually small-scale and extremely fast; Ignitia's technology is used to cope with and predict such unique weather.

### 2. Project team and project development

Founded in the African country of Ghana, Ignitia is headquartered in Stockholm, Sweden, and has 13 full-time office staff and 24 local staff. The founders, Liisa Smits and Dr. Andreas Valgren, are both scientists.

Ignitia chose six countries in West Africa as pilots (Burkina Faso, Ghana, Mali, Nigeria, Senegal, and Côte d'Ivoire). By 2018, Ignitia's users had spread all over the world, including Southeast Asia, Central America, and East Africa. Ignitia received funding from the Dutch Ministry of Foreign Affairs, Swedish Centre for International Development and Cooperation,



and United States Agency for International Development. The exact amount of funding is unknown.



### 3. Characteristics/features

Ignitia developed a weather forecasting model for West Africa that uses a unique algorithm calibrated to tropical weather patterns that predicts weather twice as accurately as global models. The output of the model is made available easily to farmers, using a system that has the following characteristics:

→ A smart phone is not needed. As long as a phone has SMS capabilities, it can receive weather forecast updates through an SMS subscription service. The high-quality satellite used by Ignitia is able to narrow the range to nine square kilometers and achieve higher targeting.

→ Farmers can subscribe to receive weather messages on a daily basis and can cancel subscriptions at any time. It costs USD 4 cents per message and only USD 6 dollars per rainy season.

## III. Impact

### 1. Achievement

Ignitia's product is helping a large number of farmers take advantage of weather forecasting tools. In West Africa alone, Ignitia recorded more than 1 million subscribers in 2018, most of whom are small farmers with earnings of less than USD 2 per day. Ignitia is positioned as a social enterprise and most of their funding institutions are non-governmental organizations. The company has won numerous awards, including the 2016 MIT Initiative on the Digital Economy (IDE).

### 2. Limitations, challenges and recommendations

With rapid growth in the number of smartphone users in Africa, Ignitia may face the problem of upgrading to accommodate consumer products..



## Goal 1 –

# People & Data: Big Data and Precise Poverty Alleviation

### Matrix:

Related SDG: 1, 8



Essential Technologies:

Information and Communication Technology (ICT)



Recommendation Index:

5 stars

Impact	5
Scalability	4
Sustainability	5
Technology	4
Innovation	4

## I. Introduction

To achieve poverty alleviation goals requires precise targeting of people's needs based on reliable data. "People and Data" works on data collection using data platforms and big data to provide services and help solve key social issues such as unemployment, health care, and education in poverty-stricken areas



## II. Description

### 1. Background

As of 2017, Guizhou was the most impoverished province in China with 2.8 million poor people. There are 50 poverty-stricken counties and 5,200 poor villages in the province, with a poverty rate of 8%. The government has carried out substantial macroeconomic regulation to help alleviate the poverty therein. Another issue is the gap between the rich and the poor, which is expanding. The precision of poverty alleviation work and the achievement of income sustainability for rural populations needs attention. The transition from general poverty alleviation work to competitive-based poverty alleviation approaches is still a social issue ("competitive poverty alleviation" refers to competitive platforms built by governments or agricultural project owners, for people in poverty to obtain projects, technology, financial support and employment with a low interest. The platforms normally "open for tender" to encourage applicants to take initiatives rather than being given them).

### 2. Project team and project development

Guizhou People and Data Co., Ltd. is a high-tech innovation platform for data collection, integration, sharing, and activation. It also focuses on the application of big data and provides massive information data collection services, including consulting on the development of computer hardware and information technology.

The first step was to collect the data. The project team visited each household and recorded information about the villagers with data collection equipment. The team members obtained a significant amount of first-hand data on the rural population in Guizhou. As of 2017, the

collected data covered 61 counties (cities) and 20,317 villages, representing nearly 20 million people.

The second step was to use rural data to solve the problems of employment and entrepreneurship. Team members targeted employment situations at construction sites and human resource dispatches, employment and entrepreneurship information in rural areas, left-behind children, training, immigration relocation, and residents' personal health. The archive data was continuously tracked. The result was a precision data poverty alleviation platform, which included a dynamic real-name management system, a social security card-making library, human resources service, and a national enrollment registration data collection service. The third step was to build a digital platform to protect the legitimate rights and interests of workers in construction sites, manage the problem of delayed wages, and maintain social stability.

The fourth step involved farmers using the data platform to solve problems such as employment and insurance. People and Data Co., Ltd. used data analysis algorithms to conduct in-depth mining and analysis of individual occupational ability portraits to arrive at a precise match based on the characteristics of corporate job posts. Using this model, the process of finding suitable jobs for those who have difficulty seeking employment and delivering them to the corresponding enterprises was improved. It also increased employment satisfaction and enhanced the employment stability of the labor force.

### 3. Characteristics/features

**A. Situational data collection:** By developing a realistic scenario based on relevant social conditions and undertaking data mining so as to discover new data applications, data was collected and interpreted in rural contexts. The data was applied to countryside scenarios by way of government purchase services, corporate cooperation, and scenario embedding.



**B. Data services for the common people:** Such services include a social security card library (which has wide coverage, is efficient, and solves the difficulty of participating in different places), dynamic real-name management system (to meet the needs of enterprises and governments and prevent unpaid wages), human resources services (to help villagers find jobs and participate in technical training), and national enrollment registration data collection services (to improve information technology, social insurance coverage, and to optimize department-level management).

## III. Impact

### 1. Achievement

Since 2015, the program has collected data from 61 counties and cities in Guizhou Province, 20,317 natural villages, and nearly 20 million people. Since 2016, the dynamic real-name management system has covered more than 300,000 migrant workers. The social security card-making's data coverage reached 5.3 million. The company won awards such as "Innovative SMEs in Guizhou Province", "National High-tech Enterprises", "CMMI3 Certification", "Intellectual Property Certification", and "Third Prize for Cloud Data Mining Development of Guizhou Government."

### 2. Limitations, challenges, and recommendations

The total amount of data in the system holds tens of millions of bits of information. Ensuring that such information is not leaked is a problem that must be considered. The program advocates competitive-based approaches to poverty alleviation, by providing Internet assistance to the farmers who collected the data. For families with no working capacity or who are otherwise unable to access the data, the impact of this project will be relatively small.

## Goal 2 –

# Preserving Harvests – Eradicating Hunger in East Africa

### Matrix:

Related SDG: 1, 2, 10



Essential Technologies:

Food & Agriculture  
Technology



Recommendation Index:

4 stars

Impact	4
Scalability	4
Sustainability	4
Technology	3
Innovation	4

## I. Introduction

The project was initiated by the World Food Programme (WFP) in 2015 in sub-Saharan Africa, where they used an innovative model which subsidized airtight storage equipment and provided training to small-scale farmers. Through the provision of financing, equipment, and capacity-building support, safely stored crops were guaranteed. This allowed farmers to decide when to sell their own crops, rather than having to sell immediately following harvesting, which improved market stability.



## II. Description

### 1. Background

Extreme hunger and malnutrition remain significant barriers to development in many countries. In some developing countries, up to 40% of food production is lost before it even leaves the farm gate because of ineffective preservation techniques. To advance change in the world's food supply chain, WFP has turned to a practical, yet innovative solution.

By subsidizing airtight storage equipment - in the form of plastic and metal containers - and providing training on how to use it, small-scale farmers throughout sub-Saharan Africa no longer have to struggle to preserve their hard-earned harvests from spoilage and pests. With their crops stored safely in improved storage facilities, they do not have to rush to sell them immediately after harvest at low prices, leaving them to buy food at much higher prices or seek assistance later in the year.

### 2. Project team and project development

Assisting 80 million people in approximately 80 countries each year, WFP is the leading humanitarian organization fighting hunger worldwide, delivering food assistance in emergencies, and working with communities to improve nutrition and build resilience.



Besides the pilot areas, seven countries are participating in the initiative, including Uganda, Burkina Faso, Tanzania, Zambia, Burundi, Niger, and Rwanda, while seven others are preparing to do so. In Uganda, more than 113,000 farmers have purchased and are using airtight storage, which gives them higher quality grains and the ability to store their produce until prices rise during the lean season. The use of silos has led to a threefold increase in their income and has cut their post-harvest losses by 98%.



### 3. Characteristics/features

- Replicates proven models by identifying sound post-harvest management practices used in other regions.
- Fosters partnerships with governments, NGOs, the United Nations, and the private sector to create local knowledge networks.
- Develops the capacity of farmers to understand key biological and environmental factors leading to rotting, fungal infestation, insect infestation, and weather spoilage.
- Equips and supports farmers by providing access to airtight storage units and drying equipment, along with guidance on their proper usage.

## III. Impact

### 1. Achievement

First, the project increased food availability, thereby bringing more food to the market. Second, it increased the income of small farmers to such a degree that they now have more control over their decisions. Third, it reduced costs for local farmers and thus freed up more funds for investment. Fourth, the project was a net positive for the environment and contributed to a sustainable future.

It is a comprehensive solution which combines technology and human-centered design fit for application in local contexts. The project is progressively scalable and its impact is still being tracked.

## Goal 2 –

# Zero Hunger– Big Data and Food Safety in Guizhou

### Matrix:

Related SDG: 2, 9



### Essential Technologies:

Food and Agriculture Technology



Recommendation Index:

4.5 stars

Impact	4
Scalability	4
Sustainability	4
Technology	5
Innovation	5

## I. Introduction

Initiated by the Guizhou Provincial Party Committee and the provincial government, “Food Safety Cloud” is a demonstration project focused on big data applications. The project attempts to aggregate food safety supervision information through cloud computing, cloud storage, and other technologies, develop the informatization of food quality traceability and identification, and use big data analysis methods to help government departments predict food safety sensitivity information.



## II. Description

### 1. Background

Food safety is an important part of sustainable development. However, since 2006 China has experienced a number of high profile food safety issues. These issues have caused reflection throughout Chinese society about “how to solve food safety problems”.

### 2. Project team and project development

The project is led by the Guizhou Academy of Testing and Analysis and was implemented by the Food Safety and Nutrition (Guizhou) Information Technology Co., Ltd., together with companies and institutes from Guizhou, Guangzhou, and Beijing.

In the context of the development of data and network technology, big data and cloud platforms have become an important path of exploration for solving food safety problems. Food safety supervision departments at all levels in China have established a multitude of databases. However, due to limited technical know-how, such platforms generally suffer from incomplete, untimely, and inaccurate data. To accelerate the development of the food safety and nutrition information service industry, the Guizhou Academy of Testing and Analysis developed the “Food Safety Cloud”.

In 2014, Guizhou Province pioneered the development of a food safety and nutrition cloud platform in China. It includes a variety of mobile terminal application software, such as the "Food Safety Nutrition Knowledge and Food Safety Supervision Information System" and "Food Safety Survey," both of which provide food safety testing and nutritional analysis data to society in a timely, open, and authoritative manner. In August 2017, with the promotion and application of the "Food Safety Cloud," Guizhou launched the "Big Data + Supervision" pilot project to explore the use of big data in developing food regulation.

### **3. Characteristics/features**

The project built a "1126" technology system, which consists of a data center, an information platform, and two types of cloud services, intended to achieve six types of user connections. 27.36 million pieces of data have been collected, which formed the basis of its big data inventory.

## **III. Impact**

### **1. Achievement**

- Food safety information is abundant: Nearly 40 million pieces of information about food production enterprises, food security, food inspection reporting, and food-related media have been gathered.
- Positive application results in the food safety clouding system: The regular updating of the monitory system has improved both the monitory system itself as well as the food production licensing system.
- Increase of social impact: The technical positioning of the "Food Safety Cloud" service, the development of the service food industry, and the "big data, big poverty alleviation" service strategy of Guizhou Province have gradually been accepted and recognized by other provinces in the country.
- The desired outcomes include achieving effective management, providing enterprises with a more credible product quality display platform and reliable market development data support, empowering consumers with food production, ingredient, and nutritional information, and offering personalized services to help consumers choose dependable and nutritious food.

### **2. Limitations, challenges and recommendations**

Currently, the scale and influence are limited to the provincial level. Cross-provincial cooperation is advised so as to expand influence.

## Goal 3 –

# Paperfuge: Low-Cost Manual Paper Blood Centrifuge

### Matrix:

Related SDG: 3



Essential Technologies:

Medical and  
Pharmaceutical Technology



Recommendation Index:

5 stars

Impact 4

Scalability 5

Sustainability 4

Technology 5

Innovation 4

## I. Introduction

Malaria and tuberculosis kill thousands of children between ages 0-5 in sub-Saharan African countries due to a lack of electricity to power the centrifuge, which is needed for proper diagnosis. The Paperfuge is a hand-powered centrifuge made of paper, string, and plastic that can assist in diagnosis. As a low-cost technology, it can help rural healthcare workers reduce deaths caused by such diseases.



## II. Description

### 1. Background

Malaria and tuberculosis, two diseases that can be cured by simple means, still persist in sub-Saharan African countries such as Uganda and Tanzania. To diagnose these diseases properly requires a centrifuge to separate blood or urine samples. However, due to limited power generation infrastructure, more than 50% of such countries' medical facilities lack electricity. Malaria and tuberculosis kill at least 430,000 children under the age of five each year.

### 2. Project team and project development

Paperfuge's team has only two people - Manu Prakash and Saad Bhamla; they developed Paperfuge at Stanford University.

Centrifuges are essential for diagnosing the above diseases. They use centrifugal force to rotate rapidly and separate and detect pathogens and parasites in blood, urine, and fecal samples. Traditional centrifuges can cost up to USD 1,000 each and generally rely on electricity to obtain their



high speeds. To solve this problem, scientists have come up with a variety of human-powered solutions, including simple machines similar to egg beaters and salad spinners. However, the speed of these devices is still not comparable to that of commercial centrifuges, which spin at more than 100,000 rotations per minute (rpm). This was the highest speed a human centrifuge could reach before the Paperfuge.

As early as 2013, during a visit to a medical center in Uganda, Manu discovered that expensive centrifuges were used as the center's door stopper. Shocked, he visited clinics and medical centers in other parts of Uganda and found that obsolete, but nonetheless expensive, medical equipment was frequently used for alternative purposes. After many visits, inquiries, and verifications, he found that although there are many international donations of expensive medical equipment to sub-Saharan African countries, they are not used due to a lack of power. Thus, in medical facilities without power, the staff end up wasting otherwise useful medical equipment as door stoppers, floor mats, and chairs. This resolved Manu to develop medical equipment that is cheap, does not require energy, and is simple and convenient.

### 3. Characteristics/features

**A. Cost-effectiveness:** Paperfuge was inspired by an ancient toy, similar to a modern gyro. It follows Manu's simple science philosophy, consisting of rope, paper, and plastic. It weighs only about 2 grams. It is simple and portable and is more suitable for transportation and distribution than other human centrifuges. Paperfuge is able to rotate samples at a speed of up to 125,000 rpm, separating plasma in just 90 seconds. After Paperfuge came out, it achieved the highest human centrifuge speed on the market.

**B. Easy to obtain:** The raw materials are easy to obtain, especially in resource-poor areas. As a result, diseases can be diagnosed and treated quickly, which in turn can reduce regional mortality significantly. Also important to note is that users have fun with Paperfuge – from a gaming and learning perspective, Paperfuge designers have also managed to address medical training and education issues, thereby enabling local healthcare departments to work more efficiently and intelligently.

## III. Impact

### 1. Achievement

Paperfuge can reach speeds of up to 125,000 rpm – faster than many commercial centrifuges. Similar to high-tech centrifuges, Paperfuge was able to separate plasma from blood samples in less than 1.5 minutes, as reported by the team in the journal, *Nature Biomedical Engineering*.

In 2017, the Paperfuge team won the "Play & Learning Award" from Sweden's famous venture capital fund INDEX. The team also received capital investment, although the amount is unknown.

### 2. Limitation, challenges, and recommendations

Paperfuge is a product with a strong application scenario, but without continued investment from scientists and medical workers, regulatory, social, and cultural barriers may make new technologies useless. Some professionals worry that people will not have the same confidence in paper gadgets as in expensive professional equipment. To promote Paperfuge and other simple scientific technologies, government promotion and trust is needed.



## Goal 3 –

# BrainCo: Popularizing home-use wearable brain-control smart devices

### Matrix:

Related SDG: 3



Essential Technologies:

Medical and  
Pharmaceutical Technology



Recommendation Index:

5 stars

Impact	4
Scalability	3
Sustainability	5
Technology	5
Innovation	5

## I. Introduction

BrainCo strives to apply brain machine interface and neurofeedback training to education and health. Its wearable devices collect and present real-time brain data and attention level index, which can be used to assist individuals with ADHD, autism, Alzheimer's, or prosthetics. By improving the design to allow for greater use, BrainCo is also fighting against the stigma of wearing brain-control devices in public.



## II. Description

### 1. Background

In 1920, brain-control technology began to emerge and has continued to grow through lab work. Brain-control technology is also often called brain-computer interface (BCI) technology, where users can engage a wearable device to interact with electronic devices. However, before 2013, BCI was cutting-edge technology in the medical field, bringing needed convenience to people with disabilities or autism, even if the technology and medical equipment was bulky and complicated to use. This latter point hindered the further commercialization of BCI technology and its adoption by the market.

### 2. Project team and project development

BrainCo. was founded in Boston and started at the Harvard University Innovation Lab. BrainCo chose to focus on attention-enhancing training

and attention monitoring. The first wearable device, Focus 1, measured people's concentration. When BrainCo made its advanced technology into a wearable form, it was used for measuring concentration, education, and the treatment of ADHD. BrainCo combines brain-monitoring technology and market demand to develop products, product development roadmaps, product testing programs, business and academic cooperation programs, hardware upgrades, software (educational and personal editions), product design, electrode materials, user experience feedback, filter producers, and more.

### 3. Characteristics/features

A. Dry wearable electrode: Electrodes are very important. "Wet electrodes" are generally used on the market, which require wetted hair to obtain brain data. What BrainCo did was use a wireless electrode to monitor through a person's hair. Compared with similar equipment, this has the advantage of being more accurate and objective. It also changes the way people wear the device, as there is no need to wet the hair; it is more convenient compared to the conventional wet electrode.

B. Unique algorithm: The conventional algorithm assumes that brain-monitoring relies on a one-dimensional signal, a process of generation and recognition. The products on the market today artificially divide such signals into four different waveforms and then calculate the energy ratio of the waves using four-bit variations. BrainCo products use the latest computing model in research, which result in better control and more information.

C. Social impact project: In addition to the version for autistic and Alzheimer's patients, BrainCo has also established a social impact project called Brain Robotics, which is dedicated to providing low-cost intelligent prosthetics for people with disabilities. Their prosthetics help the user control the movement of the robot arm and fingers through a brain signal. Each disabled person can learn to use the robot to complete most of their daily activities after a short period of training. The product greatly improves users' quality of life. The team reduced the price of smart prosthetics from the current market price of \$70,000 to \$3,000 to better serve people with disabilities around the world. Han Wei believes that good science should not only serve people in need, but should also be affordable and accessible for the general public.

## III. Impact

### 1. Achievement

Since its inception, BrainCo has won various awards, such as the MassChallenge Gold Award and first prize at the Harvard-China Forum Entrepreneurship Competition. These competitions brought honor to the brand and funding for development. At present, BrainCo's team receives investment from China Electronics, Everbright Holdings, and Tencent co-founder Zeng Liqing. It is developing the world's first Brain Bio marker processing chip, which uses a combination of artificial intelligence algorithms. The chip's successful development will lead to new developments in the brain-computer interface field and play a substantial role in the treatment and detection of various diseases, including Alzheimer's disease and autism.

### 2. Limitation, challenges, and recommendations

One limitation of brain-control technology is the way it is worn. Many people think that a person wearing a helmet of brain-monitoring receptors is mentally sick and needs treatment. But the research on brain-monitoring is far more than just epilepsy, and includes the measurement of human emotions, the regulation of attention, the development of brain potential, and a series of behavioral studies controlled by the brain. To continue increasing public awareness and improving brain control technology, future market consumers should begin to be more accepting toward human-computer interactions and brain-control intelligence products.

## Goal 4 –

# Bridge International Academy: Technology to Improve Education in Poverty-Stricken Areas

### Matrix:

Related SDG: 4, 10



#### Essential Technologies:

Information and  
Communication Technology  
(ICT)



Recommendation Index:  
4 stars

Impact	4
Scalability	4
Sustainability	5
Technology	5
Innovation	4

## I. Introduction

The uneven distribution of resources on a global scale has become one of, if not the most difficult issue in the education sector. In countries and regions where educational resources are scarce, it is difficult to ensure that students receive a high level of it. Bridge International Academy developed an innovative curriculum design, teacher training, and school management system using communications technology and equipment to bring world-class education to the poorest communities in Africa.



## II. Description

### 1. Background

In Kenya, the problem of the uneven distribution of educational resources is serious. First, high-quality educational resources are lacking and, to the extent that they are available, they are concentrated in the capital of Nairobi. The shortage of educational resources outside the capital, especially in poverty-stricken areas, is dire. Many children face a problem whereby there is "no school to learn." Second, the distribution of educational resources in public and private schools is uneven. The average absentee rate for teachers in public schools is as high as 47%. The average teaching time per instructor is only approximately two hours per day. 65% of the teachers have not received professional training and may not have even passed the exams they are giving their students themselves. Conversely, private schools with a slightly higher quality of teaching have high tuition fees, which are cost prohibitive for students and families in poor areas. Educational problems often lead to high dropout rates, which in turn have become the source of many social problems, such as slow social development, gender inequality, and poor public security.

### 2. Project team and project development

Bridge International Academy was founded by Shannon May and Jay Kimmelman from the United States in 2008 to improve the educational situation in Kenya. The Academy was designed to spread specialized



education to poor communities and provide students with low-tuition and high-quality education.

Bridge International Academy opened its first school in Nairobi in 2009, in the slums of the Kenyan capital, and has since expanded rapidly. As of 2016, the Academy served more than 100,000 students in 450 communities in Kenya, 57 communities in Uganda, and seven communities in Nigeria through the operation of kindergartens and elementary schools. On average, a new school is established every 2.5 days. The project was also successfully introduced to India and Libya (through more than 50 pilot schools). It is expected that by 2025, 10 million children in 12 countries will be provided quality education services.

### 3. Project characteristics

The Academy's first innovation was to ensure that each teacher was equipped with a tablet computer, each school leader was equipped with a mobile phone, and a unified online system was established to update and record teaching progress and student achievements in real time. The application of electronic equipment not only ensured the effectiveness and rapidity of program adoption, but also enabled teachers to provide effective participation interactions to increase their impact. More importantly, the data recorded by the online system became a reliable source of data for the subsequent evaluation of teaching quality, thus providing an important reference for improving the project's ability to attract investors and replicate in other regions.

Bridge International Academy's tuition is approximately USD 6 per month and 88% of households in Kenya have the ability to pay. Its low fees require that the Academy be effectively operated and controlled at very low costs. The ability to charge such a low cost is made possible by the innovative character of the Academy's business model. It has a number of notable qualities. The first is the separation of the design of the teaching content from the actual teaching of said content. This method not only provides more time for teachers to teach, it gives them more time to pay attention to the development of their students and thus establish closer ties with them. Moreover, the teaching content itself was evaluated by educational experts for relevance and impact and resulted in a reduction in the time cost per teacher in designing their lesson plans. Second, teacher training, tuition payment, and related matters are all handled through an online network, which substantially reduces labor costs. In summary, the project uses electronic devices to form a virtuous cycle of experts, teachers, students, teaching content, assessment, feedback, interaction, and management, and establishes a fast, effective, and low-cost education system.



## III. Impact

### 1. Achievement

In 2015, Bridge International Academy won the Education Project Award from the World Education Innovation Summit (WISE). It also received investment from Bill Gates and Mark Zuckerberg.

### 2. Limitations, challenges, and recommendations

The future direction of the project includes:

- Introduce other technologies such as an Intelligent Counseling System (ITS) to provide students with more personalized content and feedback and deepen use of scientific and technological means to reduce the cost of education.
- Actively communicate with government departments, design and develop teaching content that is in line with local conditions, and allow teachers to design more educational programs to achieve the purpose of teaching students in accordance with their aptitude.

## Goal 4 –

# Adream: Innovation Helps Education Development in Poor Western Areas

### Matrix:

Related SDG: 4, 10, 17



### Essential Technologies:

Information and Communication Technology (ICT)



### Recommendation Index:

4 stars

Impact	4
Scalability	4
Sustainability	3
Technology	4
Innovation	4

## I. Introduction

The problem of uneven educational resources is widespread, and it is no exception in fast-growing China. The Shanghai True Love Dream Foundation has made innovative attempts to balance educational resources through scientific and technological means. It brings advanced education concepts to schools and teachers and promotes the development of education in poverty-stricken areas in the West.



## II. Description

### 1. Background

Fair education and development opportunities are important aspects of positive societal development. In China, the uneven development of education in the eastern and western regions has become one of the main obstacles restricting fair development in society. The 2016 China Education Index released in 2017 revealed that there is still a substantial gap in innovation and creativity between the East and the West. This is related to the backwardness of particular educational practices, exam-oriented education, and inertia toward changing historical norms. The difference in the level of education between the East and West has not narrowed, but continued to widen. As a response to the fact that many schools in China, especially in the western region, lack quality education, the Shanghai True Love Dream Foundation decided to use advanced technology to improve literacy in the poor areas of the west. Their advanced educational concept has helped local teachers, students, and parents, and has taken an important step towards establishing a quality education system.

### 2. Project team and project development

The Shanghai True Love Dream Foundation was founded in 2007 to supplement conventional educational concepts and models and to release educational pressures in an era of rapid economic and technological





development. They also believe that the content and quality of education is more important than the hardware used to deliver it.

In 2015, the Shanghai True Love Dream Foundation and Suning Group jointly launched the Dream Caravan project, "Adream." The Dream Caravan is a mobile multimedia classroom for literacy education. It is approximately 17 meters long, four meters high, weighs 27 tons, and can form a classroom of nearly 60 square meters. In addition to desks, bookshelves, and projectors, it also includes advanced

teaching equipment such as tablet computers, multimedia video equipment, mobile cinemas, and mobile libraries. Advanced methods, such as 3D printing and VR technology have also been added to cultivate students' innovative capacity. It is guaranteed to provide experiential courses and innovative classroom interactions for local teachers and students. These modern, Internet-based and diverse learning experiences not only broaden the horizons of students in remote areas, but also introduce and popularize the importance of literacy education in local villages and societies.

### 3. Characteristics/features

The course was jointly developed by the Foundation, education experts, related companies, and frontline teachers. It has been adapted into a campus version and a parent-child class, which are both suitable for school and family use; such adaptations achieve the goal of providing quality education through a variety of different approaches.

At the same time, the Dream Caravan connects with the local education bureau, local schools, teachers, volunteers, non-profit organizations, corporate partners, and parents to form a dream team including team leaders, teachers, teacher volunteers, and corporate volunteers. The course provided to local education bureaus, schools, and teachers through participatory training and encourages them to carry out quality education courses, such that more parents and their local communities recognize the importance of literacy education.



## III. Impact

### 1. Achievement

Since its establishment in 2008, Shanghai True Love Dream Foundation has accumulated more than 327,000 donations and raised RMB 330 million. The core products of the Foundation include Dream Center, Dream Book House, and Dream Cubbyhole. The Dream Caravan project effectively addresses the difficulties of building a Dream Center and library in remote areas. It provides more convenience for effective literacy education and lets all parties participate in activities to support it. Such education has helped to establish an innovative educational ecosystem.

### 2. Limitations, challenges, and recommendations

It only spends 2-3 days in each place, making it difficult to establish a substantive literacy education system. The level of education can still be improved.

## Goal 5 –

# Technovation: An Innovative Community That Provides Women with Technology Education, Entrepreneurship Guidance, and Awards

### Matrix:

Related SDG: 5, 17



#### Essential Technologies:

Information and  
Communication Technology  
(ICT)



#### Recommendation Index:

5 stars

Impact	5
Scalability	5
Sustainability	5
Technology	4
Innovation	5

## I. Introduction

Technovation provides girls an opportunity to create a team to address a local problem. Including online courses which teach girls about entrepreneurship skills and local coaches that foster a community of Technovation teams, the organization gives girls the ability and support needed to create their own enterprises or develop their own apps. The model's online-based resources allows for easier organizational scaling.

## II. Description

### 1. Background

In today's economically globalized world, girls still do not have access to basic education. Combined with the fact that they have limited opportunities to learn about digital technology, these circumstances result in some girls lagging behind boys. From 2013 to 2016, the gender gap in terms of global access to the Internet only increased from 11% to 12%. To make matters worse, women living in extreme poverty are 31% less likely to be connected to the Internet than men. The number of women with mobile phones in developing countries is 200 million less than that of men. Given that mobile phones are the most common way for developing countries to access the Internet, it is distressing that the digital divide is expanding. If the gap continues to increase at the current rate, it is expected that more and more women will not be able to connect to the Internet or acquire digital skills.

### 2. Project team and project development

Technovation was started in 2010 and initiated by Iridescent, a NGO found by Tara Chklovski. It provides learning opportunities and skills to girls around the world, empowering them to become technology entrepreneurs and leaders. Every year, girls are invited to identify problems in their community and then address them through technology. Technovation has been in operation for eight years. It has worked with nearly 10,000 girls around the world to solve a variety of problems, including food waste, nutrition, and women's safety, by developing mobile apps and founding startups. Technovation has also grown into an influential brand and has received significant financial support.



### 3. Characteristics/features

A. Target participants: Teams are made up of several 10-18-year-old girls, who then identify a problem that exists in their community. In Technovation's online courses, they learn digital skills such as surveying, market research, and software development. With help from supporters, each team communicates with mentors, parents, and ambassadors to incubate their projects.

B. Reasonable course completion: Each Technovation course is finished in 12 weeks.

C. Diverse participation roles

1. Student: Students' tasks include registering the team, identify a problem in the community, creating and applying code to solve stated community problem with the support of the entrepreneur, mentor, and ambassador team.

2. Mentor: The mentor is a professional who directs the team and provides leadership support. Mentors can be teachers, parents, community leaders, or professionals and do not need to be technical staff (although technical expertise is preferred).

3. Ambassadors: Regional ambassadors are community leaders who help Technovation grow, specifically by developing strong community activities and effective management processes in new communities.

4. Parents: Parents are either the biological parents or guardians of the girls. They provide venues and resources, as well as encouragement, to support their daughters' teams.

## III. Impact

### 1. Achievement

Technovation has been operative in more than 100 countries for eight years and is supported by UNESCO and UN Women. During this period, 15,000 girls around the world developed mobile apps and created startups to solve a variety of problems — food waste, nutrition, women's safety, and more. At the 2016 White House Science Fair, President Barack Obama, Indian Prime Minister Modi, Nigeria's First Lady, and the UN Secretary-General of the International Telecommunication Union, met the girls of Technovation.

### 2. Limitations, challenges, and recommendations

A. Given that the institution's curriculum requires Internet and computer hardware, it makes access difficult for girls from poor families.

B. The promotional costs for Technovation's entrepreneurial projects are relatively high, thereby requiring technological and capital support from technology and venture capital companies.



## Goal 5 –

# Girls Coding Club: Providing Girls with Free Programming Learning Opportunities

### Matrix:

Related SDG: 5



Essential Technologies:

Information and  
Communication Technology  
(ICT)



Recommendation Index:  
5 stars

Impact	5
Scalability	5
Sustainability	4
Technology	3
Innovation	4

## I. Introduction

Despite the rise of the Internet and computer technology, girls across the world face difficulty getting access to computer literacy classes, such as computer coding. This is especially surprising considering that many of the individuals who pioneered software development were women. Girls Coding Club is a Chinese organization that provides girls with no coding background the opportunity to learn about coding and mobile app development, while also creating a community that can support them.

## II. Description

### 1. Background

Internet technology reduces the cost of accessing information, knowledge, education, and resources and gives women the opportunity to overcome the barriers of ineffective economic systems. It allows them to use digital technology to compensate for the lack of job opportunities. In Forbes' 2018 "The Richest People in Tech" list, the top 100 contained only six women. Although the number of Internet users in China in 2018 has reached 800 million, women are still in a weak position and their participation in technological and digital economic activities is far from adequate. Before the 1980s, women were considered to be suitable for computer programming; yet nearly 40 years later, their participation in engineering and technology has not only not improved, but has decreased.

### 2. Project team and project development

GCC is the abbreviation for Girls Coding Club, founded by Wen Yang in the United States.

In 2012, Wen Yang was a volunteer at a programmer's party in Zhongguancun, where he learned about Rails Girls (RG), an organization dedicated to providing women a community whereby they could learn technical skills and receive support. Wen Yang began to serve as RG's head of China. He worked with other volunteer instructors to compile teaching materials and organize free online programming activities. In three years, they helped thousands of female students.

On June 1, 2016, he relaunched a women's technology project named Girls Coding Club. He also launched Girls Coding Day (GCD), China's

largest female charity programming workshop. GCD is a one-and-a-half-day introductory web development course for women interested in learning programming. It is self-sustaining and not-for-profit and led by companies and programming tutors eager to promote gender equality. With the growth of GCD, there has been an increase in both participants and cities will to host the event. GCD now includes app development courses.

### 3. Characteristics/features

#### A. No Background, No Threshold

GCD is to help women with digital empowerment and encourage them to do “extraordinary things an ordinary way.” Participating in GCD does not require programming experience and there is no age limit. As long as one has a laptop and is interested, one can participate.



#### B. Practical Textbooks, Practical Skills

The GCD textbook was created based on Wen Yang’s three years of experience at RG. Even after thousands of student participants, the workshop remains relevant, practical, and needed. Its student output rate is high.

#### C. High Degree of Standardization

The GCD workshop operation structure is as follows:



#### D. Gender-Friendly Technology Company Support

GCD was originally supported by the well-known American company GitHub, in addition to funding support from NEO, Starck College, Nuggets, and more. Given its connection with companies like ThoughtWorks, GCD is helping to put workshop participants into direct contact with gender-friendly enterprises.

## III. Impact

### 1. Achievement

On the 11th of every month, records are taken from Wuhan, Beijing, Xi’an, Chengdu, Shanghai, Nanjing, Hangzhou, Shenzhen, and Guangzhou. Each city holds five programming workshops per year for women without programming backgrounds. To date, 50 workshops have been held nationwide, with over 2500 women and 500 volunteer coaches participating.

### 2. Limitations, challenges, and recommendations

The project does not have a stable source of funding and it is difficult to scale the existing model. Although it has strong community support and social capital, a good reputation, and recognition as the largest female programming workshop in China, the broadening of GCD’s influence across additional technology-focused enterprises is limited due to the lack of full-time staff and stable financial support.



## Goal 6 –

# Balde a Balde: A Portable Faucet That Provides Clean Drinking Water

### Matrix:

Related SDG: 6, 3



#### Essential Technologies:

Water and Hygiene  
Technology



Recommendation Index:  
5 stars

Impact	4
Scalability	5
Sustainability	5
Technology	5
Innovation	4

## I. Introduction

Geographical realities that prevent an equal distribution of water around the world are compounded by poor systems of water storage and water usage. In Peru, Kim Chow, a designer, noticed that a difficulty in storing and transporting water resulted in increased hygiene risks. She created a portable faucet called Balde a Balde that helps residents use water in a safer and healthier way.

## II. Description

### 1. Background

The average amount of annual precipitation in Peru is 1,691 millimeters. Although the amount of water resources per capita is large, the distribution of such resources is extremely uneven. There are fewer resources in the East than in the West, while nationally the discrepancy between the availability of water resources in comparison to the amount of water needed for economic development is alarming. While the region near the Pacific Rim is densely populated and economically developed, droughts and water shortages regularly hinder economic development and negatively affect people's lives. In response to the shortage of water in coastal areas, the Peruvian government adopted a plan to address the problem of water shortages in the capital city of Lima and other areas.

### 2. Project team and project development

Balde a Balde was started by Kim Chow, a female designer from the United States who graduated from the University of California at Berkeley's School of Art. During a trip to Peru, Kim Chow noticed that people were at risk of sharing water from dirty containers. She found that local people do not have suitable containers for water transportation. Additionally, because faucets are not ubiquitous, locals do not wash their hands as much, and thus expose themselves to various illnesses and diseases.

After experiencing this, Kim Chow, along with a classmate from the Art Center Design Institute, developed a low-cost portable faucet called Balde a Balde. The device pumps water through an adjustable nozzle to provide a clean water source for children, to encourage them to develop good hygiene habits and wash their hands frequently. While designing

Balde a Balde, the team developed the following process:

A. Demand survey criteria for portable faucets: The team found that a life without clean water is at risk of diseases caused by polluted or contaminated tap water. However, the solution had less to do with accessibility to medical treatment, and more so with a lack of productivity and education. Because of a lack of equipment, children either do not wash their hands at all or, if they do, they wash them in muddy basins. Additionally, during the process of transporting water, residents use a jug, which causes contamination and wastes water.

B. Use of portable faucets: The portable faucet was found to be very convenient. It was able to provide a better experience for the residents who used it. The number of children washing their hands increased. Fewer residents were required to transport water. Given the presence of more water than before, cleaning the dishes and related chores became easier.



### 3. Characteristics/features

Balde a Balde provides access to water and reduces water waste. The universal applicability of its clips allows for water to flow out of any container, which is important given that containers are used by 46% of the world's population. Balde a Balde has a variety of clip heights to choose from, depending on user needs. It uses a tight siphon pump to start the flow of water; the spout is then used to control the ingress and egress of water. The water can be adjusted by twisting the valve. It allows the user to control the exact position of the clip and control the amount of water being used. Balde a Balde maximizes health and makes it easy and quick to wash your hands.



## III. Impact

### 1. Achievement

2011 Spark International Design Gold Award; NCIIA Forum Special Presentation Award. LeBome has incorporated this product into its commercial production line. There is a market opportunity to produce low-cost filters, heating equipment, and shower accessories for the 780 million people who cannot get clean water on a regular basis.

### 2. Limitation, challenges, and recommendations

At the beginning of the project, problems such as clip dysfunction, one-handed operation, and sub-optimal water consumption controls were discovered. After the team's modification, the clips were reinforced, valve function was improved, and the access controls for water consumption were amended.

## Goal 6 –

# China Water Quality Map: Public Participation to Improve China's Water Environment

### Matrix:

Related SDG: 6



Essential Technologies:

Information and  
Communication Technology  
(ICT)



Recommendation Index:  
4.5 stars

Impact	4
Scalability	4
Sustainability	5
Technology	4
Innovation	5

## I. Introduction

The quality of China's water supply varies from place to place and residents often don't know what the quality of the water coming out of their faucets. To address this lack of knowledge, several organizations collaborated to create the "China Water Quality Map." Individuals can take pictures of polluted waterways and upload them to a centralized platform, allowing for public participation and improved monitoring of the local water and sanitation situation.

## II. Description

### 1. Background

China has vast territory and a large population. Drinking water quality varies widely among residents across the country. Because of these differences, new solutions for water purification are needed. Most of today's water purification equipment is unable to address the full range of concerns that together contribute to purified water deficits: machines only containing one water treatment technology, membrane components being inaccurately calculated, water treatment effects not displaying clearly, and no filter cartridge replacement notifications. In response to this problem, Bolebao collaborated with the China Water Security Public Welfare Fund and the China-Europe Environmental Protection Alumni Association to launch the "China Water Quality Map" project.

### 2. Project team and project development

Bolebao Technology Co., Ltd. is a wholly-owned subsidiary of Botian Environment Group. The company uses a "product + service + solution + data platform" business model. It was joined by the China Water Security Public Welfare Fund ("Water Security Fund"), a cross-border initiative with environmental, legal, media, and non-profit organizations.

The project conducts free water sample testing for residential areas in many cities across the country. The purpose of launching the project was to involve more social forces in the construction of the "China Water Quality Map", further enrich the map's data, encourage the public to check local water quality data in real time, and help the public understand the status of drinking water in their area.





### 3. Characteristics/features

#### A. Cleanup process display

The project encouraged people to take pictures of water pollution when they encountered it. Through this software, if a polluted river is found, a small flag is placed on the river's corresponding position on the map. A red flag on the map represents the reported area, a blue flag represents pollution verification, a green flag represents cleanup is underway, and a purple flag represents that the problem has been resolved. The data is continuously being updated.

#### B. Public Participation, Right to Information

The "China Water Quality Map" project reflects not only the cleanliness of the water, but also the public's involvement in the management of water sources and their concern for water quality. Clean drinking water is not just a matter of tapping into nature's abundance or relying on government assistance. Individuals, business organizations, and public welfare organizations should also work together.

## III. Impact

### 1. Achievement

With the active help of the Water Security Foundation and the China-Europe Environmental Protection Alumni Association, water quality for most parts of the China's interior is presented on the map. For the first time, China has a "China Water Quality Map" that educates people about local water quality conditions and raises their awareness about the importance of healthy drinking water. In addition, the public can work together to protect water resources. Bolebao Technology Co., Ltd. won the 2014 "Best Responsible Brand Award" for its "China Water Quality Map" project.

### 2. Limitation, challenges, and recommendations

Governments, enterprises, and public welfare organizations must work together to encourage the public to participate in solving water safety issues. Promoting good political governance is the next step for the project.

## Goal 7 –

# The Silk Leaf: Oxygen-Producing Artificial Leaves

### Matrix:

Related SDG: 7



Essential Technologies:

Energy Technology



Recommendation Index:

4 stars

Impact 4

Scalability 4

Sustainability 4

Technology 4

Innovation 4

## I. Introduction

Both outer space travel and outdoor pollution require improved air quality and a source of oxygen. The Silk Leaf can address both of these problems. Created from silk proteins and plant chloroplasts, the biomimetic design recreates leaves that can then be fixtures of walls or space colonies. It has the potential to replace the current energy-heavy electrolysis.

## II. Description

### 1. Background

During space travel, one of the biggest challenges is oxygen supply. Currently, spacecraft use hydrolysis to break down water into hydrogen and oxygen, a much more expensive and complex technique compared with how plants do it through photosynthesis. Although space travel seems to be increasingly feasible, plants cannot survive in a zero-gravity environment. However, what if we could design a synthetic plant that performed the same function? Biomimetic technology is bringing unprecedented possibilities to humans.

### 2. Project team and project development

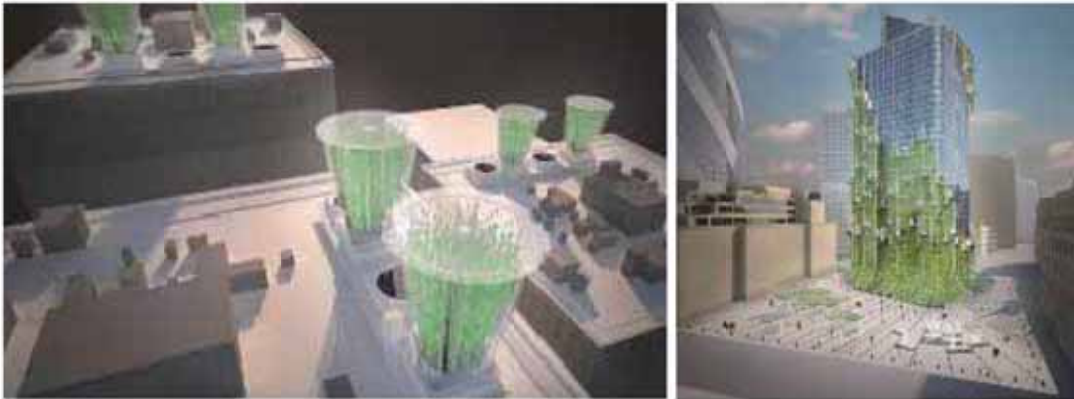
A graduate of the Royal College of Art, Julian Melchiorri developed "The Silk Leaf" to facilitate space travel and oxygen production. The Tufts University Laboratory team is also involved in the project. The Silk Leaf requires very little energy to work. It is fit to both extend the length of space travel and improve the air quality in cities. If the silk leaves are attached to a wall, it can serve as a ventilation system that absorbs outside air and then releases clean, oxygenated air.





### 3. Characteristics/features

Melchiorri's Silk Leaf extracts chloroplasts from real plant cells and then suspends them on silk fibers. The biological materials include protein and chloroplasts made from silk and another embedded technology which incorporates water into the chloroplast. The Silk Leaf absorbs carbon dioxide using a technique based on photosynthesis, thus producing oxygen.



## III. Impact

### 1. Achievement

The Silk Leaf was nominated for the INDEX: Design to Improve Life award in 2015. INDEX is a non-profit organization established in Denmark in 2002; its funds are directly sponsored by the Danish Crown Prince.

### 2. Limitations, challenges, and recommendations

Attaching chloroplasts to silk proteins is an innovative idea and can facilitate the equivalent of photosynthesis. However, it may not be a long-term solution. Once chlorophyll is extracted from its environment, it begins to break down. Additional scientific research and tests are needed to determine whether the Silk Leaf is a viable technology for long-term usage.

## Goal 7 –

# Baofeng Group's "PV + Goji Berries"

### Matrix:

Related SDG: 7, 1



Essential Technologies:

Energy Technology



Recommendation Index:

5 stars

Impact 5

Scalability 3

Sustainability 5

Technology 5

Innovation 5

## I. Introduction

A recent development in renewable energy projects is the "photovoltaic +" model which combines renewable energy production with other productive activities. Baofeng Group, based in Ningxia, is creating a project in the Ningxia Autonomous Region targeting poverty; it combines PV-energy production with goji berry plantations. The inclusion of PV allows for more renewable energy and a dependable revenue source while local residents will grow and process the berries. The joint project can thus bring alternative energy, ecological governance, and employment to the region.

## II. Description

### 1. Background

The Ningxia Hui Autonomous Region is one of the regions with the most abundant solar energy resources and energy potential in China. The National Energy Administration and the State Council Office of Poverty Alleviation issued the "Notice on Organizing the Pilot Work on Photovoltaic Poverty Alleviation" (2014) and selected five provinces (districts) in Ningxia for implementation. In poverty-stricken districts, pilot work on photovoltaic poverty alleviation was carried out to help poor households build low-voltage photovoltaic grids. Based on over one year of PV poverty alleviation experience, Ningxia has begun to explore new models of poverty alleviation in the pilot counties and districts, to improve the lives of poor village residents.

### 2. Project team and project development

Baofeng Group is a private enterprise focused on the energy industry in Ningxia Autonomous Region. It plans to invest RMB 30 billion in the suburbs of Yinchuan City to build a poverty alleviation project integrating goji berries, PV, and tourism.

Baofeng Group will build a 2-gigawatt centralized photovoltaic poverty alleviation project. The core components of the power station will adopt MPPT technology, allowing for an increased power generation rate of 18-20% compared with existing centralized photovoltaic systems.

Baofeng Group also plans to invest RMB 2 billion in planting goji berries on the 100,000 mu of leased photovoltaic poverty alleviation land. Early on, the company will level the land and raise seedlings; then the group will guide farmers in carrying out management and cultivation work; finally, the

company will work with farmers to process and sell the berries. Baofeng Group also plans to construct sightseeing platforms, five-star sightseeing cabins, farmhouses, happy farms, vegetable greenhouses, and other infrastructure in the photovoltaic zone, thus combining agro-ecological tourism with new energy industrial tourism in promotion of a diversified utilization of resources.



### 3. Characteristics/features

A. Diversified resource integration: Adopting the “agriculture-photovoltaic-complementary” model to create “photovoltaic power generation, goji berry planting, and holistic tourism.”

B. “Company + Farmers” model: Farmers only provide labor for field management and harvesting. Costs associated with land leveling, planting, technical guidance, processing, sales, and other fixed and operating costs will be paid for by Baofeng Group. Enterprises can use PV to help the poor compensate for the production costs in view of achieving sustainable industrial development.

C. Job creation: Baofeng Group is to provide approximately 93,000 jobs in irrigation, fertilization, pest control, pruning, processing, and packaging.

D. Ecological governance: The desertification of the Yinchuan area in Ningxia is quite serious. The use of photovoltaics will encourage ecological management and reduce the rate of desertification.

## III. Impact

### 1. Achievement

Ningxia’s power station not only ensures that local residents have clean, affordable energy, but also that such energy can be exported to other areas to solve the problem of resource imbalance. The first phase of the project has been completed and Baofeng Group guarantees that poverty-stricken households with no labor capacity will gain an income boost of RMB 3,000 per person per year. The second phase of the project uses a “company + farmer” cooperative business model. Baofeng Group is contracted to address the labor capacity problem of eight poor counties and districts. The project has a large investment and will employ 18,000 people in 17,000 poor households. 100,000 mu of high-quality goji berry bushes are being grown from the support of the PV, thus turning what once was dry desert into productive land.

### 2. Limitations, challenges, and recommendations

The land promised by the local government in support of enterprise investment does not include the PV generation project. Dealing with the corresponding economic and tax requirements is a necessary prerequisite that Baofeng Group must address to effectively implement their PV poverty alleviation program. The company has also promised to provide subsidies of RMB 3,000 for certain households and the government must regulate and follow up on this process. For poverty-stricken farmers originally from areas far away from the industrial park, the project will help to find appropriate housing.



## Goal 8 –

# Bhutan: Game-Changing Approach to Fight Youth Unemployment

### Matrix:

Related SDG: 8, 10



#### Essential Technologies:

Information and  
Communication Technology  
(ICT)



Recommendation Index:  
4 stars

Impact	4
Scalability	4
Sustainability	4
Technology	4
Innovation	4

## I. Introduction

In Bhutan, young persons are the largest unemployed demographic, which has greatly hindered their development and social participation. Therefore, the Ministry of Labour of Bhutan, in collaboration with UNDP and Emerson College (US), developed an online game named Youth@Work to support youth employment using an innovative approach.

## II. Description

### 1. Background

In Bhutan, young persons are the largest unemployed demographic. Nationally, 7.3% were unemployed in 2012 and in urban areas it was nearly double that figure. With almost half (48.9%) of the population under the age of 25, the Royal Government of Bhutan, as well as parents, educators, the private sector, civil society, and particularly the young persons themselves, are looking for new and creative approaches to engage each other in constructive dialogue about youth unemployment.

### 2. Project team and project development

Community PlanIt, a game that makes planning playful and gives everyone the power to shape the future of their digital communities, has been used in a number of planning contexts in the United States and around the world. This was the first instance of its implementation in an Asian developing country.

To better understand market needs, consultants from the Engagement Lab at Emerson College, where the Community PlanIt platform was developed in 2012, visited Bhutan and met with UNDP, officials of the Ministry of Labour and Human Resources, the Institute for Management Studies, and other local agencies to create and promote the Youth@Work game. As an important step in developing the game, a 2-day design workshop was held in Paro, Bhutan with local youth leaders, school principals, government officials, and other key stakeholders.





The workshop focused on game creation and the testing of non-digital games purposed to open up meaningful public conversation about the issue of youth employment. The participants also provided insights and information about the issues facing Bhutanese youth that were later incorporated into the content of the online game.



### 3. Characteristics/features

Youth@Work Bhutan was officially launched in October 2014. Anyone can play the game online or through SMS, which consists of three “missions,” each open for one week with its own unique theme (e.g. information sources, educational opportunities, etc.).

Game participants answer questions and complete exercises designed to build empathy between different members of society, raise awareness of youth employment issues, and instill a sense of personal responsibility. Throughout the weeklong game, participants gain the opportunity to express their opinions about what is missing from the system and deliberate over the best solutions to the problem of youth unemployment in Bhutan today.

Within the game, participants can also promote ideas for new projects. The most popular proposals, supported by a majority of players, are recognized by the organizers and awarded funding at the conclusion of the game. UNDP and the Ministry of Labour incorporate the inputs and ideas gained into long-term strategic plans for Bhutan.

## III. Impact

### 1. Achievement

- 1,904 people played the game using the unemployment theme.
- Over 70 proposals to address unemployment were suggested through the game, increasing conversations about youth unemployment and encouraging the participation of society in addressing it.
- The inputs from the game have been used to shape the policy recommendations suggested by UNDP to the Government of Bhutan.

## Goal 8 –

# Tele-Employment for People with Disabilities

### Matrix:

Related SDG: 1, 8, 10



### Essential Technologies:

Information and Communication Technology (ICT)



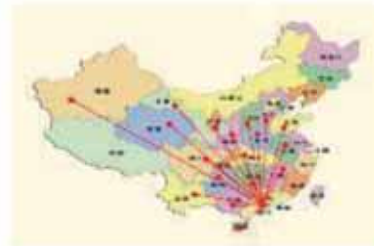
### Recommendation Index:

3.5 stars

Impact	4
Scalability	4
Sustainability	4
Technology	3
Innovation	3

## I. Introduction

People with disabilities face many social barriers in obtaining employment and thus struggle to achieve financial independence. This problem is especially prevalent in a country as large as China with an estimated population with a disability exceeding 80 million. Canyou Group provides online skill training and job pairing for individuals with disabilities to work from their home through a cloud platform.



## II. Description

### 1. Background

According to data from 2016, over 80 million people in China live with a disability, accounting for 6% of the national population. Being vulnerable, they encounter widespread employment difficulties. Although the government has provided support and protection to encourage the employment of disabled people, their employment situation is still not optimistic because of scarce education opportunities, employer discrimination, and other types of social barriers. Overall, the unemployment rate for people with a disability in China is quite high and for those with a job, working conditions are quite poor. Moreover, most people with a disability in rural areas are living in poverty or extreme poverty, relying on grants from the government.

### 2. Project team and project development

Zheng Weining Charitable Foundation delegated responsibility to Canyou Group, which has one charitable foundation, eight NPOs, and 32 high-tech social enterprises, providing thousands of disabled people with stable employment.

In early 2015, Alibaba Group and Zheng Weining Charitable Foundation signed a cooperation agreement for a project called "Taobao Cloud Customer Service by People with a Disability". The project provides online consultation, product sales, after-sales service, and other public

service positions for people with a disability on the Taobao platform. The Foundation is responsible for screening suitable candidates throughout the country and conducting skills training. Candidates obtain employment opportunities insofar as they pass the “cloud customer service” job evaluation. In November 2015, the project received a charitable donation from JP Morgan Chase, signaling their interest in working together to help tap the potential of the disabled demographic by helping them find employment and improve their living standards.



### 3. Characteristics/features

The project is designed for disabled people who can only undertake home-based work. Located on the Internet, it provides remote, high-quality positions in customer service, distribution, external media operations, and personalized handicraft customization in the e-commerce industry chain. By utilizing the “Internet+” platform, the project will create a new employment channel for disabled people in this era of e-commerce and become an effective way for such people to participate in social activity and economic development and improve their life quality. In these cases, the goal of home-based employment for people with a disability can be achieved. Furthermore, this project will help fill the skills gap in the current fast-growing e-commerce sector and help promote economic development.

JP Morgan Chase is an important investor in this project, which demonstrates how international charitable organizations can work with domestic organizations toward common social ends.

## III. Impact

### 1. Achievement

As of December 2016, the project has been launched in more than 20 provinces and autonomous regions, including in nearly 100 cities. It established a centralized employment base for people with a disability and conducted more than 300 training sessions. About 10,000 people attended the training sessions and more than 5,500 passed the Taobao cloud customer service assessment and received employment. Their monthly salaries ranged from RMB 1,000 to 5,000.

### 2. Limitations, challenges, and recommendations

China is party to the UN Convention on the Rights of Persons with Disabilities. The Convention emphasizes: “People with disabilities have the right to work on an equal basis with others, including opportunities that are open, inclusive and do not pose obstacles to the workforce or the working environment; they also have the right to choose or accept work freely to earn a living.” The job opportunities offered by this project are mainly based on home employment and centralized employment. The proposed project can also make full use of existing platforms and resources to enter mainstream enterprises. Persons with disabilities who are employed in the workplace must be provided opportunities and training, can effectively promote the equal participation of disabled people in society.



## Goal 9 –

# Build resilient infrastructure – LC3 and New Construction Technology

### Matrix:

Related SDG: 9, 1, 11, 13



Essential Technologies:  
Construction Technology



Recommendation Index:

4 stars

Impact	4
Scalability	4
Sustainability	4
Technology	5
Innovation	5

## I. Introduction

Located in Switzerland, LC3 was initiated by Ecole Polytechnique Federale de Lausanne (EPFL) and supported by the Swiss Agency for Development and Cooperation. LC3 is a new type of cement that uses a blend of limestone and calcined clay.



LC3 can reduce CO2 emissions by up to 30%, is made using limestone and low-grade clays which are available in abundant quantities, is cost effective, and does not require capital intensive modifications at existing cement plants.

## II. Description



### 1. Background

According to UN Habitat's "World Cities Report 2016", as many as 600 million urban households will lack decent housing between 2010 and 2030. One billion new homes will be needed worldwide by 2025, at an estimated cost of USD 650 billion per year, or some USD 9-11 trillion in total. Despite the high demand for housing, which is good for jobs and growth, the construction industry has struggled with sustainability. Around half of all non-renewable resources are used in construction (such as the use of metals), making it one of the least sustainable industries in the world. Additionally, construction activity contributes to the loss of soil and agricultural land, as well as air pollution through the emission of dust, fiber, and toxic gases from site activities and building materials.



production processes. It also contributes to global ozone depletion (upwards of 50%) by the use and release of chlorofluorocarbons in buildings and by the emission of carbon dioxide and other greenhouse gasses. Thus, the construction industry contributes significantly to each of these areas of environmental stress.

## 2. Project team and project development

LC3 was initiated by Ecole Polytechnique Federale de Lausanne (EPFL). The objective of the LC3 project is, through research and testing, to make LC3 a standard and mainstream its use in the global cement market. The core research activities focus not only on specific thematic areas of cement research, such as hydrate assemblages, pore structure, rheology, reactivity, durability, and mechanical properties, but also on LC3's production, environmental sustainability, and cost effectiveness.

With funding from the Swiss Agency for Development and Cooperation through its Global Programme in Climate Change, the LC3 project will fund PhD- and Master-level projects in Switzerland, Cuba and India during the next 3 years.

## 3. Characteristics/features

Cement is the key ingredient for making concrete, which is the primary material for constructing buildings and other infrastructure and is the second-most consumed item after water. However, one out of every 20 tons of human-made CO<sub>2</sub> that enters the atmosphere comes from the kilns of cement factories. Reducing the amount of clinker used in making cement, will reduce the amount of CO<sub>2</sub> in the atmosphere.

In LC3 cement, the amount of clinker needed has been reduced by 50%. LC3 cement is thus attractive due to the following features and benefits: First, it can reduce the CO<sub>2</sub> emissions associated with cement production by about 30%; second, it is made using limestone and low-grade clays that are in abundant supply and are readily available; third, it is cost effective and does not require capital intensive modifications to existing cement plants. LC3 can be produced with existing manufacturing equipment, thereby only requiring a marginal additional investment for calcining equipment.



# III. Impact

## 1. Achievement


There are currently pilot implementation projects in India and Cuba, which are showing highly promising results and are being used to build houses. In India, tests of the blends at production scale were consistent with the laboratory results. In Cuba, an industrial trial of 130 tons proved that LC3 could be produced even in challenging technical conditions.

## Goal 9 –

# Industry, Innovation and Infrastructure – Chinese Experience in "Blockchain + Charity"

**Matrix:**

**Related SDG: 9, 1, 3, 10**



**Essential Technologies:**

Information and Communication Technology (ICT)

**Recommendation Index:**

**4 stars**

Impact	4
Scalability	4
Sustainability	4
Technology	5
Innovation	5

## I. Introduction

As the most popular Internet database technology, blockchain, with its decentralized and open and transparent features, promotes innovation in charity and related industries, illness insurance, and poverty reduction. It also is being applied to combat information asymmetry to improve the efficiency and synchronization of philanthropic activities.



## II. Description

### 1. Background

Blockchain is a digital, decentralized method of recording transactions so that all parties are aware of any modifications. Because of this openness, blockchain technology is heralded for its advancement of transparency and accountability. In 2016, more than ten organizations, including Qingsongchou, started to use blockchain technology in project applications, fundraising, donation activity, and funding. During this time, China's "Blockchain + Charity" was developed and launched. In July 2017, Qingsongchou launched the first self-developed blockchain product in China – the Sunshine Charity Alliance Chain – in the emerging financial technology field. The Sunshine Charity Alliance Chain is being used to build an open infrastructure for financial-related activities. The blockchain is decentralized, anonymous, open, and practically non-tamperable, such that every fund will be "traceable."

### 2. Project team and project development

The project was initiated by the HMS team, who brought together professionals in the areas of mutual insurance and blockchain with multi-industry backgrounds in healthcare, finance, and blockchain. Early investment came from INBlockchain, IDG Capital, and German Capital. The size of the team is around 20 people.

In order to solve the problem of trust in the practice of charity, on 24 July 2017, Qingsongchou began cooperating with six major foundations, including the China Red Cross Foundation. Together they released the “Sunshine Charity Alliance Chain,” a product that uses blockchain technology to achieve what is called “sunshine rescue.” After six months of development, more than 50 charity foundations had joined the cooperation, with over USD 100 million of donations received.



### 3. Characteristics/features

- **First-mover advantage:** Through the application of blockchain technology in the practice of charity, various entities can fully share charity information. Regarding resources, the pioneering of blockchain technology, the number and stickiness of the users, and the subdivision of user products and services, will together establish a distinct advantage for Qingsongchou.
- **Blockchain technology:** Qingsongchou ensures security through algorithms and certification systems. Also, through the company's self-developed system, transactions will be stable and efficient.

## III. Impact

### 1. Achievement

Heretofore, charity projects that use online fundraising platforms could not track funds after they entered a foundation's account. The real-time updates of blockchain technology help the participating public better understand how charity projects are carried out, so as to improve trust and increase transparency.

### 2. Limitations, challenges and recommended solutions

- **Diversity of public services and the standardization of charity projects:** In addition to one-to-one funding, charitable organizations also serve benefactors in the form of hardware (materials) and software (services). The format, mode, and visibility of relevant information on the blockchain platform needs to be somewhat unique, thus making standardization difficult. The use of standardized data for technical processing in charity projects is an essential step toward further optimizing blockchain technology in the charity industry.
- **Adjust the implementation process for charity projects:** The financial system's accounting methods, which were developed using the banking system's collection and payment processes, need to be converted under the new platform and technology. Monitoring and evaluation goals also require new methods based on the present technological environment - for example, real-time feedback to donors using the platform could replace mid-term or annual reports.
- **Blockchain is not a master key:** The transparency of funds is not the only important feature of successful charity projects. "Humanization" is also essential to charity work and should not be completely replaced by technology.



## Goal 10 –

# ConVerTic: Helping People with Visual Impairment

### Matrix:

Related SDG: 10, 4, 8



#### Essential Technologies:

Information and Communication Technology (ICT)



### Recommendation Index:

3.5 stars

Impact	3
Scalability	3
Sustainability	4
Technology	3
Innovation	4

## I. Introduction

As the Internet becomes increasingly important for everyday activities, this becomes a challenge for people that are visually impaired. If they are unable to take advantage of the educational and employment opportunities on the Internet, they are left with a severe disadvantage. However, ConVerTic, a project by the Colombian government, uses software to aid users with reading or magnifying material online.



## II. Description

### 1. Background

There are more than 1.2 million visually impaired people in Colombia. Visually impaired people often encounter obstacles in the process of accessing information and obtaining employment or educational opportunities, resulting in unequal social development. Launched by the Colombian government, the ConVerTic project aims to use information and communication technologies to help visually impaired people gain access to information, knowledge, education, employment opportunities, and entertainment. The project combines Jaws, the best reading software available on the market, and Magic Image, a magnifying software, and offers its product as a free download to visually impaired users. Robotic speech-reading software can read content at the user's desired speed by interpreting code and text. People with disabilities can then use computers, office software, video players, and the Internet independently.



## 2. Project team and project development

The Ministry of Information and Communication Technologies of Colombia established a partnership with the National Association of the Blind (INCI) to develop a digital literacy strategy. The ConVerTic project is designed to help visually impaired groups gain access to information on their own and to create equal opportunities for development within the country.

Part of ConVerTic's project strategy is to increase access to education for the visually impaired. Screen reading and magnification software have been downloaded and installed in many elementary and middle schools, as well as in higher education institutions and libraries throughout Colombia. Of the more than 100,000 ConVerTic project downloads to date, 18,601 were from higher education institutions and 9,506 were from public libraries.

## 3. Characteristics/features

- **Wide audience:** The ConVerTic program allows all Colombian citizens to apply and benefit from ICT technology, regardless of their social or sensory status. By leveraging the Internet and other digital applications, the visually impaired are provided the same tools as everyone else to learn, innovate, and entertain themselves on the web. ConVerTic also assists them in obtaining decent jobs and founding and growing their own businesses.
- **Multi-partnership:** Collaboratively speaking, the ConVerTic project works with companies, libraries, schools, technology centers, and other service providers and software programs to award ConVerTic certificates and badges to organizations that download its software. This has not only increased the amount of software downloads and usage activity, but also effectively promoted the project to the public. This has resulted in much needed help for the visually impaired to learn, gain employment, socially integrate, and become a part of the development of equality in Colombian society.

# III. Impact

## 1. Achievement

The original expected annual download volume of ConVerTic was 32,000. However, more than 100,000 downloads have been made after only half a year of operations. The probability of visually impaired people using computers and mobile phones to access the Internet has more than tripled. This reaffirms the obstacles visually impaired people can face and the reinforces the need for the ConVerTic project.

## 2. Limitations, challenges, and recommendations

At present, the download volume is far from enough to address digital literacy. To ensure the ongoing efficiency and practicality of the software, it is necessary to improve the following aspects:

- Conduct trainings based on the type of user to ensure proper use of the software according to each user's own situation.
- Establish a volunteer system to help visually impaired people with first-time software downloads and the engagement of one-to-one services. Such a system can also work to encourage visually impaired people who have successfully used the software to become volunteers and help others in similar situations to themselves. This is conducive to helping the visually impaired build ability and confidence.
- The second phase of the project should establish partnerships with more public institutions to help the visually impaired live a better life and integrate into society.
- Develop complementary software for different types of visually impaired people to help them integrate into society.

## Goal 10 –

# ING Care: For the Happiness of Children with Autism

### Matrix:

Related SDG: 10



### Essential Technologies:

Information and Communication Technology (ICT)



Recommendation Index:

4.5 stars

Impact 4

Scalability 4

Sustainability 5

Technology 5

Innovation 4

## I. Introduction

ING Care is committed to using the Internet to provide rehabilitation education services for three million children with autism in China, while also establishing a standardized and systematic rehabilitation training system. On ING Care's platform, autistic teachers can improve their professional level through online video courses. According to the different needs of each child, and based on data profiles, the platform automatically generates personalized training courses to address the problems thousands of people with autism face.



## II. Description

### 1. Background

Autism has three main characteristics: language barriers, social disorder, and stereotypes. Autism is congenital and life-long. Its cause remains unknown and there is no cure. The proportion of people with autism is approximately 1:100. Currently, the number of children with autism in China exceeds two million and is growing at an annual rate of about 200,000. The golden intervention period for autism is 2-6 years of age, during which a given autistic child's challenges can be addressed through scientific rehabilitation training. However, studies have found that 83% of special education teachers have only a high-school diploma or lower and a mere 8% have studied special education. After only two weeks of training, interested parties are allowed to work as special education teachers. Given this, the most pressing issue is that the level of autism rehabilitation education in China is in urgent need of reform.

### 2. Project team and project development

ING Care has a socially innovative team established by Tsinghua University. Their aim is to provide better rehabilitation education resources and services for children with autism in China. They integrated

technology into humanistic care and created the project “ING Care Autism Internet Rehabilitation,” which uses the Internet and big data to create opportunities for autistic children through the participation of teachers and families.

In the project’s early stages, ING Care applied pre-existing methods to rehabilitation training for children with autism as a response to their unmet needs, such as interactive products used amongst multiple parties. However, the scale of such methods requires significant financial support, which means both the cost and the price is high, while the user base is small. Consequently, the number of children who can receive help is limited, an outcome contrary to the team’s goal. After a period of time researching solutions, the ING Care team decided to build an Internet-based service platform for autism rehabilitation, bringing together institutions, teachers, and parents.



### 3. Characteristics/features

ING Care has achieved five innovations over a period of three years:

- **ING Care Cloud Classes:** More than 11,000 special education teachers have been trained so far, of whom more than 8,700 have obtained certificates. The cloud classrooms are divided into free and paid online courses. The courses are further segmented according to the target user, either parents or teachers.
- **VB-MAPP Assessment:** ING Care introduced the internationally renowned Child Development Scale VB-MAPP and developed its “VB-MAPP Assessment Assistant” using it. This helps teachers develop objective and efficient language proficiency assessments with individual education plan (IEP) recommendations to guide rehabilitation training.
- **Certifications for training:** ING Care established rehabilitation institutes and teacher databases in partnership with specialized hospitals and institutes to facilitate the development of certification standards for rehabilitation institutes.
- **Rehabilitation App:** Based on the VB-MAPP Assessment, the App provides a number of services for parents and special education teachers. Such services include cloud courses, lists of qualified educational institutes, book recommendations, and experience sharing regarding offline activities.
- **Industrial platform:** There is a lack of industry collaboration. ING Care wants to unite colleges, institutions, and domestic and international experts to build a Chinese autism rehabilitation education concept.

## III. Impact

### 1. Achievement

In 2015, ING Care was awarded the “Social Innovation Star” by the British Council, the “Tsinghua University President’s Cup” Silver Award, and the Social Innovation Award. In 2016, UNICEF and Tsinghua University signed The University – UNICEF Memorandum of Understanding on Cooperation, which identified ING Care’s “Internet+Autism” as a joint project and innovative enterprise. In August 2017, ING Care received pre-A financing of over RMB 10 million, which was the single largest in China’s autism field to date.

By the end of 2017, ING Care has trained some 8,700 frontline rehabilitation teachers by combining websites, apps and offline activities. They saved training costs of approximately RMB 15 million. ING Care also provided teachers and parents with online courses - at a value of RMB 6.25 million - for free, which directly helped 4,737 parents. The company donated RMB 80,000 and educational materials worth RMB 180,000 to the field of autism directly. Cloud Classroom visits totaled 4.92 million and teachers answered 2,920 questions for parents. The Q&A content was visited 830,000 times.



## Goal 11 –

# Bangladesh: Alleviating Traffic Congestion

### Matrix:

Related SDG: 11, 17



#### Essential Technologies:

Information and Communication Technology (ICT)



Recommendation Index:

4 stars

Impact	4
Scalability	5
Sustainability	5
Technology	4
Innovation	4

## I. Introduction

Many of the largest cities around the world are notorious for traffic. This is especially true for cities in developing countries that have experienced rapid urbanization and migration. Traffic not only hampers the efficiency of cities and their economic development but also has a real impact on the city's residents. In Bangladesh, UNDP and GO-BD collaborated to create an app that gives users updates about public transportation and traffic, thus improving the reliability and efficiency of the bus system.



## II. Description

### 1. Background

Traffic congestion is a problem that follows urbanization and the expansion of cities, especially for developing countries with large populations and relatively weak infrastructure. Dhaka, the capital of Bangladesh, is no exception. As the economic, political and cultural center of Bangladesh, the total population of Dhaka has grown from three million in 1971 to 18 million in 2016. Approximately 400,000 relocate to the city each year. Dhaka's urban density has already surpassed Mumbai, Tokyo, and Shanghai. In the 2016 Global Livable City Survey, Dhaka ranked 137 out of 140 cities.

Although millions of people commute every day, the city has only 60 traffic lights and a mere 7% of people drive private cars. The average traffic speed is only 6.4 kilometers per hour. Traffic jams have affected people's moods, work efficiency, and safety, resulting in a loss of USD 3-12 billion in GDP per year. Coupled with environmental pollution and various inefficiencies, the loss for the city is even greater. It is thus imperative to solve the traffic congestion crisis in Dhaka.



## 2. Project team and project development

UNDP, in collaboration with the Bangladesh Road and Transport Corporation (BRTC) and a local technology startup, GO-BD, launched the pilot project in Dhaka. In December 2015, the beta version of the application was released.

GO-BD is currently establishing strategic partnerships with companies and institutions, including telecommunications companies, NGOs, and government agencies, to expand the application's user base and improve its data collection mechanisms. The near-term goals of the project are to expand to other cities in Bangladesh, reach one million users within the next 18 months, and incorporate other types of services to combat transportation inefficiencies.

In light of the large number of commuters in Dhaka, high traffic volumes, and weak infrastructure, it is obvious that adopting conventional traffic control methods is not sufficient. Experts started by analyzing traffic flow patterns and through behavior analysis proved that it was the unreliability of the public transportation system that drove Dhaka's citizens to choose private transportation options. That has resulted in an even greater increase in traffic volume, making the work of this project ever more important.

## 3. Characteristics/features

The project is improving the reliability and accuracy of the bus system and aims to alleviate traffic congestion by reducing traffic volume. GPS tracking devices were installed in buses. Then a mobile application called GoTraffic was developed to provide commuters with reliable real-time traffic data about bus location and waiting times. Commuters can use this information to better arrange their own travel plans and bus companies can use it to better develop bus schedules.

Given recent economic and social developments, Bangladesh's mobile phone penetration rate has increased, allowing for project participants' information to be integrated into a traffic information platform. For example, bus companies and commuters can share information to provide estimates on crowd intensity. This big data-based approach has the potential to turn traffic information platforms into information sharing platforms for those using the application. This community is capable of optimizing data sources, improving data diversity, increasing user stickiness, and enhancing satisfaction.

# III. Impact

## 1. Achievement

Within three months, the app was downloaded 500,000 times and used more than 200,000 times. Currently, the program maintains more than 6,000 active users per bus line per month, with an average daily usage of more than 3,700. The application's website allows citizens to check the status of public transportation in real-time; it has a daily usage frequency of more than 500. The user retention rate is approximately 60%. The project has encouraged more than 20% of private car users to take public transport, effectively reducing traffic congestion in downtown Dhaka. Experts predict that in the future, with increases in urban infrastructure construction and public transport convenience, more citizens will choose public transportation. This will further increase the application's usage rate.

## 2. Limitations, challenges, and recommendations

The technology used in the project is not very complicated and production costs are low. In addition, the iterative cost of the project is not high and scalability is strong. The managing of strategic partnerships with telecommunications companies, NGOs, and government agencies remains a major challenge for the project.

## Goal 11 –

# E-Waste Recycling in China

### Matrix:

Related SDG: 11, 17



### Essential Technologies:

Information  
and Communication  
Technology (ICT)



Recommendation Index:

4.5 stars

Impact	5
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Scalability	5
-------------	---

Sustainability	4
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Technology	4
------------	---

Innovation	4
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## I. Introduction

E-waste recycling is of great importance as simply throwing away electronics results in chemical and metal pollution. UNDP and Baidu collaborated to create the UNDP-Baidu Big Data Joint Lab, which created "Baidu Recycle." By connecting users who want to recycle their appliances with certified treatment plants, e-waste recycling has become simpler and safer.



## II. Description

### 1. Background

According to the United Nations, in 2014 China produced 6 million tons of electronic waste, making the country the world's largest e-waste dumping site and treatment plant. China receives e-waste from nations around the globe, including used TVs, refrigerators, washing machines, computers, mobile phones, and other electronic products and parts.

The refurbishment and resale of electronic products is only the first level of e-waste processing. Rather than being recycled, parts that cannot be refurbished are stripped by untrained and unprotected workers for layer decomposition, incineration, or strong acid dissolution. This has formed a gray market for electronic waste disposal. The "by-products" from these processes include farmland abandonment, gas waste, liquid waste, residue waste, soil and water pollution, heavy metal pollution, plastic waste pollution, chemical pollution, and other forms of pollution which seriously threaten the environment and the health of affected citizens.

## 2. Project team and project development

In 2014, the UNDP teamed up with Baidu and the Chinese Ministry of Environmental Protection to establish a big data lab. From this they launched Baidu Recycle, a mobile-based application.

Version 1.0 of Baidu Recycle was launched in August 2014. During the application's one-year trial period, Baidu Recycle launched pilot projects in Beijing and Tianjin and arranged the recycling of 11,429 pieces of electronic waste, including TVs, computers, and refrigerators. Drawing from user data and feedback, version 2.0 was launched in August 2015 and expanded to include small items like mobile phones and laptops. The program has been viewed over 370,000 times. Version 3.0 was developed in 2016 and has undergone a number of technical enhancements. The project team added a built-in online B2B payment system, as well as other improvements to e-waste services.

By March 2016, this service had been extended to 22 cities. The application has been readily adopted in these cities, with more than 253,820 user searches per month, a user service trial rate of over 20%, and an average of 5,900 e-waste products processed per month.



## 3. Characteristics/features

Baidu Recycle uses an iterative design and rapid prototyping, similar to the models used by Uber's software programs. The application connects individuals who want to dispose of used electronics with legally certified e-waste providers, ensuring that they have the equipment necessary to safely recycle electronic products.

# III. Impact

## 1. Achievement

In November 2015, the project team established the Baidu Recycling Green Service Alliance with Intel, Boss, Midea, Jiuyang, Changhong, Haier, Lenovo, TCL, and more. With the China Resource Recycling Association, the team built an Internet-based alliance and nationwide e-waste management ecosystem. The initiative was recognized globally and was a semi-finalist at the MIT Climate Joint Lab competition; it was one of 800 projects at the Solutions Summit. The project was also selected by the UAE government at the Fourth Summit of Government.

As a product of the UNDP-Baidu Big Data Joint Lab, this project aims to raise awareness about the possible harm caused by e-waste, encouraging the public to properly handle such waste, and address the associated gray market. As the project gained traction, it began reducing informal electronic waste recycling stations, improving the recycling system for resources, and promoting the healthy development of China's electronic waste recycling industry. Moreover, electronic waste disposal enterprises with a national certification are positioned to promote the development of a circular economy through recycling and reuse, improve resource utilization, prevent environmental pollution, and enable sustainable development.

## 2. Limitations, challenges, and recommendations

The project's middle- and late-stage development still faces many limitations and challenges. For example, it has always operated as a development project and does not have a self-sufficient business model. The inefficiencies of procurement cannot keep up with the recycling demand and requires the cooperation and coordination of many parties. Baidu Recycle was updated in September 2017, but the application is currently inaccessible. After five years of implementation, UNDP and Baidu decided to halt the development of the project to review it, adjust sub-optimal operational methods, and perform internal upgrades. The project team aims to extend Baidu Recycle from an individual development project to a self-sustainable project available for adoption by both enterprises and governments.



## Goal 12 –

# AVANI: Plastic Made of Plants

### Matrix:

Related SDG: 12



Essential Technologies:

Biotechnology



Recommendation Index:

5 stars

Impact 5

Scalability 5

Sustainability 5

Technology 5

Innovation 4

## I. Introduction

Single-use plastic products like plastic bags and utensils are ubiquitous on land and sea. With some plastic products estimated to last for hundreds of years, the pollution has a protracted negative effect on the environment. Avani is a company designing new products, created from plant materials, that can replace these plastic products. Started in Indonesia, its products are now being used in the Middle East.



## II. Description

### 1. Background

Plastic products are widely used, relatively inexpensive to manufacture, and can be seen everywhere in people's lives. They are often viewed as part and parcel to satisfying the needs of today's fast-paced and convenient lifestyle. However, almost all plastics are not biodegradable and can exist in landfills or oceans for hundreds of years.

In 2015, researchers at the University of Georgia conducted a global assessment of plastic waste discharged into the ocean. They estimated that a total of 275 million tons of plastic waste was produced in 192 coastal countries and regions in 2010. Between 4.8 to 12.7 million tons was concluded to have entered the oceans, resulting in disastrous effects for marine life. In July 2015, The New York Times reported that plastic products were responsible for at least 1 billion marine deaths each year.

### 2. Project team and project development

Kevin Kumala is the co-founder and Chief Green Officer of Avani. A challenger of the status quo, Kevin believes that "frustration is the true mother of invention", a belief that pervades the entire company. Avani is working to replace disposable plastics by providing integrated environmental solutions.

In 2014, Avani was founded by a manufacturer dedicated to solving the global plastic pollution problem through technology. Through years of research, Avani has developed a new technology that replaces disposable plastic products (ones that take hundreds or even thousands of years to decompose naturally) with renewable resources made from plants. Avani Eco Products is a series of modified compostable and biodegradable bioplastic products made from natural plant material. Such products



include takeaway containers, cutlery, straws, coffee cups, grocery bags, and raincoats. Avani also offers disruptive and compostable bioplastics made from tapioca starch, as well as a full range of sustainable food packaging and hotel supplies made from renewable resources.

Today, cassava is still the only water-soluble bioplastic (150 days). The Avani bag has passed oral toxicity tests, meaning it is safe for both land and marine life. The bag can be safely discarded, turned into compost, and 100% recycled with pulp material.

Avani's products are fully biodegradable within 3 to 6 months, depending on soil conditions. They naturally convert to carbon dioxide and biomass with no toxic residue. Avani bags "disappear" under microbial digestion and can be directly disposed of in landfills, a development that will help humanity to cope with today's most challenging environmental challenges. The shape, size, and color of the Avani bag can be customized. Their lunch box can be heated by microwave or kept in the refrigerator.

### 3. Characteristics/features

- |  |                               |
|--|-------------------------------|
| A. Biodegradable & compostable in months | B. Harmless to animals        |
| C. Durable                               | D. Can be recycled with paper |
| E. Good material properties              | F. Food safe                  |
| G. Customizable                          |                               |

## III. Impact

### 1. Achievement

First launched in Indonesia, Avani is actively expanding internationally and was officially launched in the Middle East (UAE, Dubai) in October 2017. Avani's co-founder and Chief Green Officer Kevin Kumala said at the UAE conference: "Avani bags can solve the global problem of plastic waste. Today marks Avani's next journey of bringing plastic-free bags to the UAE. Over the years, we have supported the UAE's commitment to ban the use of plastic bags, and we believe that Avani will be a key player in the UAE's environmental protection program."



### 2. Limitations, challenges, and recommendations

Avani's ecological products are made from crops such as corn starch and sugar cane fiber. Additional attention should focus on the sustainability of the corn and sugarcane farming practices and ensure that food security is not being threatened as a result of crop usage for these ecological products.

## Goal 12 –

# Green Earth: Waste Recycling Digitization

### Matrix:

Related SDG: 12, 11



Essential Technologies:

Biotechnology



Recommendation Index:

5 stars

Impact	4
Scalability	4
Sustainability	5
Technology	5
Innovation	4

## I. Introduction

Effective recycling programs do not just process materials but also engage citizens to care about their communities and surroundings. In China, Green Earth has mobilized residents by creating an incentive-based system to promote recycling. Users scan a QR code of their recycled material and accumulate points that can be redeemed, while also helping the company to better understand individual behavior around recycling.

## II. Description

### 1. Background

China is the world's largest importer of waste, receiving 56% of the world's total in 2016. There are two main types of waste disposal. One is the landfill and the other is incineration. The historical model of waste disposal causes a great waste of resources. Effective and sustainable urban waste management must include sorting and classification. The cost of waste sorting and the need for public participation are high, and any program requires supportive policies and public education. At present, China does not have a mandatory law for residents to classify waste, nor does it carry out specific waste classification education. Therefore, garbage sorting and recycling remain important tasks in China.

### 2. Project team and project development

Wang Jianchao is the founder of Green Earth Environmental Technology Co. Ltd. – the first enterprise in China to specialize in urban residential waste sorting services. His team designed a system to support the shift of residential persons from “meeting” to “doing,” and from conscious awareness to behavioral change. Through garbage sorting and recycling bins, 10% of community residents can now begin contributing to



waste management and slowly compel others to do the same.

Leveraging QR code technology, Green Earth uses mobile Internet and smart technology to collect behavioral statistics. The company then designed a set of specialized, data-based, and sustainable garbage collection solutions for residents. When the company was first started, the team had to go into the community to promote what they were doing. The Jinjiang District Government in Chengdu, Sichuan Province held a public bidding for waste sorting and Green Earth's bid was successful, which gave them necessary traction. In 2015, Green Earth's coverage area expanded from Jinjiang District to Wuhou District, Gaoxin District, Qingyang District and Jinniu Districts. Green Earth has since developed a game, which residents, and especially children, love and have embraced. It has resulted in the mobilization of residents toward garbage sorting. Green Paper and Uber jointly launched "paper-making forests and city-wide recycling" waste paper recycling activities in Chengdu. Green Earth developed a garbage classification-themed exhibition hall, launched a Green Earth exclusive membership card, and created WeChat points to withdraw cash.

### 3. Characteristics/features

A. QR code-linked account: After residents sort their garbage, a QR code sticker is added to their trash bag. This gives the bag a unique identity – each QR code corresponds to a family account.

B. Special garbage collection box: This machine weighs garbage and spreads knowledge about garbage sorting. Residents can check their point totals on their phones every month and redeem them for gifts or cash.

C. A variety of recycling activities: The team is not limiting themselves to garbage collection and point redemption features, but intends to open a library classification exhibition hall, create a city-centric paper forest, and design comics, games, and other activities to drive more people to participate in Green Earth's activities.



## III. Impact

### 1. Achievement

From 2011 to 2015, Green Earth's program covered 100,000 households; on November 4, 2016, Green Earth's executive team participated in Beijing's Global Innovators Conference (GIC) and won the title of "Future Messenger." As of May 2018, Green Earth had covered 328,000 households and 1,160 communities in Chengdu, recovering a total of 11,800 tons of recyclables.

### 2. Limitations, challenges, and recommendations

The technology for and management of waste recycling could be improved to allow for recycled goods, electricity, and/or fertilizer manufacturing.



## Goal 13 –

# Using Satellite Imagery System to Combat Climate Change Impacts

### Matrix:

Related SDG: 13, 3, 9



### Essential Technologies:

Information and  
Communication Technology  
(ICT)



### Recommendation Index:

4 stars

Impact	5
Scalability	3
Sustainability	4
Technology	5
Innovation	4

## I. Introduction

Climate change is having significant impact on the Earth and its weather systems, including droughts and flooding. However, one impediment to effective response systems is the lack of information during times of disaster. The UN and Ukrainian agencies created a satellite imagery system that can analyze maps and provide real-time damage assessment and risk management for affected populations and aid agencies.

## II. Description

### 1. Background

Climate change presents the single biggest threat to sustainable development and its effects disproportionately burden the poorest and most vulnerable. Between 1990 and 2013, more than 1.6 million people died in internationally-reported disasters; the number of annual deaths from natural disasters is increasing.

Space applications that support the observation of the Earth, telecommunications, and global navigation play a vital role in disaster risk reduction, response, and recovery. They do this by providing accurate and timely information for decision-makers. Governments have reiterated the need to protect the environment and to promote international cooperation around the use of satellite applications for climate-related issues.



### 2. Project team and project development

The practice was developed by the National Academy of Sciences Ukraine and the State Space Agency of Ukraine (NASU-SSAU). It was initiated, tested, and applied to disaster management by the United

Nations Platform for Disaster Management and Emergency Response - UN-SPIDER – a United Nations program with a mission to “ensure that all countries and international and regional organizations have access to and develop the capacity to use all types of space-based information to support the full disaster management cycle.”

The general workflow of this practice is as follows:

- (0) SAR image acquisition.
- (1) Calibration in SNAP through radiometric correction.
- (2) Speckle filtering in SNAP.
- (3) Binarization in SNAP through Band Math.
- (4) Geometric correction in SNAP through the Range Doppler Terrain Correction Function.
- (5) Visualization in Google Earth.

The practice was used during the January 2015 flood in Malawi. Starting in December 2014, heavy rains began to affect Malawi causing rivers to overflow. The practice was applied to an affected area in the Nsanje district around Chiromo.

### 3. Characteristics/features

The objective is to determine the extent of flooding in affected areas during times of disaster. The use of SAR (synthetic aperture radar) satellite imagery for flood extent mapping constitutes a viable way to process images quickly and provide close to real-time flooding information to relief agencies. Moreover, flood information can be used for damage assessment and risk management by alerting affected populations of their flood risk such as the applications of Google Earth and Sentinel Application Platform (SNAP).

## III. Evaluation

### 1. Achievement

SAR's threshold method has the following advantages: cloud-independent SAR images, high revisit frequency, and easy detection of water with an accuracy rate of up to 95% (depending on the landscape and area).

The practice can be applied globally. It was successfully used during floods in Australia, Africa, and Asia. The only precondition for SAR water detection is a smooth water surface.

### 2. Limitations, challenges, and recommendations

False alarms can occur in areas of radar shadow due to variable terrain or because of smooth objects like roads and sand. Flood detection in urban areas remains difficult. The detection of flooded vegetation from SAR imagery requires a different approach, which uses two multi-temporal images.

## Goal 13 –

# Ant Forest: Combating Desertification by Planting Trees Using Smartphones

### Matrix:

Related SDG: 13, 9, 15



### Essential Technologies:

Information and Communication Technology (ICT)



Recommendation Index:

4.5 stars

Impact	5
Scalability	4
Sustainability	4
Technology	4
Innovation	4

## I. Introduction

Beijing occasionally is hit by sandstorms, with the entire city tinged yellow from sand blown in from the nearby desert. As the rate of desertification in China is increasing, sandstorms will become more prevalent. Ant Financial, the owner of



Chinese payment app Alipay, started a project called Ant Forest. Users of Alipay can engage in "green" activities, such as walking or requesting electronic receipts. They can also "plant" a virtual tree with accumulated points from their phone. Meanwhile, many miles away, Ant Forest will have a physical tree planted to combat desertification and promote ecological preservation. In addition to combating desertification, this project directly combats climate change by promoting low carbon behavior.

## II. Description

### 1. Background

Desertification is a worldwide ecological problem. According to the United Nations Environment Programme (UNEP), the regions that have been or are still being affected by desertification account for 35% of the global land area. In response to the United Nations Convention to Combat Desertification (UNCCD), China is committed to promoting the global goal of zero land degradation. They launched the "Belt and Road" mechanism to combat desertification. Ant Financial's response to efforts to prevent and control desertification in Belt and Road areas and promote green financial strategies is called Ant Forest.



### 2. Project team and project development

Ant Financial was established in October 2014 as a subsidiary of



Alipay, with a mission to “bring equal opportunities to the world.” Ant Financial is committed to building an open and shared credit and financial service platform through scientific and technological innovation.

Estimating individual emission reductions on a global scale is a big challenge. Ant Financial and the Beijing Environmental Exchange cooperated to develop a methodology for calculating emission reductions for low-carbon behavior, which helped in calculating the reductions for individual actions and is linked to “carbon accounts.” Low-carbon behavior on Alipay, such as walking, offline payment, or using electronic invoices, awards users “green energy points” which can be used to plant virtual trees through their carbon accounts. Users can also get up early to “steal energy points” from their friends who use this application to feed their trees. Once their virtual trees grow up to certain standards, Ant Forest will plant real trees in Alashan, which is within the Gobi Desert.

### 3. Characteristics/features

- Original “carbon account”: Carbon accounts are one of Alipay’s four major accounts (finance, credit, carbon, love). Ant Forest is involved with the creation and optimization of algorithms that enable better account balance accuracy, operability, and transparency. This is not only the world’s largest carbon reduction program, but it also has important global innovative and practical value.

- “Virtual Tree” project display: Ant Forest, Joint Technology Partners, Gago, and Extreme Flying Technology launched satellites and real-time tree viewing functions in select areas, enabling 230 million users to see Ant Forest’s entire forest landscape as well as the individual trees each user “planted.” Gago uses remote sensing satellite technology to collect meteorological, soil, and altitudinal information in desertified areas. In the future, such technologies will be used in additional areas for ecological restoration programs. Ant Forest and Feifei Technology installed the Feifei Electronic Scarecrow FM1 intelligent monitoring station, which communicates with multi-spectral drone technology to help the team accurately determine the health status of their trees. This technology, which was previously applied in the agricultural field, is being used to establish ecological databases and provide technical references for public welfare projects.

- Mobilization: Ant Forest is not a public fundraiser, but a mobilization force. By participating in Ant Forest, users acquire a better understanding of low-carbon behaviors and how to adopt low-carbon lifestyles.

## III. Impact

### 1. Achievement

Following its release in 2016, the number of Ant Forest users exceeded 60 million after three months and went on to exceed 200 million after five months. As of December 2017, the number of Ant Forest users exceeded 280 million, with a cumulative emissions reduction of 2.05 million tons. Ant Forest planted 13.14 million trees and protected 12,111 acres of land.

### 2. Limitations, challenges, and recommendations

First, the calculation of low-carbon behavioral emission reductions and the selection of low-carbon scenarios requires further research. For offline payments, comparing between the different types of products purchased for evaluation should be considered. Second, a majority of Ant Forest’s users are on Alipay; however, Ant Forest’s reproducibility is not affected by the advantages of the Alipay application. Third, in addition to planting trees, Ant Forest is also able to deal with other environmental issues through the same platform.

## Goal 14 –

# Greenwave: A Marine Farm to Restore Marine Ecology

### Matrix:

Related SDG: 14, 13



#### Essential Technologies:

Food and  
Agriculture Technology



Recommendation Index:

5 stars

Impact	5
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Scalability	5
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Sustainability	5
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Technology	4
------------	---

Innovation	5
------------	---

## I. Introduction

Current ocean and fishing practices are not sustainable. Fishing vessels continuously overfish marine populations and aquaculture farms often strain marine resources with their single-culture practices. Greenwave promotes a new idea called "3D marine farm" which creates a vertically-tiered farm with kelp and oysters growing on long ropes and other seafood. This practice encourages a deeper understanding of marine ecosystems and sustainable production.



## II. Description

### 1. Background

Overfishing has already exceeded the limited of the ocean and threatened marine diversity. Research from National Geographic shows that if world fishing operations continue at their current level, fisheries will collapse by 2048.

The damage to biodiversity caused by overfishing the oceans is significant. The Food and Agriculture Organization estimates that 70% of the world's fish species are either fully fished or are approaching depletion. According to United Nations agencies, aquaculture is growing faster than any other animal food production sector.

### 2. Project team and project development

Bren Smith is the executive director of the Greenwave Project, and owner of Thimble Island Ocean Farm, located in Branford, Connecticut, USA. He leads a team of project managers which include individuals with

Master's degrees in forestry and environmental studies and a director with a corporate background.

Like other oyster farmers, Bren Smith raises shellfish in cages under the sea. However, Hurricane Irene in 2011 and Hurricane Sandy in 2012 caused large quantities of marine sediment to ruin 90% of his harvest. He realized that he had to diversify and raise a variety of marine species, including seaweed, demand for which was growing.

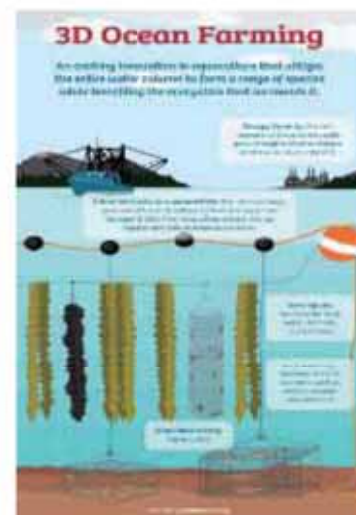
Faced with this situation, Bren referenced research by Charles Yarish, a marine scientist at the University of Connecticut, USA, to create the prototype for Greenwave, a project which advocates for the local cultivation of seaweed and restorative species like shellfish. Each species is scientifically selected to address certain environmental challenges. Although oysters and seaweed emit nitrogen and absorb carbon dioxide from ocean water, he knew more was needed to achieve the desired impact. Bren thus takes a vertical approach to aquaculture, calling his technology a "3D marine farm."

### 3. Characteristics/features

3D marine farms filter harmful and polluted water, sequester carbon dioxide, and support biodiversity. The farms not only do no harm, but actually support the recovery of ocean systems. This integrated model has the potential to transform aquaculture from an increasingly fragile single-culture system into a vibrant ecosystem that yields significant benefits. Greenwave's seaweed, mussels, and scallops hang from floating ropes, oysters grow in cages under the ropes, and the farm itself harvests salt.

According to research, kelp absorbs five times as much carbon as terrestrial plants, while oysters filter 50 gallons of water per day and vent nitrogen. This helps to offset climate change impacts and reduce ocean dead zones.

GreenWave provides grants, low-cost seedlings, free outdoor gear, and two years of training for new farmers. It guarantees to buy 80% of the crops at three times the market price within five years and supply restaurants across the country.



## III. Impact

### 1. Achievement

In 2015, Greenwave won a \$10 million prize from the Fuller Challenge and in 2017 won Denmark's prestigious INDEX award for sustainability. Greenwave has also received a lot of media attention. Founder Bren Smith was invited to speak at TEDx in Bermuda and has been featured in reports from the British Guardian, CNN, The New Yorker, National Geographic, and The Wall Street Journal.

### 2. Limitations, challenges, and recommendations

The demand for seafood is rapidly increasing. The 3D farming model's primary goal is to protect ecology and abandon large-scale single-culture farming in aquaculture. However, it may face challenges as it attempts to scale globally.



## Goal 14 –

# Rainbow Fish: Private Capital to Support Technology

### Matrix:

Related SDG: 14, 17



Essential Technologies:

Transportation Technology



Recommendation Index:

5 stars

Impact 5

Scalability 4

Sustainability 5

Technology 5

Innovation 5

## I. Introduction

In 2012, the Chinese submersible “Dragon” set a deep dive record in entering the “abyssal zone.” The deputy chief designer of the project, Cui Weicheng, has started a new company called Rainbow Fish, which is also focused on deep sea

dives. The company hopes to take advantage of private venture capital resources to fund the innovation and development needed to better understand the deep sea and its resources.

海洋大数据产品	海洋产品链接	服务对象
海洋大数据产品	海洋大数据产品	海洋大数据产品
海洋大数据产品	海洋大数据产品	海洋大数据产品
海洋大数据产品	海洋大数据产品	海洋大数据产品
海洋大数据产品	海洋大数据产品	海洋大数据产品
海洋大数据产品	海洋大数据产品	海洋大数据产品

## II. Description

### 1. Background

Deep sea science is a marine oceanography discipline specializing in water depths from 6,500 meters to 11,000 meters. 6,500 meters is considered the dividing line between the ocean familiar to humankind and the so-called abyssal zone. Deep sea science and technology are at the forefront of marine science and technology. Research and exploration in this field have played an important role in the understanding of Earth ecology, climate, marine environment protection, the origins of life, and earthquake prediction. It is also currently playing an important role in the development of China’s maritime abilities. The exploration of abyssal trenches and the understanding of the trench ecosystem have become increasingly urgent as land resources continue to deplete and large-scale consumption of marine resources continues to grow.

### 2. Project team and project development

Technology: Professor Cui Weicheng, director of the Abyss Science and Technology Research Center. He was the first deputy chief designer of the manned submersible “Dragon” and head of the project. It set a deep dive record of 7,035 meters. He was awarded the honorary title “Manned Deep Hero” by the Central Committee of the Communist Party of China and the State Council, was ranked in “China’s Top Ten ‘Science Stars’” by

Nature magazine in 2016, and won the first China Innovation Award in 2017.

Cui Weicheng was employed by the Shanghai Ocean University in March 2013 to form the Abyss Science and Technology Research Center. The purpose of the Center was to develop a 11,000-meter manned submersible. One of Cui Weicheng's professors during his doctorate in the UK had another student named Wu Xin, who was a senior executive of a Fortune 500 company at the time. In March 2014, Cui Weicheng and Wu Xin jointly established Shanghai Rainbow Fish Marine Technology Co., Ltd. (Rainbow Fish Company). In February, the Abyss Science and Technology Research Center (Abyss Center) was established. The purpose of Rainbow Fish Company is to provide funds and resources for the Abyss Center and to develop related industries such as deep sea equipment production, marine engineering, and adventure tourism. The Abyss Center is responsible for the development of deep sea landers and manned and unmanned submersibles. The Abyss Center funds and rewards individuals, teams, and projects involved with deep sea science and technology research who innovate ways to promote marine conservation and sustainable human development. Cui Weicheng and his team are exploring the use of private capital (both donations and investment) to support new science and technology research and to develop two models, namely, "national support + private investment" and "scientists + entrepreneurs." Deep sea data services are one of the key business areas for Rainbow Fish. Rainbow Fish uses advanced deep-sea exploration technology, derived from 10,000-meter deep submersibles, to create deep-sea buoys for placement at depths of 4,000 to 6,000 meters. Such innovation is seeking to fill the domestic technology gap in this field. They are also configuring what is called the Beidou satellite communication and positioning system, so as to build an independent Argo area observation and monitoring network. The network will be the basis for forming China's deep ocean digital monitoring system and big data intelligence service center.

### 3. Characteristics/features

Cui Weicheng and his team members do not hold any shares in Rainbow Fish Company. The Abyss Center and Rainbow Fish Company are two independent institutions. This set-up was to ensure that the research team remained focused on scientific research. Because the Rainbow Fish Company bears market risks, it is not obliged to donate to the Abyss Center. Even if there are funds available and a willingness to donate, it does not need to donate to the Abyss Center.

The Abyss Center uses "fixed donors" to raise social funds to support the scientific development of the abyssal zone. The Abyss Center also launched a project to raise public awareness about the importance of marine protection.

## III. Impact

### 1. Achievement

In the 2016 selection of Nature magazine, Cui Weicheng was named one of China's top ten scientific stars. In May 2016, the BBC named the deep-sea manned submersible developed by Cui Weicheng one of the five cutting-edge technologies capable of transforming China's innovation. The Shanghai Municipal Science and Technology Commission, Shanghai Municipal Education Commission, and Shanghai Pudong New Area Lin'gang Management Committee have provided subsidies and support for the submersible project.

### 2. Limitations, challenges, and recommendations

Rainbow Fish Company's "private capital for technology development" model is innovative but faces significant market challenges.

## Goal 15 –

# ShadowView Foundation: Smart Alerts for Wildlife Sanctuaries

### Matrix:

Related SDG: 15



### Essential Technologies:

Information and  
Communication Technology  
(ICT)



Recommendation Index:

4 stars

Impact	4
Scalability	4
Sustainability	4
Technology	5
Innovation	5

## I. Introduction

Wildlife sanctuaries are created to preserve the natural habitats of creatures, yet the occasional overlapping of human and animal populations can result in poaching or deadly interactions between them. ShadowView Foundation uses technology to enhance the surveillance of these sanctuaries and makes it safer for both animals and residents. Using drones and monitoring fences, ShadowView Foundation improves wildlife conservation while also promoting public awareness.



## II. Description

### 1. Background

Natural resources are deteriorating globally, ecosystems are under pressure, rare wild animal hunting is common, biodiversity is being lost, clean water resources are dropping, and land degradation and soil erosion are growing. At present, the rate of cultivated land loss in the world is 30-35 times that of the past. Drought and desertification have caused 12 million hectares of cultivated land to disappear. Of the 8,300 species currently known, 8% are extinct and 22% are endangered. The African savannah, home to the earliest human beings, is also home to many rare wild animals, many of which are currently being hunted by poachers and on the verge of extinction. As a response to this challenging situation, Laurens de Groot and his team decided to form a foundation dedicated to wildlife conservation and public education. Technology is applied to provide real-time information in support of wildlife protection and park management.

### 2. Project team and project development

Laurens de Groot is the co-founder of the ShadowView Foundation (SV). Prior to SV, Laurens participated in marine conservation projects in Africa, Europe, and Antarctica. He also worked as an investigator for the Dutch police, specializing in organized environmental crimes. Other employees of the Foundation have experience in environmental and anti-



poaching projects (their work collectively spanning five continents), foundation management, and research.

Africa has many ecological parks covering a wide expanse of area. However, most parks do not have basic 3G or 4G coverage. Since 2013, SV has used sensor technology to install sensors in parks, which collect data to observe animal conditions, provide real-time information on wildlife, and play an important role in finding poachers.

As a technology-based foundation, SV uses the latest unmanned aerial systems and operators to offer technical support to wildlife conservation organizations. In 2014, SV provided aerial photography and support for the National Geographic Gorilla Rescue documentary. Currently, SV is working with the International Animal Rescue Organization to implant chips in the necks of gorillas for aerial tracking and monitoring after their release following rehabilitation.

The present wildlife tracking system is very labor intensive. Staff need to walk and position animals using a handheld antenna and receiver. GPS equipment is very inefficient, bulky, and has a short battery life. Drones are much more cost-effective for tracking wildlife. Some people have questioned the application of drone monitoring technology as a replacement for the work of patrollers, but according to SV drone technology does not replace ground staff, but helps them work more effectively.

### 3. Characteristics/features

#### A. LoRa Telecom Technology

Although many conservation methods have been used in national ecological parks around the world, such as electric fences, deep trenches, and even pepper grenades, they are not enough. Between 2014 and 2017, 1,200 people were killed by wild animals in India alone, along with hundreds of animals.

The founders of SV designed a tool to improve the efficiency of parks' electric fences to monitor elephants in Northeastern India. Based on wireless LoRaWAN (Long Range Wide Area Network) telecommunications technology – a low-bandwidth, low-power network technology that covers large areas at a lower cost – state-of-the-art sensors can detect the presence of animals and power leaks from electronic fences. Sensor-related alarms send a text message to warn villagers when an elephant fence is damaged or destroyed.

#### B. Technology + Philanthropy

All operating funds for the Foundation project derive from donations and income from the provision of services. According to SV's official website, the World Wildlife Fund and Save the Children UK both provide financial support, in addition to technology companies and map development firms. Wildlife protection trusts have also provided support for SV. SV also promotes technological awareness and animal protection to children in schools and communities.



## III. Impact

### 1. Achievements

The World Wildlife Fund (WWF) and Wildlabs set up the Human Wildlife Conflict Tech Challenge in July 2017 and invited technology developers, engineers, and nature lovers to find new solutions. With its mission to help reduce the conflict between humans and wild animals, SV won the challenge's award.

## Goal 15 –

# GAGO: Agricultural Data for Ecological Protection

### Matrix:

Related SDG: 15



Essential Technologies:

Food and Agriculture  
Technology



Recommendation Index:

5 stars

Impact	5
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Scalability	4
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Sustainability	5
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Technology	5
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Innovation	5
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## I. Introduction

Although China has been witnessing a rapid adoption of big data and AI across many fields, it has been remarkably absent in agriculture. This is likely because agriculture is an industry with high risk, low revenue, and a long developmental timeline, making it relatively unattractive to venture capital funding, which often looks for scalability and an IPO exit strategy. However, GAGO has applied big data to improve agricultural farming practices and has expanded to include drone products and agricultural insurance, providing a greater safety net for farmers.



## II. Description

### 1. Background

Agriculture, as one of the oldest human activities, has begun to adopt numerous new technologies. In China, the farming industry suffers from small and dispersed farming plots as well as a shortage in water resources. It is very difficult to increase agriculture yields and intensify agricultural activity. In the US, cloud computing and big data have become essential to agricultural management. Data collection, storage, transmission, and analysis are used extensively across a range of agricultural activities.

## 2. Project team and project development

GAGO Inc. specializes in collecting, analyzing and visualizing environmental, weather, and agricultural data from satellites, drones and ground-level sensors. They deploy self-innovating deep learning algorithms for analyzing massive amounts of remote sensory data to estimate planting areas, crop yields, growth, and to support disease predication and prevention, irrigation planning, machinery planning, and financial decisions.

GAGO's intelligent agriculture solution, dubbed "wonderland," is a cloud-based platform, enabling real-time monitoring and smarter decision-making by leveraging visualized agronomic data. This solution is available for all seasons, all weather conditions, all crops, and all terrain farms. It provides stable, efficient, and accurate agricultural data services, allowing farmers to quickly understand and estimate weather changes and crop growth through PCs, tablets, or smartphones. This can greatly increase production efficiency through agricultural arrangements, agricultural machinery development, pesticide spraying, and other activities.

## 3. Characteristics/features

### A. Agricultural Technology

GAGO's technology fills the AI gap in China's agricultural modernization and makes up for the absence of applied AI in the agricultural field. It provides suitable planting area planning, crop growth cycle estimation, soil moisture estimation, and meteorological predictions through an AI algorithm and satellite remote sensing. The technology also allows for disaster prediction, crop pest warnings, production forecasting, crop monitoring, and other derivative services. Financially, GAGO's services include agricultural land productivity assessment, agricultural investment return analysis, agricultural efficiency assessment, and loan risk assessment.

### B. AI Applications

In the past, agricultural services captured an image using satellite technology and the image was then reviewed by analysts for the required information. GAGO applies AI to the recognition process, greatly improving efficiency. AI has been prominent in the technology sector for many years and has been attracting attention from the finance, biotechnology, and Internet industries. However, due to its long production cycle, high risk, and low revenue, agriculture rarely receives artificial intelligence or entrepreneurial interest.

## III. Impact

### 1. Achievement

"Wonderland," once implemented, will make agricultural activity fully traceable. Additional services include logistics, sales, re-processing, food safety management, and data support. By increasing the transparency of the production process, "wonderland" provides the necessary decision-making assistance for financial services such as agricultural loss assessment, agricultural insurance premium determination, and bank loan risk management.



## Goal 16 –

# Papua New Guinea: Phones against Corruption

### Matrix:

Related SDG: 16



Essential Technologies:

Information and  
Communication Technology  
(ICT)



Recommendation Index:

4.5 stars

Impact 4

Scalability 5

Sustainability 4

Technology 3

Innovation 4

## I. Introduction

While the abuse of public trust for individual benefit is certainly undesirable, most citizens in Papua New Guinea (PNG) do not know where or how to denounce corruption and often fear violent retribution. Effective and safe corruption reporting mechanisms are therefore in need across the country. UNDP worked with the Department of Finance to create a platform based on SMS-text that would create a channel for individuals to report corruption and improve government practices.



## II. Description

### 1. Background

PNG features 144th out of 175 in Transparency International's Corruption Index and is in the lowest 15% of countries dealing with corruption according to the World Bank's Global Governance Corruption Index. Success in dealing with corruption is important to PNG, where it has negatively impacted the country's development. Given this background, UNDP's "Phones Against Corruption" initiative was launched to meet this important demand, offering a confidential line for reporting corrupt practices by using text messages.

### 2. Project team and project development

The unveiling of corrupt practices was made possible through the new "Phones Against Corruption" initiative, launched by UNDP in partnership with PNG's Department of Finance in 2014. Working with the Australian and PNG government, the initiative introduced a corruption reporting tool based on mobile messaging and was piloted across 1,200 staff at the Department of Finance (DoF) in 2014. All reported cases were referred to the DoF's Internal Audit and Compliance Division for further investigation,

in collaboration with relevant state bodies responsible for criminal investigations and prosecution.

Based on the success of the trial in 2014, the project was scaled up to reach more civil servants in 2015. Six new departments have been incorporated, involving approximately 25,000 government officials, as the first step toward incorporating all civil servants. Those incorporated were located nationwide – in provinces and districts - and approximately 35% are female. By the end of December 2015, more than 21,753 SMS messages were received from 6,157 different users.

### 3. Characteristics/features

Although the mobile phone penetration rate in PNG is now more than 40%, its mobile broadband rate remains low - at barely 8%. Therefore, instead of a smartphone app, the program was designed around text messages, or SMS messages, to maximize the reach of its audience. An SMS system is considered to have the following benefits:

- Anonymous
- Free
- Any handset
- Simple to use
- Bilingual (English and Tok Pisin [local language])

## III. Impact

### 1. Achievement

- More than 29,164 SMS messages were received from 8,827 different users by end of June 2016.
- Of the 741 cases under investigation, 93.6% (694 cases) were reported from provinces and districts, instead of the capital city.
- In 2015, six new departments were incorporated, involving approximately 25,000 government officials, as the first step toward incorporating all civil servants. 21,753 SMS messages were received from 6,157 different users as of December 2015.
- The initiative was piloted across 1,200 staff from the Department of Finance in 2014. 6,254 SMS messages were received from 1,550 different users as of December 2014.
- 251 cases of alleged corruption are under investigation by the Internal Audit and Compliance Division.

The use of simple technology means that corruption reporting can be simple, quick, and accessible to a wide audience. With support from telecom partners, the tool does not cost users any money or credits (for example, to send messages to the system), nor does it require internet access. Despite the fact that most people in PNG (87%) live in rural areas, the initiative achieved significant reach. Currently, of the 741 cases under investigation, 93.6% (694 cases) were reported from provinces and districts.

An independent user experience research assessment concluded that the "Phones against Corruption" service worked well and provided a useful service. Most respondents indicated that they would be willing to use the SMS service again (90%). Three-quarters of respondents (76%) indicated they were confident in the relevant authorities to follow up on corruption reports.



## Goal 16 –

# China's Smart Court – Making China's Courts Fair

### Matrix:

Related SDG: 16



Essential Technologies:

Information and Communication Technology (ICT)



Recommendation Index:

4.5 stars

Impact 5

Scalability 4

Sustainability 4

Technology 4

Innovation 4

## I. Introduction

The Information Age has brought unprecedented changes to every industry. The legal industry is no exception. It is imperative to introduce informatization into the judicial system and develop its efficiency and transparency by way of big data and cloud computing. China's smart court system, which utilizes the Internet and big data, has already reached prominence worldwide. It promotes transparency and fairness in the judicial system and is playing an important role for the establishment and development of smart court systems in other countries.



## II. Description

### 1. Background

Making use of big data and the Internet to improve the application of justice and promote social governance has almost unanimous support domestically and abroad. According to the "13th Five-Year" National Informatization Plan, the proportion of electronic litigations will exceed 15% in 2020. The construction of the so-called Smart Court is highly replicable in developed countries and some developing countries, given its low iteration costs and strong sustainability. That said, the establishment of smart courts has stringent requirements regarding the use of technology for statistics and the collection of data. The required data often spans many years, but once they are built and developed, smart courts promote efficiency in the achievement of social fairness and justice in the judicial system.

### 2. Project team and project development

In January 2016, Zhou Qiang, president of the Supreme People's Court, first proposed the construction of a Smart Court in China. In July of the same year, the agenda for building one was incorporated into the National Informatization Development Strategy. By the end of 2017, People's Court



Informationization 3.0 was completed and the establishment of the Smart Court System had taken shape nationally.

### 3. Characteristics/features

The establishment of the Smart Court was a crucial change in the mind and work style of the Chinese judiciary. Intelligent services, such as online business processing, process disclosure, electronic documents, and cross-regional information sharing, not only improved the efficiency of judicial personnel, but also provided convenience for people participating in litigation services and encouraged better judicial supervision.

Perhaps most importantly, smart courts make it possible to avoid the kind of errors caused by subjective factors, so that litigations and trials are based on the intersection of objective big data analysis and the professional experience of judges. This helps to make the trial criteria uniform for related cases and prevent judgments from changing at different times and places because of the subjective experience of the judges.

In addition to supporting the work of the courts and assisting persons involved in legal proceedings, the Smart Court also helps lawyers. In 2015, the Supreme People's Court's lawyer service platform was launched. The platform strives to provide lawyers with more convenient, transparent, and efficient litigation services. Lawyers can log onto the platform to complete online filing, enquiry, scoring, and use it to contact judges.



## III. Impact

### 1. Achievement

By the end of 2017, informatization 3.0 of the People's Court was completed and the establishment of the Smart Court system had taken shape nationally. It now automatically updates every five minutes, collecting 50,000 to 60,000 bits of case information per day, which it organizes within a database of more than 100 million data entries and counting. The Smart Court system effectively connects more than 4,000 courts across the country and nearly 10,000 courts have begun issuing real-time updates and communications.

### 2. Limitations, challenges and recommend solutions

Although the construction of the Smart Court in China has made significant progress and set a worldwide precedent, there is still much room for improvement. Some judges and legal practitioners still misunderstand how the system works, leading to problems such as the incompleteness of uploaded documents. To deal with this, judges and court staff should be systematically trained in the ways of the smart court. At the same time, the scope of data use should be expanded and a larger database of public security, procuratorate, court, land, industry and commerce, vehicle management, and banking information should be developed to ensure efficient social security, governance, and operation.

## Goal 17 –

# SDG Philanthropy Platform for Sustainable Development

### Matrix:

Related SDG: 17, 3, 5, 6, 10, 16



#### Essential Technologies:

Information and Communication Technology (ICT)



**Recommendation Index:**  
4 stars

Impact	4
Scalability	4
Sustainability	3
Technology	4
Innovation	4

## I. Introduction

The 2030 Agenda was introduced with 17 Sustainable Development Goals and over 200 targets aiming to end poverty, protect the planet, and ensure prosperity for all. However, it would be immensely challenging to achieve all the goals by 2030 without cooperation and coordination. The SDG Philanthropy Platform is a global and national online connector that helps to optimize resources and efforts to achieve the SDGs by enabling effective collaboration with the broader ecosystem. Their initiatives have enabled scaled up solutions for integrated impact.

## II. Description

### 1. Background

The United Nations Secretary General in 2017 said: “Despite some positive developments, a stronger commitment to partnership and cooperation is needed to achieve the Sustainable Development Goals. That effort will require coherent policies, an enabling environment for sustainable development at all levels and by all actors, and a reinvigorated Global Partnership for Sustainable Development.”

The SDG Philanthropy Platform (SDGPP or the Platform) is a project that links philanthropy and SDGs globally. It is designed to tackle various challenges, including a lack of transparency, fragmented philanthropic giving, misalignment with national development plans, limited impact, and a lack of awareness of the sector’s ecosystem. It is a global initiative that connects philanthropic work with knowledge networks that can deepen collaborations, leverage resources, sustain impact, and drive SDG delivery within national development agendas.

### 2. Project team and project development

Established as a global facilitator of partnerships between philanthropic organizations, the United Nations, governments, civil society, businesses, and other stakeholders, SDGPP is led by the United Nations Development Programme (UNDP) and Rockefeller Philanthropy Advisors (RPA). It is supported by the Conrad N. Hilton Foundation, Ford Foundation, Brach Family Charitable Foundation, and UN Foundation.

To date, over 1,000 philanthropists, social investors, and key opinion leaders have engaged in dialogue about the SDGs. They have also discussed development priorities and how to effectively engage national

actors through a series of capacity-building workshops and meetings.

The milestones and deliverables of the SDGPP include:

- December 2016: guides and tools for governments to engage with philanthropy;
- December 2017: data on philanthropic investments (via [sdgfunders.org](http://sdgfunders.org)) made available to track progress, find partners, and tell stories about effective collaborative efforts; country-level and sub-country level structures were used to identify opportunities for philanthropy and partners with which to collaborate; institutions engaged in philanthropy in support of SDG implementation.



### 3. Characteristics/features

The SDG Philanthropy Platform Impact Model has proven effective because of the following features:

- **Connecting and Converging:** It brings foundations and their grantees together with the government and UN to work with on national plans for SDG implementation. It builds connections on-the-ground and through a digital community platform. To date, the platform has engaged over 1,500 stakeholders through its global reach.
- **Building Collaborative Pathways:** Once the SDGPP brings stakeholders together, it utilizes their collective expertise to develop pathways whereby philanthropic actors and the government can collaborate. These pathways define key funding and innovation areas and have the potential to accelerate progress towards the fulfillment of the SDGs. SDGPP has developed 11 scalable pathways to achieve the SDGs.
- **Catalyzing Innovation:** By connecting key stakeholders and building collaborative pathways for local SDG action, SDGPP is able to catalyze and fund innovative approaches to solve the world's most pressing problems. Through rich data, ecosystem mapping, and robust networks, SDGPP connects foundations to initiatives focused on the SDGs.

## III. Impact

### 1. Achievement

SDGPP has been instrumental in breaking down silos and piloting new models for multi-stakeholder engagement. Below are some highlights from 2017:

- SDGPP organized and participated in 70+ global, regional and local events, including the UN General Assembly, the Social Good Summit, Rethinking Philanthropy, among others. At these events it promoted multi-stakeholder partnerships for the SDGs and showcased SDG localization best practices in pilot countries.
- 100+ stakeholders were brought together to identify collaborative pathways for finding inclusive, innovative, and scalable solutions to address various issues. 16 SDG accelerators have been identified as a result of these consultations.
- Eight Innovation Challenge winners have been identified and awarded with funding to the amount of USD 307,000.



## Goal 17 –

# PPP – Partnership Between the Government and Social Capital to Advance Technical Innovation

### Matrix:

Related SDG: 17, 4, 10



Essential Technologies:  
Multiple technologies



Recommendation Index:  
4 stars

Impact	4
Scalability	4
Sustainability	3
Technology	4
Innovation	4

## I. Introduction

When the government invests in infrastructure and other services for the public, it is often suspected to be plagued with inefficiencies and a lack of professionals. Some suggest that the private sector would be better suited to handle the projects that the government pledges to do. More governments are now embracing public-private partnerships (PPP), where governments contract out a task to the private sector and collectively negotiate financing agreements. The Chinese government is now in the mode of “scaling up” its public-private partnerships.



2. Project team and project



## II. Description

### 1. Background

PPPs refer to a long-term contract between the government and one or more private entities that includes franchise rights or subsidies, as well as shared risk and responsibility. In a typical PPP setup, the government signs a franchise contract with a special purpose company, usually the one who wins a bidding process. The company is responsible for fundraising, construction, and operation, while the government provides financial institutions (including banks, trust companies, insurance companies and investment companies) with loan amounts sufficient to pay all relevant fees in accordance with the signed contract.

### 2. Project team and project development

The UK first used the PPP model in 1992. More than 75% of government managers believe that projects under the PPP model meet and exceed price and quality requirements, saving more than 17% in project funds. China's PPP development has gone through three stages:

- 1995 – 2003 “Crossing the river by feeling the stones”: The PPP model was introduced to China as a new project financing method, which coincided with demand from the Chinese government for foreign investment.
- 2004 – 2013 “Black Cat White Cat”: The PPP model was officially introduced for municipal public utility projects and large-scale initiatives were launched in the areas of water supply, sewage treatment, and natural gas supply.
- 2014 – present “Scaling”: The central government communicated its support for the PPP model and intends to promote its application in institutions, legislation, and projects (representing the three levels of application). It will also establish and improve PPPs in the public service environment, ecological protection, and infrastructure.

### 3. Characteristics/features

- PPP is a new type of project financing model. The direct benefits of project management and the benefits converted through government support can be the source of funding for the repayment of loans. Moreover, the PPP model guarantees, to an extent, a particular rate of return on private capital.
- Private capital investors have the ability to apply better technology to government projects that use the PPP model, thereby improving project efficiency and reducing risk.
- The PPP model mitigates the burden of investment and reduces the risks associated with the government’s initial construction. It can also improve public services and the quality of infrastructure services.

## III. Evaluation

### 1. Achievement

The primary advantage of the PPP model is the introduction of market mechanisms into the financing of infrastructure. Some examples of the benefits of the PPP model include eliminating high governmental project costs, converting government functions, reducing financial burdens, promoting the diversification of investment, and promoting knowledge- and experience-sharing between government departments and the private sector. Project participants can form strategic alliances and play a key role in coordinating the different interests of the parties. In 2017, the National Development and Reform Commission announced 43 new PPP projects. The projects have large technological components and benefit a significant portion of the population. Many also promote the achievement of the SDGs.

### 2. Limitations, challenges, and recommendations

The PPP model has led to a number of problems in some cases, including the high cost of financing in the private sector, the creation of monopolies caused by franchising, inefficiencies due to complex transaction structures, a lack of flexibility after long-term contracts are signed, and difficulties in determining the cost of services. According to the Chinese government’s “Notice on Deepening the Cooperation Between the Government and Social Capital in the Field of Public Service,” the reform of China’s PPP model has undergone improvements. These include adjustments to the public service supply, the expansion of the effective supply, PPP promotion and application, improved pre-project demonstration, standardization in project implementation, autonomy for the partners of demonstration projects, localized management systems, increased financial support, and the development of a PPP integrated information platform.

## IV. Key findings and recommendations for stakeholders

### 1. Key findings

The findings of the “Technology for Philanthropy Under the SDGs” report are as follows:

**1.1 ICT4D (Information and Communications Technologies for Development) is still the mainstream application of technology in the field of philanthropy, especially in China.**

In the case studies, 15 out of 34 cases are ICT related cases. These include applying big data to support poverty alleviation, conducting distance learning to supplement education, empowering girls through coding, and smart governance carried out by the government. ICT has been applied widely in the development areas. ICT4D<sup>8</sup> refers to the application of information and communication technology (ICT) in development, with a particular focus on helping poor and marginalized demographics and communities. It supports international development by bridging the digital divide and providing equitable access to technology. UNDP and other UN agencies have been actively promoting the use of ICT4D on a global scale. The development of ICT4D has gone through three major stages, from 0.0 to 2.0.<sup>9</sup> Not only is the level of ICT development varied around the world, but the application and focus, as well as the main participants in such development, also differ. Regardless, ICT has had a disruptive impact on the methods of participation in philanthropy. At present, it is still the primary mode for science and technology to be applied to solve development problems and it has potential to be a driver in the use of big data. The development of China's ICT industry has ensured that its infrastructure and user groups allow for ICT4D to be adopted and improved across many fields.

**1.2 For the fruitful application of technology in the field of philanthropy, partnerships and feasibility assessments are key.**

The successful use of biotechnology, big data in medicine, artificial intelligence, innovative medical devices, and other technologies in the field of philanthropy depends upon the feasibility of the project. This includes the adaption of highly-sophisticated technology to local conditions, the ease of operation, and the degree of adoption. In addition to the technology itself, the role of partners cannot be ignored. Charities must cooperate with the government or technology companies to perform well their duties and to ensure the effective implementation of projects.

**1.3 Technology is not a panacea. Project application scenarios and projects' compatibility with SDGs matter more.**


Although case selection is based on the application of technology to philanthropic activity, technology is not a panacea for solving development problems. For certain goals, the power of technology is applicable and effective, while for other goals technology alone cannot ensure

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<sup>8</sup> Unwin, 2009, p. 9.

<sup>9</sup> Heeks, 2009, p. 3.





effectiveness. Thus, government support, teamwork, and cooperation are also important, as well as the matching of technology to the SDGs. Using the example of Ant Forest, only a collaboration between technology companies and NGOs made remote anti-desertification possible.

#### **1.4 Model innovation and technological innovation together contribute to the development of philanthropy. Innovation is still the driving force.**

As mentioned above, philanthropy is an emerging driving force for technology to become a tool for economic, social, and environmental development. It should be emphasized that innovation in the application of technology to philanthropy should strike a balance between model innovation and technological innovation. Such a balance will ensure all technology is fit for local conditions and purposed to solve specific social problems. In the case of applying innovative models to subsidize airtight storage equipment and provide training to small-scale farmers, the model weights more than the technology. Merely chasing after high-tech solutions may not result in an evidence-based outcome.

#### **1.5 Technology for Philanthropy is not limited to development field. The future may lie in impact investment.**

The ultimate goal of technology in philanthropy is not the solving of a single problem or a type of problems, but rather a long-term, sustainable solution. Under the vision of “Big Philanthropy,” forward-looking entrepreneurs and philanthropists are supporting a wide range of projects through the use of impact investment. This may cultivate a technological philanthropic culture in society that is fit to promote social innovation and solve social problems, as well as scale up impactful projects more sustainably.

## **2. Recommendations for stakeholders**

Using technology in philanthropy as a starting point, strategies to advance the SDGs should be continuously developed in different countries and fields. Individuals have different approaches, which allows for sustainable development to advance from a wide range of angles.

### **2.1 Government:**

As a policy maker, the government should support policies for science and technology in view of creating an empowering environment for active participation and effective practice. Taking China as an example, the 18th National Party Congress proposed an innovation-driven development strategy <sup>10</sup> and once again reaffirmed their desire to enter the ranks of innovative countries. This policy encourages the integration of technology with philanthropy and provides more possibilities for innovation in the field of philanthropy. Policy development is the primary way for the government to participate in “technology and philanthropy.”

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<sup>10</sup> Ministry of Science and Technology, 2016.

## **2.2 Enterprise:**

The extent of corporate participation in “technology and philanthropy” is closely related to each company's own strengths, philanthropic strategy, and leadership style. In addition to existing donation approaching, technology companies have the ability to add philanthropic ends to existing technological applications and use their expertise to drive sustainable development. For entrepreneurs, support for “technology and philanthropy” can be achieved in a variety of ways, including working with corporate foundations, supporting charitable organizations and projects that solve social problems, and promoting sustainable development through impact investment. Companies can use capital and technology to participate in “technology and philanthropy.”

## **2.3 Non-profit organizations:**

Non-profit organizations that specialize in solving social problems can improve project efficiency and social impact by adopting existing technologies or by seeking to collaborate with companies or research institutions. Their experience in solving social problems is the primary means by which non-profit organizations can participate in “technology and philanthropy.”

## **2.4 Academic research institutions:**

Research institutions can assist with implementation through research in the fields of policy, technology, and social development. They can also participate in the planning phase of innovation. Scientific research and talent acquisition are the primary contributions for academic research institutions to participate in “technology and philanthropy.”

Technology for philanthropy has become a new trend sweeping the world. The rise of global technology companies, philanthropists, research institutions, and public welfare organizations responding to the 2030 agenda, not only brings new momentum to the advancement of science and technology, but also promotes the incorporation of philanthropy in sustainable development. Policies that support technological innovation will allow Chinese “technology and philanthropy” companies and non-profit organizations to participate in more international exchanges, continue expanding globally, and promote the achievement of the SDGs.

## V. Appendix

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## 2. Sources for Case Studies

SDG	Case Title	Source	Link	Type		
				Direct Team	Desk Research	Inter view
1	Ignitia	Justine Hufford, "Ignitia", Global Innovation Exchange, 2 March, 2018	<a href="https://www.lobalinnovationexchange.org/innovation/ignitia">https://www.lobalinnovationexchange.org/innovation/ignitia</a>		x	
		Ignitia official website	<a href="http://www.ignitia.se/">http://www.ignitia.se/</a>		x	
	People & Data	Marker Sustainability Consulting, "Impact investment with big data to serve 20317 natural villages, more than 10 million people. They almost do it on foot", 22 May 2018	<a href="https://mp.weixin.qq.com/s/UchZ0GqW8iPbKdR-8os2gg">https://mp.weixin.qq.com/s/UchZ0GqW8iPbKdR-8os2gg</a>		x	
		CSR Report on People & Data	(Internal CSR report)			x
2	Preserving Harvests	World Food Programme. "Preserving Harvests - Eradicating Hunger."	<a href="https://documents.wfp.org/stellent/groups/public/documents/reports/wfp289791.pdf?_ga=2.79691281.425639774.1517037158-2137076846.1515566164">https://documents.wfp.org/stellent/groups/public/documents/reports/wfp289791.pdf?_ga=2.79691281.425639774.1517037158-2137076846.1515566164</a>		x	
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		XinhuaNet. "Investing in agricultural science and technology critical to achieving zero hunger by 2030," 13 Dec 2016.	<a href="http://www.xinhuanet.com/english/world/2016-12/13/c_135902847.htm">http://www.xinhuanet.com/english/world/2016-12/13/c_135902847.htm</a>		x	
	Food Safety Cloud	China Food Safety Network. (official website)	<a href="http://www.cfsn.cn/">http://www.cfsn.cn/</a>	x		
		Chinese Guizhou Province Government. (official website)	<a href="http://www.chinaguizhou.gov.cn/">http://www.chinaguizhou.gov.cn/</a>	x		
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SDG	Case Title	Source	Link	Type		
				Direct Team	Desk Research	Inter view
2	Food Safety Cloud	Yang Yan. "Guizhou Province releases the 'Food Safety Cloud' system application platform," Guizhou News, 26 May 2018. (in Chinese)	<a href="http://www.chinaguizhou.gov.cn/system/2018/05/26/016606658.shtml">http://www.chinaguizhou.gov.cn/system/2018/05/26/016606658.shtml</a>		x	
3	Paperfuge	Fang Zheng "An interview with BrainCo Han Bicheng: brain Control equipment will become the Ultimate Mode of Human-Computer interaction", Zhihu, 3 Jan 2017.	<a href="http://mini.eastday.com/a/160322094932844.html">http://mini.eastday.com/a/160322094932844.html</a>		x	
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		Yanshu, "Ultimate wearable :brain wearable(brainco)", Xtecher, 23 July 2015	<a href="http://www.xinhuanet.com/english/world/2016-12/13/c_135902847.htm">http://www.xinhuanet.com/english/world/2016-12/13/c_135902847.htm</a>		x	
4	Bridge International Academies	The Bill and Melinda Gates Foundation. "2015 Gates Annual Letter," 2015.	<a href="https://www.gatesnotes.com/2015-annual-letter?lang=en&amp;page=0&amp;WT.mc_id=01_21_2015_AL2015-PI_COM_NA_Top_12">https://www.gatesnotes.com/2015-annual-letter?lang=en&amp;page=0&amp;WT.mc_id=01_21_2015_AL2015-PI_COM_NA_Top_12</a>		x	
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SDG	Case Title	Source	Link	Type		
				Direct Team	Desk Research	Interview
4	Adream	Adream.org. (official website)	<a href="http://www.adream.org/">http://www.adream.org/</a>	x		
		Expert consultation with team.	N/A	x		
		Adream. "Dream Caravan: A Mobile Dream Catcher," 29 Aug 2016. (in Chinese)	<a href="http://www.adream.org/news/简介-梦想大篷车%E7%BC%9A一个移动的梦想中心">http://www.adream.org/news/简介-梦想大篷车%E7%BC%9A一个移动的梦想中心</a>		x	
		Adream. "Dream Caravan: Dreaming for a Horse - onward!", 20 Sept 2015. (in Chinese)	<a href="http://www.adream.org/news/梦想大篷车-以梦为马">http://www.adream.org/news/梦想大篷车-以梦为马</a>		x	
5	Technovation	Technovation official website	<a href="https://technovationchallenge.org/">https://technovationchallenge.org/</a>		x	
	Coding Girls Club	Interview	N/A			x
		CGC official website	<a href="http://codinggirls.club/">http://codinggirls.club/</a>		x	
6	Balde a Balde	Balde-a-Balde founder: kimchow	<a href="http://cargocollective.com/kimchow/Balde-a-Balde">http://cargocollective.com/kimchow/Balde-a-Balde</a>		x	
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SDG	Case Title	Source	Link	Type		
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7	Baofeng Group	Baofeng Group: "Photovoltaic Lycium barbarum" Special investigation - consultation	N/A			x
		Ningxia News Net, "Baofeng Group builds 'Agriculture, Light and Tourism' Integrated demonstration Zone with New Energy which consists of 'Agriculture, Light and Tourism'". 27 May 2016.	<a href="http://www.sohu.com/a/77608072_204350">http://www.sohu.com/a/77608072_204350</a>		x	
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SDG	Case Title	Source	Link	Type		
				Direct Team	Desk Research	Interview
9	LC3 - New Construction Technology	LC3 "Limestone Calcined Clay Cement". (official website)	<a href="https://www.lc3.ch/">https://www.lc3.ch/</a>	x		
		Hostettler, Silvia, Samira Najih Besson and Jean-Claude Bolay eds). Technologies for Development: From Innovation to Social Impact. Springer, 2018.	<a href="https://www.springer.com/us/book/9783319910673#aboutBook">https://www.springer.com/us/book/9783319910673#aboutBook</a>		x	
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	China's "Blockchain + Charity"	Direct interview with team.	N/A			x
		Gao Wenxing. "The Chinese Practice of 'Blockchain + Charity'," Gongyi Shibao, 29 Aug 2017. (in Chinese)	<a href="http://www.gongyishibao.com/html/yaowen/12356.html">http://www.gongyishibao.com/html/yaowen/12356.html</a>		x	
		Tianye Maisui. "Ali uses the Internet for Charity: Is the charity blockchain by Ant Financial more form than substance," Huxiu, 1 Sept 2016. (in Chinese)	<a href="https://www.huxiu.com/article/162279.html">https://www.huxiu.com/article/162279.html</a>		x	
		Qin Puyue. "Blockchain technology is transforming charity, distancing 'shady practices' from charity," Golden Finance, 19 Sept 2017. (in Chinese)	<a href="http://www.jinse.com/blockchain/70110.html">http://www.jinse.com/blockchain/70110.html</a>		x	

SDG	Case Title	Source	Link	Type		
				Direct Team	Desk Research	Interview
9	China's "Blockchain + Charity"	PI Lei. "Blockchain + Charity, concept or trend?" Gongyi Shibao, 11 Jan 2017. (in Chinese)	<a href="http://www.gongyishibao.com/html/yaowen/11197.html">http://www.gongyishibao.com/html/yaowen/11197.html</a>		x	
		Zheng Kai. "When blockchain meets charity, it is easy to have three pillars of support," Sohu, 3 Aug 2018. (in Chinese)	<a href="http://www.sohu.com/a/161955891_116326">www.sohu.com/a/161955891_116326</a>		x	
10	ING Care	ING Care. (official website)	<a href="http://www.ingcare.com/">http://www.ingcare.com/</a>	x		
		Zhenghedao Gushihui. "Helping 10 million autistic children in four years, Using technology to help autistic children create happiness," Sohu, 26 Oct 2017. (in Chinese)	<a href="http://www.sohu.com/a/200491537_309555">http://www.sohu.com/a/200491537_309555</a>		x	
		Discapacidad Colombia. "ConVerTic: Technology to See," 2018.	<a href="http://js.china.com.cn/information/zgjsw79/msg20721398117.html">http://js.china.com.cn/information/zgjsw79/msg20721398117.html</a>		x	
	ConVerTic	Discapacidad Colombia. "ConVerTic: Technology to See," 2018.	<a href="http://discapacidadcolombia.com/index.php/articulos-discapacidad/convertic">http://discapacidadcolombia.com/index.php/articulos-discapacidad/convertic</a>		x	
11	Baidu Recycle	Baidu Innovation. "AI for GOOD," 2017. (in Chinese)	<a href="http://innovation.baidu.com/detail/8.html">http://innovation.baidu.com/detail/8.html</a>		x	
		UNDP Innovation Facility. "2016 Year in Review: Spark, Scale, Sustain," 2017.	<a href="http://www.undp.org/content/dam/undp/library/innovation/Version%2022%20-%20July%2011%20-%20Annual%20Report%202016%20V17.pdf">http://www.undp.org/content/dam/undp/library/innovation/Version%2022%20-%20July%2011%20-%20Annual%20Report%202016%20V17.pdf</a>	x		x
	Bangladesh	Shahi, Twishy. "This Bangladeshi startup doesn't want you to ever get stuck in traffic," e27, 4 Aug 2015.	<a href="https://e27.co/this-bangladeshi-startup-doesnt-want-you-to-ever-get-stuck-in-traffic-20150804/">https://e27.co/this-bangladeshi-startup-doesnt-want-you-to-ever-get-stuck-in-traffic-20150804/</a>		x	



SDG	Case Title	Source	Link	Type		
				Direct Team	Desk Research	Inter view
12	AVANI	Avani Eco official website	<a href="https://www.avanieco.com">https://www.avanieco.com</a>		x	
	Green Earth	Lin Chuan, "Microsoft engineer earned 10 millions by picking up litter within two years, and helped people make money. The reasons are..." Sina Viewpoints, 29 April, 2018.	<a href="https://k.sina.com.cn/article_5617174412_14ecf478c019008y1b.html?wm=13500_0">https://k.sina.com.cn/article_5617174412_14ecf478c019008y1b.html?wm=13500_0</a>		x	
13	NASU-SSAU	UN-SPIDER. "Recommended Practice: Radar-based Flood Mapping," 2 Mar 2014.	<a href="http://www.un-spider.org/advisory-support/recommended-practices/recommended-practice-flood-mapping">http://www.un-spider.org/advisory-support/recommended-practices/recommended-practice-flood-mapping</a>		x	
		UNOOSA. "Report on the United Nations International Conference on Space-based Technologies for Disaster Management: Understanding Disaster Risk (Beijing, 19-21 September 2016)," 28 Nov 2016.	<a href="http://www.unoosa.org/oosa/oosadoc/data/documents/2016/aac.105/aac.1051130_0.html">http://www.unoosa.org/oosa/oosadoc/data/documents/2016/aac.105/aac.1051130_0.html</a>		x	
		UNOOSA. "Report on the United Nations/Austria Symposium on Integrated Space Technology Applications for Climate Change (Graz, Austria, 12-14 September 2016)," 28 Nov 2016.	<a href="http://www.unoosa.org/oosa/oosadoc/data/documents/2016/aac.105/aac.1051127_0.html">http://www.unoosa.org/oosa/oosadoc/data/documents/2016/aac.105/aac.1051127_0.html</a>		x	
	Ant Forest	Expert consultation with team.	N/A	x		
		Baike Baidu. "Ant Forest," 20 June 2018. (in Chinese)	<a href="https://baike.baidu.com/item/蚂蚁森林">https://baike.baidu.com/item/蚂蚁森林</a>		x	
14	Greenwave	Greenwave official website	<a href="https://www.greenwave.org/">https://www.greenwave.org/</a>		x	
		Design to Improve Life, "Greenwave: 2017 Work Winner" 1 Sep, 2017	<a href="https://designtoimprovelife.dk/greenwave-2017-work-winner/">https://designtoimprovelife.dk/greenwave-2017-work-winner/</a>		x	

SDG	Case Title	Source	Link	Type		
				Direct Team	Desk Research	Inter view
14	Rainbow Fish	Internal Interview - Rainbow's Fish's new model of technology for philanthropy	N/A			x
15	ShadowView Foundation	ShadowView Foundation official website	<a href="https://www.smartparks.org/">https://www.smartparks.org/</a>		x	
	GAGO Inc.	Expert consultation with team.	N/A			x
16	Phones	UNDP. "Papua New Guinea: Phones against corruption," 16 Aug 2016.	<a href="http://www.asia-pacific.undp.org/content/rbap/en/home/ourwork/development-impact/innovation/projects/png-phone-against-corruption.html">http://www.asia-pacific.undp.org/content/rbap/en/home/ourwork/development-impact/innovation/projects/png-phone-against-corruption.html</a>	x		x
	Chinese Smart Court	China Court. (official website)	<a href="https://www.chinacourt.org/index.shtml">https://www.chinacourt.org/index.shtml</a>	x		
		Yu Ziru. "Chen Ziyuan: Smart courts let information do more, makes people waste less time," XinhuaNet, 12 Mar 2017. (in Chinese)	<a href="https://www.chinacourt.org/article/detail/2017/03/id/2577050.shtml">https://www.chinacourt.org/article/detail/2017/03/id/2577050.shtml</a>		x	
17	Public-Private Partnerships	Zhu Dajian. "The Innovation and Transcendence of the Public-Private Partnership Model," People's Daily, 22 Aug 2017. (in Chinese)	<a href="http://theory.people.com.cn/n1/2017/0822/c40531-29485003.html">http://theory.people.com.cn/n1/2017/0822/c40531-29485003.html</a>		x	
		Jia Shujun. "The focus on promoting Public-Private Partnership mechanisms," Hebei Daily, 3 June 2015. (in Chinese)	<a href="http://www.xinhuanet.com/chanye/sjz/2015-06-03/c_1115500533.htm">http://www.xinhuanet.com/chanye/sjz/2015-06-03/c_1115500533.htm</a>		x	
		Baike Baidu. "PPP model," 15 Aug 2018. (in Chinese)	<a href="https://baike.baidu.com/item/ppp%E6%A8%A1%E5%BC%8F/5474529">https://baike.baidu.com/item/ppp%E6%A8%A1%E5%BC%8F/5474529</a>		x	
	SDG Philanthropy Platform	SDG Philanthropy Platform. (official website)	<a href="https://www.sdgphilanthropy.org/">https://www.sdgphilanthropy.org/</a>	x		
		UN Sustainable Development. "SDG Philanthropy Platform."	<a href="https://sustainabledevelopment.un.org/partnerships/SDGphilanthropy">https://sustainabledevelopment.un.org/partnerships/SDGphilanthropy</a>		x	