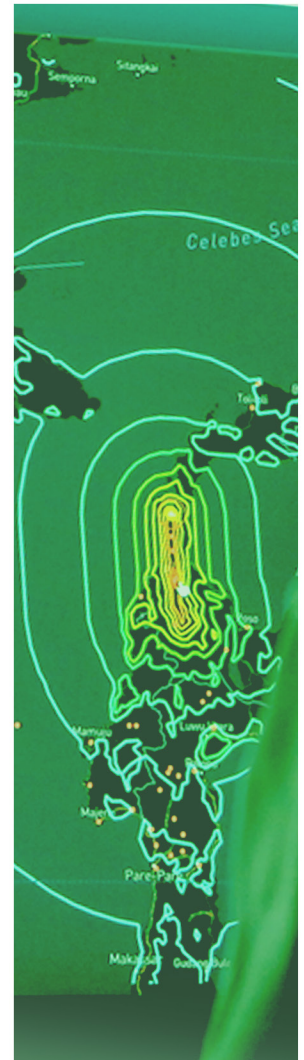
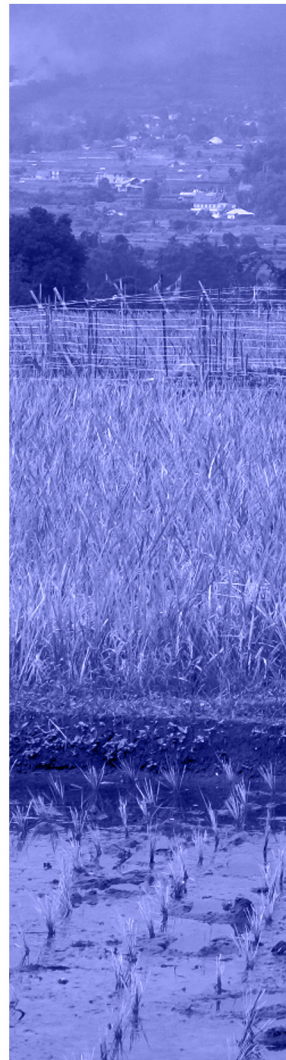


ANNUAL REPORT 2019

CREATING INNOVATIVE PATHWAYS TOWARDS
INCLUSIVE GROWTH AND SUSTAINABLE DEVELOPMENT



As part of United Nations Global Pulse, Pulse Lab Jakarta expresses sincere gratitude for the continued support from the Australian Government, and to the Indonesian Government and the United Nations for their guidance and leadership that have enabled us to conduct cutting-edge data analysis research alongside the application of human-centred design to glean actionable, data-informed insights for policy making.



PARTNERS AND COLLABORATORS

Government



Development



Private Sector



Academia



ACRONYMS

AFTECH	Indonesia FinTech Association
AI	Artificial Intelligence
ASEAN	Association of Southeast Asian Nations
BaKTI	Eastern Indonesia Knowledge Exchange
BPS	Statistics Indonesia
Bappenas	Ministry of National Development Planning
BIT	Behavioural Insights Team
BNPB	National Disaster Management Authority
BTS	Buy The Service
CDRs	Call Detail Records
CGIAR	Consortium of International Agricultural Research Centers
DFAT	Department of Foreign Affairs and Trade
DNKI	Indonesian National Council for Financial Inclusion
FinTech	Financial Technology
GDACS	Global Disaster Alert and Coordination System
GIZ	German Agency for International Cooperation
HCD	Human-Centered Design
IOM	International Organisation for Migration
ISOCARP	International Society of City and Regional Planners
MIND	Managing Information for Natural Disaster
MoFA	Ministry of Foreign Affairs
OJK	Financial Services Authority
Organda	Organisation of Land Transportation Owners
PLJ	Pulse Lab Jakarta
PNG	Papua New Guinea
Pusdatin	Centre for Data and Information
QCRI	Qatar Computing Research Institute Technology Platform for Resiliency
RPJMN	National Medium-term Development Plan
SDGs	Sustainable Development Goals
SMEs	Small and Medium-sized Enterprises
S-DNKI	Secretariat of The National Council for Financial Inclusion
TNP2K	National Team for the Acceleration of Poverty Reduction
UK	United Kingdom
UN	United Nations
UNCDF	United Nations Capital Development Fund
UNDOCO	United Nations Development Operations Coordination Office
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
UNSDCF	United Nations Sustainable Development Cooperation Framework
UN OCHA	United Nations Office for the Coordination of Humanitarian Affairs
UN Women	United Nations Entity for Gender Equality and the Empowerment of Women
VAMPIRE	Vulnerability Analysis Monitoring Platform for Impact of Regional Events
WWB	Women's World Banking

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PREFACE



Almost 8 years ago, the Government of Indonesia decided to collaborate with the United Nations by becoming an open laboratory to experiment with the use of big data for policy making. It is good to note that this agreement, formalized with a Memorandum of Understanding, has resulted in the development and growth of Pulse Lab Jakarta (PLJ), the first data innovation lab of its kind in the Asia-Pacific region.

As the new co-chair of PLJ's joint steering committee, I would first like to acknowledge and thank the Government of Australia for its continued support of this initiative, and its new commitment through to 2023. I would like this to be a new beginning for this cooperation, not only to build stronger accountability, but also to strengthen and improve the impact of Pulse Lab Jakarta in Indonesia and for the region.

The context in which Pulse Lab Jakarta now operates has changed drastically. In 2012, not many government agencies knew about big data, and those who knew were often skeptical on how it could be applied for public policy. Nowadays the situation is very different, with many ministries and even local governments actively seeking to apply new data innovations. This is reflected in the increasing number of directorates within Bappenas as well as other ministries and agencies in Indonesia seeking to engage Pulse Lab Jakarta. I salute the foresight of our predecessors in establishing PLJ.

Bappenas also intends to establish a dedicated analytical unit, called Tim Analitika, under the Ministry's Center for Development of Planning Data and Information (Pusdatinrenbang), which will become PLJ's main entry point for capacity building and knowledge sharing on advanced data analytics within the Government of Indonesia. Since 2020, the new role of Pusdatinrenbang will emphasize the partnership in aspects of activity principles, decision making, Steering Committee, executing agency, and risk. Now, more than ever, we need to build our capacity to manage and analyze the huge amount of data and information now available to us, and I plan to fully utilize the capacity now existing in PLJ.

This annual report seeks not only to profile what PLJ has accomplished in 2019, but importantly to highlight what the body of work since its establishment actually adds up to in terms of impact. Moving forward, it is my expectation that PLJ will continue to be promoted as a model of development cooperation. To do this, it is important to ensure that PLJ continues to experiment with new data innovations, which are effectively linked to our national development priorities, regional research agendas and the Sustainable Development Goals.

Dr. Ir. Himawan Hariyoga Djojokusumo, MSc.
Executive Secretary, Ministry of National Development Planning



It's been a decade since UN Global Pulse was set up inside the office of the United Nations Secretary-General to unleash the power of big data and analytics to protect vulnerable populations. Much has changed since then, and the data innovation ecosystem continues to grow and mature in ways that have significant implications for our work.

Global Pulse hired the first data scientist in the UN and built an interdisciplinary team of scientists, engineers, designers and legal experts working alongside UN experts to investigate how data analytics could be used to “take the pulse” of what’s happening on the ground. To ensure that our research was grounded in the realities of the communities we were trying to assist, we established a network of labs around the world. Servicing the Asia-Pacific region, Pulse Lab Jakarta (PLJ) was established in 2012 as a joint facility between the UN and the Government of Indonesia.

Over this past decade, the proliferation of innovation units, hubs, services, and initiatives in the international development sector, including the UN, has created a labyrinth of both opportunities and challenges. At PLJ for instance, while stakeholders have increasingly valued and requested our collaboration over the years, we’ve at the same time realised that our own resources are limited in comparison to other private and public data labs that focus on particular sectors or problem domains.

Recognising these challenges and the need to adapt our approach, last year UN Global Pulse embarked on an internal exercise. For PLJ, this was in the form of a Portfolio Sensemaking Workshop, designed to obtain insights from the Lab’s existing portfolio, to then jointly develop a set of change agendas and ensure that all team members can both engage on required changes and understand why these changes are necessary.

As UN Global Pulse kicks off its second decade, some key components of PLJ’s repositioning agenda include:

1. Accelerating our research and development of fit-for-purpose innovations; and continuing to be a catalyst for a strong data ecosystem in Indonesia and the Asia-Pacific Region;
2. Building more effective and forward-thinking relationships with our key governance stakeholders;
3. Improving management of our work and the team’s wellbeing through stronger project decision-making and communication protocols;
4. Promoting our branding/niche as a mixed-methods approach data innovation lab with a proven track record of adherence to our principles, values and the responsible and ethical use of data; and
5. Selecting and fostering longer-term partnerships which strengthen PLJ’s position and reputation.

With these renewed priorities which are fully aligned with the strategic direction of UN Global Pulse, it is important that we continue to work towards a future in which big data, artificial intelligence and emerging technologies are harnessed safely and used whenever and wherever to save lives, better livelihoods and create a healthier planet. We’re extremely grateful to the Government of Australia and the Government of Indonesia for their continued support of Pulse Lab Jakarta and the engagement of other research and resourcing partners. To the team at PLJ, congratulations on the 2019 achievements you’ve highlighted in this annual report, and more importantly on reaching this significant milestone.

A handwritten signature in black ink, appearing to read "Robert Kirkpatrick".

Robert Kirkpatrick
Director, UN Global Pulse



To mark the 16 Days of Activism Campaign against Gender-Based Violence, a public discussion was held in Jakarta to share findings from PLJ's joint After Dark research with UN Women. Anita Nirody, Resident Coordinator of United Nations Indonesia (centre), views an exhibition at the event.

2019 has been a year of transition for Pulse Lab Jakarta. Since its establishment in 2012, Pulse Lab Jakarta has effectively undertaken three main functions: (i) Forging and Leveraging Strategic Partnerships, (ii) Identifying and Combining New Data Sources, and (iii) Contributing to Global and Regional Research Agendas.

Taking stock of what has been accomplished, it is exciting to note how PLJ has expanded the sources and types of data analysed, the number of partnerships now in place and the variety of contributions provided to improve research-oriented development outcomes. This report seeks not only to profile what has been accomplished in 2019, but importantly to highlight what the body of work actually adds up to in terms of impact.

Emerging through our analysis is that PLJ's results in 2019 show a clear progression, where the team has consistently built on relationships, research and data innovations to have impact. This includes observable changes in the way partner organisations



work and have become more efficient and effective (Operational Impact), where the way we have applied data science and human centered design has now been adopted by others (Methodological Impact), and where we have contributed to improved institutional and linkages as well as the principles by which these institutions engage (Ecosystemic Impact).

This report highlights how PLJ has transitioned within the dynamic operational context it operates. From a Lab having to self-initiate projects and convince actors in a variety of development ecosystems of the value of data innovation through experiential evidence, PLJ is now having to carefully manage the overwhelming demand to share our accumulated knowledge, experience and networks.

This accumulation has also allowed the team to see clear emerging trends in terms of thematic areas of work the team is now consolidating its outputs. These are:

Disaster Response and Climate Change - aimed at protecting the society, specifically the most vulnerable cohorts from long-lasting harms that may be induced by natural disasters; and helping communities cope with the effects of climate change.

Urban Dynamics - intended to improve human mobility and strengthen the interconnectedness of services in urban areas, thus allowing citizens, specifically those who tend to be marginalised, to have access to economic opportunities and access to basic services.

Food Security and Agriculture - focused on shedding light on spatio-temporal dynamics within local and regional agriculture and food systems, and supporting sustainable production and provision of nutritious food, so as to ensure systems that are resilient to climate and economic shocks.

Financial Inclusion - envisaged as a means to improve access to (and utilisation of) financial products and services, specifically for the unbanked and low-income segments of the population, thereby providing citizens with greater access to economic activities and opportunities for resource accumulation that can protect against financial shocks.

Strategic Exploration - designed to accommodate initiatives that fall outside of the four main areas, but are aligned with PLJ's overall goal and objectives towards inclusive growth and sustainable development.

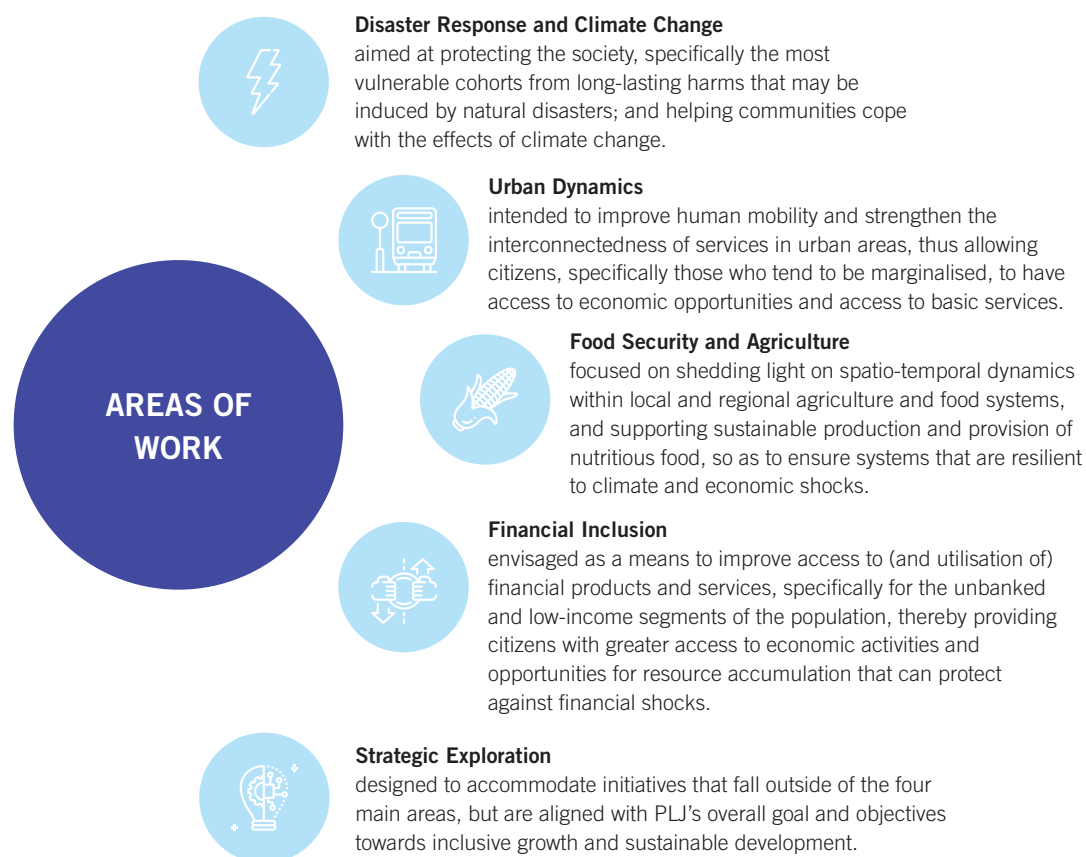
These areas are undergirded in our mission to strengthen the capacity of stakeholders to adopt, scale and utilise innovative, integrated, and gender-visible data solutions to better plan, monitor and evaluate advancements towards achieving the Sustainable Development Goals.

We hope this report not only accounts for PLJ's work in 2019, but provides insights and opportunities to improve and strengthen our engagement and the broader Global Pulse network moving forward. We have been good in presenting possibilities on how to apply data innovations to development initiatives, the challenge moving forward is to move from possibilities to realities, where our prototypes can be operationalised in real-life settings to address challenges faced by development institutions and stakeholders.

To accelerate the adoption of data innovation for inclusive growth and sustainable development, Pulse Lab Jakarta has strategically aligned its work with Indonesia's national development priorities, the South-South and triangular cooperation agendas and the broader global development goals. Our work has thus focused on protecting the most marginalised and vulnerable cohorts of the population and ensuring that all citizens have equitable access to economic opportunities, all while working to safeguard our natural resources from depletion.

The Lab has conducted diverse, cutting-edge research alongside our partners over the years, by blending new and existing data sources, as well as combining different research approaches to develop fit-for-purpose tools and glean actionable insights. Ranging from research projects undertaken on public transportation and air quality, to natural disasters and food production, these initiatives have shaped our collective and experiential knowledge in several domains.

Upon gauging the value of the portfolio the Lab has built to date, in 2019 we came together as a team and consolidated our work into four main thematic areas and one area that allows for strategic exploration. By focusing on these domains and employing a mixed-method approach that fuses data science with social research, the Lab seeks to emphasise its added value to the development ecosystem in Indonesia and scale its impact across the Asia Pacific region. The five areas include:





Colleagues from Aga Khan Foundation, Australia's Department of Foreign Affairs and Trade (DFAT), InnovationXchange, The Ethics Centre and Roshan Telecom participated in a three-day data innovation clinic on women empowerment hosted by the Lab.

As part of our growth and evolution, we have seen our work shift from prototype development towards a more systems thinking approach to promote the long-term integration of our tools into systems used by our government and development partners. By doing so, we expect to be able to better assess the operational impact of work and ensure suitable uptake of the interventions upon successful prototyping. The geospatial financial access mapping tool we recently partnered with the Indonesian National Council for Financial Inclusion (DNKI) to design represents an example, as the fit-for-purpose, systems thinking design allowed for integration into the organisation's operating system following rapid prototyping and testing.


























Whilst data science remains a cornerstone of our work, we acknowledge the need for thick data coming from the depths of human stories and experiences to complement data analytics and help us answer policy questions that big data cannot. This is particularly illustrated with our After Dark research with UN Women that used a human-centered design approach to survey women's perceptions of safety while travelling at night. This research added the human experiences into what may have been in the past for us a single-method data analytics research. With the Medan City Government's plans to implement recommendations from the After Dark research as part of the Ministry of Transportation's new Buy The Service (BTS) programme, this presents an opportunity to further explore non-conventional data points and maximise the Lab's mixed-method research capacity. From a gender studies perspective, the personas identified in the research highlight distinct behavioural patterns among women who travel after dark, as well as shed light on some of their





































emotions, needs and underlying beliefs behind that can be further analysed to understand women's transportation choices and travel patterns.

Beyond Indonesia, we continue to strengthen our presence, sharing lessons with regional partners and learning from their experiences. From prior modelling of population displacement after natural disasters in the Pacific Islands using mobile network data, we have been able to replicate the approach using data from an Indonesian telecom to better understand the impact on local communities after the 2018 earthquake in Central Sulawesi. The Lab's data innovation clinics, which are uniquely contextualised to the needs of the participants, continue to serve as practical, knowledge-sharing platforms to trigger conversations on the benefits of utilising a big data-thick data approach to improve public service delivery and inform policies. This is exemplified in the data clinic Pulse Lab Jakarta facilitated with participants from the Australia's Department of Foreign Affairs and Trade and the Aga Khan Foundation Afghanistan in 2019, which sought to investigate whether mobile phone data and banking data can serve as proxy indicators of women's empowerment in Afghanistan.

In the pages that follow here, we've provided a snapshot of our research activities in 2019, outlining the areas of work they fall under and their alignment with our key functions. Summaries of the projects can be found in Annex A.

2019 AT A GLANCE

RESEARCH ACTIVITIES	AREA OF WORK					UNDERLYING FUNCTION		
	Disaster Response and Climate Change	Urban Dynamics	Financial Inclusion	Food Security and Agriculture	Strategic Exploration	Forge and Leverage Strategic Partnerships	Identify and Combine New Data Sources	Contribute to Regional and Global Research Agendas
Understanding Population Movement After the 2018 Central Sulawesi Natural Disasters								
After Dark: Encouraging Safe Transit for Women Travelling at Night								
Mapping Financial Service Points Across Indonesia								
Mapping Smallholder Farmers in Indonesia to Inform Policies								
Making Sense of Diplomatic Correspondence through Data Analysis and Visualisation								
Modelling Internal Migration in Vanuatu Using Mobile Network Data								
#TabunginAja: Fusing Behavioural Science and HCD for Financial Inclusion								

RESEARCH ACTIVITIES	AREA OF WORK					UNDERLYING FUNCTION		
	Disaster Response and Climate Change	Urban Dynamics	Financial Inclusion	Food Security and Agriculture	Strategic Exploration	Forge and Leverage Strategic Partnerships	Identify and Combine New Data Sources	Contribute to Regional and Global Research Agendas
Applying Big-Data-Based Positive Deviance Approach in Agriculture								
Nowcasting Inflation to Keep Indonesia's Growth on Track								
Combining Different Data Sources to Manage Information for Natural Disasters								
Using Ride-Hailing Data to Inform Transportation Planning and Policy								
Fintech Challenge Fund Winners 6-Month Pilot: Lessons Learned								
Dataku: Using Data Analytics and Visualisation to Inform Government Decision Making								
Informing National Statistics and Managing Disaster Risks in Samoa								
Real-time Data for Faster Decision Making in Times of Crisis								
Comparing Population Displacement Estimates from Mobile Network Data in PNG								

TAKING STOCK OF OUR IMPACT

Internal learning sessions, as well as discussions with our stakeholders and development partners have emphasised the need to expand our understanding of impact beyond the quantification of effects using measurements common to other development initiatives. Impact for Pulse Lab Jakarta has thus been defined based on our *contributions* to change.¹ In that light, we have identified three main pathways where our work brings value to our stakeholders.

The first is **Operational Impact**, which we define as the positive effects our analytics or prototypes have on how our partner/client organisations' work. For instance, improvements in operational effectiveness and/or efficiency due to the adoption or adaption of PLJ-inspired products, or due to an increased understanding of human-centered design issues are considered here.

Second, our **Methodological Impact** covers the effects that we have on the practice and application of data science and human-centered design. Under this definition, our contributions towards individuals' and organisations' use of existing data in new ways, utilisation of new data sets, or integration of new analytical methods to address existing problems are charted as impact.

The third is **Ecosystemic Impact**, which is important given our mandate to support data innovation more broadly. We are conscious that we exist as part of a much more complex data innovation ecosystem, not only in Indonesia, but also within the Asia Pacific region and globally. Where we contribute to key stakeholders participating or partnering differently within this ecosystem, for example in terms of new collaboration or further research, we consider also to be an important impact.

Operational Impact

2019 saw PLJ influencing positive changes in the way several government agencies and local governments in Indonesia operate and provide services to the public. One particular impact to note is from our After Dark research, which was a collaborative research between PLJ and UN Women to better understand the experiences of women who use public transportation at night. Whilst there has been research on women's safety in public places, due attention has not been given to women who work night-shifts in the small retail sector and rely on public transportation to travel after dark. This human-centered research provided actionable insights on how public transportation services can be made safer and more inclusive for women.

“The effect our analytics or prototypes have on the ways that our partner/client organisations' work.”

A co-design workshop was subsequently conducted in Medan, one of the three cities where field research was conducted. Based on the insights gained from the research, combined with an immersive experience from the workshop participants in the After

¹ To a certain degree, this is a wider definition from the perhaps more common concept of impact, which refers to the causality of a specific intervention to a set of desired outcomes. Our definition of impact, however, is “fit for purpose” considering PLJ's business of working with partners in exploring, experimenting, and implementing innovative practices. A longer discussion on this is available here: bit.ly/impactforplj

Dark journey, the workshop generated a set of practical recommendations. At its core, the recommendations envision bus stops as part of a broader public safety ecosystem, instead of being merely physical pick-up points. Coincidentally, the recommendations came as Medan was included in the six cities for which the Ministry of Transportation is implementing a *Buy The Service* (BTS) programme for public transportation that will be rolled out in 2020.² In December 2019, the Medan City Government announced plans to implement a number of the recommendations from After Dark as part of the BTS programme. More broadly, the Ministry of Transportation took up the recommendations and disseminated them to all of the other cities under its 2020 BTS programme.

PLJ also worked with the United Nations Global Working Group on Big Data to explore how mobile network data analytics can inform official statistics. In that light, and

² The BTS programme essentially allows city government to buy public transportation services from the private sector. The six cities under the BTS programme are Denpasar, Medan, Palembang, Surabaya, Surakarta and Yogyakarta.

still related to mobility, PLJ collaborated with Empatika on research commissioned by the World Bank to use pseudonymous cellular data to capture migration patterns across Indonesia. This has provided unprecedented data granularity that allowed the Indonesian government to see the main origins of individuals that migrate to large cities, such as Jakarta, Medan, and Makassar. In addition to identifying migrant source communities and destination cities, the results of this research also revealed essential insights on the volume and directional movements of rural to urban migration across Indonesia's vast archipelago. Understanding the movements of individuals at a national scale provides the opportunity for the Indonesian Government to improve planning for services, infrastructure and policy.

In supporting policy makers to improve financial service access and availability, PLJ worked with the Indonesian National Council for Financial Inclusion (DNKI) and Women's World Banking (WWB) to develop a prototype of an Indonesian financial access map. The geospatial interactive map visualises financial service points and



In celebration of national Disaster Risk Reduction Month, PLJ showcased its latest research tool on Managing Information for Natural Disasters (MIND) during a business and community resilience event arranged by the United Nations humanitarian country team in Indonesia.

existing gaps based on socio-economic infrastructure and financial services. The initial prototype visualised financial service data from two districts: Yogyakarta City, Yogyakarta and Bima District, West Nusa Tenggara. DNKI has developed the map further to have a national coverage. According to DNKI, the map has been used by the Executive Office of the President of Indonesia and Ministry of Social Affairs for assisting disbursement of the Government's cash transfer programmes and by the Indonesian Financial Services Authority (OJK) to visualise bank agent distribution.

Our operational impact can also be seen when a partner picks up and continues an originally joint initiative with PLJ. The case of Indonesia's Ministry of Foreign Affairs' (MoFA) digital diplomacy conference is a good example of this. This started in 2018, when PLJ collaborated with MoFA and DiploFoundation to organise the International Seminar on Digital Diplomacy. The seminar served as a roundtable for diplomats, development practitioners, social media enthusiasts and civil society members to exchange fresh ideas and approaches on how to both adopt and adapt to digital diplomacy. The success of and the wealth of insights generated from the 2018 international seminar has led MoFA to host a second conference in 2019.

The nowcasting inflation dashboard PLJ developed represents one particular operational impact in 2019 which has contributed to the other two impact pathways. The dashboard analysed price data from Bank Indonesia and media monitoring on nine identified proxies, including food, cement, and cooking oil. The inflation dashboard has been utilised by the Directorate of State Finance and



PLJ facilitated an introductory workshop on big data analytics attended by researchers from the Indonesian Agency for Agriculture Research and Development (Balitbangtan) to highlight how emerging big data sources can improve monitoring of agri-food systems.

Monetary Analysis to support rapid policy response in anticipating inflation. The near real-time results from this dashboard have been regularly fed to Bappenas Senior Leadership Meetings (Rapat Pimpinan Bappenas) and the National Team for Inflation Management (Tim Pengendalian Inflasi Nasional) and proven to be very close to the official inflation index produced traditionally. This has drastically reduced the time required by the Bappenas State Finance and Monetary Analysis team to produce such near real-time monitoring.

Methodological Impact

PLJ has developed methodologies and applications of data science that function as the building blocks of our innovations. 2019 provided some highlights of how our methodologies were adopted, modified and refined by different organisations to change and improve the way they look at data and information.

“The effects that we have on the practice and application of data science and human-centered design.”



PLJ first conceived “research dives” in 2016 as a way to adapt hackathons traditionally used by software companies to analyse massive amounts of data related to development and humanitarian issues. In August 2019, PLJ worked with Bank Indonesia’s Macroeprudential Policy Department on a research dive for development that focused on household vulnerability, making it the ninth research dive PLJ hosted. The 2019 research dive helped Bank Indonesia explore how big data could be used to measure household financial vulnerability alongside its banking indicators and survey results.

With each iteration, our research dives have methodologically improved. This has resulted in further acknowledgment of the approach as an effective tool to bring together people from different backgrounds, look at a specific issue and available data, and subsequently generate potential solutions.

While research dives are meant to focus on specific data sets and identify how they can generate alternative solutions, “data innovation clinics” were set up to provide step-by-step facilitated workshops for designing

data innovation projects. Pulse Lab Jakarta designed and ran a number of data innovation clinics, with each contextualised to the specific needs of our partners, meaning that no two data innovation clinics were the same. For instance, while our previous data innovation clinics with Bappenas and a more recent one that was co-organised with the Development CAFE were all guided by our idea-to-implementation data innovation toolkit, the knowledge exchanged and discussions among the participants offered something different. In 2019, PLJ hosted a data innovation clinic focused on women’s empowerment, particularly in Afghanistan, and again the insights that emerged were quite unique. PLJ-style data clinics have now gained recognition as an effective tool in designing specific data innovation initiatives.

2019 also saw PLJ’s first experiment using behavioural economics principles. The initiative *Tabungin Aja* (literally translated as “Just Save it”) was conceived from the acknowledgment that financial inclusion should go beyond simply ensuring that poor households and vulnerable groups have access to bank accounts; we also want to see them using their accounts to save and slowly build emergency funds and even wealth. Working with the UK’s Behavioural Insights Team (BIT), S-DNKI, and a private bank, PLJ embarked on the initiative by applying human-centred design and behavioural insights to encourage bank account usage. The initiative relies on “agents” (trusted community members, who often run a shop or a food stall) to help their neighbours to sign up for accounts, help customers conduct bank transactions such as deposits and withdrawals, and act as general financial service advisors. Our campaign and the underlying message was well received by agents and customers alike, although some fine-tuning is still needed to improve its overall effectiveness. Nonetheless, this initiative has led to the introduction of the use of behavioural insights in our practice.

One of the Lab’s contributions to the application of data science in 2019 mainly came from our innovative use of mobile network data to track mobility and migration patterns. This started from our work in Vanuatu to understand the movements of individuals at a national scale, in order to improve planning for services, infrastructure, and policy. PLJ conducted research to track human mobility by examining trends in the aggregated

movements of pseudonymous cellular phone users over the course of the year. The success of this modelling approach led to its replication in Indonesia, as IOM joined forces with the Lab to use mobile network data to track displacements after the 2018 earthquake and tsunami in Central Sulawesi. We look forward to seeing further adoption and evolution of this application of data, including combining it with on-the-ground information to provide a more complete picture of migration - something that PLJ has also commenced in 2019.

The inflation dashboard described under the operational impact heading above also counts as part of our methodological impact. With the dashboard, we have introduced a methodology to “nowcast” inflation using data that are more readily available than the traditional data used to measure inflation. Comparison with official inflation numbers demonstrates the reliability of this method. Our approach to measuring inflation has contributed to the body of knowledge on data innovation for public policy.

Ecosystemic Impact

At PLJ, we realise that our impact is sustainable beyond the Lab’s lifetime if an effective and enabling data innovation ecosystem is established. To support this, PLJ has sought opportunities contributing to systemic improvements.

In 2019, we contributed to the drafting of the UN Sustainable Development Cooperation Framework (UNSDCF) for Indonesia, that will promote agendas to build stronger partnerships in data innovation. The new framework lays down strategic priorities leveraging the UN’s combined expertise to achieve its SDG targets. PLJ’s approach in promoting data innovations to address development challenges is incorporated in the fourth strategic priority of the framework, known as “Innovations to accelerate progress towards the SDGs”. Under this strategic priority, the UN, with PLJ playing a key role, will support the Indonesian Government and other stakeholders to “harness new and advanced formulas, big data, innovative practices, technologies and partnerships

Our contribution to a stronger data innovation ecosystem, both in Indonesia and in the Asia Pacific region.

for SDG attainment.”³ This is significant as it recognises the importance of utilising data innovations in development and will be tracked across UN organisations and encouraged through collaboration with the Government of Indonesia.

Our impact on the ecosystem can be seen from the collaborations that we initiated or facilitated. Within the Indonesian Government, PLJ has significantly expanded its partnerships beyond Bappenas. In 2019 alone, we have undertaken collaborations with MoFA, S-DNKI, OJK, and Medan City Government in various initiatives described as part of our operational impact. Our non-traditional partnerships have also affected the ecosystem that supports the use of data innovation in development. The research on Indonesia’s migration pattern commissioned by the World Bank

³ United Nations Sustainable Development Cooperation Framework, Indonesia 2021-2025 (upcoming).



During the recent United Nations Global Working Group on Big Data’s regional workshop on the use of mobile phone data for official statistics that took place in Jakarta, PLJ was happy to host a group of participants coming from ten national statistical offices in the region, and share some of our related research projects and insights.

hinged on the partnership that we established with an Indonesian telecommunication company that provided the necessary mobile network data. These partnerships will continue to strengthen the ecosystem by increasing both the demand of and access to data that can be leveraged to provide insights to address development challenges.

Partnerships and collaborations that we initiated and facilitated are strongly linked to the methodologies that we employ. Hence, where we delivered a methodological impact through the use of research dives, for instance, the dives also allowed us to bring together different or new stakeholders into the data innovation sphere. The 2019 research dive has successfully exposed Bank Indonesia to data innovation tools. Other methodologies have also expanded and strengthened the network of data innovation in development: our experiments with behavioural economics brought together BIT and S-DNKI, while our engagement

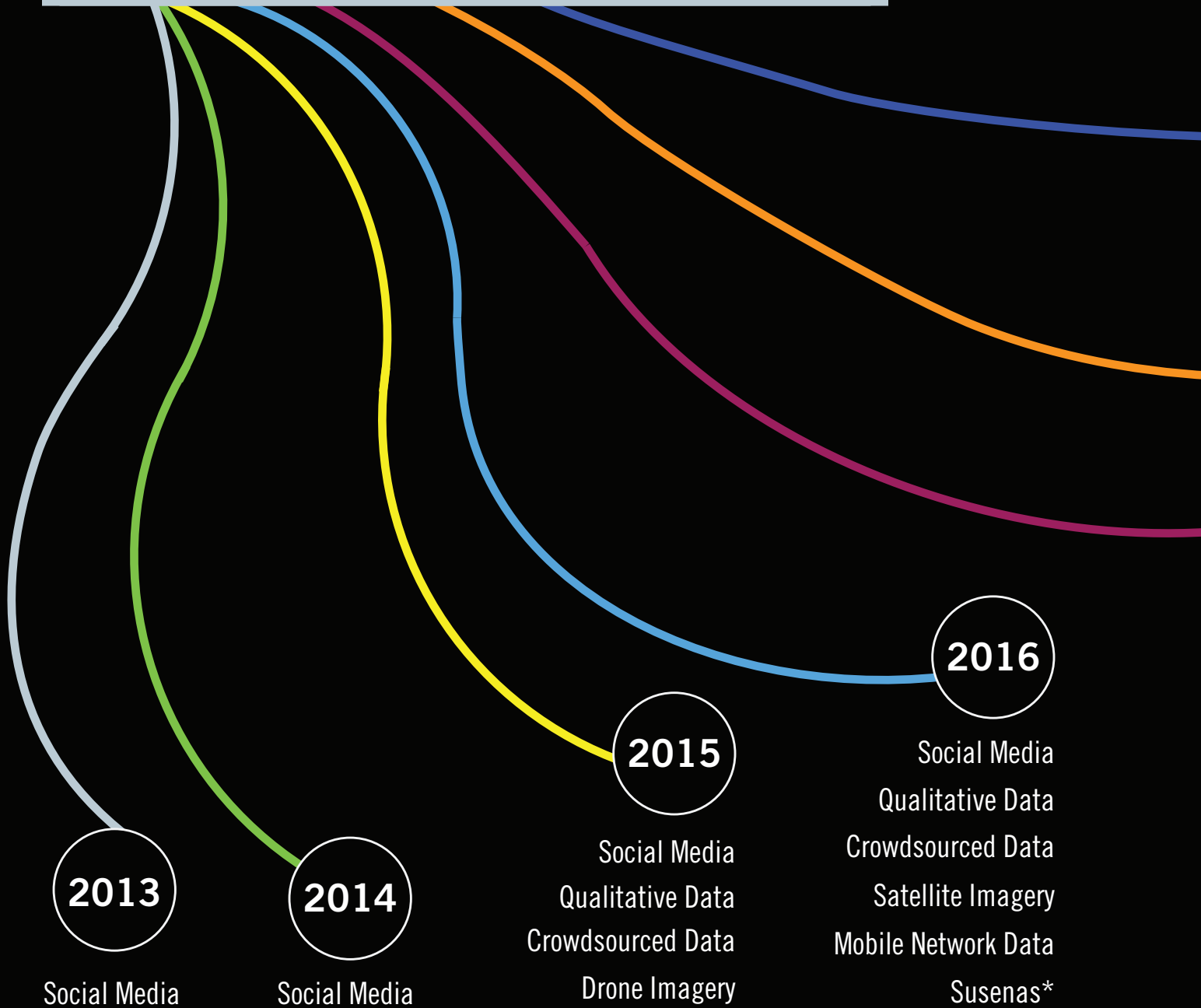
in digital diplomacy has helped convene MoFA, DiploFoundation and governments in the Asia Pacific region. To wrap up the story of the inflation dashboard, the nowcasting initiative has brought together Bank Indonesia, Bappenas, and the National Team for Inflation Management, leading to stronger recognition, use, and potential future demand for data innovation by fiscal authorities.

We are also pleased to note where we have played a role in strengthening the principles of data ethics in the data innovation ecosystem. Our particular contribution in this area in 2019 was in fact not by design, which further highlights how emerging partnerships arising from the way we practice data innovation can lead to further impacts that “branch out” beyond the original intent. For instance, our contribution to the field of data ethics was recognised through the work of Dr. Simon Longstaff, Executive Director of The Ethics Centre. Dr. Longstaff was a participant in the data clinic on women’s empowerment in Afghanistan described previously. Insights gained from the clinic highlighted the importance of ensuring a balance between data innovation and responsible use of data. Discussions during the workshop were used by Dr. Longstaff to develop a manual that provides an ethical framework for decision making in new technology innovations, with the case of women’s empowerment in Afghanistan as an example. The manual also highlights the virtue of ethical restraint and how value-driven decision making in data usage can work to benefit vulnerable groups.⁴ PLJ is now promoting further incorporation of this framework into all phases of technological innovations for development.



⁴ The manual can be downloaded from The Ethics Centre’s website: <https://ethics.org.au/ethical-by-design-evaluating-outcomes/>

OUR DATA JOURNEY





AIS: Automatic Identification Systems
 ATM: Automated Teller Machine
 BRT: Bus Rapid Transit
 CCTV: Closed Circuit Television
 Fintech: Financial Technology
 IoT: Internet of Things
 Jitupasna: Pengkajian Kebutuhan Pascabencana
 Podes: Potensi Desa
 Susenas: Survei Sosial Ekonomi Nasional

2019

Social Media
 Qualitative Data
 Crowdsourced Data
 Geospatial Data
 Diplomatic Cables
 Mobile Network Data
 Displacement Tracking Matrix

2018

ATM Transaction Data*
 Satellite Imagery
 Ride-Hailing Data
 Google Trends
 Air Quality Index
 Fintech Data*
 Jitupasna Data*
 Food Security Data

2017

Social Media
 Qualitative Data
 Crowdsourced Data
 Satellite Imagery
 Satu Data
 Susenas*

Population Density Maps
 Agriculture Census
 Consumer Price Index
 Microfinance Data
 E-Commerce Data
 Susenas*
 AIS Data*
 Podes*
 IoT Data*

Social Media
 Qualitative Data
 Crowdsourced Data
 Satellite Imagery
 ATM Transaction Data*
 Microfinance Data
 Mobile Network Data
 Susenas*
 E-Commerce Data
 AIS Data*
 BRT Data*

Mobile Network Data
 E-Commerce Data
 CCTV Data*
 Air Quality Index
 AIS Data*
 Fintech Data*
 Ride-Hailing Data
 ATM Transaction Data*
 Microfinance Data

Bringing Together Researchers to Better Understand Household Vulnerability

In partnership with the macroprudential policy department at Bank Indonesia, Pulse Lab Jakarta brought together a cadre of Indonesian researchers across government, academia and the private sector for its 9th Research Dive for Development. The primary goal of the research-event was to better understand financial vulnerability in Indonesia at the subnational and national levels through the use of traditional and non-traditional data. This unique collaboration, which leveraged the Lab's advanced data analytics capacity and Bank Indonesia's domain expertise, facilitated a series of thematic research sprints specifically to:



Researchers analysed a range of data sets to gather insights to inform macroprudential policies

- Understand the housing mortgage default rate in Indonesia
- Identify indicators of household indebtedness at the provincial level
- Use fintech data to assess customers' financial vulnerability
- Evaluate how natural hazards impact loans-at-risk

Recognising the potential of big data and how it can be harnessed effectively to inform its ongoing and future work, Bank Indonesia sought to explore how these emerging data sources can also be used to formulate macroprudential policies to mitigate systemic risks and help strengthen the overall financial system.

The research participants were grouped based on their research interests and worked closely with domain experts, who provided feedback on how to approach the assigned research tasks; what datasets may be useful; and the type of research methodology that might be most applicable. Preliminary results from the research sprints were shared with key stakeholders who attended the closing presentations and were later made available in a technical report submitted to Bank Indonesia.

Insights from the research sprints:

bit.ly/researchdive9



Urban planners from across the globe participated in PLJ's Lab on Wheels at the 55th ISOCARP World Planning Congress held in Jakarta

Lab on Wheels: Triggering Conversations on the Use of Non-Conventional Data

When Pulse Lab Jakarta first envisioned the concept of Lab on Wheels, there were two main goals in mind. The first, encoded into the name itself, was to promote PLJ's data analytics work to a broad audience. Second, through a variety of activities engaging participants during these outbound junctures, the intention was to advocate data literacy and trigger conversations on the use of non-conventional data in more diverse contexts. Thus when the International Society of City and Regional Planners (ISOCARP) invited the Lab to participate in its 2019 forum in Jakarta, the team at the Lab saw this as yet another opportunity to share our work with a different audience.

The academic spectrum of participants ranged from undergraduate students to urban planners with PhDs. We thus tailored the content to their specific contexts and took into consideration that their jobs already brought them into close contact with data on a regular basis. An interactive session built on and supported by two "studio cases" (one on Transit Oriented Development and the other on the historical preservation of Jalan Suryakencana in Bogor) was designed to facilitate the discussions.

In demystifying "big data" for these young professionals, PLJ sought to demonstrate the uses of non-conventional data for urban planning

in everyday life, as well as address the limitations. Using a participatory approach, we unpacked our commuting statistics research that uses Twitter data and mapped it to the participants' own daily journey. While some of the participants were already familiar with big data, presenting an actual, specific, real-world use case from our own portfolio enhanced the ideation stage. This further built our credibility with the audience, as we weren't just speaking "theory" but also demonstrating analysis of experiential evidence.

The Lab's efforts paid dividends in how the session was received by the participants. The overall feedback indicated that this hands-on session did not only help the participants to appreciate the increasing use of non-conventional data to improve everyday life, but importantly in stimulating their creative thinking to innovate in their respective fields of work.

Behind-the-scenes preparations for Lab on Wheels:
bit.ly/labonwheels3

Building Capacity for Data Innovation in the Public Sector

Throughout 2019, Pulse Lab Jakarta organised, facilitated and participated in a series of data clinics and workshops as part of the Lab's broader efforts to promote and build capacity for data innovation in the public sector. Below is a snapshot of our key events:

MARCH



Data Innovation Clinic Jakarta, Indonesia

PLJ hosted colleagues from Aga Khan Foundation, Australian Department of Foreign Affairs and Trade (DFAT), InnovationXchange, The Ethics Centre and Roshan Telecom for a three-day data innovation clinic at the Lab focused on exploring the different contexts in which data innovation takes place and discussing why it is important to adapt our mindset and processes accordingly.

APRIL

Dataku: Data Visualisation Workshop Jakarta, Indonesia

PLJ organised a training workshop with representatives from the Ministry of National Development Planning (Bappenas) aimed at exhibiting Dataku, a data analytics and visualisation prototype that the Lab developed to enhance the Ministry's work and decision making processes.

Statistics Indonesia Data Workshop Jakarta, Indonesia

PLJ participated in an internal data training workshop with Indonesia's national office of statistics, Statistics Indonesia (BPS), to identify new and emerging data sets that can be used to complement survey data sets and analytical approaches.

Inflation Dashboard Showcase Medan, Indonesia

PLJ showcased a prototype of its nowcasting inflation dashboard at Medan State University's Faculty of Economics to gather feedback on its ongoing development and potential uses for policy makers working in the domain of economics.

MAY

UNDP Data Innovation Clinic Istanbul, Turkey

PLJ served as one of the mentors during the clinic, which was organised by UNDP Regional Hubs in Amman and Istanbul, and facilitated a dialogue on how thick data from the depths of human stories can complement big data analytics.

JUNE

Big Data Regional Workshop on the Use of Mobile Phone Data for Official Statistics Jakarta, Indonesia

PLJ exhibited several of its research projects and prototypes leveraging mobile network data for decision making to participants from ten national statistics offices in the region during a hands-on, knowledge sharing session.

JUNE

1st Workshop on Computer Vision for Global Challenges

California, The United States

PLJ's proposal to the Computer Vision for Global Challenges (CV4GC) initiative was selected as one of the final 17 challenge winners. During the workshop, the Lab presented the model it designed to nowcast air pollution and received expert feedback from the computer vision community on how to refine its development.

SEPTEMBER



Pulse Lab Scoping Mission

Apia, Samoa

A team from PLJ spent several days in Samoa meeting and consulting with potential partners and stakeholders across government, academia, development and the private sector to obtain feedback and their support towards the establishment of a Global Pulse lab in Samoa.

OCTOBER

Disaster Risk Reduction & Mobile Data Workshop

Jakarta, Indonesia

PLJ and IOM invited representatives from the Indonesian Government, United Nations, and mobile telecoms to participate in a training workshop to discuss how mobile network data can be better harnessed to support government-led disaster response.

Ministry of Agriculture Big Data 101 Training

Bogor, Indonesia

PLJ facilitated an introductory workshop on big data analytics attended by researchers from the Indonesian Agency for Agriculture Research and Development (Balitbangtan) to highlight how emerging big data sources can improve monitoring of agri-food systems.

NOVEMBER

After Dark Co-Design Workshop

Medan, Indonesia

To come up with interventions that are practical and designed in a way to meet both prevailing and future needs of women who travel at night, PLJ invited representatives from government institutions, local NGOs, academia, as well as designers, technologists and generalists from the local community to participate in co-design workshop held in Medan.

Positive Deviance in Agricultural Performance Workshop

Bangkok, Thailand

The GIZ Data Lab organised a joint workshop with experts and collaborators from Pulse Lab Jakarta, the University of Manchester, the GIZ agriculture and food cluster Thailand and UNDP Regional Innovation Centre Bangkok to further work on the application of the Big Data-based Positive Deviance approach in the agricultural sector in South East Asia.

Knowledge-Sharing Engagements

There has been overwhelming demand to share PLJ's accumulated knowledge and experience, marked particularly by the growing number of invitations and requests the team has received for involvement, collaboration and services. From academic conferences to development forums, this timeline includes a selection of our knowledge-sharing engagements throughout 2019.



JANUARY

GovPay Summit

Jakarta, Indonesia

PLJ shared its experiential knowledge on how new data sources can mitigate challenges related to disaster preparedness and response during a roundtable discussion on disaster management.



OLX Indonesia x Data Science Indonesia: Data Talks

Jakarta, Indonesia

Discussing how to build strong measurement and data tracking capabilities to drive better decision making, PLJ underlined growing opportunities that exist in Indonesia for the use of e-commerce data for macroeconomic analysis.



FEBRUARY



AI for Social Good Workshop

Doha, Qatar

PLJ discussed how the application of machine learning and artificial intelligence has enhanced its work to advance development agendas in the Asia Pacific region towards the achievement of the SDGs.

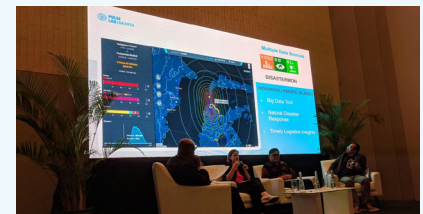


MARCH

Duck, Cover and Hack 2019

Jakarta, Indonesia

In observance of International Open Data Day, PLJ moderated a panel discussion organised by U-INSPIRE on how open data can be repurposed to improve how well governments and communities respond to natural disasters.



ASEAN Workshop on Disaster Reporting and Big Data for Disaster Management

Jakarta, Indonesia

PLJ mapped the evolution of its disaster risk reduction tools over the years and emphasised the importance of developing these use cases to build the capacity of disaster management authorities throughout ASEAN Member States.



APRIL

SNKI Financial Inclusion Sharing Session

Jakarta, Indonesia

On the invitation of the Secretariat for the National Council for Financial Inclusion of Indonesia, PLJ and the UK's Behavioural Insights Team facilitated a sharing session on how human-centred design and behavioural insights can be used to accelerate financial inclusion in Indonesia.

4th Indonesia-United Nations Consultative Forum

Jakarta, Indonesia

PLJ shared how it has used its experience developing innovative solutions in Indonesia to connect with various non-traditional development partners across the region and contribute to South-South cooperation agendas.



Launch of Malaysian SDG Dashboard

Kuala Lumpur, Malaysia

PLJ presented a snapshot of various tools it has been developing in Indonesia to help the Government monitor progress of the SDGs, focusing on the benefits of using open data and crowdsourced data for policy making.

World Resources Institute TalkShow on Data for Climate Change

Jakarta, Indonesia

PLJ showcased several proofs-of-concept the Lab has developed over the years around disaster response and climate change to illustrate how these tools can both empower citizens on the ground and better inform governments' decision making.



Smart City: How smart can we go?

Jakarta Indonesia

As part of the University of Indonesia's guest lecture series on big data, PLJ discussed how data from new technologies can be leveraged by city planners to not only develop smarter cities, but create ones that are also inclusive and more sustainable.



MAY

Information Systems for Crisis Response and Management Conference

Valencia, Spain

PLJ presented its research on understanding aggregate human behaviour changes in response to a natural disaster in Vanuatu through the application of mobile network data analysis.



AI For Good Global Summit

Geneva, Switzerland

PLJ emphasised the importance of harnessing emerging real-time data and artificial intelligence to help develop innovative tools that can be scaled up to monitor progress of the SDGs at the local and national levels.



JUNE

4th International Conference on Data for Policy

London, United Kingdom

PLJ weighed in on the policy discourse about the potential of employing a participatory approach via crowdsourcing to advance the SDGs and unpacked results from some of its key crowdsourcing initiatives.



Bukalapak Design Research Conference

Jakarta, Indonesia

Pulling lessons from field research conducted, PLJ talked about the importance of sharing the often unspoken stories and insecurities related to doing field research and steps that can be taken to avoid future pitfalls.



JULY



Indonesian Development Forum

Jakarta, Indonesia

PLJ shared snippets from its After Dark research which focused on night-shift women workers who use public transportation to travel at night, underscoring how safe and inclusive cities influence economic productivity.

Service Design Indonesia Meet-Up

Jakarta, Indonesia

PLJ shared learnings from several of its service design research, discussing how and why participatory design approach can be used to improve public service delivery across Indonesia.

Lessons Learned Sharing Session with AFTECH

Jakarta, Indonesia

The winners of our the Microenterprise Fintech Innovation Challenge Fund shared lessons learned with other fintech players in Indonesia based on their experimentation tapping into the microenterprise market.

AUGUST

12th ATRANS Annual Conference

Bangkok, Thailand

PLJ made a case for the use of non-conventional data sources to improve mobility, by presenting proofs-of-concept from its urban dynamics portfolio that integrate big data from new technologies and apply machine learning approaches.

Human-Centered Design Workshop

Jakarta, Indonesia

PLJ facilitated an introductory workshop on human-centered design for Awantunai, one of the winners of the Fintech Innovation Challenge Fund, discussing the importance of understanding the needs of micro entrepreneurs.

SEPTEMBER



Regional Conference on Digital Diplomacy

Jakarta, Indonesia

Pulse Lab Jakarta moderated a session on the role of digital diplomacy during crises, describing how real-time data from non-conventional data points might be used to inform timely decisions.



ASEAN-China-UNDP Symposium 2019

Hanoi, Viet Nam

On the theme of how governments should go about building an inclusive innovation system that benefits the most vulnerable, PLJ emphasised the role of technology and big data in addressing the shortcomings of the existing system.

Financial Inclusion for Micro Enterprise in Fintech Summit and Expo 2019

Jakarta, Indonesia

PLJ moderated a session that brought together policy makers and fintech companies who are working to advance financial inclusion in Indonesia, particularly among micro entrepreneurs.



Statistics on Gender and the Environment Expert Meetings

Bangkok, Thailand

PLJ led a discussion on the benefits of tapping into unconventional data sources to obtain actionable intelligence for policy makers, specifically related to gender and the environment.



OCTOBER



3rd South-East Asia Forum on Implementation of the SDGs

Bangkok, Thailand

PLJ shared highlights of the work it has been doing with big data to shape development practices and humanitarian action throughout the Asia Pacific towards the balanced implementation of the 2030 Agenda.

Asia Pacific Urban Forum

Penang, Malaysia

Under the theme Smart Governance and Society, PLJ underscored why coming up with innovative solutions means more than just developing “smart tech”, explaining that technologies should be user-centred to address the existing and prevailing needs of a society.



Climate-Smart Agriculture Conference

Bali, Indonesia

PLJ exhibited ongoing research from its food security and agriculture portfolio to demonstrate how agri-food systems can be monitored at higher resolution using non-traditional data sets.



CGIAR TRUST Convention 2019

Hyderabad, India

PLJ described the value of using non-conventional data sources and new data analytics methods to complement traditional approaches to inform programming geared towards sustainable living and food security.

Nesta's Collective Intelligence Conference

London, The United Kingdom

PLJ described how its disaster response and climate change tools have transformed over the years, emphasising how the needs of end users have changed and why implementation does not conclude an innovation's life cycle.



NOVEMBER

National Coordination Meeting on Governance Goods and Services Procurement 2019

Jakarta, Indonesia

PLJ pulled insights from its Banking on Fintech research to facilitate a discussion on how the adoption and application of ICTs among micro merchants in Indonesia can accelerate economic growth.



12th Asia Pacific Future Trends Forum

Jakarta, Indonesia

Addressing the challenges of bringing digital network and artificial intelligence to healthcare, PLJ shared use cases of how big data has improved citizens' quality of life and can transform national healthcare services.



Economics of Cash-In/Cash-Out Agent Networks in Indonesia seminar

Jakarta, Indonesia

During a session on micro savings, PLJ presented its joint research with the UK's Behavioural Insights Team on using human-centred design and behavioural insights to find and test innovative ways to improve financial inclusion in Indonesia.

Save the Children – Regional Leadership Meeting

Jakarta, Indonesia

PLJ showcased some of its flagship innovations to facilitate a discussion on how the use of big data can be effectively leveraged to inform disaster response and protect the most vulnerable during times of crisis.



DECEMBER

IEEE International Conference on Big Data

Los Angeles, The United States of America

PLJ presented its data analytics research on modelling wealth in Papua New Guinea using call detail records and tele-survey data during a special session on machine learning and big data.



Meet Young Scientist

Jakarta, Indonesia

As part of Tempo's Media Week, PLJ contributed to a roundtable dialogue with other Indonesian researchers and scientists about how the adoption of big data by government institutions is creating clearer pathways for data-informed policies.

After Dark Report Launch

Jakarta, Indonesia

To mark the 16 Days of Activism Campaign against Gender-Based Violence, PLJ participated in a public discussion to share findings from the After Dark research and trigger conversations on how to create safer and more inclusive public spaces for women and girls.

PERSONAL DATA PROTECTION & PRIVACY PRINCIPLES

Adopted by the UN High-Level Committee on Management (HLCM) at its 36th Meeting on 11 October 2018

Purpose: These principles (the “Principles”) set out a basic framework for the processing of “personal data”, which is defined as information relating to an identified or identifiable natural person (“data subject”), by, or on behalf of, the United Nations System Organisations in carrying out their mandated activities.

These Principles aim to:

- (i) harmonise standards for the protection of personal data across the United Nations System Organisations;
- (ii) facilitate the accountable processing of personal data for the purposes of implementing the mandates of the United Nations System Organisations; and
- (iii) ensure respect for human rights and fundamental freedoms of individuals, in particular the right to privacy.

Scope: These Principles apply to personal data, contained in any form, and processed in any manner.

The United Nations System Organisations are encouraged to adhere to these Principles and may issue detailed operational policies and guidelines on the processing of personal data in line with these Principles and each Organisation’s mandate.

Personal data should be processed in a non-discriminatory, gender sensitive manner.

Where appropriate, these Principles may also be used as a benchmark for the processing of non-personal data, in a sensitive context that may put certain individuals or groups of individuals at risk of harms.

United Nations System Organisations should exercise caution when processing any data pertaining to vulnerable or marginalised individuals and groups of individuals, including children.

In adherence with these Principles, the United Nations System Organisations should conduct risk-benefit assessments or equivalent assessments throughout the personal data processing cycle.

Implementation of these Principles is without prejudice to the privileges and immunities of the relevant United Nations System Organisations concerned.

PRINCIPLES

FAIR AND LEGITIMATE PROCESSING	The United Nations System Organisations should process personal data in a fair manner, in accordance with their mandates and governing instruments and on the basis of any of the following: (i) the consent of the data subject; (ii) the best interests of the data subject, consistent with the mandates of the United Nations System Organisation concerned; (iii) the mandates and governing instruments of the United Nations System Organisation concerned; or (iv) any other legal basis specifically identified by the United Nations System Organisation concerned.
PURPOSE SPECIFICATION	Personal data should be processed for specified purposes, which are consistent with the mandates of the United Nations System Organisation concerned and take into account the balancing of relevant rights, freedoms and interests. Personal data should not be processed in ways that are incompatible with such purposes.
PROPORTIONALITY AND NECESSITY	The processing of personal data should be relevant, limited and adequate to what is necessary in relation to the specified purposes of personal data processing.
RETENTION	Personal data should only be retained for the time that is necessary for the specified purposes.
ACCURACY	Personal data should be accurate and, where necessary, up to date to fulfill the specified purposes.
CONFIDENTIALITY	Personal data should be processed with due regard to confidentiality.
SECURITY	Appropriate organisational, administrative, physical and technical safeguards and procedures should be implemented to protect the security of personal data, including against or from unauthorised or accidental access, damage, loss or other risks presented by data processing.
TRANSPARENCY	Processing of personal data should be carried out with transparency to the data subjects, as appropriate and whenever possible. This should include, for example, provision of information about the processing of their personal data as well as information on how to request access, verification, rectification, and/or deletion of that personal data, insofar as the specified purpose for which personal data is processed is not frustrated.
TRANSFERS	In carrying out its mandated activities, a United Nations System Organisation may transfer personal data to a third party, provided that, under the circumstances, the United Nations System Organisation satisfies itself that the third party affords appropriate protection for the personal data.
ACCOUNTABILITY	United Nations System Organisations should have adequate policies and mechanisms in place to adhere to these Principles.

Ethics and Innovation



Can does not imply ought:

“The fact that an action is technically possible does not mean that it should be performed. Technical mastery must be subject to ethical restraint.”

The Ethics Centre has published a set of principles on ethics and innovation based on discussions during a data innovation clinic organised by Pulse Lab Jakarta around the ethical challenges of using big data to monitor and evaluate development outcomes. The above is an excerpt from the publication.

Available for download here:

<https://ethics.org.au/ethical-by-design-evaluating-outcomes/>

ANNEX A

Research Activities



Scan here to read our blogs and stay up to date with our research activities.

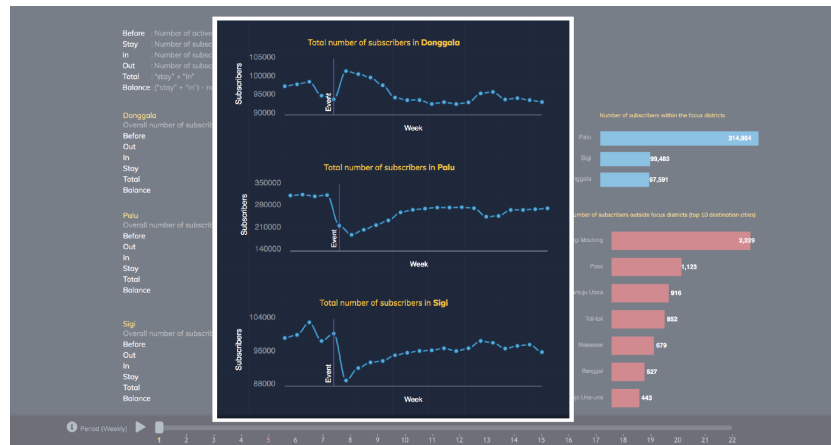


Disaster Response and Climate Change

Understanding Population Movement After the 2018 Central Sulawesi Disasters

Leveraging Pulse Lab Jakarta's advanced data analytics capacity and experience in developing disaster risk reduction data analytics tools gained from prior modelling with Digicel data, IOM joined forces with the Lab to undertake research using data from an Indonesian telecom. In particular, the research aimed to gather insights on internal displacement throughout the most affected districts in Central Sulawesi with a view to developing a proof-of-concept on the feasibility of using mobile network data for effective displacement assessment.

An interactive visualisation was designed to make sense of the results. It communicates the distribution of subscribers in Palu, Sigi and Donggala; highlights the most popular destinations where people travelled to after the disasters; and provides an estimate of the number of displaced subscribers based on analysis of subscribers' movements before and after the disasters. Representatives from the Indonesian Government, United Nations, and mobile telecoms were then invited to participate in a training workshop to discuss how mobile network data can be better



Distribution of mobile subscribers in Palu, Sigi, and Donggala from one of Indonesia's telecoms before and after the 2018 Central Sulawesi disasters

harnessed to support government-led disaster resilience efforts. The workshop was also intended to gather feedback to inform further development of the visualisation dashboard and explore adoption and scaling of the tool to aid future disaster response. How to scale up the tool and nurture an ecosystem in which it can be maintained was a critical part of the feedback discussion. This included inputs on relevant policies that should be put in place to support such an ecosystem, and the best positioned stakeholders to become custodians and ensure its sustainability.

Our analysis demonstrates that by identifying the movement of affected cohorts of a population, we can also ensure that they are not left behind in the Government's disaster response and resilience strategy. The case of the 2018 Central Sulawesi disaster episodes revealed that data on displaced citizens is scarce, hampering the speed and effectiveness of humanitarian agencies in distributing vital resources to those most in need. There's still more research to be done on how mobile network data can be harnessed to inform the Government's disaster response effort, and this proof-of-concept demonstrates the value of the approach and how it can be applied in different disaster scenarios to reduce the scope of impact.

are important storm shelters in Samoa. This analysis assumed that if the churches are indeed important community structures, those churches with weak social networks would need entirely different humanitarian or development assistance in the event of a disaster than those churches with strong networked communities. We can also glean numbers of people affected by disasters through pseudonymised mobile network data which can help build up the evidence base for decision-makers. This project was done in parallel with several other research projects in other Pacific island countries and the methods for modelling education, household characteristics, expenditure and income diversity from mobile network data was published in an academic paper.

During our visit to Samoa to meet and engage with stakeholders and understand the gaps which we felt could be filled through the use of non-conventional data sources, interest in data innovation was heightened. Through our colleagues in the UN office in Samoa, we had great access to government officials who were impressed with the work of the UN Global Pulse lab network and are keen to leverage the opportunities for data innovation not only in Samoa but also throughout the Pacific islands. This has since led to official communication from the Prime Minister of Samoa to establish a Lab in Samoa to serve the Pacific.

Comparing Population Displacement Estimates from Mobile Network Data in PNG



Visualisation showing the displacement of subscribers

This research explored pseudonymised mobile network data as a source of insights on displacement following the Highlands earthquake in Papua New Guinea in February 2018, and compared the findings to the current best practice for displacement tracking, namely IOM's displacement tracking matrix. We also compared the insights against information on the targeting of humanitarian resources, finding that the targeting of surveys and the allocation of humanitarian assistance are respectably efficient.

We hypothesised that by removing the frequent travellers, we were better able to focus the analysis on displaced subscribers, and remove any noise generated by regular commuters, who could also have been displaced but

due to their movements we are less confident of this classification. We thus subset the data set to include only subscribers with an average day-to-day travel distance of less than or equal to 15 kilometres, and use this subset to filter the day-to-day subscriber trajectory data set following the earthquake.

The analysis revealed a high-level picture of earthquake impact on communities across PNG by modelling the relationship between cell tower activity and cell tower distance relative to the earthquake epicentre. The tower activity ratio, which is defined as a ratio between the number of unique mobile phone subscribers connected to the tower and the number of unique mobile phone subscribers connected to the entire Digicel network in PNG over a week, was first calculated. In order to observe the earthquake's impact, we examined these ratios during two time periods, before the earthquake and after the earthquake.

This analysis only examines data from Digicel, which holds a majority market share in PNG. The absence of data from the other mobile network operator, as well as the fact that neither network has network coverage of all populated areas introduces some additional coverage error. Nevertheless, the findings from the analysis offer new perspectives on the quantification of displacement and underline the potential of mobile network data to offer highly valuable information during what are often chaotic days and weeks following a natural disaster.



Ms. Ursula Mueller (centre), Assistant Secretary-General for Humanitarian Affairs and Deputy Emergency Relief Coordinator in UN OCHA was the keynote speaker at the launch

Combining Different Data Sources to Manage Information for Natural Disasters

Pulse Lab Jakarta launched its latest research prototype — an automated, open source platform that integrates multiple non-traditional data sets to aid logistics planning and information management following natural disasters. Ms. Ursula Mueller, Assistant Secretary-General for Humanitarian Affairs and Deputy Emergency Relief Coordinator in the United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA), was the keynote speaker at the event, which was attended by a wide audience across the development and humanitarian sectors. During its early development and prototyping, the platform was intended for disaster monitoring, but as the prototype was refined and new features were added, it evolved more into managing information to better inform responses following natural disasters.

The platform is built on an automated data pipeline, allowing it to stream and analyse several non-traditional data sets all in one place. This data pipeline is triggered based on disaster alerts received from the Global Disaster Alert and Coordination System (GDACS), which is a global system aimed at closing information and coordination gaps. Though information that can inform disaster authorities and citizens generally begins to generate right after a disaster hits, such information tends to be managed independently by different responders and information access comes with its

own challenges. As an open source platform, MIND is designed to address these challenges, by publicly providing stakeholders with timely insights on affected areas, the needs of communities, among others.

The platform analyses Twitter data, in particular by examining public geotagged tweets that are within a disaster's geographical parameters, known as a bounding box. It also integrates a pair of APIs from OpenStreetMap and OpenRouteService (an open source route planner developed by Heidelberg Institute for Geoinformation Technology at Heidelberg University) to help identify suitable routes for the transportation of aid and resources. This feature provides information on strategic Points of Interest (PoI) such as schools, hospitals, government buildings, airports and ports, which are important for exploring options for origin and destination points.

A text processing algorithm is incorporated into the platform to extract news articles that are related to a given disaster from a credible news API. Based on the set of articles identified, the algorithm then proceeds to extract figures from the articles that describe an estimation of the number of casualties (words such as victims, fatalities and deaths are used as proxies). The Google Trends feature of the platform gives a sense of what topics people are talking about and the type of content they are searching for. This is an important communication tool that can help government disaster authorities to better contextualise the information they share with the public throughout the disaster response phase. The platform is designed to complement existing disaster response tools and can be modified to meet the specific needs of an organisation. PLJ offered an open invitation to encourage stakeholders across different sectors to participate in its user testing and has since received several requests and interests from disaster management authorities.

Real-time Data for Faster Decision Making in Times of Crisis

Real-time data can accelerate a government's understanding of a disaster's impact, as well as the urgent needs of its population much faster than traditional data sources used in emergencies. The immediate days following a sudden onset emergency are typically focused on crucial decision making and questions about the scope of impact, location of the most vulnerable and resource allocation. Following extensive discussions with relevant humanitarian agencies and stakeholders in Indonesia, PLJ and UNICEF identified a set of challenges that can be addressed through the integration of non-traditional, real-time data sources.

Problem: Collection of data on the movement of people is expensive and time-consuming

Solution: Combine Facebook Geoinsights and Mobile Network data to produce real-time displacement maps

During disasters, Facebook provides anonymised, privacy-conscious aggregated real-time data on the movement of people at the town (Kecamatan) level. Under an existing agreement with Facebook, this data is available to UNICEF and some international NGO's (IFRC), at no cost. Whilst rigorous benchmarking is required before deploying this data in decision making, in exploratory work done by PLJ and UNICEF it was revealed that the unweighted Facebook population movement data in the aftermath of the 2018 Palu earthquake was broadly representative of the later confirmed displacement data, and substantially more accurate than other early and informal data available in the 72 hours after the disaster.

Problem: Data preparedness is time-consuming and under-resourced

Solution: Leverage a set of reproducible open source data pipelines that ingest data from disparate sources and presents that data via a common, documented, interoperable API

Humanitarian Data Exchange (HDX) stood out from our survey of potential real-time data. HDX is an open source platform built by UNOCHA that allows UN agencies and NGOs to store, manage and access datasets for instant

analysis, visualisation and comparison. The platform and tools are accessible to both technical and non-technical staff, and allow the design of visualisations and dashboards in a web browser. HDX also leads work on the Humanitarian Exchange Language (HXL) data tagging standard, which enables non-technical staff to easily annotate and validate data and create both summary and map based live data dashboards without the need for coding or use of additional data cleaning or validation resources. These dashboards are suitable for viewing on a range of devices and already function well in low-connectivity and offline environments.

Problem: 4W/5W Tools are cumbersome and take time away from disaster response

Solution: 5W, Leverage existing technologies to create a standardised, massively streamlined 5Ws reporting workflow

The process of completing a 5W's questionnaire can be complicated and is prone to data entry errors as it requires many data post-processing steps before becoming available (and soon after becomes unreliable or out of date). Using Natural Language Understanding NLU, 5Whats can understand responses and ask clarifying questions to ensure that activities are being recorded in the correct location and have sufficient detail, while reducing reliance on spreadsheets and manual, computer based data entry. UNICEF has invested in, and open sourced the conversational reporting platform Rapidpro. Operating over SMS, Whatsapp and other instant messaging platforms, it allows for structured data collection in a conversational flow, without imposing additional workflow requirements or cognitive load on field and information management staff who may already be overbruned.

This research exploration has unearthed the need for the adoption of innovative tools that can surface relevant real-time data in a timely and interpretable fashion during times of crisis. Going forward, the goal is to make existing public data sets and ones available to UNICEF more accessible through reproducible data pipelines; test the prototype of our data analytics and visualisation tool that demarcates affected areas; as well as gather user feedback and scope the feasibility of applying machine learning applications to existing data sets (such as predicting movement of people post-disaster using historical Facebook Geoinsights and Mobile phone CDRs).



Urban Dynamics

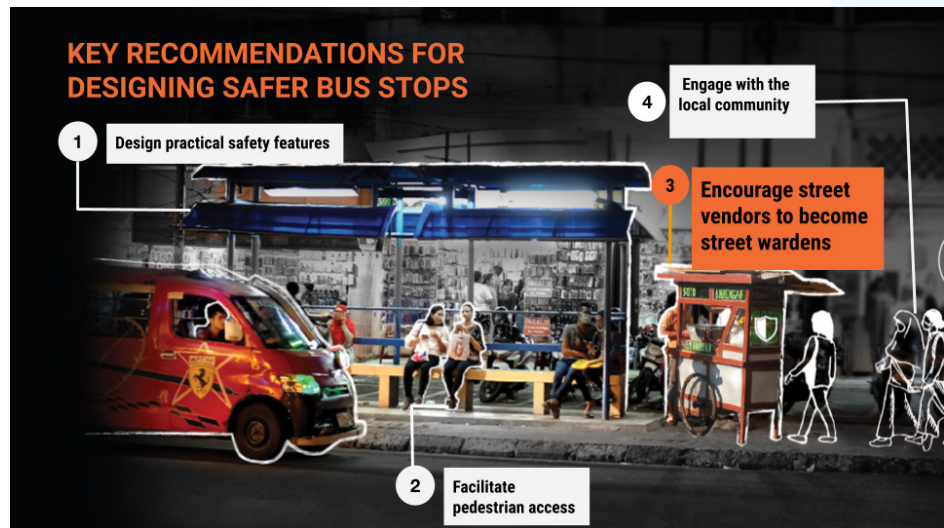
After Dark: Encouraging Safe Transit for Women Travelling at Night

City governments nowadays are adopting sophisticated technologies and near real-time data to improve planning and service delivery to enhance citizens' quality of life. Known as the smart city approach, the aspect of the discourse regarding women has focused on improving mobility. However in order to be able to navigate through these fast-advancing, urban cities, women sometimes have to develop their own safety mechanisms because smart cities do not always mean safe cities. Pulse Lab Jakarta teamed up with UN Women to conduct research on how women navigate public transportation in the evening time.

Aptly called the After Dark research, the overarching goal was to understand the mobility patterns and perceptions of safety among women workers who regularly travel at night. The research was guided by the following questions:

- How do women perceive safety when using public transportation at night?
- What factors influence women's perception of safety when travelling at night?
- What are the challenges that impact women's mobility and travel choices?
- How can transit systems be improved to encourage safe transit for women travelling at night?

There's a scarcity of research on the safety of women who work night shifts in small retail industries and use public transportation to commute at night in urban areas. Yet in Indonesia, this group of



women is quite significant, as the Ministry of Finance reports that they make up around 40 per cent of this sector's workforce. The focus of the After Dark research was therefore narrowed to focus on the experiences of women who may be employed as shop attendants, cashiers, restaurant servers and in other small business enterprises. To expand the understanding about women's safety and mobility choices in urban areas beyond the Greater Jakarta locale, the research was conducted in Medan, Semarang and Surabaya.

This After Dark research focuses on the individual experience rather than the systemic factors; it delves into what "being safe" means for women who regularly travel at night; and it examines the emotions and beliefs influencing women's travel choices. The research was thus designed to gain insights about every aspect of a woman's travelling experience from the first mile to the last mile; and every stop in between. We approached this research with the understanding that a woman's mobility, for instance, returning home from work at night, should not be fragmented into safe and unsafe dilemmas — every part of the journey should be safe.

Thirty-seven women respondents from three cities participated in the research. These women recorded their travel experience over four days in a diary, which served as a springboard for our researchers to conduct



further in-depth interviews. As part of the research, a few of the respondents were shadowed on their journey home at night, which provided researchers with an actual, real-life context to help synthesise information and analyse findings. Preliminary findings from the fieldwork were shared in a co-design workshop with a diverse group of participants to obtain feedback and elicit ideas for intervention opportunities.

We found that the respondents' perceptions of safety exist on a spectrum — it is not simply a dichotomy of being safe or unsafe. While their overall nighttime travel experiences are influenced by a range of factors, the quality of public infrastructure, efficiency of transportation services and women's own sense of familiarity with their surroundings stand out. Regardless of how the women perceived travelling at night to be, they all acknowledged that it was part of what they had to deal with having to work night shifts.

Instead of limiting their mobility due to security concerns, they try to find ways to keep going such as building their own protection mechanisms. These mechanisms help them to reduce dependence on friends, family, fellow passengers and onlookers when travelling at night. The main challenge that emerged is two-fold: it is about how to reduce the burden that is placed on women to maintain their safety, and what steps can be taken to build safe and inclusive cities.

We identified five opportunity areas for intervention:

1. Repositioning Organda (a land transportation organisation that was established by a Ministerial Decree in 1963) to lead the angkot reformation by implementing and monitoring vehicle and driving guidelines to meet safety standards.
2. Reimagining designated angkot (a type of transportation that transports passengers in the city area with the use of small buses and passenger cars) stops

3. Encouraging street vendors to become street wardens
4. Designing a newcomer starter pack for migrant workers
5. Enabling bystanders to take action

To mark 2019's 16 Days of Activism Campaign against gender-based violence, a public discussion was held in Jakarta to share findings from the research and trigger open conversations on how to create safer and more inclusive public spaces for women and girls. The UN Resident Coordinator in Indonesia and the Ministry of Transportation's Head of Research and Development opened the discussion and highlighted the timeliness of the research and the importance of bringing together key stakeholders to explore ideas for user-centred solutions.

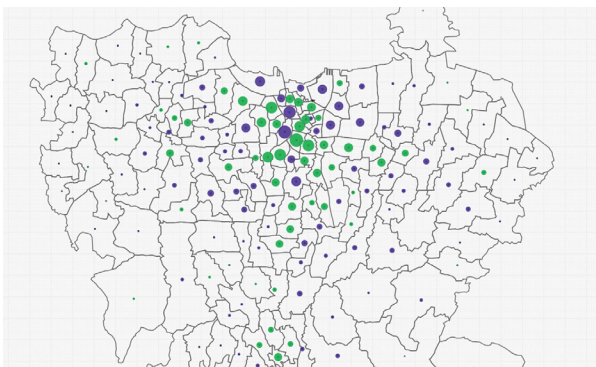
Similar messages were echoed during the panel discussion which included representatives from the Medan Transportation Office, Coalition for Safe Public Space (KRPA), Gojek and UN Women. We are heartened by the intent of Medan City Government to adopt recommendations of the After Dark research as part of the Ministry of Transportation's new Buy The Service (BTS) programme, which upon implementation next year may serve as a useful case study for other cities throughout Indonesia. The After Dark research contributes to a much broader discourse on creating safe and inclusive public spaces for all, and the report presents a variety of opportunities for intervention.

Using Ride-Hailing Data to Inform Transportation Planning and Policy



INDONESIA

Ride-hailing apps have significantly transformed transportation in Indonesia, yet there is much research to be done on their potential to support national development goals. In Greater Jakarta for instance, not everyone uses public transport as some commuters prefer private transport for convenience. Having data-supported insights on segments that are underserved by both public and private transport services can, therefore, help city planners and policymakers develop an integrated transport system. In partnership with Grab, PLJ started off by crunching anonymised driver's GPS traces in Greater Jakarta during August 2018 to get an understanding about ride-hailing inflows/outflows at the sub-district level.



The visualisation above shows traffic patterns in Greater Jakarta as inferred from Grab's anonymised GPS data

To better communicate the results of the analysis, the team generated a set of interactive visualisations to show traffic patterns in Greater Jakarta as inferred from Grab's anonymised GPS data. The visualisation also shows traffic flows during weekdays and weekends. Differences in traffic patterns in several sub-districts were observed. For example, sub-district Menteng (one of the busiest office and business areas in Jakarta) shows higher traffic during weekdays compared to weekends. An opposite trend is seen in commercial and tourist areas, like Bekasi Selatan and Bogor Tengah sub-districts. When the Asian Games took place in Jakarta in 2018, we also saw an opportunity to further explore these dynamics and assess the impact on economic growth and resilience at the subnational and national levels. Going forward, PLJ will act as Regional Data Partner for Grab-UN research partnerships.

THAILAND

The rapid urbanisation that Asia is in the midst of has brought attendant economic benefits from economies of scale, but has also meant that our cities are choking. The rising levels of traffic lead to significant productivity losses that come with being stuck in traffic, whilst also increasing pollution levels with greater emissions. Efficient transportation planning and management requires spatio-temporal data of high frequency. Leveraging an ongoing data partnership with Grab, and partnering with GIZ Data Lab and the Office of Transport and Traffic Policy and Planning of Thailand through GIZ Transport and Climate Change in Asian Programme, PLJ initiated work to explore the feasibility of ride-hailing data to both inform transportation policy and planning, as well as to develop proxy measures of air-quality at high spatio-temporal resolution for the Bangkok metropolitan region.

The initial research shows that ride-hailing data could potentially provide a range of needs for transportation planning and management, both in terms of data points as well as in terms of modelling such as traffic speeds, nowcasting congestion, and macroscopic traffic flow modelling. It also suggests that even with a low number of actual sensors for calibration, models developed through the use of ride-hailing data coupled with other data sources including those from satellite imagery, could potentially infer air quality at high spatial and temporal resolutions.



Financial Inclusion



Mapping Financial Service Points Across Indonesia

Focused on how to support policymakers in improving financial service points' availability and access in terms of proximity, Pulse Lab Jakarta partnered with the Indonesian National Council for Financial Inclusion (DNKI) to design an interactive geospatial mapping tool with the aim of charting the various financial service points across the country's archipelago. Prototyped using data from Yogyakarta City, Yogyakarta and Bima District, West Nusa Tenggara, the tool visualises financial services points and existing gaps based on socio-economic infrastructure and financial services offered. Together with SNKI and Women's World Banking (WWB), we explored a few ideas and fine-tuned them along the way, resulting in a prototype visualisation dashboard.

Multiple datasets were used to develop the interactive visualisation dashboard, enabling policymakers to explore data layers and indicators that are relevant for improving financial access, and more broadly financial inclusion. These data sets range from financial and telecommunications data to geospatial and demographic

data, which have been collected by Government institutions such as the Financial Services Authority (OJK), the Ministry of Communication and Information Technology, Statistics Indonesia (BPS), and National Team for the Acceleration of Poverty Reduction (TNP2K) to name a few.

By visualising the information, we sought to enhance policymakers' analysis and decisions towards the broader

objective of financial inclusion. The tool features indicators beyond the conventional measurements of financial inclusion, for instance branches per capita or ATMs per 100,000 people — which typically do not factor in where people live in relation to financial service points. Important information related to financial service points were added and categorised into Financial Access Points (FAP) and Potential Access Points (PAP). Eight indicators were integrated for the financial access points, namely: the availability and locations of State banks, Regional banks (BPD), Private banks, Joint Venture banks, Sharia banks (BPR Syariah), Banking agents, Cooperatives and ATMs.

The visualisation dashboard is designed with a modular orientation to accommodate additional data sets. Building the prototype, we only used data from two districts in Indonesia, which allowed us to do rapid prototyping and testing. Nevertheless to scale up the Indonesian Financial Access Map across the country, relevant data for other parts of the country will be required. PLJ has handed over the prototype of the interactive geospatial financial access map to the Indonesian National Council for Financial Inclusion (DNKI), where it'll be enhanced for future usage at national-scale for more informed and timely policy making.

Fintech Challenge Fund Winners 6-Month Pilot: Lessons Learned



Six Indonesian FinTech companies were awarded seed grants towards the end of last year as part of the Microenterprise Fintech Innovation Challenge Fund which Pulse Lab Jakarta implemented together with the United Nations Capital Development Fund — Shaping Inclusive Finance Transformations (UNCDF SHIFT) programme. Taking on insights from the Lab’s Banking on FinTech:

Financial Inclusion for Micro Enterprises in Indonesia research, the winners tested a variety of ideas related to the value of human intermediaries (agents), alternative credit scoring, financial literacy and cash light practices.

The challenge fund was a catalyst to help these six local fintech companies incorporate microenterprises as an important part of their business models. The 6-month pilot programme nonetheless was only the beginning; our winners plan to take the insights from the pilot and expand and improve their business solutions. There are plans to begin digitising micro merchant receipts, incorporating crowdsourced information for quality assurance via community surveyors, and geographic expansion of their business offerings. The plans for scaling and sustaining the business solutions show that microenterprises are becoming more of an integral part of business for fintech companies.

The piloting phase provided a practical platform for experimentation for the participants who may not have otherwise had the opportunity to pilot initiatives in their organisations. Although lessons from the piloting phase

provided a foundation for understanding the opportunities and barriers for using fintech for financial inclusion in Indonesia, we acknowledge that the 6-month pilot programme has only scratched the surface with a limited sample in limited geographic locations. We were grateful for the close support from the Australian Government Department of Foreign Affairs and Trade (DFAT), Asosiasi FinTech Indonesia (AFTECH) and the Indonesian Financial Services Authority (OJK) during the programme, as well as VISA, Oracle, and Deloitte for their mentorship support for the winners in undertaking their experiments.

The Winners by Areas of Experimentation

 <p>The Value of Human Intermediaries</p>	<p>AwanTunai</p> <p>AwanTunai proposed a digital mobile application system to replace the kasbon credit system for micro merchants. They later shifted their model to offer the working capital loans instead to fast moving consumer goods distributors who work with the micro merchants.</p>	<p>Gandengtangan</p> <p>Gandengtangan proposed a digital mobile platform for distributors who work with microenterprises to offer a digital credit system to create a closed-loop payment system, along with the ability to have digital inventory management and cashless payments.</p>	<p>Modalku</p> <p>Modalku proposed a strategy of using an agent-based acquisition model (sales agents and surveyor agents) to reach micro enterprises for microloans.</p>
 <p>Financial Literacy</p>	<p>Amartha</p> <p>Amartha proposed to introduce a financial literacy training as a part of their lending process to their borrowers (low income rural women micro-entrepreneurs) via a mobile application, Amartha Go. They also proposed reaching non digitally savvy borrowers by introducing digitally savvy youth agents who are trained in using the Amartha Go app.</p>		
 <p>Alternative Credit Scoring</p>	<p>JULO</p> <p>JULO proposed a new loan product that uses an alternative credit scoring system that incorporates smartphone usage behavior data which is aimed at being more inclusive of women’s micro enterprises.</p>		
 <p>Cash Light Practices, Digital Payment System</p>	<p>Duithape</p> <p>Duithape proposed to develop a digital cashless payment system that will allow distributors to collect payments from micro enterprises without the inefficiency and risk of physical cash pickup, enabling micro enterprises to perform transactions with greater ease and security.</p>		

#TabunginAja: Fusing Behavioural Science and HCD for Financial Inclusion



The Behavioural Insights Team (BIT), Pulse Lab Jakarta (PLJ) and Secretariat of the Indonesian National Council for Financial Inclusion (S-DNKI), formed a partnership in 2018 to apply human-centred design and behavioural insights to develop and trial innovative approaches to improve financial inclusion. The project aimed to encourage bank account usage, more specifically regular deposits made into agent-based bank accounts. Such accounts rely on agents to help their neighbours to sign up for accounts, help customers conduct bank transactions such as deposits and withdrawals, and act as general financial services advisory and support.

To test our ideas in the real world, we thus partnered with a large Indonesian bank that offers agent-based banking. We designed an 8-week long WhatsApp campaign called #TabunginAja (#JustSaveIt), implemented between March and May 2019. The messages, consisting of pictures with short messages, comics and text, were sent to agents, asking them to encourage their customers to save the change from purchases at the agent's shop or street food stalls. The messages built on a number of insights from the behavioural sciences, such as goal-setting and rules of thumb.

The qualitative evaluation showed that the implementation of the campaign was labour intensive and messages therefore did not always reach all agents. Among the

agents who received the messages, the content was positively received - indeed, some agents already actively encouraged customers to save their change or had previously done so. Among the agents interviewed, however, none of the agents to whom the idea was new started the habit of asking customers to save their change as a result of the campaign. This was in part due to structural barriers, such as a lack of liquidity among agents. The results of the quantitative evaluation also indicated that customers in the intervention areas were 10-percentage points less likely to make a deposit in May 2019 than those in control areas. We believe, however, that this is due to randomisation failure as it seems highly unlikely that a relatively light-touch intervention would have such a large impact on the outcome of interest.

As we were not able to determine the overall impact of the campaign and its implementation was associated with a cost (human resources necessary to send out the messages), we cannot recommend its roll-out across the agent-based banking system in Indonesia. However, we think that the project and its results display important lessons for agent-based banking and financial inclusion policies in Indonesia, specifically around innovating to improve financial inclusion and enhancing the effectiveness of the agent-based banking system. We thank S-DNKI for partnering with us, and look forward to developing and testing more innovative approaches to ensure every Indonesian can eventually benefit from access to appropriate financial products.



One of the comic strips shared during the campaign



Food Security and Agriculture

Mapping Smallholder Farmers in Indonesia to Inform Policies



As the world's population continues to increase, governments have been stepping up efforts to ensure that citizens have access to safe and adequate food supply. The Sustainable Development Goals are also undergirded in the ambition to end hunger, which is crucial to sustain humanity. Collaborating with the Directorate of Cooperatives and Small and Medium-sized Enterprises (SMEs) in the Ministry of National Development Planning (Bappenas), Pulse Lab Jakarta developed an interactive visualisation and analysis dashboard that uses the latest agriculture census data to identify smallholder farmers, with respect to the commodities they produce and the size of their landholdings to generate insights that can inform policies relevant to SMEs in the agriculture sector.

Consisting largely of smallholder farmers (defined as having landholding less than two hectares) and large plantations, millions of Indonesians depend on the agriculture sector to earn their everyday livelihoods. Smallholder farmers, who typically come from agriculture-dependent households, are also part of the segment of SMEs in Indonesia. Information nonetheless regarding SMEs (in the case of smallholder family farmers) that contribute to the agriculture sector remains limited. Having a better understanding of how many of these smallholder farmers exist; the kinds of commodities they produce; and the land size used can enable the Government to provide more fitting support.

The agriculture sector in Indonesia is vast, yet not all smallholder farmers are recognised in official statistics. The 2013 Agriculture Census, the latest of six agricultural censuses ever conducted in the country, is the most comprehensive data set currently available. Within this data set though, there is no indication of which farmers are considered SMEs. Through discussions with Bappenas' Directorate of Cooperatives and SMEs, we thus decided to experiment with land size as a proxy to determine smallholder farming SMEs. For instance, farmers with landholdings less than one hectare were categorised as SMEs for the food crops category. While for the horticulture category, farmers with landholdings smaller than half a hectare were classified as SMEs.

Once the data was processed and the classifications for smallholder farming SMEs for each agriculture category was established, our next move was to prototype a visualisation and analysis dashboard that could cover all 34 provinces in Indonesia, including data on the national and sub-district levels. The dashboard was intended to not only present the data collected in a way that was digitally interactive (allowing users to easily switch between provinces and survey commodities of interest), but also do so in a visually appealing way. After rounds of iterations alongside our Bappenas colleagues to ensure optimum user experience, we came up with a prototype that allows data overlaying and multiple presentation views.

The dashboard also provides useful visualisations on the amount of land that is used for a particular category of agriculture, which helps with categorising which farmers fall into the SMEs segment. Having an understanding about the type of agriculture commodity, the size of landholding, characteristics of the farm (and the related household) used for production can provide the Government with useful information that can inform resilience efforts when smallholder farmers experience economic shocks. Using the data from the 2013 agriculture census as the single data source, the dashboard was developed as a rapid prototype.

Determining smallholder farming SMEs is multidimensional and to be more accurate, we cannot rely on the size of landholding alone. Therefore in 2019, the Directorate for Cooperatives and SMEs showcased the features of the

dashboard to other ministries and government institutions to discuss how the dashboard could be further developed by integrating additional data sets from other ministries to provide a more comprehensive understanding about how the agriculture sector intersects with other areas of national development, as well as to come with a multidimensional proxy for smallholder farming SMEs.

Moving forward, Bappenas as the custodian of the dashboard, is positioned to explore additional data sets from other ministries (especially with the Satu Data initiative now being implemented) to also ensure the livelihoods of smallholder farmers are safeguarded through long-term resilience planning.

Applying Big-Data-Based Positive Deviance Approach in Agriculture



In developing countries, agriculture production systems and households that manage these systems are complex and varied. Knowledge and data collection activities undertaken by government agencies tend to fall short of capturing this complexity and variety across both spatial and temporal dimensions. In Partnership with GIZ Data Lab, PLJ undertook a scoping project to understand the potential of big-data driven “positive deviance” (land managers who are exposed to similar conditions, but are faring better than their peers in the same group). The primary objective of the research was to identify the behaviours, strategies and factors employed by the positive deviants and develop interventions to facilitate the adoption of those strategies.

Our study population included villages in Indonesia having at least one household growing rice. From the 2013 agricultural census, roughly 40,000 villages covering almost nine million rice growing households were identified based on this criterion. The agriculture census provides troves of data, which is potentially noisy

because the data set was not developed for the purpose of identifying positive deviance per se. Since the census data is collected across three cropping seasons in 2012-2013, all the data could be leveraged but the performance measure would need to change to reflect the seasonality across the year. To maximise the identification of outliers and to maintain the interpretability of the results, we aimed to remove noise and extraneous variables that could potentially impact the final result.

Our early findings confirm that positive deviants can be identified by analysing key variables within data sets, but to reach a more conclusive result additional datasets and contextual experts are needed to corroborate findings. This pilot was an opportunity to start the discussion about what a “positive deviant” means for agriculture production and its broader implication for sustainable development. Though our method investigated yield proxies, as a measure of agricultural performance, higher yields are not necessarily sustainable. However, methods to increase yield can have long-time impact on community, environment and even agricultural performance over time.



Discussing how big data based positive deviance approach might be used to identify rice farmers in Indonesia who are performing better than their peers



Strategic Exploration



Nowcasting Inflation to Keep Indonesia's Growth on Track

Inflation is the average change in percentage based on a general price index, but in many cases an increase or decrease only becomes evident on a monthly and annual basis. This lag delays a government's ability to take a swift course of action. Pulse Lab Jakarta and the Directorate of State Finance and Monetary Analysis within the Ministry of National Development Planning have been developing a fit-for-purpose inflation monitoring tool, which can generate same-day inflation information to advise decision and policy makers working in the economic policy domain.

While a few days lag may seem insignificant for consumers, at a national scale a negative outcome could have an adverse effect on the population. Nowcasting therefore enables daily assessments to ensure that the Government is informed in a timely manner and can plan interventions to cope with such an outcome. Initial discussions between our data science team and representatives from the Directorate of State Finance and Monetary Analysis about the possibility of developing a nowcasting model began in 2017. We considered several traditional and non-traditional data sets to investigate whether they could aid near real-time orientation.

After extensive exploratory data analysis, the data set from Bank Indonesia's Strategic Food Commodities Price Information Centre showed some positive results. This data set contains daily-updated price data of ten strategically selected commodities: rice, red chillies, cayenne peppers, shallots, onions, cooking oil, sugar, beef, eggs and chicken. To gain a comprehensive measure of domestic inflation, we also considered housing prices and automotive prices.

The model we developed can successfully 'nowcast' the rate of inflation within a running month with 72 per cent accuracy and an average error rate of 4 per cent. The working model was initially tested in the second week of November 2018, and generated a 3.15 per cent year on year inflation rate for November 2018. We compared the model's result with the official inflation rate published by BPS in the first week of December that showed a rate of 3.12 per cent. Whenever one or two of the data sets were removed, the model showed varying results that were not close to the officially published inflation rates. This suggests that the current model relies heavily on all the data sets being used to prevent any statistical disturbance.

The model has received recognition from the Bappenas Minister, Bambang Permadi Soemantri Brodjonegoro, and the Minister has encouraged his team to explore additional features that might be relevant for policy makers across the Indonesian Government. The Directorate is also planning to present the inflation model to the National Inflation Control Team and Bank Indonesia as a national planning and strategy tool to help monitor the inflation rate for a running month. This nowcasting tool will be integrated as part of the Bappenas' Situation Room that will be launched soon.

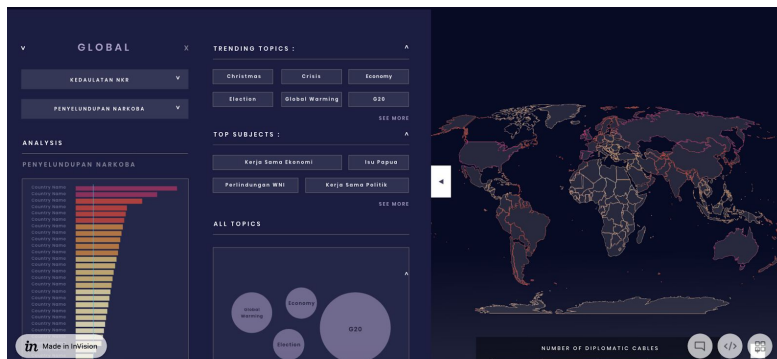
Dataku: Using Data Analytics and Visualisation to Inform Government Decision Making

To complement the Indonesian Government's data governance initiative known as Satu Data, Pulse Lab Jakarta alongside the Ministry of National Development Planning (Bappenas) developed a data visualisation tool to provide government officials with an at-a-glance, data informed view on particular development topics. The tool is being tested with potential users within the Ministry for feedback, and will become a cornerstone in Bappenas' Situation Room for planning, implementation, monitoring and evaluation.

Known as DatakuID, the tool visualises near real-time data that is made available through Satu Data Indonesia portal APIs. While this portal houses several complex data sets

that can be leveraged for effective policy making, making sense of the data often comes as a challenge. To address this challenge, Bappenas' Data and Information Centre initially explored a few ideas with Pulse Lab Jakarta's data analytics team, from which insights were garnered that later informed the development of the data visualisation tool. DatakuID is designed to ingest data from the Satu Data Perencanaan Pembangunan portal, then visualise and present them in an intuitive, concise and attractive format to inform decision making at the subnational and national levels.

The tool is built with much agility, which makes it adaptable to other datasets that may be added in the future from the Satu Data portal, including datasets from other ministries.



Making Sense of Diplomatic Correspondence through Data Analysis and Visualisation

Collaborating with the Indonesian Ministry of Foreign Affairs, Pulse Lab Jakarta have extensively explored and produced a machine learning visualisation tool to help staff understand their diplomatic correspondence between the Ministry and their diplomatic staff abroad. To facilitate dialogues with foreign governments and other stakeholders, analysts within MoFA are required to produce summaries of diplomatic cables for each country for diplomatic staff, government officials and the Minister. Currently, these summaries are generated by analysts reading, annotating and summarising large volumes of diplomatic communications, which is time intensive and a large volume of communications are unable to be read and incorporated into analysis reports.

Subsequent to user research conducted within the Ministry, we identified one clear need inside the department that was amenable to a machine learning solution: Understanding, classifying and making accessible their diplomatic cable data. PLJ began a collaborative process of ideation and design, and concepts and mockups were presented at an early stage of the project to clarify the need and ensure that our proposed solution would be usable and practical with the existing workflow of the staff within the Ministry. Based on feedback from these mockups, we made substantial changes to our proposed design and presented a second round of prototypes. This resulted in a set of tools that can reliably extract metadata and text data from MoFA diplomatic cables, and can automatically classify new incoming cables using the taxonomy provided by MoFA. The tool enables MoFA to analyse, locate and make sense of their large volume of correspondence and improves analysts' abilities to provide relevant, timely and accurate advice.

ANNEX B

Media Coverage

JANUARY

Festival Praktik Cerdas Lokal for Sustainable Development in Indonesia

“Through Lab on Wheels, Pulse Lab Jakarta shares information to stakeholders in eastern Indonesia about the benefits of using new data sources for public policy as well as for planning and evaluating development programmes.”

Source: BaKTI, 29 January 2019

FEBRUARY

The Importance of Data in Decision Making Process

Source: SWA Online, 7 February 2019

Disaster Management and Strategy, The Crucial Part of Smart City

Source: Medcom.id, 18 January 2019

Female Leaders Share Experience in Advancing Women’s Participation in STEM

Source: Magdalene, 25 February 2019

Home | [Single](#) | [Data Science for social good: move fast and fix things](#)



Data Science for Social Good: Move Fast and Fix Things

“...collaborating with UN Pulse Lab Jakarta to improve traffic safety in Indonesia through video analysis.”

Source: Imperial College Business School, 25 February 2019

MARCH

Think Equal, Build Smart, Innovate for Change

“Innovation and technology have shown incredible progress touching every aspect of our lives. Innovative approaches in urban planning show the best results when women are consulted and included in the planning and decision-making processes.”

Source: The Jakarta Post, 8 March 2019

Julo Fintech, Easy Online Loans with Low Interest

Source: DuniaFintech.com, 8 March 2019

Readiness of National Statistical Systems in Asia and the Pacific for Leveraging Big Data to Monitor the SDGs

Source: Asian Development Bank, 18 March 2019

Hub members collaborate with Jakarta Lab of UN Global Pulse

Source: The Allens Hub, University of New South Wales, 19 March 2019

AI for International Development

Source: Data Science Campus, 26 March 2019

What we’re reading... on collective intelligence #4

Source: Nesta, 25 March 2019

APRIL

Why Micro Merchants are Less Interested in Using Financial Technology Services?

“The research from Pulse Lab Jakarta also highlighted that the main pain point is not about adopting financial technology, but instead about how to retain fintech users.”

Source: The Conversation, 26 April 2019

MAY

Pulse Lab Jakarta Launches Natural Disaster Logistics Planning Information Platform

Written by Aji Hidayat

Read this item



Pulse Lab Jakarta, Towards Inclusion, launched the Natural Disaster Logistics Planning Information Platform. Pulse Lab Jakarta is an institution established through a partnership between the United Nations (UN) Global Pulse and the Indonesian Government through the Ministry of National Development Planning (Bappenas).

Pulse Lab Jakarta Launches Natural Disaster Logistics Planning Information Platform

“The national disaster logistics planning information platform collects various information about the current disaster in an area. This platform provides information about a disaster that is happening to the party responsible for the disaster.”

Source: Voice of Indonesia News, 8 May 2019

Communities Across Indonesia Still Face Water Problems: A Consolidated Effort is Necessary to Ensure Access to Clean Water

Source: Kopernik, 20 May 2019

JUNE

People-centric technology targets disaster displacement

“Pulse Lab Jakarta’s methods have led to the development of CycloMon, which tracks satellite data on the path of cyclones, and Haze Gazer, which wraps in user-generated data and has been adopted by Indonesia’s government to monitor wildfires...”

Source: SciDev.Net, 10 June 2019

JULO distributed fund from UNCDF to women micro entrepreneurs

Source: kontan.co.id, 11 June 2019

JULO is trusted by UNCDF to help women micro entrepreneurs in Indonesia

Source: techinasia.com, 15 June 2019

JULY

Is Artificial Intelligence the frontier solution to Global South’s wicked development challenges?

“Some of the examples of automated translation and voice recognition systems include ‘Translator Gator’ developed by Pulse Lab Jakarta (Indonesia) to invite people to create taxonomies, or collections of keywords, in lesser-known languages and dialects ...”

Source: Towards Data Science, 5 July 2019

Use of Big Data in Achieving Sustainable Development Goals

Source: BioEnergy Consult, 11 July 2019

SEPTEMBER

MIND – the UN’s New Data Analysis Platform for Disasters

Source: Social Media for Good, 6 September 2019

Foreign Ministry Partners With UN Big Data Lab, Australia in Digital Diplomacy

“Pulse Lab will also help digitalise correspondences between the ministry and Indonesian missions abroad.”

Source: The Jakarta Globe, 10 September 2019

Natural disasters fuel environmental degradation

Source: SciDev.Net, 13 September 2019

Data for Good Exchange 2019 Preview: Prosperity & Peace Track

Source: Bloomberg, 17 September 2019

UN Global Pulse Lab for Big Data to Support Inclusive Development

Source: Samoa Global News, 19 September 2019

Samoa to host big data centre for the region

Source: Samoa Observer, 19 September 2019

Southeast Asia must find the right balance in ride-hailing regulation

Source: Nikkei Asian Review, 27 September 2019

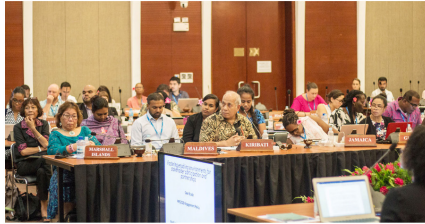
OCTOBER

Juries, data gaps, and software intermediaries: Nesta's collective intelligence Conference

Source: Science Practice, 24 October 2019

Home / Samoa /

Lab looks at data to develop Small Island Developing States



Lab looks at data to develop Small Island Developing States

"Governments come to us with problems they need solving, and we develop a prototype to solve it."

Source: Samoa Observer, 31 October 2019

NOVEMBER

Balittas Dalam Training Workshop on Big Data 101 for Agricultural Research

Source: Indonesian Sweetener and Fiber Crops Research Institute (Balittas), 5 November 2019

BNPB Supports Efforts to Strengthen Refugee Information Systems

Source: National Disaster Management Authority (BNPB), 22 November 2019

Palembang UIGM Lecturer Shares Experience from PLJ's 9th Research Dive

"Discussions with participants that come from different backgrounds often push researchers to get out of their comfort zones and be open to accepting new insights."

Source: DuniaDosen.com, 27 November 2019

DECEMBER

UN Women Praises Gojek's Efforts to Assure Women's Safety

Source: Tempo.co, 11 December 2019

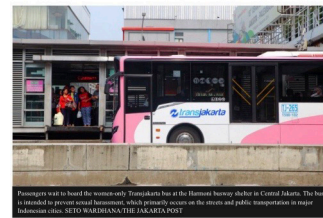
Efforts to Create A Sense of Safety for Women Travelling at Night

Source: Fimela, 11 December 2019

Anti-harassment report in Indonesia pushes for bystander intervention

Asia News Network | Publication date 17 December 2019 | 21:03 ICT

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Passengers wait to board the women-only TransJakarta bus at the Harmoni heavy shelter in Central Jakarta. The bus is intended to prevent sexual harassment, which primarily occurs on the streets and public transportation in major Indonesian cities. **SEDO WARGHANA/THE JAKARTA POST**

Aprilia Rezdim was taking the train from Bogor to Jakarta when she saw a man rubbing his crotch against the back of a female passenger, who looked uncomfortable and helpless. Aprilia moved by her side and started asking her about the train routes.

On seeing that his victim was no longer alone, the man stopped.

"The victim was aware of [what I had done] and thanked me, saying that worse things would have happened if I had not intervened," said Aprilia, who is studying at Jakarta State University.

Nadia was not as fortunate as the woman on the train. No one came to help her when she was walking home in the upscale South Jakarta neighbourhood of Kebayoran Baru, one-night last year after work.

Step up, step in: Anti-harassment campaigns urge bystander intervention

"After Dark explores what being safe means for women and strategies on taking public transportation at night in three major Indonesian cities – Medan in North Sumatra, Surabaya in East Java and Semarang in Central Java."

Source: The Jakarta Post, 16 December 2019

Anti-harassment report in Indonesia pushes for bystander intervention

Source: The Phnom Penh Post, 17 December 2019

Big Data: Asia's newest socio-economic ally

Source: Telecom Review Asia, 20 December 2019

ANNEX C

Academic Papers and Publications

Academic Papers

Understanding Aggregate Human Behaviour Changes in Response to a Natural Disaster in Vanuatu via Mobile Network Data Analysis

16th International Conference on Information Systems For Crisis Response and Management

The Potential of Crowdsourcing to Advance the SDGs by Fostering Local and Global Collaboration

Data For Policy 2019

The Disaster-related Dictionaries in Multiple Asian Languages by Crowdsourced Translations to Support Sustainable Development Goals

Data for Good Exchange by Bloomberg

Data Analytic Platform for Logistics Planning and Information Management Following Natural Disasters

Data for Good Exchange by Bloomberg

Modelling Wealth from Call Detail Records and Survey Data with Machine Learning: Evidence from Papua New Guinea

IEEE International Conference on Big Data

Data Analytic Platform for Logistics Planning and Information Management Following Natural Disasters

Australasian Aid Conference 2020

Comparing population displacement estimates from mobile network data and other sources

Internal Displacement Monitoring Centre (IDMC) journal - Global Report on Internal Displacement

Using Social Media Imagery to Nowcast Air Quality

The IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2019 (Computer Vision for Global Challenges)

Publications



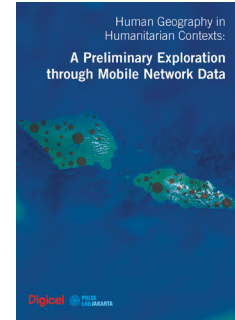
Annual Report 2018



**After Dark:
Encouraging Safe Transit for
Women Travelling at Night**



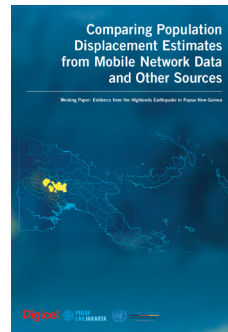
**Samoa Scoping Mission
Report**



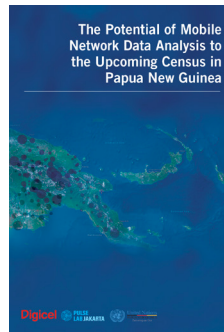
**Human Geography in
Humanitarian Contexts:
A Preliminary Exploration
through Mobile Network Data**



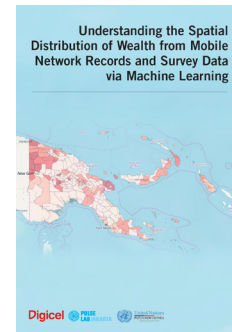
**9th Research Dive
Technical Report:
Household Vulnerability**



**Comparing Population
Displacement Estimates
from Mobile Network Data
and Other Sources**



**The Potential of Mobile Network
Data Analysis to the Upcoming
Census in Papua New Guinea**



**Understanding the Spatial
Distribution of Wealth from
Mobile Network Records and
Survey Data via Machine Learning**

ANNEX D

Strategic Framework and Governance

Strategic Framework

The main elements of the strategic framework identify PLJ’s goal and objectives, as well as outline the strategies the Lab will implement to achieve its primary goal and ensure ongoing relevance and effectiveness.

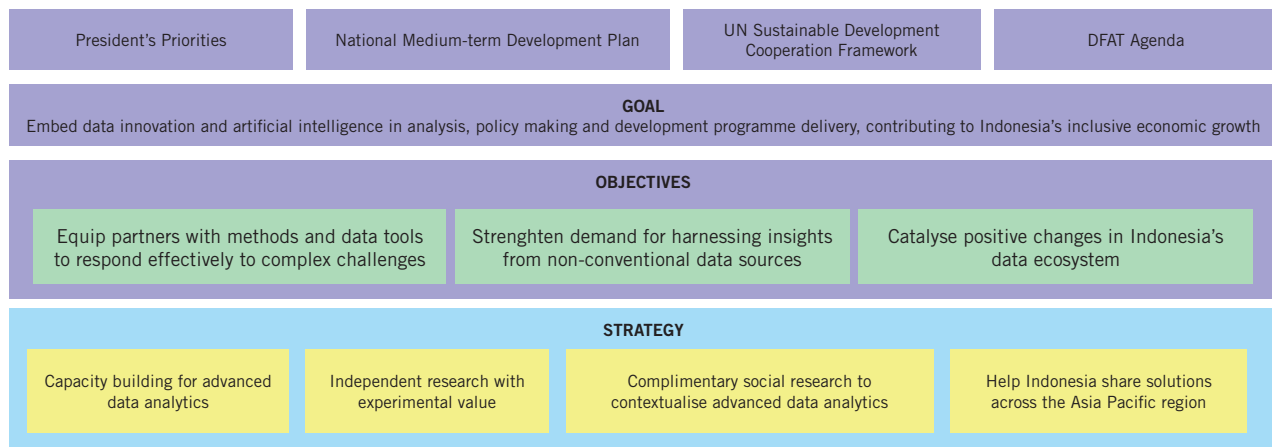
PLJ’s main goal and objectives combine and align with components of the development goals and priorities of the Indonesian Government, the upcoming 2021-2025 United Nations Sustainable Development Cooperation Framework (UNSDCF), and the development cooperation objectives of Australia’s Department of Foreign Affairs and Trade as the main donor for PLJ’s core funding. Specifically, Pulse Lab Jakarta seeks to support Indonesia’s agenda on enhancing the nation’s economic resilience and transformation and in strengthening the capacity of government policy and decision making processes through effective use of data innovations to respond to challenges and avert crises.

PLJ’s areas of work are aligned with Indonesia’s medium-term development plan (RPJMN) priorities on responding to disasters and climate change, as well as on reducing regional disparity. Furthermore, PLJ’s goal and objectives revolving around the adoption and use of data innovations for inclusive economic growth will contribute to the

UNSDCF Outcome 4 that focuses on building innovative and inclusive development solutions to achieve the SDGs. Improved resilience and ongoing economic growth are also linked to Australia’s interests in supporting Indonesia as a robust and thriving neighbour, by actively collaborating to improve political and economic conditions regionally.

The four-pronged strategy adopted by PLJ guides the work of the Lab, which each initiative fitting in one of the following categories: capacity building; research utilising data innovation; social research to contextualise data analytics; or sharing (and gaining) solutions across the Asia Pacific region.

In carrying out its mission, PLJ adheres to and promotes data protection and privacy principles. PLJ ensures responsible use of data and upholds the idea that data use and processes should benefit first and foremost people and society. With citizens being at the centre of the work PLJ does, ethics means more than simply observing data privacy and personal data protection principles; it remains foremost throughout the innovation life cycle and influences our risks, harms and benefits assessment. An important aspect of PLJ’s work is to ensure gender visibility, and that use of data is based on the principles of transparency and accountability.



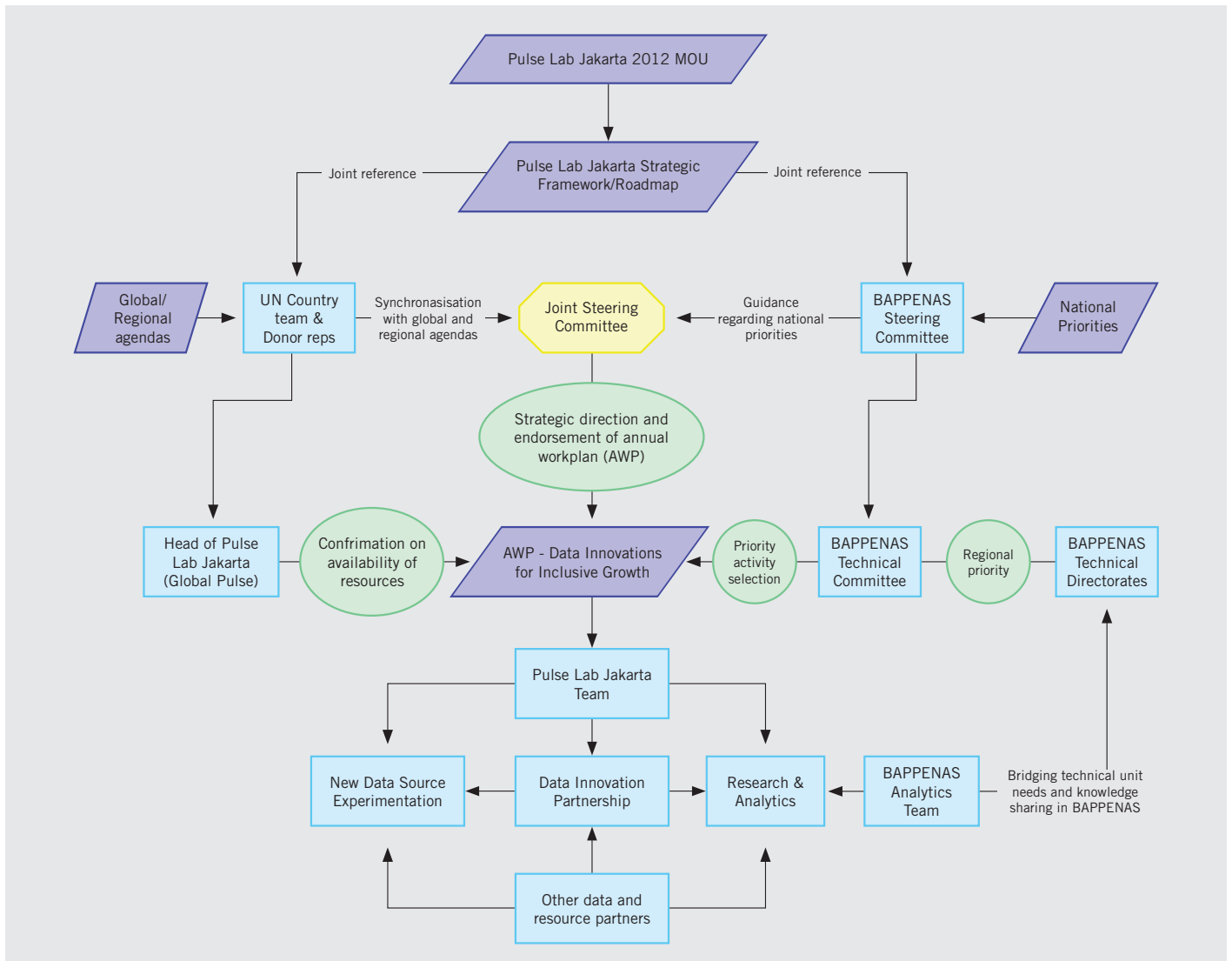
Governance

PLJ's activities are guided by a Joint Steering Committee, comprised of representatives of the Government of Indonesia, the United Nations and Australia's DFAT as the major donor for this project. The Joint Steering Committee provides overall guidance and strategic direction for the Lab.

A Technical Committee within Bappenas will also be engaged in screening and selecting proposed research and development activities from Bappenas requiring

PLJ's advanced analytical capacity. The Steering Committee also monitors the progress of said activities and advises PLJ on decisions to continue building on successful research or emerging priorities and areas of work.

Going forward, Bappenas plans to set up a dedicated analytical unit, aptly called *Tim Analitika*, under the Ministry's Centre for Data and Information (Pusdatin). The unit will become the Lab's main entry point for capacity building and knowledge sharing on advanced data analytics within the Government of Indonesia. *Tim Analitika* will also serve as PLJ's main counterpart within Bappenas whilst conducting research and analytical initiatives.





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