2014 ANNUAL REPORT

UN GLOBAL PULSE

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Front Cover: Georgina Smith / UN

FOREWORD

The 2014 annual report of the United Nations Global Pulse comes at a moment of opportunity for an international paradigm shift. This year, countries aim to adopt a set of sustainable development goals and a universal climate agreement that, taken together, could mark an historic turning point for our planet and all people.

The data revolution can significantly contribute to this shift. Since its inception in 2009, Global Pulse has grown from a hypothesis that real-time digital data can be a global public good to a proven concept that it is possible to 'take the pulse' of the world using Big Data, inform policy responses and keep development on track.

This is paramount in today's volatile and interconnected world marked by growing demands for faster and smarter responses to the spread of new diseases, fluctuating food and fuel prices, and intensifying natural disasters.

I am heartened by how many partners have come together through the Global Pulse initiative to put the spirit of a data revolution into action.

At a time of global concern around data privacy, normative work on privacy protection by partners through the Global Pulse initiative is showing us ways to use this data in a responsible manner.

It will be essential to build on this progress in order to effectively implement the global agreements we hope to conclude in 2015. As the Global Pulse continues to shape policy frameworks that can leverage new data sources as an enabler of sustainable development, I encourage all partners to strengthen this valuable initiative and, by that, accelerate progress towards the future we want.

- Jan Eliasson, Deputy Secretary-General of the United Nations

The push for a data revolution is, at it's heart, about leaving no-one behind and giving all people a life of dignity.

We must raise the ambition of what we want to measure. That means not just looking back at what happened but examining trends as they emerge. Not only examining the hard figures but holistically considering people's wellbeing and listening to their views and priorities. Not collecting data for data's sake but aligning data collection and decision-making to deliver maximum impact from limited resources.

Global Pulse is doing vital work to bring about the promise of a data revolution. Working with Member States, UN and development partners to discover how to use new forms of digital data, to forge new partnership models and take fresh approaches to achieving the Sustainable Development Goals.

- Amina J. Mohammed, Assistant Secretary-General and Special Adviser on Post-2015 Development Planning

THE YEAR AT A GLANCE

When the Global Pulse initiative was launched by the UN Secretary-General in late 2009, its mission to use real-time and other non-traditional data sources in development and humanitarian action was groundbreaking.

Five years later, the initiative has enabled the growth of a thriving community of practice, redefined the data innovation landscape and demonstrated how real-time data can play a role in supporting decision-makers and shaping public service delivery.

Since the inception of Global Pulse, interest in big data and its relevance to the development agenda has grown exponentially. This growth has been accelerated by a global focus on the development agenda that will succeed the Millennium Development Goals, and discourse regarding the changing development and humanitarian landscape anticipated over the next 15 years.

In 2014, Global Pulse consolidated its expertise in the emerging field of Big Data for Development, assumed a highly visible advocacy role, undertook numerous activities to advance the field, and built a substantial network of development and private sectors partners.

Over 25 joint data innovation projects were implemented, making a significant contribution to the body of evidence demonstrating practical examples of how big data can complement traditional approaches to development planning and monitoring. The projects were driven by more than 15 new data and technology partnerships cultivated over the year, demonstrating the increasing willingness of the private sector to use data for the common good.

Global Pulse also provided substantive guidance and participated in intergovernmental processes determining that taking advantage

25 BIG DATA INNOVATION PROJECTS

135 PRESS ARTICLES

30 PRIVATE SECTOR COLLABORATORS

of real-time data should be considered a central part of the Post-2015 development agenda.[1]

Accordingly, the burgeoning Big Data for Development practitioner community has seen an influx of new actors across many sectors and regions. Despite the wide variation in programme areas and geographies, organisations entering this field typically experience common requirements and barriers, such as data privacy, access to data and lack of regulatory frameworks.

In recognition of the new landscape and the common set of barriers, Global Pulse underwent a strategic review in 2014, involving detailed consultations with over 60 stakeholders including donors, UN Agencies, Member States and other concerned
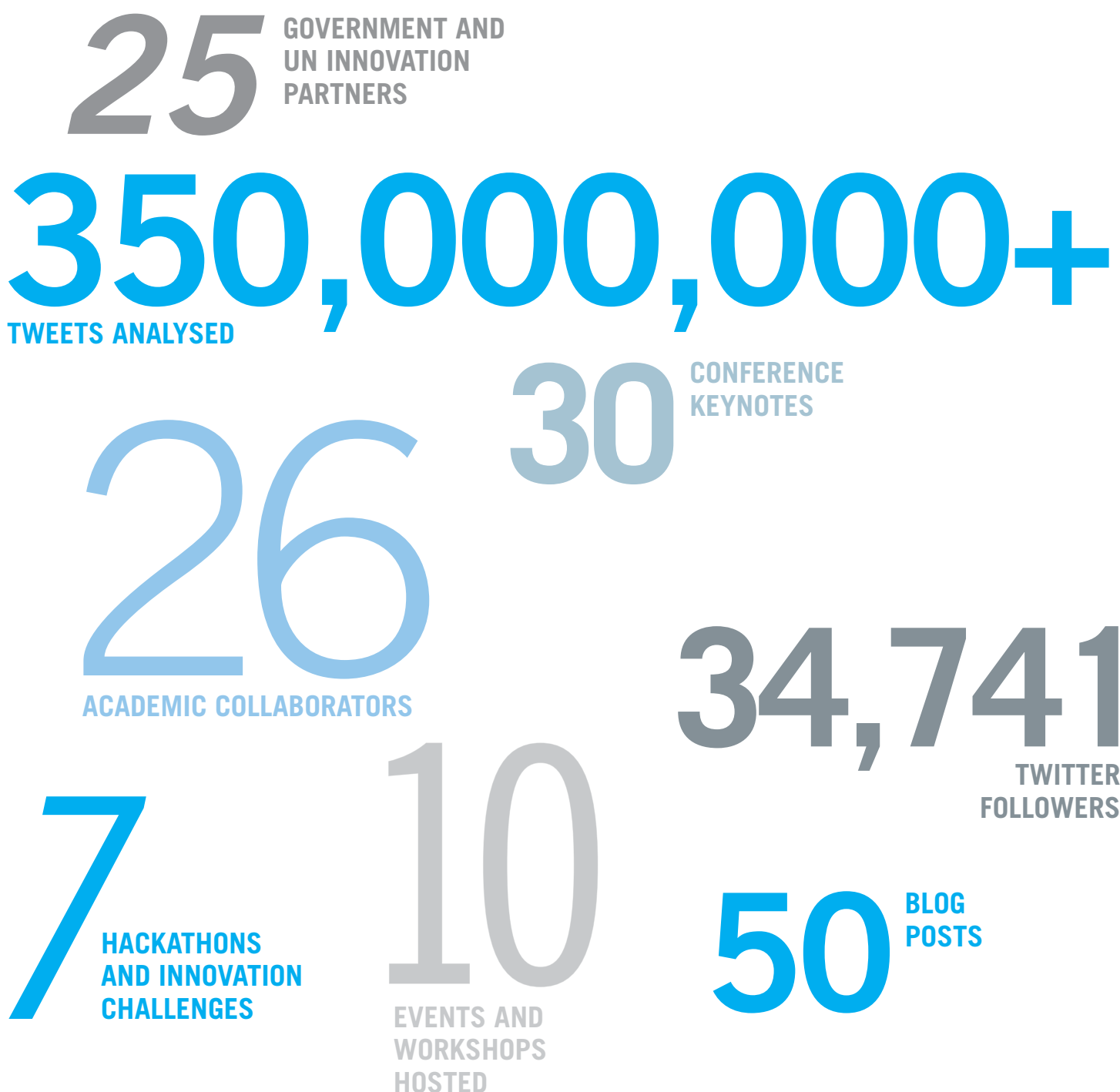
1 One Year On: An open letter from former members of the UN Secretary-General's High-Level Panel of Eminent Persons on the Post-2015 Agenda. http://www.un.org/sg/management/pdf/HLP_2015_open_letter_sept_2014.pdf

organisations. This resulted in a reframed two-track strategy of 1) direct implementation and 2) policy and ecosystem support activities.

In its first strategic track, Global Pulse operates as 'innovation driver,' providing technical services and guidance on implementing big data innovation projects. In the second track, Global Pulse operates as 'ecosystem catalyst,' supporting the development of frameworks for sustainable data access and responsible use, strengthening the innovation community of practice and building institutional capacity for real-time, data-driven operations. Underpinning both tracks is a focus on strategic partnerships, and data privacy and protection.

This report provides a brief overview of Global Pulse's work in 2014.

25 GOVERNMENT AND UN INNOVATION PARTNERS

350,000,000+
TWEETS ANALYSED

30 CONFERENCE KEYNOTES

26
ACADEMIC COLLABORATORS

34,741
TWITTER FOLLOWERS

7 HACKATHONS AND INNOVATION CHALLENGES

10
EVENTS AND WORKSHOPS HOSTED

50 BLOG POSTS

ABOUT

GLOBAL PULSE HAS THREE OBJECTIVES:

1 **ACHIEVE A CRITICAL MASS OF IMPLEMENTED DATA INNOVATIONS**

2 **LOWER BARRIERS TO ADOPTION AND SCALING**

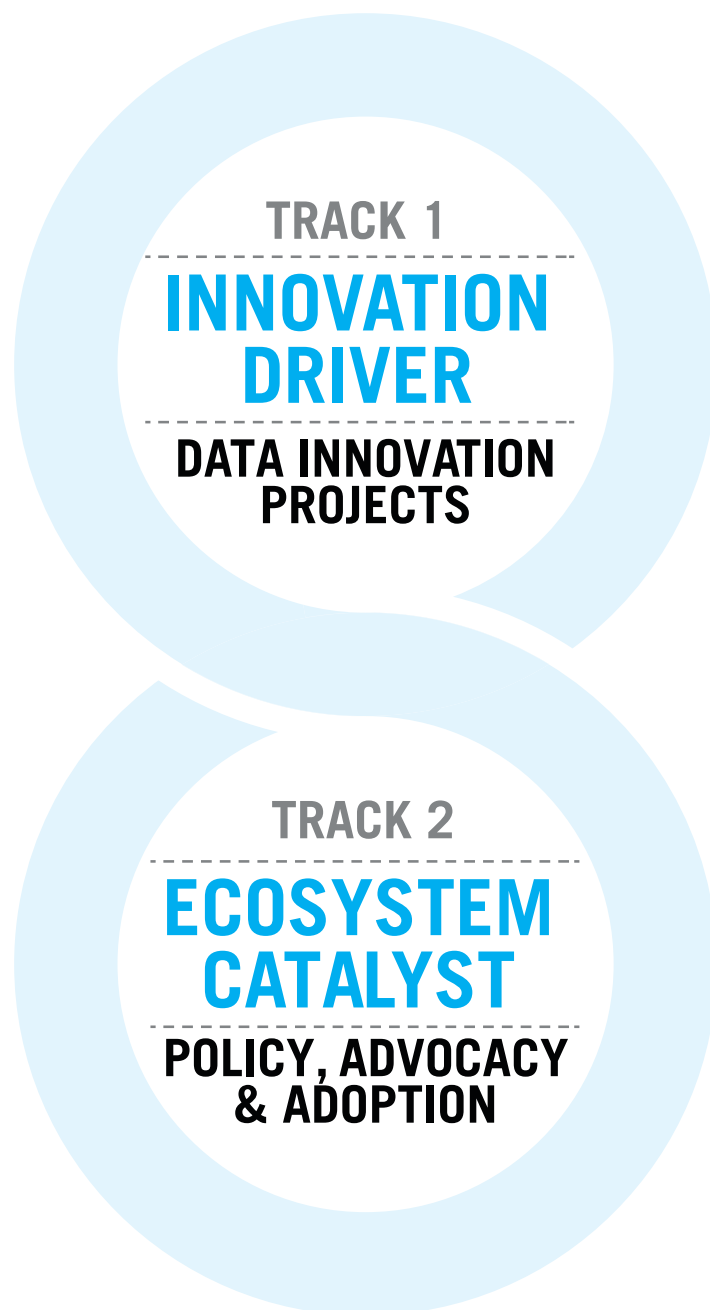**3** **STRENGTHEN THE BIG DATA INNOVATION ECOSYSTEM**

These objectives are achieved through a two-track implementation strategy:

TRACK 1: INNOVATION DRIVER
- Implement data innovation programmes through Pulse Labs to provide UN and development partners with access to the data, tools and expertise required to discover new uses of big data for development.
- Develop toolkits, applications and platforms to improve data-driven decision-making and support evaluation of promising solutions.

TRACK 2: ECOSYSTEM CATALYST
- Contribute to the development of regulatory frameworks and technical standards to address data sharing and privacy protection challenges.
- Engage key stakeholders on a priority innovation agenda.
- Provide public sector organisations with policy guidance and technical assistance to strengthen their capacity for integrating real-time insights into operations.

TRACK 1

INNOVATION DRIVER

DATA INNOVATION PROJECTS

TRACK 2

ECOSYSTEM CATALYST

POLICY, ADVOCACY & ADOPTION

ENGAGEMENT MODELS

Global Pulse has three modalities for working with the UN, governments and other development partners on big data innovation:

EXECUTOR
Pulse Labs execute data innovation projects together with UN and development partners contributing practical subject-matter expertise.

FACILITATOR
Pulse Labs enables data innovation projects through the facilitation and brokering of data science partnerships with private sector and academia.

TECHNICAL ADVISOR
Global Pulse provides guidance on policy issues such as data privacy and data access, as well as technical issues such as data science methodologies and open innovation practices.

A NETWORK OF PULSE LABS

Big data analysis needs to be understood in context in order for it to yield insights for global development and humanitarian purposes. That is why Global Pulse is organized into a network of Pulse Labs in different regions of the world with a lab at the UN in New York, in Jakarta, Indonesia, and in Kampala, Uganda.

Big data analysis also takes practice, and teamwork. Pulse Labs offer a safe space for experimentation and learning for UN and public sector partners, industry, academia and the technology sectors. Pulse Labs include interdisciplinary teams of social scientists, data scientists, engineers and analysts who build bridges with a wide range of partners and collaborators to prototype, test and share big data techniques and tools. The Pulse Labs share knowledge gained from innovation projects by producing technical papers as well as project briefs tailored to
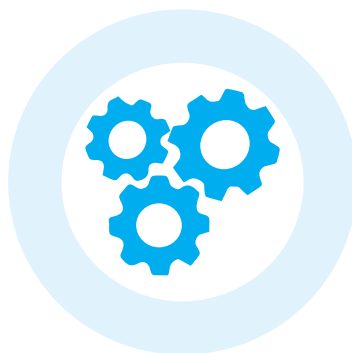
PARTNERSHIPS

Partnership and collaboration is central to the success of Global Pulse's vision of big data being leveraged as a resource for sustainable development. The Global Pulse network of partners includes private sector companies willing to grant access to data and tools for public good, as well as industry leaders, non-profits and research institutions ready to bring their skills to the task of advancing the use of data science in the global development and humanitarian sectors.

GRANTING ACCESS TO DATA AND SUPPORTING DATA PHILANTHROPY
Partners provide access to data for innovation projects in Pulse Labs, and support the advancement of "data philanthropy."

PROVIDING TECHNOLOGY
Partners provide analytical tools, software, data storage or computing capacity to Pulse Labs.
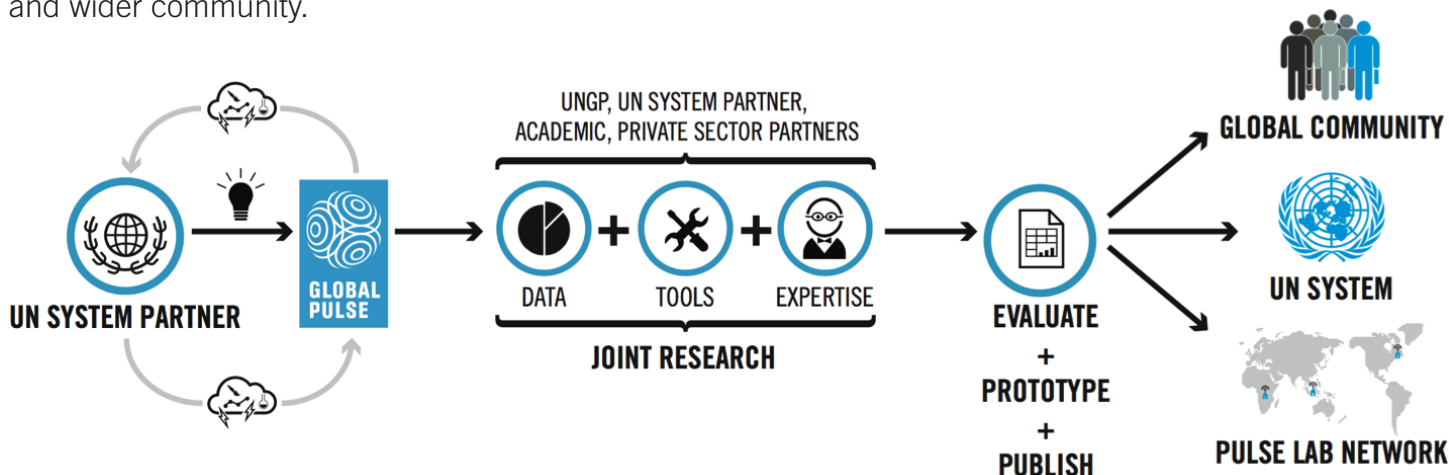
SHARING EXPERTISE
Partners provide technical skills to support innovation projects, collaborate on advocacy work, or provide expertise on normative issues such as data privacy.
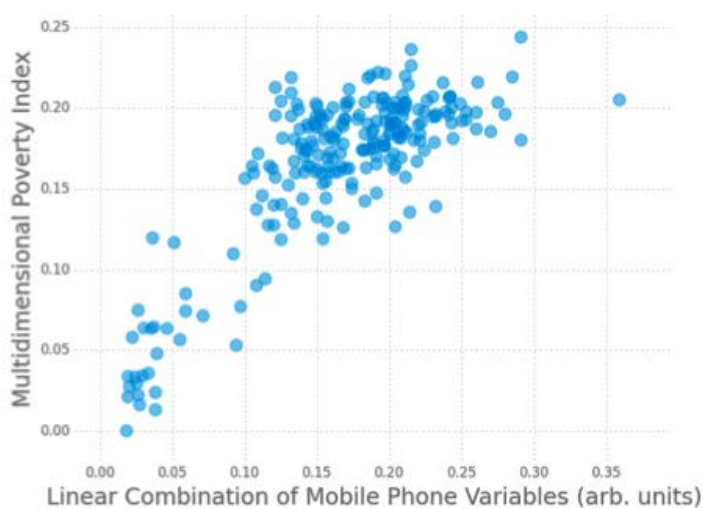
DATA INNOVATION PROJECTS

Global Pulse's innovation cycle begins by brainstorming with UN and development partners. Then, a multi-disciplinary project team designs and conducts the analysis and develops prototypes. Finally, project findings are evaluated and published openly to enhance knowledge across the Pulse Lab Network and wider community.

In collaboration with partners across private sector, the UN and academia, 25 data innovation projects were commenced or completed in 2014. A summary of featured projects includes:

MOBILE PHONE DATA ANALYSIS

The figure shows the correlation between the Multidimensional Poverty Index and a combination of mobile phone variables (including top-ups).
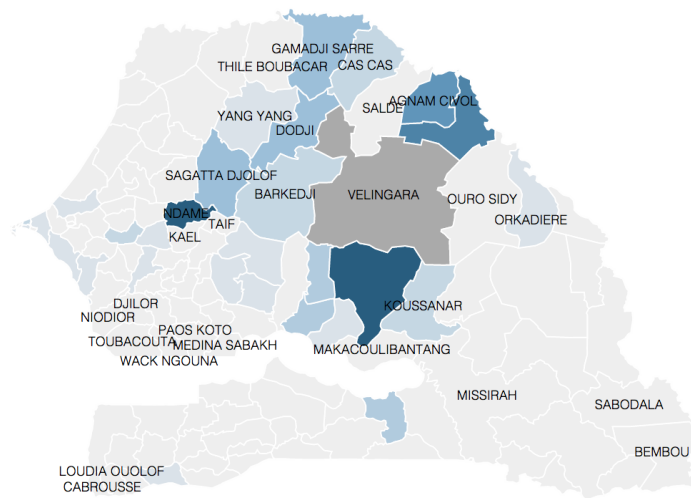
USING MOBILE PHONE DATA AND AIRTIME CREDIT PURCHASES TO ESTIMATE FOOD SECURITY

This study assessed the potential use of mobile phone data as a proxy for food security indicators. It was conducted jointly with the UN World Food Programme (WFP), Université Catholique de Louvain and Real Impact Analytics of Belgium. Data from airtime credit purchases (or "top-ups") and mobile phone activity in an East African country was compared to a nationwide household survey conducted by WFP at the same time. Results showed high correlations between airtime credit purchases and survey results referring to consumption of several food items, such as vitamin-rich vegetables, meat or cereals.

Findings demonstrated that airtime purchases could serve as a proxy indicator for marketplace food expenditures. In addition, models based on both mobile phone activity and airtime credit purchases were shown to accurately estimate multidimensional poverty indicators. Proxies like these could be usefully integrated into existing monitoring systems.

	PROJECT	PARTNER	DATA TYPE	COUNTRY	LAB
FOOD & AGRICULTURE					
	Estimating Food Security	WFP	Mobile	East Africa	New York
	Nowcasting Food Prices	Ministry of Development Planning (Bappenas), WFP	Social media	Indonesia	Jakarta
	Analysing Seasonal Changes in Migration Patterns	WFP	Mobile	Senegal	Kampala
ECONOMIC WELL-BEING					
	Analysing Public Perceptions of Gas Subsidy Reform	World Bank	Social media	El Salvador	New York
	Estimating International Migration Flows	UNFPA	Online search	Australia	New York
	Discovering a New Proxy for Economic Activity	Universal Postal Union	Postal	Global	New York
	Identifying Trends in Discrimination Against Women in the Workplace	Bappenas, ILO	Social media	Indonesia	Jakarta
HUMANITARIAN ACTION					
	Enhancing Disaster Management and Response	Government of Mexico, WFP	Mobile, satellite	Mexico	New York
PUBLIC HEALTH					
	Remote Monitoring and Detection of HIV Stigma	UNAIDS, Government of Brazil Ministry of Health	Social media	Brazil	New York
	Analysing Public Perceptions of Sanitation	UN Millennium Campaign, WSSCC	Social media	Global	New York
	Understanding Public Perceptions of Immunisation	Bappenas, Ministry of Health, UNICEF, WHO	Social media	Indonesia	Jakarta
	Analysing Attitudes to Contraception and Teenage Pregnancy	UNFPA	Social media, UNICEF U-report	Uganda	Kampala
	Identifying Trends in Population Movement and Disease Mapping	Ministry of Health, WHO	UNICEF's M-trac system	Uganda	Kampala
	Understanding Themes in Gender Issues and Family Planning	UNFPA	News articles	Uganda	Kampala
CLIMATE & RESILIENCE					
	Measuring Global Engagement on Climate Change	Executive Office of the UN Secretary-General	Social media	Global	New York
	Supporting Forest and Peat Fire Management	UNORCID	Social media	Indonesia	Jakarta
DATA PRIVACY & PROTECTION					
	Protecting Privacy While Preserving Utility of Mobile Phone Data		Mobile	Global	New York
POST-2015					
	Understanding the Post-2015 Development Landscape	UN Resident Coordinator, Government of Uganda	Social media, UNICEF U-report	Uganda	Kampala
REAL-TIME EVALUATION					
	Digital M&E Toolkit			Indonesia	Jakarta

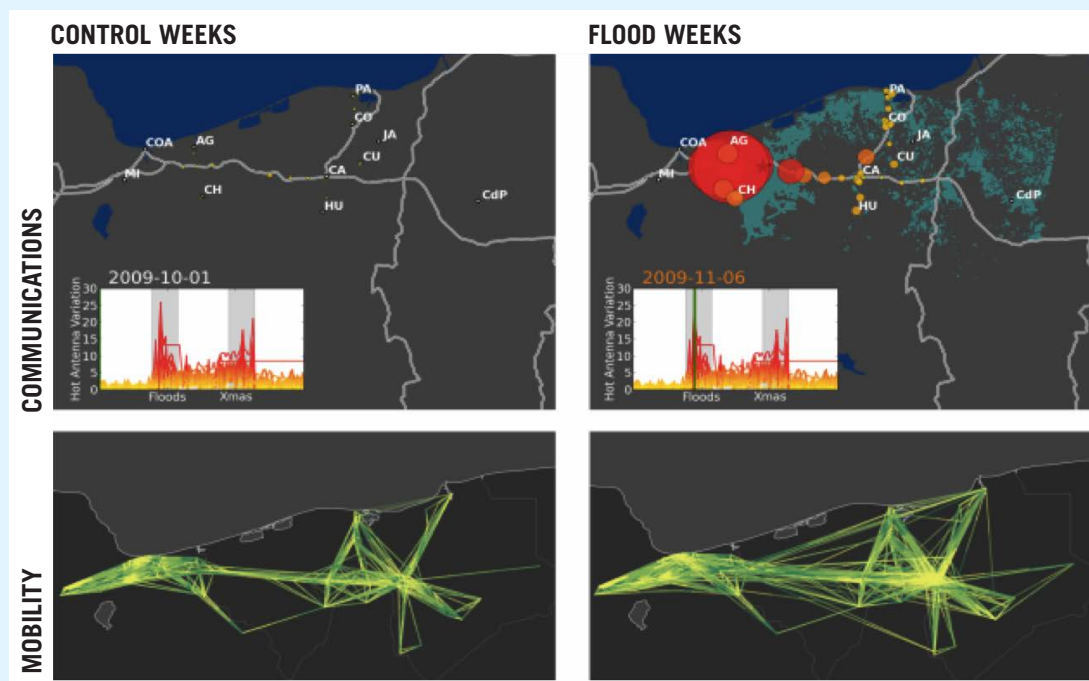## ANALYSING SEASONAL CHANGES IN MIGRATION PATTERNS USING MOBILE PHONE DATA

The visualisation shows seasonal movements of phone users in Velingara, Senegal, to surrounding districts in 2013 (more people moved to darker-coloured districts).

Pulse Lab Kampala collaborated with WFP in Senegal and researchers from the Technical University of Madrid to analyse seasonal changes in migration patterns using mobile phone data. The project was part of the Orange "Data for Development Challenge" (D4D), an open data competition that made anonymised mobile phone data from Senegal available to researchers. Mobility information from anonymised mobile phone tower signals was used to identify the timing of labour migration (i.e. to find work or travel with livestock). The findings showed that people in different regions exhibited mobility patterns that change by season, and that annual events such as agricultural harvests affect mass movement patterns. Results of the project included a new method for establishing a baseline of mobility patterns related to livelihood zones, as well as multiple interactive visualisations. Understanding seasonal migration patterns could prove useful in targeting service delivery to rural populations.

USING MOBILE PHONE ACTIVITY FOR DISASTER MANAGEMENT DURING FLOODS

Global Pulse collaborated with WFP, the Government of Mexico, the research division of mobile network operator Telefonica and the Technical University of Madrid to explore whether anonymised data collected by mobile network operators could be used to track population movement after natural disasters. Mobile phone activity data was combined with satellite data to understand how people communicated during severe flooding in the Mexican state of Tabasco in 2009. The results of the study showed that the patterns of mobile phone activity in affected locations during and after the floods could be used as indicators of disaster impact on infrastructure, the population and public awareness of the event. These results demonstrated the value of public-private partnership in using mobile phone data to improve early warning and crisis management, and that real-time insights about human behaviour during such critical events could be used to improve disaster response.
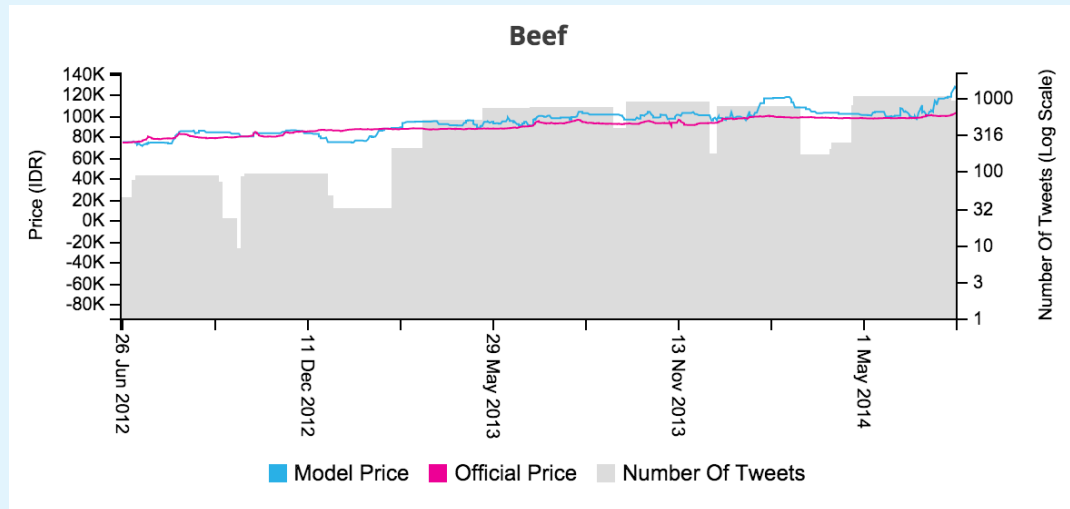

The maps show the level of mobile phone activity and population mobility before and during 2013 floods in Tabasco, Mexico.

SOCIAL MEDIA ANALYSIS
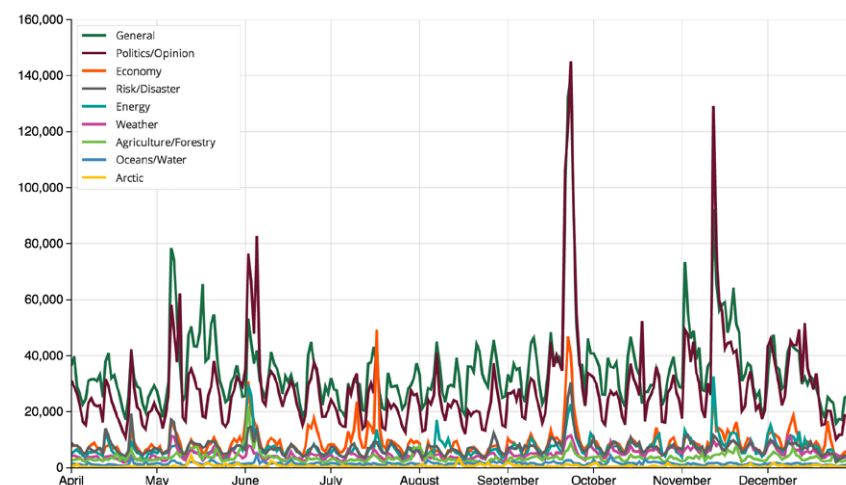
NOWCASTING FOOD PRICES USING SOCIAL MEDIA DATA

This project explored how Twitter data can be used to 'nowcast' or provide real-time food prices. Pulse Lab Jakarta collaborated with the Indonesian Government and WFP on the study, the outcome of which was a statistical model of daily price indicators for four food commodities: beef, chicken, onion and chili. When the modeled prices were compared with official food prices, the figures were closely correlated, demonstrating that near real-time social media signals can function as a proxy for daily food price statistics. This study shows that social media analytics can complement traditional price data collection by offering a faster, more affordable and efficient way of collecting real-time food prices.

The figure shows the official beef price compared to the price of beef quoted from over 14,000 tweets. The nowcasted prices remained correlated with actual prices throughout the timeframe.

USING TWITTER TO MEASURE GLOBAL ENGAGEMENT ON CLIMATE CHANGE

Global Pulse developed a real-time social media monitor to measure and explore online discourse about climate change in support of the United Nations Climate Summit in 2014. The publicly accessible monitor analysed tweets in English, Spanish and French on a daily basis to show the volume and content of tweets about climate change across a range of topic areas such as economy and energy. Measuring and visualising public tweets over time created a baseline of engagement, and showed a significant increase in discussions about climate change around the Climate Summit. By providing a tool for comparing interest level between topics and regions, and monitoring the social media impact of climate-related public communications and events, the monitor could be used to measure awareness, support climate policy decision-making and to drive further public engagement.
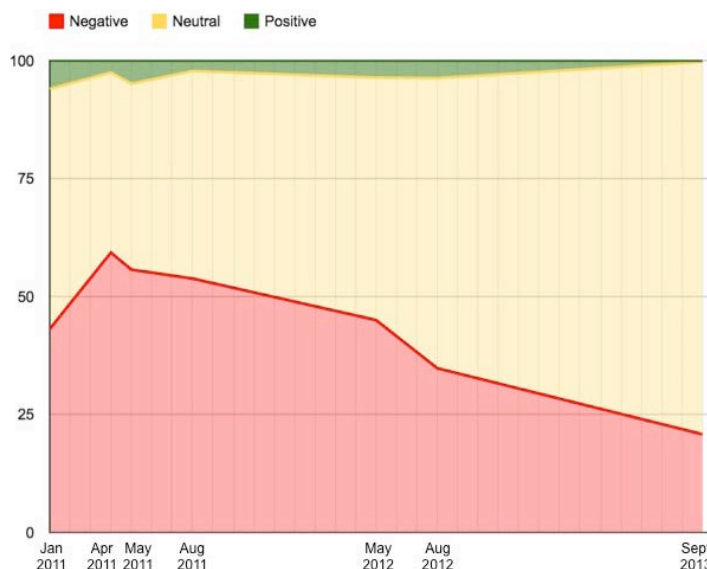

The graph shows the daily volumes of English-language tweets about climate change and various related sub-topics in April–December 2014.

UNDERSTANDING PUBLIC PERCEPTIONS OF IMMUNISATION USING SOCIAL MEDIA DATA

This project examined how analysis of social media data could be used to understand public perceptions on immunisation. In collaboration with the Ministry of National Development Planning (Bappenas), the Ministry of Health, UNICEF and WHO in Indonesia, Pulse Lab Jakarta analysed relevant tweets about vaccines and immunisation. Findings included identification of perception trends including concerns around religious issues, disease outbreaks, side effects and the launch of a new vaccine. The results built on Global Pulse's 2013 projects in this field, confirming that real-time information derived from social media could complement existing knowledge of public opinion and lead to faster and more effective response to misinformation, since rumours often spread through social networks.

USING TWITTER DATA TO ANALYSE PUBLIC SENTIMENT ON FUEL POLICY REFORM IN EL SALVADOR
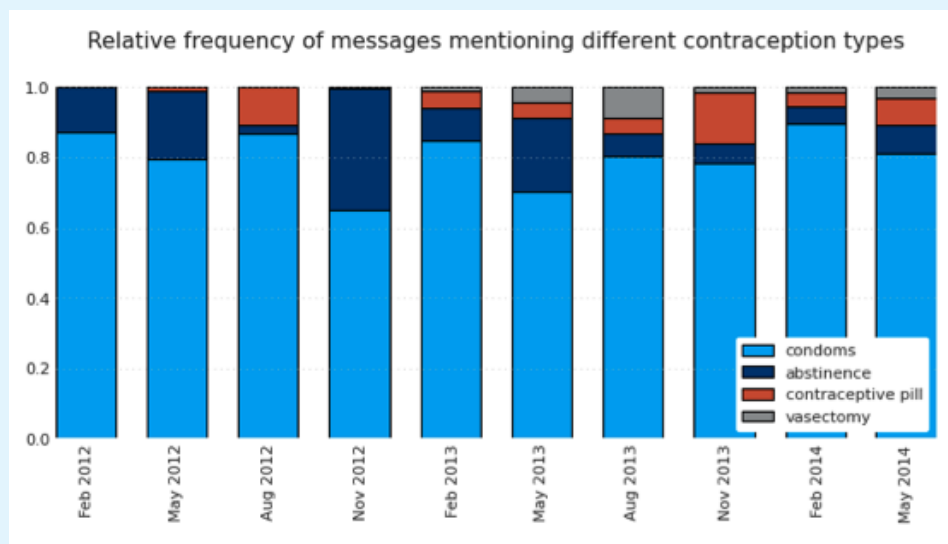
In 2011, El Salvador made policy reforms to a national subsidy on propane gas, causing widespread public disaffection and a series of strikes by distributor companies. The World Bank and Global Pulse collaborated on a research project analysing the content and sentiment of tweets in order to better understand public opinion around the reforms. The study demonstrated that public opinion as expressed in social media could complement and potentially replace household survey data if none were available. The research findings showed that public displeasure with the distributor strikes might have contributed to increased positive perception of the reforms more than previously acknowledged.

The figure shows the evolution in sentiment from January 2011 when the subsidy was passed to July 2013. Positive (green) and negative sentiment (red) gradually decreased, while neutral sentiment (yellow) increased.

ANALYSING ATTITUDES TO CONTRACEPTION AND TEENAGE PREGNANCY USING SOCIAL DATA

Pulse Lab Kampala and the United Nations Population Fund (UNFPA) collaborated on a project to explore the use of real-time digital data to understand debate among Ugandans on contraception and teenage pregnancy, and to analyse perceptions towards different types of contraception. The project resulted in a real-time interactive dashboard that analyses public Facebook posts and data from UNICEF's U-report (a SMS-based polling system) for keywords related to contraception and teenage pregnancy. The dashboard allows for tracking of emerging and trending topics and perceptions related to family planning month by month. This project demonstrated the potential of using social data to supplement traditional means of gaining insights through less-frequent national surveys.
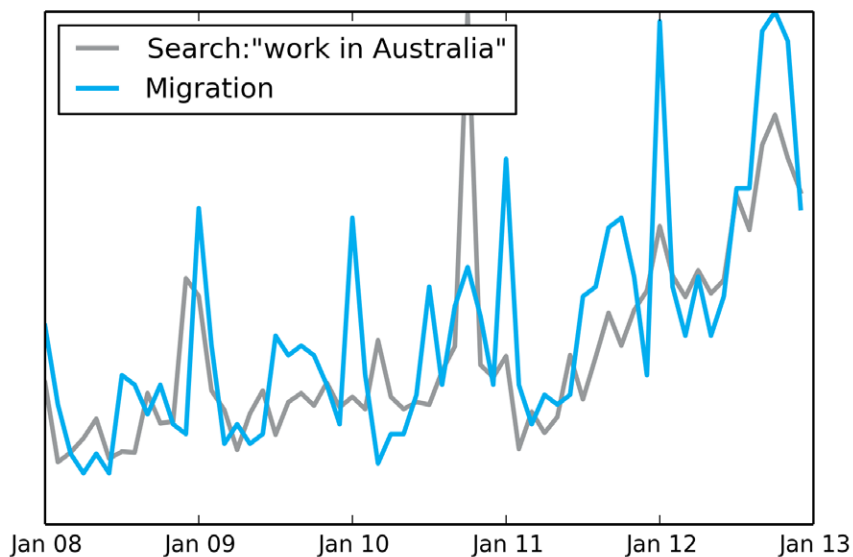

The graph shows the relative frequency of U-report messages and Facebook posts mentioning different contraception types from 2012 to 2014 in Uganda.

INTERNET SEARCH AND NEWS MEDIA ANALYSIS

ESTIMATING MIGRATION FLOWS USING ONLINE SEARCH DATA

This study was conducted in partnership with UNFPA to explore how online search data could be analysed to understand migration flows. Using Australia as a case study, Google search query data from around the world was disaggregated by country and compared to historical official monthly migration statistics provided by UNFPA. Correlations were observed between relevant search queries (for example, searching for 'jobs in Melbourne') and official migration statistics (number of people who migrated to Melbourne). In particular, queries from specific locations in Australia related to local employment opportunities showed highest correlation. The research findings point towards new possibilities for further exploration into using online and other digital search data as proxy for migration statistics.

The figure shows the trend in actual migration from Italy to Australia from 2008 to 2013 (blue line) and Google search activity from Italy for the query 'work in Australia' (grey line).

UNLOCKING NEW DATA SOURCES

Part of the Global Pulse innovation strategy is working to unlock new data sources that could reveal insights into human or economic well-being, or understand community priorities and concerns. In particular, in 2014 Global Pulse began several collaborations to explore postal data and digitizing radio content.

- **POSTAL DATA:** Global postal services generate digital data every time a letter or parcel is sent. This new digital data source could prove to be a unique proxy for economic activity in a community, even in regions where people may not have access to mobile phones or the Internet. Under an agreement signed in 2014, the Universal Postal Union economists and Global Pulse researchers are working together to analyze postal data flows. All data will be aggregated to ensure confidentiality, data privacy and protection. More information: http://www.unglobalpulse.org/universal-postal-union-tedx

- **RADIO MINING:** Radio reaches parts of society that may not have access to mobile phones or social media. In 2014 Pulse Lab Kampala began a project to transform community radio content into text. This capability could help development partners gain a real-time understanding of community concerns and priorities. More information: http://www.unglobalpulse.org/radio-mining-uganda

Read about Global Pulse's past and ongoing projects, and download project summaries and technical papers, at www.unglobalpulse.org/projects

POLICY, ADVOCACY AND ADOPTION

The objective of Global Pulse's advocacy agenda is to raise awareness of big data as a public good. This is achieved through public outreach and knowledge sharing, providing technical advice, participating in workshops and conferences, and targeted communications efforts.

LOWERING BARRIERS TO INNOVATION

Contributing to the development of regulatory frameworks and technical standards to address data sharing and privacy protection challenges.

STRENGTHENING THE DATA INNOVATION ECOSYSTEM

Cultivating a community of practice by bringing together stakeholders to align on priorities, share knowledge and spur innovation.

ACCELERATING PUBLIC SECTOR ADOPTION

Accelerating public sector adoption by fostering a culture of data-driven innovation and provide technical guidance on big data to policymakers.

International Conference on Data Innovation for Policymakers hosted by Pulse Lab Jakarta in Bali, Indonesia, in November 2014.

DATA ACCESS AND DATA PRIVACY

While some big data sources, such as social media, are publicly accessible on the open web, valuable insights may also be gleaned from analysis of data held by private sector (such as telecommunications, food, pharmaceutical or transport industries). If properly anonymised and aggregated, this data could be used for public benefit. However, there are challenges related to sharing data between public and private sector entities. Global Pulse works with a network of partners to help bring about frameworks for the safe and responsible use of big data as a public good.

Legitimate and growing concerns about data privacy and regulatory frameworks that vary by country add complexity to the development of standards, and scalable approaches to data access and the management of privacy risks. Therefore, in 2014, Global Pulse established a Data Privacy Advisory Group comprising private sector, academia and civil society experts from around the world to inform its data privacy and protection guidelines. The Data Privacy Advisory Group makes recommendations on the risks, harms and utility associated with the use of big data, and focuses on human rights principles when dealing with big data analytics.

Global Pulse's Privacy Officer presenting at the International Conference of Data Protection and Privacy Commissioners in Mauritius in October 2014.

Throughout the year, Global Pulse also actively participated in shaping the international discourse on data privacy, data access and the value of data science for social impact at key international conferences including the International Conference of Data Protection and Privacy Commissioners (Mauritius), the 2014 Global Privacy Summit (US), the 2014 Internet Governance Forum (Turkey) and the 2014 Skoll World Forum (UK) among others.

Over 30 multi-sector stakeholders convened in New York for a Responsible Data Forum on Private Sector Data Sharing in July 2014.

Global Pulse also continued thought-leadership around the concept of 'data philanthropy': the idea that the private sector 'holders' of big data can make this valuable resource available for public good. In particular, in July 2014, Global Pulse co-hosted a Responsible Data Forum on Private Sector Data Sharing. The forum convened experts from private sector, academia, civil society, law, and philanthropy to explore the ethical, privacy and safety dimensions of private sector data sharing. Several case studies, discussion papers and working groups have been organised as an outcome of the meeting, and activities continue through 2015.

Find out more about Global Pulse's work on data privacy and protection at http://www.un-globalpulse.org/privacy-and-data-protection

A GROWING COMMUNITY OF PRACTICE

Whether it's a hackathon, business forum or policy seminar, Global Pulse engages inter-disciplinary experts to debate complex issues, develop new solutions, share knowledge and spur innovation.

Former Secretary Hillary Clinton, 108th Mayor of New York City Michael Bloomberg, and CEO of UN Foundation Kathy Calvin join representatives from UN Global Pulse, the International Labour Organisation, and UN Women among others commit to partner on filling gender gaps with the Data2X initiative in December 2014.

Global Pulse was part of a coalition of major development organisations and donors which crafted and adopted the 'Principles for Digital Development', also known as the 'Greentree Consensus'. The project represents a shared effort to capture lessons learned by the development community in implementing technology for development projects.

In 2014, a new partnership with Data2X and UN Women was established in which Global Pulse will support a number of research pilots to explore how different methods of collecting and analysing big data could potentially close global gender gaps. The partnership will also devise a long-term strategy for expanding the use of big data for gender, and aims to be a springboard for future Big Data for Development efforts to ensure that gender remains at the forefront of this nascent field.

Global Pulse hosts a roundtable on 'Big Data for Managing Climate Resilience' at Thomson Reuters in New York in September 2014.

During the UN General Assembly in 2014, Global Pulse co-hosted a 'Data Playground' event in New York, showcasing innovative work on data for development. Global Pulse and UN Millennium Campaign presented interactive case studies and answered questions from public and private sector participants, highlighting the ways in which a data revolution is already underway across the UN.

TEDx Place Des Nations talk about Big Data for Development in Geneva in December 2014.

At a December 2014 TEDx held in the Assembly Hall of the United Nations in Geneva, Global Pulse's Chief of Research highlighted a new collaboration with the Universal Postal Union, explaining how 'big postal data' may become a new way of garnering real-time economic insights from regions that do not yet have a strong digital presence.

Global Pulse engaged with technical and academic data-science communities. In 2014, the Knowledge Discovery and Data Mining Conference (US) was themed 'Data Science for Social Good,' an important signifier within the community. Global Pulse also presented at other key events including 'Big Data for Development: Responsible Use of Mobile Metadata to Support Public Purposes,' hosted by LIRNEasia (Sri Lanka), 'Science of Networks' hosted by the Technical University of Madrid and Orange (Spain) and re:Invent Hackathon hosted by Amazon (US).

OPEN INNOVATION CHALLENGES

Open innovation challenges engage wide networks of talented and enthusiastic data scientists, technologists and researchers. Challenges unite problems with problem solvers, creating new opportunities for individuals and organisations to share resources, try new tools and methodologies. In 2014 Global Pulse hosted two open innovation challenges.

THE BIG DATA CLIMATE CHALLENGE

The Big Data Climate Challenge was hosted in support of the UN Secretary-General's Climate Summit 2014. Pulse Lab New York crowdsourced projects from around the world that used big data to mitigate climate change risks. Submissions were received from 40 countries in over 20 topics. Top projects came from Colombia, China, India, Macedonia, Finland, US and UK.

The winners presented projects at a roundtable of climate experts and practitioners from foundations, private sector, UN and academia hosted by Global Pulse and Thomson Reuters on 'Big Data for Managing Climate Risks'. Winners presented their projects during the UN Climate Summit in September and to the Chair of the Intergovernmental Panel on Climate Change (IPCC).

Read more about the Big Data Climate Challenge at: http://www.unglobalpulse.org/big-data-climate

Pulse Lab Jakarta hackathon participants work on apps to improve public services.

DATA FOR BETTER PUBLIC SERVICES HACKATHON

In September 2014, Pulse Lab Jakarta hosted a seminar and hackathon in Bandung, Indonesia. The 24-hour hackathon invited programmers, software developers and technologists to create apps that use public sector data to improve the quality of health and transportation services.

Read more about the hackathon at: http://www.unglobalpulse.org/PLJ-hosted-seminar-and-hackathon

BUILDING BRIDGES WITH THE GLOBAL RESEARCH COMMUNITY

Global Pulse benefits from data science expertise from both private sector and academia. In 2014, students from universities around the world joined the Labs in New York, Kampala and Jakarta as collaborators, interns or fellows to advance research in the Big Data for Development field.

Additionally, Pulse Labs Jakarta and Kampala are cultivating South-South cooperation networks with academic institutions around a shared interest in working on data science projects. The map above shows Global Pulse's growing links with academia.

Learn more ways to collaborate with Global Pulse: www.unglobalpulse.org/participate/vacancies and www.unglobalpulse.org/partnerships

ACADEMIC COLLABORATIONS

- Bandung Institute of Technology (Indonesia)
- Columbia University (US)
- Gadjah Mada University (Indonesia)
- Indonesian State College of Statistics (Indonesia)
- Korea Advanced Institute of Science and Technology (South Korea)
- King's College London (UK)
- Leiden University (Netherlands)
- Makerere University (Uganda)
- Massachusetts Institute of Technology (US)
- Polytechnic Institute of New York University (US)
- Stellenbosch University (South Africa)
- School of Visual Arts (US)
- Stockholm University (Sweden)
- Technical University of Madrid (Spain)
- The Complex Systems Institute of Paris Ile-de-France (France)
- Université Catholique de Louvain (Belgium)
- University of Edinburgh (UK)
- University of Sheffield (UK)

PUBLIC SECTOR ADOPTION

2014 was a landmark year for embracing the importance of data analysis in achieving sustainable development. Global Pulse played a central role in helping to further understanding of the opportunities and risks presented by big data for public good among the international community.

In August, UN Secretary-General Ban Ki-moon established an Independent Expert Advisory Group (IEAG) tasked with making recommendations on bringing about a 'data revolution' for sustainable development. In addition to contributing as a member of the IEAG, Global Pulse also provided secretariat support to the group which published a report in November 2014 titled 'A World That Counts: Mobilising A Data Revolution For Sustainable Development'. The report emphasises the importance of harnessing new data sources, private-public partnerships for data access and fostering a culture of innovation and data literacy to deliver sustainable development.

Throughout the year, the data revolution agenda was taken-up at senior levels in governments, public sector and civil society organisations. Global Pulse became a member of the newly convened UN Global Working Group on Big Data for Official Statistics,[1] and presented case studies on big data innovation at a number of conferences including 'Informing A Data Revolution: Asia-Pacific Regional Workshop' (Thailand) and 'From Ideas to Action: Making The Data Revolution Count for Those Who Need It Most' (US) hosted by PARIS21, and at several international launch events of the IEAG report.

1 'Report of the Global Working Group on Big Data for Official Statistics: Note by the Secretary-General.' http://unstats. un.org/unsd/statcom/doc15/2015-4-BigData.pdf

KNOWLEDGE TRANSFER & CAPACITY BUILDING

The Pulse Labs openly share successes and failures, and emerging best practices in an effort to build capacity and knowledge. Global Pulse shares knowledge gained from its innovation projects by hosting workshops, publishing technical papers, as well as project briefs tailored to policymakers and development practitioners.

In 2014, Global Pulse contributed to several policy publications and published over 20 research papers and briefs. Project summaries and related reports can be accessed at: www.unglobalpulse.org/projects

DEFINING THE DATA REVOLUTION

'The data revolution is: an explosion in the volume of data, the speed with which data are produced, the number of producers of data, the dissemination of data, and the range of things on which there is data, coming from new technologies such as mobile phones and the 'Internet of Things,' and from other sources, such as qualitative data, citizen-generated data and perceptions data; A growing demand for data from all parts of society.'

UN Secretary-General's Independent Expert Advisory Group on a Data Revolution (A World That Counts report, page 6)

Read first-hand accounts of emerging innovations from data scientists in the Pulse Lab Diaries: http://www.unglobalpulse.org/lab-diaries

UN Secretary-General Ban Ki-moon with members of the Independent Expert Advisory Group (IEAG) at report launch in November 2014.

In 2014, Pulse Lab Jakarta co-hosted a 'Data Innovation for Policymakers' international conference in Bali (Indonesia) and the Asia Urban Futures Workshop in Bangkok (Thailand), in cooperation with the Government of Indonesia, USAID's Regional Development Mission for Asia, UNDP and UN-Habitat.
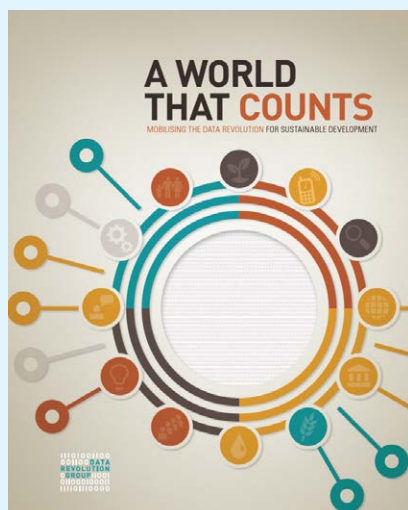
In addition, Global Pulse participated in a number of workshops and seminars, including a European Expert Consultation on Integrated Non-Communicable Diseases Surveillance hosted by WHO (Lithuania), 'Research and Development: Foresight for Policy Making' hosted by UNDP (Turkey), a Data Consolidation Workshop and Global HIV Prevention Meeting organised by UNAIDS (Switzerland).

Asian Urban Futures Workshop hosted by USAID, UNDP, UN-HABITAT and Global Pulse in Bangkok, Thailand in October 2014.
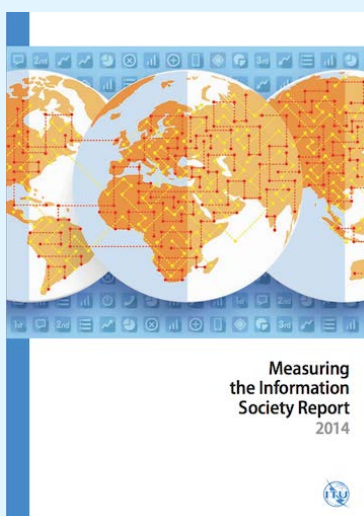
POLICY PUBLICATIONS

In 2014, Global Pulse contributed to a number of policy publications advocating for data-driven development including:

'A WORLD THAT COUNTS: MOBILISING A DATA REVOLUTION FOR SUSTAINABLE DEVELOPMENT' (INDEPENDENT EXPERT ADVISORY GROUP, NOVEMBER 2014)

In August 2014, Secretary-General Ban Ki-moon established an Independent Expert Advisory Group (IEAG) to make recommendations on bringing about a data revolution for sustainable development, which published a report in November 2014 titled 'A World That Counts: Mobilising A Data Revolution For Sustainable Development.' The report sets out the main opportunities and risks presented by the data revolution. It also highlights the importance of global standards and principles to underpin the data revolution, including ensuring data quality, usability and timeliness.

MEASURING THE INFORMATION SOCIETY REPORT (ITU, NOVEMBER 2014)

The International Telecommunication Union's Annual 'Measuring The Information Society Report' contains a detailed chapter on the background and possibilities of big data. The chapter focuses on mainstreaming use of telecommunications and other big data for monitoring and for social and economic development.

THE LANDSCAPE OF BIG DATA FOR DEVELOPMENT (DATA2X, MAY 2014)

This Data2X report summarizes the current landscape of Big Data for Development, reviews the major Big Data research initiatives over the past few years, and discusses the role of the private sector, academia, multilateral institutions, foundations, donor agencies and NGOs in these projects.

BIG DATA AND POSITIVE SOCIAL CHANGE IN THE DEVELOPING WORLD: A WHITE PAPER FOR PRACTITIONERS AND RESEARCHERS (THE ROCKEFELLER FOUNDATION BELLAGIO CONFERENCE, MAY 2014)

This white paper, which was an outcome of a two-day workshop hosted by the Rockefeller Foundation, advocates for civil society to become part of the big data for public good conversation. The paper emphasises the role of big data and ICT in facilitating information exchange and promoting accountability and transparency.

DATA-DRIVEN DEVELOPMENT: PATHWAYS FOR PROGRESS (WEF, JANUARY 2015)

The World Economic Forum's Global Agenda Council on Data-Driven Development organized workshops throughout 2014 to examine barriers to operationalising data-driven development and the incentives that might be leveraged to forge progress. 'Data-Driven Development: Pathways for Progress' recommends that incentives and policy frameworks need to be established to enable access to data streams held by private actors, and to support systemic implementation of data-driven development programmes.

COLLABORATORS

Many organizations and private sector companies have collaborated with Global Pulse to host events and provide access to data, technologies, and expertise to carry out projects with social impact.

DATASIFT — crimson hexagon — SAS — telenor

Microsoft — amazon web services — Telefónica — CARTODB Geospatial on the cloud

THE ROCKEFELLER FOUNDATION — JASAMARGA Indonesia Highway Corp. — THOMSON REUTERS — WORLD ECONOMIC FORUM

RealImpact ANALYTICS — orange — GSMA

OPEN-SOURCE TECHNOLOGIES

Numerous open-source technologies, mapping and visualisation tools have been used to enable big data innovation projects with social impact across the Pulse Lab Network.

python — hadoop — D3 — jupyter

Spark — Parquet — ubuntu — OpenJDK

INNOVATION PARTNERS

A wide range of development partners collaborated with Global Pulse to identify challenges that could be addressed through real-time analysis of digital data. Projects were executed to illustrate practical uses of big data and prototype technology tools for monitoring development progress and tracking emerging vulnerabilities.

DONORS AND SUPPORTERS

Global Pulse is supported through voluntary contributions from UN Member States, foundations and the private sector. Donors in 2014 included the governments of Australia, Denmark, Sweden, Indonesia and individual philanthropists. Project support was also contributed by UN agencies including the UN World Food Programme, UNDP, UNICEF and UNAIDS, as well as by the Gates Foundation. Expressions of interest are welcome from partners who would like to help expand and accelerate the work of Global Pulse.

"THE DATA REVOLUTION IS GIVING THE WORLD POWERFUL TOOLS THAT CAN HELP USHER IN A MORE SUSTAINABLE FUTURE."

- BAN KI-MOON, UN SECRETARY-GENERAL

GLOBAL PULSE