Understanding Risk Asia

2-3 December 2021 | Singapore

Summary Report

Opening Keynote: Climate Risk and Asia's Response

Vinod Thomas
Visiting Professor,
Lee Kuan Yew School of Public Policy,
National University of Singapore

In his Opening Keynote address, Vinod Thomas described the changing risk landscape in the Asian region and beyond driven by climate change and highlighted what governments and other stakeholders must do differently to increase resilience.

Communications efforts need to focus on connecting the dots between the weather risks we experience or can imagine and the invisible greenhouse gas emissions which are causing them. Although the link between these phenomena is indisputable, there are several steps in the chain linking the use of fossil fuels to natural hazards which makes it difficult for people to perceive the connection. As a result, the gap between knowledge and action on climate change has never been wider: global carbon concentrations continue to increase despite the weight of evidence attributing extreme weather to climate change. The media can do more to convey cause and effect in the midst of natural disasters when public attention is most focused on the issue.

To bolster resilience in the context of runaway climate change, governments cannot rely on preparing for disasters based on the magnitude of historic events. The new heights of risk are higher. Building resilience risk management from the outset is necessary in the context of a rising tide of risks. Decision-makers therefore need to invest more in prevention than recovery and to improve, innovate and sometimes break norms in preparing for and responding to extreme weather.

The Asian region is at the frontier of climate risks in many respects. South-east Asia in particular is on the frontline of natural disasters. It is also the region with the highest increase in the use of fossil fuels in recent years. Public opinion and political leadership are critical to changing this trajectory. Experience in risk management in Asia during the COVID-19 pandemic holds positive lessons for addressing climate change including the value of decisive leadership and maintaining public trust in policies and the technologies underpinning them. These lessons can be applied to climate change, where leadership and trust – not blind faith, but a sense that “together we can do it”– will be essential, as leaders argued at COP26.

From Science to Society via Trust

Pablo Suarez
Artist-in-Residence,
Institute for the Public Understanding of Risk

This session highlights the relational features of trust and the need to anticipate what other people are thinking about. Through the interactive game, participants are required to guess what and how other players think about a selected issue and the differences between expectation and reality are showcased in real time. Apart from the immediate takeaways from the activity itself, Pablo Suarez highlighted the role of art and games as a medium for communication to help convey science and facts in an engaging manner. Through the use of innovative and engaging mediums, scientists have the opportunity convey valuable information to build trust and understanding.

Sciene, Trust and Society

David Reid,
Director,
Lloyd's Register Foundation
Moderator

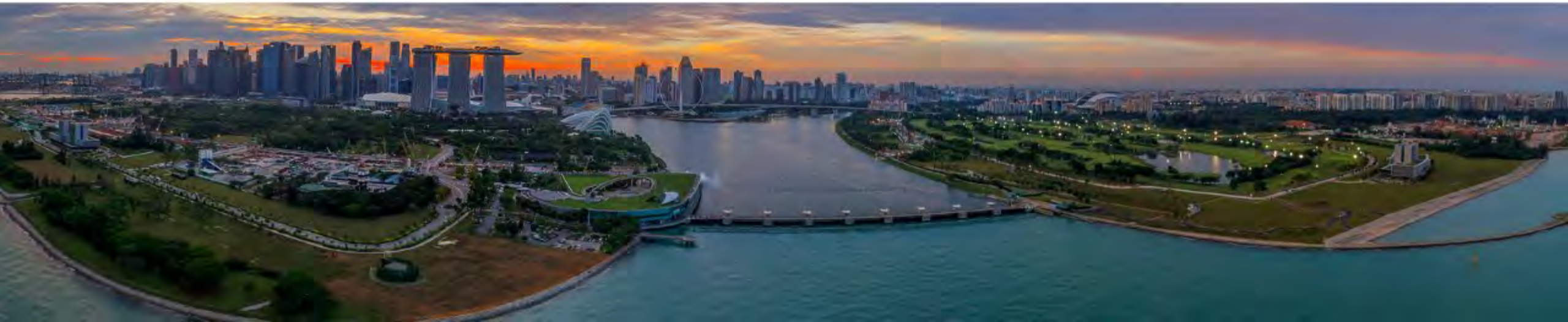
Tang Tong,
Associate Professor,
Disaster Reduction Center of China

Julian Tang,
Editorial Director,
Wildtype Media Group

Heidi Larson,
Director,
The Vaccine Confidence Project

David Chan,
Professor,
Singapore Management University

Leesa Lin,
Assistant Professor,
London School of Hygiene & Tropical Medicine



This panel explores the critical role of trust in understanding and communicating risk and draws on experience in emergencies and crises. David Chan shared that there are three dimensions of trust - competence, integrity and benevolence (honest communication), and that trust is dynamic and can change very quickly. He pointed out that trust and cooperation from society can allow governments to translate science into valuable impact, and there is a need to build trust by reducing negatives and increasing positives on the different dimensions.

From her work in HIV, Heidi Larson shared that people usually have other concerns and priorities apart from the risks that scientists are focused on. She highlighted the need to listen and understand the perspectives of the audience before devising risk communication strategies.

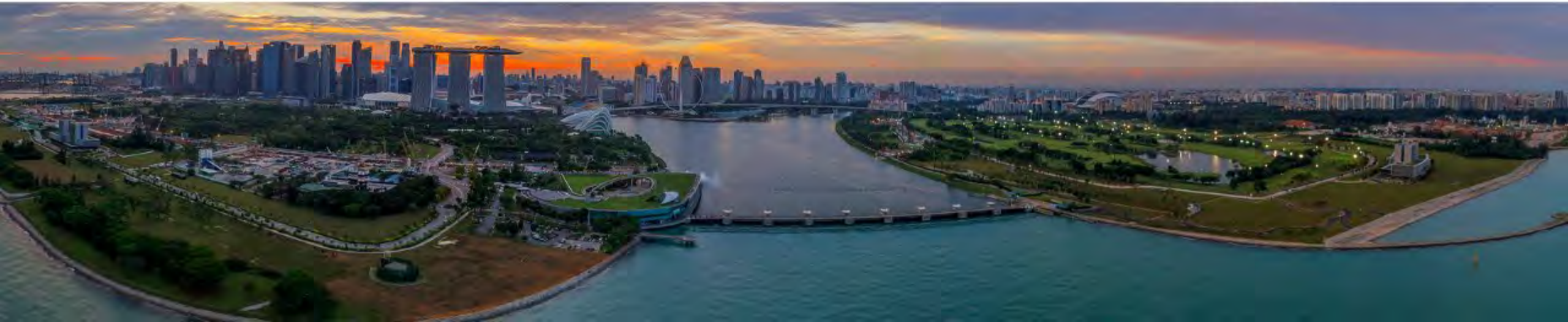
Leesa Lin shared observations made by the Vaccine Confidence Project which tracked vaccine confidence in different countries over time on people's perceived importance, effectiveness and safety of vaccines. She highlighted the need for regular monitoring of perceptions and immunization rates so as to inform policymaking and the development of timely interventions.

Julian Tang discussed the factors for successful science and risk communication. These include the recognition by scientists of the need for active communication with the public so as to reduce misinformation, the need for science communication training and continual engagement to establish visibility and credibility.

Master Lecture: Risk Telling or Risk Listening?

Peter Gluckman,
Director,
Koi Tū: The Centre
for Informed Futures

Lesley Cordero,
Senior Disaster Risk
Management Specialist,
World Bank
Moderator



Peter Gluckman's master lecture focused on how to communicate risks to senior policymakers.
The fundamental role of governments is to provide stewardship of national assets but investing in mitigating risks can still be a difficult decision for governments to take. Faced with limited resources, trade-offs are inevitable. At the same time, citizens may not understand the full risk-scape and its complexities and may demand action on the wrong things.

Nations face an increasingly complex and inter-connected landscape of risks: fiscal, security, cyber, social cohesion, geo-strategic among others, many of which cross borders and are only partly within the control of national governments. Faced with this risk-scape, risk analysis needs to be systematized across government, ideally in an integrated risk unit responsible for maintaining a national risk register.

While risk identification and assessment and feasibility of mitigation options are expert judgements, investment in mitigation is a political judgement. Like other forms of advice, risk advice needs brokerage – evidence needs to be synthesised and interpreted in a form that the policymaker can understand and make use of. Senior decision makers require very little detail in terms of scientific evidence. Instead, they need accessible language and a compelling narrative.

Effective risk advice involves creating "listening" by being honest about the problem and the options to address it and the extent of uncertainty, recognising that choosing among those options is a political decision that involves other values and considerations beyond the science. The risk assessment needs to be framed in terms of what the politician or the community values.

Brokers therefore need to understand the cultures of science, policy-making and politics and have the diplomatic skills to work with the political community without compromising on the evidence. This requires building trust through integrity, humility and iteration in the relationship.

Is It Really Risky? Why Experts and the Public Disagree about Risks

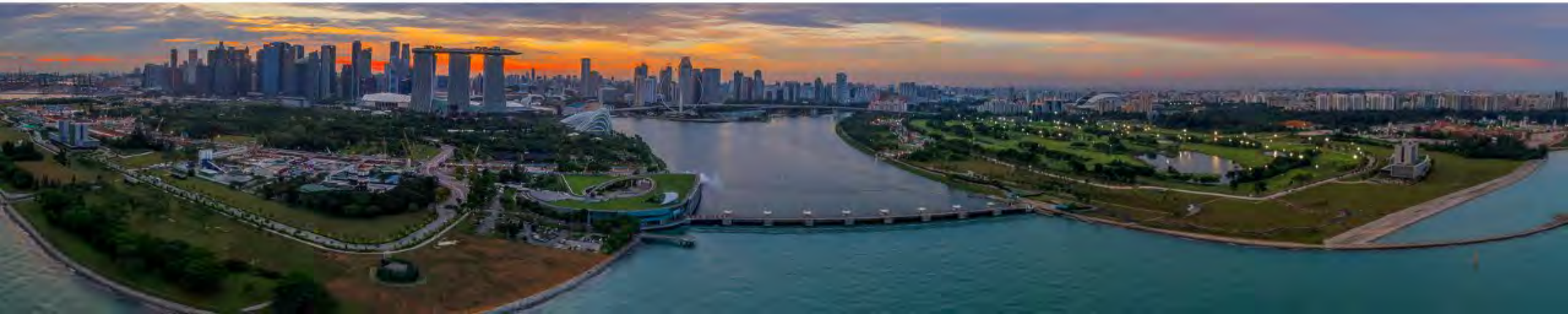
Cornelius Kalenzi,
Postdoctoral Researcher,
KAIST KPC4IR
Moderator

So Young Kim,
Director,
Korea Policy Center for the Fourth Industrial Revolution

Leonard Lee,
Deputy Director,
Institute for the Public Understanding of Risk

Olivia Jensen,
Lead Scientist,
Institute for the Public Understanding of Risk

Peng Zongchao,
Professor,
Tsinghua University



The public and experts are sometimes closely aligned in terms of what they consider to be a high risk. But there are also many cases of divergence, when experts and the public seem to disagree about what is risky. Sometimes it is experts who consider that the public underestimates risks and behaves irresponsibly, ignoring the risks of a high-fat diet, or not completing a prescribed course of medicine, for example. In other cases, it is the public that perceives higher risks – of getting children vaccinated, or living near to a hazardous waste disposal site – leaving them frustrated that experts do not appear to take their concerns seriously. When these gaps go unresolved, people fail to take protective actions which would benefit them or, conversely, experience needless anxiety, and distrust builds up between authorities and the public.

Olivia Jensen and Leonard Lee discussed their ongoing studies on the nature and extent of risk perception gaps. Underlying these gaps are a set of individual and contextual characteristics. At the individual level, differences in values, access to information, cognitive biases and temporal focus may drive differences in risk assessments between specialists and the public. At the societal level, the policy and regulatory environment, role of political leaders and traditional and social media can amplify or subdue public perceptions of risk but may have little impact on experts' risk assessments.

Kim So Young addressed risks of new technologies, which are often associated with risk perception gaps when they have a profound impact on how we live and work, or when prototypes are heavily promoted by the media, companies or political leaders even before the products or services become available. Gaps may be driven by differences in values: experts value efficiency and effectiveness over fairness, equity or safety. Experts have greater knowledge of the technology itself but the public have "lay expertise" – they know about the everyday applications of technology and its social impacts.

Peng Zongchao delved into the question of "who are the experts"? Research in China on risk perceptions relating to major policy initiatives showed that experts with topic expertise but no stake in the policies had risk perceptions which were closely aligned with those of the public, while experts who were also stakeholders had different perceptions of the risks.

Post-COP Landscape

Koh Chan Ghee,
LRF Professor, Director,
Institute for the Public Understanding of Risk
Moderator

Lutfey Siddiqi,
Visiting Professor in Practice,
London School of Economics

Melissa Low,
Research Fellow,
Energy Studies Institute

Koh Lian Pin,
Director,
Centre for Nature-Based Climate Solutions

What are the implications of the COP26 climate change negotiations for people, governments, business and nature in Asia? Panellists discuss the interlinked challenges of climate risks, mitigation and adaptation in a region critical to the global climate future.

Melissa Low shared her views on the progress made in COP26 and opined that the successful conclusion of the Paris Rulebook will enable future follow-up. She also discussed the progress of the other work streams but remains optimistic with China and US' renewed involvement.

Lutfey Siddiqi provided his assessments from the finance perspective on the implications of COP26. He highlighted that given the progress and pledges made, transition risks have now been brought to the forefront of attention. He also discusses the initiatives taken by financial institutions and funding mechanisms introduced to steer business towards greener practices.

Koh Lian Pin discussed the critical role which nature-based solutions play in carbon emissions projections and some of the work he is doing in identifying pathways for interventions.

Urban Heat: Causes and Solutions

Jonas Jörin,
Co-Director,
Future Resilient Systems,
Singapore-ETH

Moderator

Jan Carmeliet,
Chair of Building Physics,
ETH Zurich

Chao Yuan,
Presidential Young
Professor, NUS

Wen Tung Chiu,
Group Director,
Urban Redevelopment
Authority

Asian cities are impacted at an unprecedented speed by climate change and urbanisation. Since the mid-1970s, Singapore has warmed at a rate of 0.25 degrees Celsius per decade, which is higher than the global average rate of 0.17 degree Celsius. Developing nature, design, and engineering-based strategies to tackle urban heat risk at high density urban areas should be at the core of every urban climate resilience plan.

Chiu Wen Tung shared about the urban heat risks in Singapore and the efforts undertaken by the government to undertake these risks. These mitigation and adaption solutions include better urban planning and design, use of cooler construction materials and architectural design, and leveraging new technologies. Mr Chiu also discussed Singapore's research and development efforts which include the development of digital urban climate twin to explore solutions.

Jan Carmeliet discussed the use of vegetation and water in landscaping to mitigate climate heat. He also noted its limits and indicated the passive cooling technologies will not be sufficient. Jan discussed types of active cooling technologies which include urban ventilation and space planning to improve microclimate diversity.

Yuan Chao highlighted that the long-term effects from urban planning are not immediately apparent and there is a need to build understanding of its impact. Hence, his work focuses on reducing climate uncertainty for specific districts, climate modelling, climate sensing to measure and evaluate the impact of planning and design on the microclimate, and creating climate sensitive designs.

From Space to Community

JanJaap Brinkman,
Director,
Deltares Singapore
Moderator

Andrew Kruczkiewicz,
Senior Staff Associate II,
Columbia University

Chen Futong,
Public Safety Chief Engineer,
ZTE Corporation

Peeranan Towashiraporn,
Director,
Geospatial Information
Department, ADPC

Satellite and distributed data gathering hold enormous potential to improve disaster risk management, leading to leaps in the ability to forecast, respond and recover. However, getting the information into the hands of decision-makers at the community level at the time and in the form they need it is beset with challenges. Drawing on experience with droughts, floods and earthquakes in urban and rural settings, the panellists discussed how to connect data and decision-makers.

Reflecting on the use of flood risk data, Andrew Kruczkiewicz pointed out that often the challenge is not the lack of forecasts but the fact that multiple forecasts are available and the forecast mandated by a government agency is not necessarily the best or the one that is most trusted. All these forecasts are uncertain and uncertainty should be embraced. When many datasets are available, for example relating to historic floods and landslides, the selection of the information set should be tied to the decision that needs to be taken, such as triggering an early action protocol.

Peeranan Towashiraporn introduced the use of geo-spatial data in drought risk forecasting in the Mekong under the SERVIR project. He argued for “working backwards” from farmers’ need for information about possible droughts and floods to support their decisions and mitigate agricultural losses. These needs should inform the timeframe and metrics of drought forecasts. End-users should be closely involved in designing capacity development activities, working on practical problems and coding together with trainers. Forecasting tools also need to be built into the policy process and long-term strategy development by regional institutions.

Multiple sources of data from satellites, UAVs (unmanned aerial vehicles), sensors on the ground can be integrated into the decision-making structure. Chen Futong presented the structure and advantages of the “transparent city system” which is being applied in China to improve the effectiveness of disaster preparedness and response in urban areas.

Open Mapping to Address Donor-Driven Risks

Carolyn Florey,
Senior Director,
Mercy Corps
Moderator

Mahar Lagmay,
Executive Director,
University of the
Philippines Resilience
Institute

Celina Agaton,
Founder and
Managing Director,
MapPH Inc

Stephen Mather,
Founding Developer,
OpenDroneMap

Ivan Gayton,
Humanitarian
Innovator,
Rainbow Sensing

Open Knowledge Kit (OK Kit) is a free and open-source tool kit to empower local communities with digital employment through geospatial data collection, analytics and monitoring toward the stewardship of their economic, climate, and social prosperity.

The panellists discuss some of the issues faced by communities in utilising technologies introduced by external parties in address climate issues, and how the OK Kit address some of the key barriers to achieving Sustainability Development Goals. These barriers include (1) short-term and uncoordinated donor projects led by community outsiders, (2) expensive, proprietary and closed technology systems, (3) the gender gap and (4) decent work. Surveys, disaster and climate change modeling and 3D reconstruction are now possible at much lower costs, training local and non-technical communities.

The panellists also discuss ideas to incentivise funding support and institutionalisation of free and open-source software.

Using Narratives to Communicate Climate Risks

Reuben Ng,
Lead Scientist,
LRF Institute for the Public Understanding of Risk
Moderator

Matthew Schneider-Mayerson,
Associate Professor,
Yale-NUS

Pontus Wallin,
Project Manager,
Swedish Meteorological and Hydrological Institute

Song Zhao Li,
Associate Professor,
NUS School of Business

Stories engage, inspire and enlighten us. In this session, panellists discussed how books, films and games can be used to communicate climate risks to a broad audience. Song Zhaoli shared his work analysing 140 sci-fi movies to understand how people thought about the future. Through future scenario analysis, 6 scenario archetypes were identified in sci-fi films – growth & decay, wasteworlds, threats and new hopes, the powers that be, disarray and inversion. He shared that most sci-fi movies portray some form of risk, and environment and climate risks are very salient in sci-fi movies. While films are effective in highlighting impacts of climate change, they have limitations in explaining the science as they are more focused on the effects and drama, and less on the facts and causes.

Matthew Schneider Mayerson discussed how people are exposed to narratives all the time and narratives are used by people to make sense of things. While climate literature has much potential in conveying climate risks, Matthew recognises that its readers are self-selective and readers who are apathetic or against climate change will not read such books. Hence, for greater impact, Matthew suggests that climate literature should not be marketing themselves as climate literature for increased take-up. Matthew also highlights that while climate short-stories are effective in raising concerns, the effects are short-lived and as a tool, it might also convey unintentional values.

Pontus Wallin introduced a game which is used as a tool to communicate complex matters in a playful environment. The game features actions for climate adaption and could be used for a range of audiences, from politicians to students. It stands out and is easy to create interest and lead to deeper discussions. In the joint-discussion, the panellists discussed the need for a ”silver buckshot” approach and different mediums need to be used to reach different audiences.

Rapid Assessment of Comparative Climate Risk in Cities

Leon Kapetas,
Lead, Programs,
Resilient Cities
Network
Moderator

Piero Pelizzaro,
Chief Resilience
Officer,
City Council of Milan

Guy van Hemel,
Junior Employee,
Deltares

Folayinka Dania,
Chief Resilience Officer,
Lagos State
Government

Hans Gehrels,
Team Manager
Urban Resilience,
Deltares

Kamlesh Yagnik,
Chief Resilience Officer,
Surat Municipal
Corporation

Urban populations across the world are facing worsening hazards, and increasing exposure and vulnerability. A better understanding of these factors is required for cities to better manage their growth plans and development to mitigate these challenges.

Using open-sourced global data, Deltares has developed a tool to compare climate risks across cities (inter-city) and within cities (intra-city) using rapid assessment modelling. Deltares and Resilient Cities Network are now conducting this assessment for the cities of the R-Cities Network to map how climate risks are distributed throughout global regions, to learn how the assessment can be most beneficial to cities and how the method should be developed further.

The session featured the presentation of the initial results to Chief Resilience Officers of Milan, Lagos and Surat for validation of the model with reality, and a discussion on how the results can aid decision making, policymaking and development of monitoring tools to mitigate overall climate risks.

Integrating Resilience into the Financial System - the Global Resilience Index Initiative

Rowan Douglas,
Head of Climate and Resilience Hub,
Willis Towers Watson
Moderator

Tso-Chien Pan,
Executive Director,
Institute for Catastrophe Risk Management, NTU

Ekhosuehi Iyahen,
Secretary General,
Insurance Development Forum

Carlos Sanchez,
Executive Director,
Coalition for Climate Resilient Investment

Kamal Kishore,
Member Secretary,
National Disaster Management Authority

Jenty Kirsch-Wood,
Head of Global Risk Analysis and Reporting,
UNDRR

John Schneider,
Secretary General,
Global Earthquake Model Foundation

Shie-Yui Liong,
Deputy Director,
Tropical Marine Science Institute, NUS

Jim Hall,
Professor of Climate and Environmental Risks,
Oxford University

Nicola Ranger,
Deputy Director,
UK Centre for Greening Finance and Investment

Aligning financial flows with climate-resilient development is one of the goals of the Paris Agreement. The Global Resilience Index Initiative (GRII), launched at COP26, brings together global partners with the goal of providing open risk information and standards to create a basic, common language of risk that can help accelerate the integration of risk and resilience into financial decision making across both the public and private sector.

In this session, the speakers discuss the ambition and rationale of the GRII, update on progress delivered for COP26 and discuss how innovations in risk analytics in the Asia region can be linked to build toward the vision of GRII as a service by COP27.

What is the role of the financial system in helping us manage risk in society? With the right analytical tools, risk can be integrated into the financial system to build resilience in society in the projects funded. Developed with a range of expertise from academia and practitioners from the insurance industry, the GRII serves as an open and flexible framework for that analysis and a common language of risk which can be extended beyond the disaster risk community to monitor progress and inform decision making.

Jim Hall presents some results of the GRII analysis to demonstrate its proof of concept, and interventions are made by member organisations who have contributed to the development of the GRII.

Master Lecture: Communicating Climate Science

Jonathan Lynn,
Head of
Communications and
Media Relations,
IPCC

Olivia Jensen,
Lead Scientist,
Institute for the Public
Understanding of Risk
Moderator

After a decade at the Intergovernmental Panel on Climate Change (IPCC), outgoing Head of Communications and Media Relations Jonathan Lynn reflected on how the challenges of communicating about climate change have evolved over time.

Over this period, the IPCC has built its credibility and authority in reporting scientific research on climate change – what is known, what is not yet known and the areas of agreement and disagreement. IPCC reports now generate massive media interest and provide the scientific foundation for international negotiations.

To communicate effectively, technical language and jargon have to be avoided. Even commonly used terms like “adaptation” or “sustainable development” may be understood differently by the public. The subtle language of scientific research needs to be translated into clear messages without exaggerating or over-simplifying. To ensure the integrity of the science, scientists themselves are fully responsible for the substance of IPCC publications. Over time, the IPCC has moved from providing media training to scientists to a more fundamental process in which scientists develop the messaging around their reports. For example, two of the authors of IPCC’s special report on the impacts of global warming of 1.5 degree Celsius came up with the compelling summary: “Every bit of warming matters, every year matters, every choice matters.”

However, the pressure for simplicity remains, illustrated in the framing of 1.5 degree Celsius as the “safe limit” of global warming in the media. In fact, an increase of 1.5 degree Celsius in global temperatures already poses severe risks, but if the threshold is missed, it is still worth making the effort to constrain further warming.

In the last decade, global awareness of climate change has passed a tipping point and deniers of global warming have faded into irrelevance. However, deniers are now becoming more active again, casting doubt on measures to address climate change and presenting arguments to delay action. The IPCC’s efforts to communicate research from the social sciences and other disciplines on mitigation and adaptation measures will be particularly important in this context.

Integrating Resilience into the Financial System - Practitioner Perspectives

Rowan Douglas,
Head of Climate and Resilience Hub,
Willis Towers Watson
Moderator

Calvin Quek,
Senior Environmental Specialist,
Asian Infrastructure Investment Bank

Ila Patnaik,
Professor,
National Institute of Public Finance and Policy

Anders Nordheim,
Senior Vice President,
Asia Sustainable Finance,
WWF

Benedikt Signer,
Senior Financial Sector Specialist,
World Bank

Conor Donaldson,
Global Asia Insurance Partnership

Nicola Ranger,
Deputy Director,
UK Centre for Greening Finance and Investment

Aligning financial flows with climate-resilient development is one of the goals of the Paris Agreement. As many decisions made in the financial sector, such as infrastructure and investment and lending, have an impact on the resilience of society, there is a need to integrate risk into the financial sector. Practitioners across government, banking, infrastructure investment and disaster risk financing communities discuss how we can accelerate progress in integrating risk and resilience into financial decision making in the Asia region.

Ila Patnaik discussed the Indian government's role in building longer term resilient infrastructure by directly financing new infrastructure and incentivising private sector investment by establishing norms and sharing information.

Calvin Quek described the financing landscape for mitigation and adaptation programmes. He highlighted that adaptation programmes are received lesser support and a key challenge is in effectively valuating the costs of adaptation measures.

Anders Nordheim highlighted the interaction effects of climate and nature, and pointed out that more momentum around nature is required in the financial sector. He also discussed emerging nature-based solutions which could potentially be incorporated as well.

Benedikt Signer highlighted the need integrated financial and operational planning for governments to better deal with shocks related to climate disasters. He also spoke about the need to build local capabilities in financial planning and for governments to create long-term incentives to move private markets as well.
Conor Donaldson discussed the Global Asia Insurance Partnership's work in addressing large scale systemic risks and new emerging and accelerating risks in Asia.

Innovation in Risk Finance: Modelling Matters!

Hang Thu Vu,
Senior Financial Sector Specialist,
World Bank
Moderator

Apoorv Dabral,
Senior Vice President,
Guy Carpenter

Soo Hoon Hauw-Quek,
Director,
SEADRIF Insurance Company

Lynette Tan,
Chief Executive,
Singapore Space & Technology Ltd

Paul Maisey,
Catastrophe and Disaster Risk Consultant,
JBA Risk Management

The session features insights and lessons learnt from the innovative modelling work completed as part of South-East Asian Disaster Risk Insurance Facility (SEADRIF)'s offering of an initial flood insurance product. It also provides information to inform broader activities for DRM, climate analytics and rapid post-event impact assessments.

SEADRIF's first insurance product combines innovative modelling approaches to support the placement of a sovereign parametric insurance product. The successful placement of the product enabled developing countries to access the insurance market.

Hauw Soo Hoon provided an introduction of the product and its application in Lao PDR. Her presentation is augmented by Paul Masey, who discussed the technical implementation of the flood risk monitoring tool which includes flood model data and earth observation data.

Apoorv Dabral provided an overview of Guy Carpenters' experience when placing the product in the market. He highlighted the challenges for developing a reasonably acceptable product for a region where modelling information is scare. Lynnette Tan discusses the initiatives of SSTL and how space technologies can contribute to the HADR efforts.

The panellists also discuss the extensions of the product into other uses and some of the technological advancements which can support better understanding of risk and improved financial resilience.

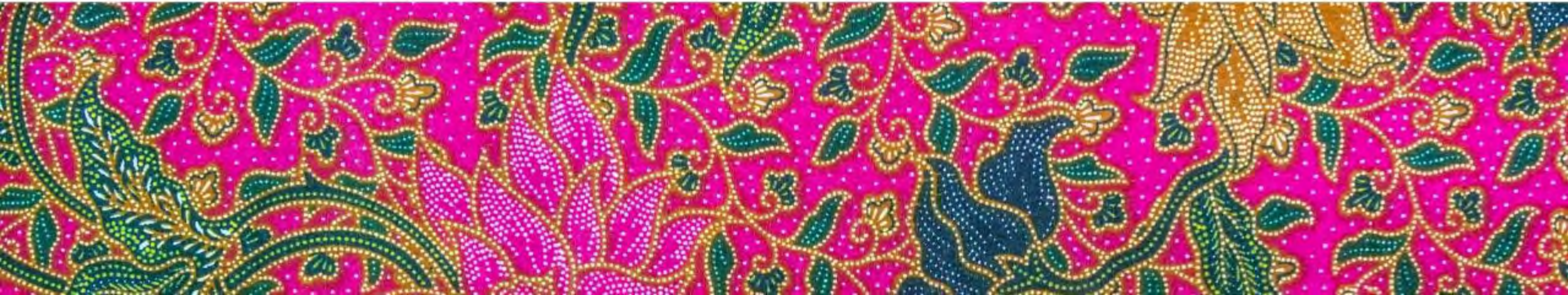
Day 2

Averted Disasters Award

Pablo Suarez,
Artist-in-Residence,
Institute for the Public
Understanding of Risk

Maricar Rabonza,
PhD candidate,
Asian School of the
Environment, NTU

David Lallemant,
Assistant Professor,
Asian School of the
Environment, NTU



People may not notice when things are done well or when nothing negatively eventful happens. In an age where effective risk management can be conveniently overlooked, how can we promote more action to tackle risks in adverse natural events? This session highlights the importance of making the invisible visible through more effective and intentional communication efforts about risk.

In the first segment, Pablo Suarez led an interactive session on the dos and don’ts of writing a good headline. Namely, good headlines need to be *unique*, *ultra-specific*, *useful* and *urgent*. Conference participants, both in-person and virtually, engaged in developing their own headlines before peer-evaluating them for newsworthiness.

The second segment featured the upcoming launch of the Averted Disasters Award (ADA). In a world with ever-increasing environmental shocks, nothing happening is extraordinary. David Lallemant highlighted the tendency for those in disaster risk management to spend a disproportionate amount of time thinking about catastrophe, loss, damage and vulnerability, compared to thinking about successes, safety and averted disasters. In truth, there are significant learnings from the latter in order to prevent or better mitigate future disasters. The ADA seeks to honour hidden heroes, acknowledge successes in disaster risk management, and recognise outstanding work that keep the public safe – a much-needed celebration of normality.

Dynamic Risk Models for Evolving Cities

David Lallemant
Assistant Professor,
Asian School of the
Environment, NTU
Moderator

Graeme Riddell
Climate & Sustainability
Consulting Leader,
Marsh Advisory, Asia

Maricar Rabonza
PhD candidate,
Asian School of the
Environment, NTU

Rashmin Gunasekera
Senior Disaster Risk
Management Specialist,
World Bank

Gizem Mestav Sarica
Senior Analyst,
Aon

Key to making informed policy decisions to promote resilient and sustainable future cities is the ability to model risk as it relates to dynamic changes in our urban environments, reflecting population increase, urban growth patterns and evolving vulnerability linked to time-dependent processes. In this session, the panel presented a range of perspectives on how risk models can best account for the uncertain future built environment.

Graeme Riddell highlighted the need to embed climate science into risk models and to look at risks across scales – at the asset-level, across networks and at city and national scales.

Gizem Sarica spoke about the exposure component of dynamic risk models, focusing on the need for a spatiotemporal approach when making future projections.

Maricar Rabonza covered the vulnerability aspect, identifying drivers such as deterioration processes (e.g., corrosion, fatigue, aftershocks) and strengthening interventions (e.g., retrofitting, improved maintenance schedules, higher standards of building replacement). She noted that current seismic risk assessment models assume that vulnerability is constant over time and encouraged more research and applications that incorporate a time-dependent module to account for time-varying vulnerability.

Presenting on behalf of Hedwig van Delden, Graeme shared about the advantages of using an integrated modelling approach through a platform called UNHARMED – a tool for proactive disaster risk management and reduction planning.

Rashmin Gunasekera spoke about the implications, importance and relevance of dynamic risk modelling from a public sector perspective, highlighting policy implications in areas including infrastructure sectors, secondary cities, economic cost-benefit and city disaster vulnerability indexes.

China's First Comprehensive National Survey of Natural Disaster Risks

Martin Raiser
Country Director for China and Mongolia, World Bank
Moderator

Sun Baitao
Professor,
Institute of Engineering Mechanics

Tong Bin
Senior Engineer,
China Institute of Geo-environment Monitoring

Yang Saini
Professor,
Beijing Normal University

Ge Gao,
Professor,
National Climate Centre

Ying Li
Associate Professor
National Climate Centre

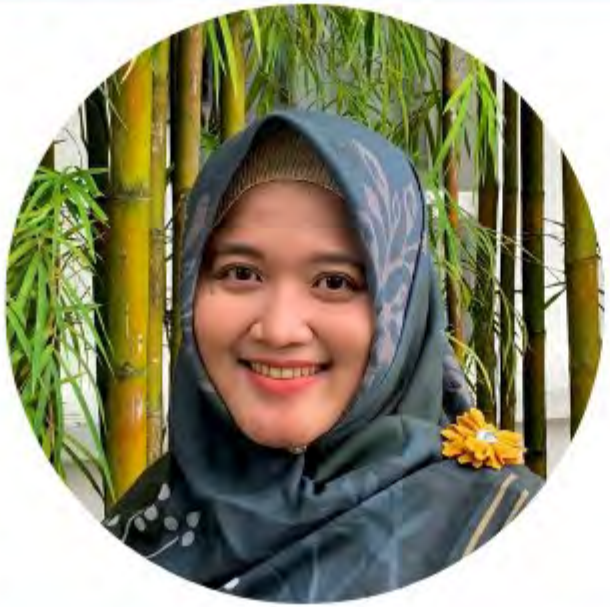
China’s first comprehensive national survey of natural disaster risks is the largest such risk assessment project in the world so far. In the context of climate change, extreme weather events are occurring more frequently in China. Meteorological and geological disaster risk management are particularly important and challenging. Through a complete assessment of natural hazards and exposure of population and assets, the survey aims to improve China’s ability to predict natural disasters and to improve resilience before disaster strikes. The session introduced the design, specific tasks and progress of the national risk survey project, and highlighted some of the findings on earthquake, geological and meteorological disasters risks in China.

The survey is intended to help decision makers from the local level up to central government to engage in strategic, risk-informed planning and to respond effectively when shocks do occur. A key feature of the survey is its collaborative data-collection process that involves all levels of government. This is raising awareness about the survey and building the capacity of decision-makers to use it. Risk assessments are already being used for catastrophe risk insurance zoning.

An important contribution of the survey is that it provides an integrated and comprehensive risk assessment. Negative impacts from natural hazards cascade from interdependent networks to the system itself and these indirect costs can amount to 10 to 20 times more than the direct impact. Thus the survey goes beyond single hazard studies to take into account interactions between multiple threat and conduct systematic assessments of complex threats and actions.

FutuRisk – Foresight-based Approach to Explore Multiple Futures and Anticipate Risks

Anie Febriastati
Associate Director,
Executive Education
Department
Lee Kuan Yew School
of Public Policy, NUS



Cheryl Chung
Co-Director, Executive
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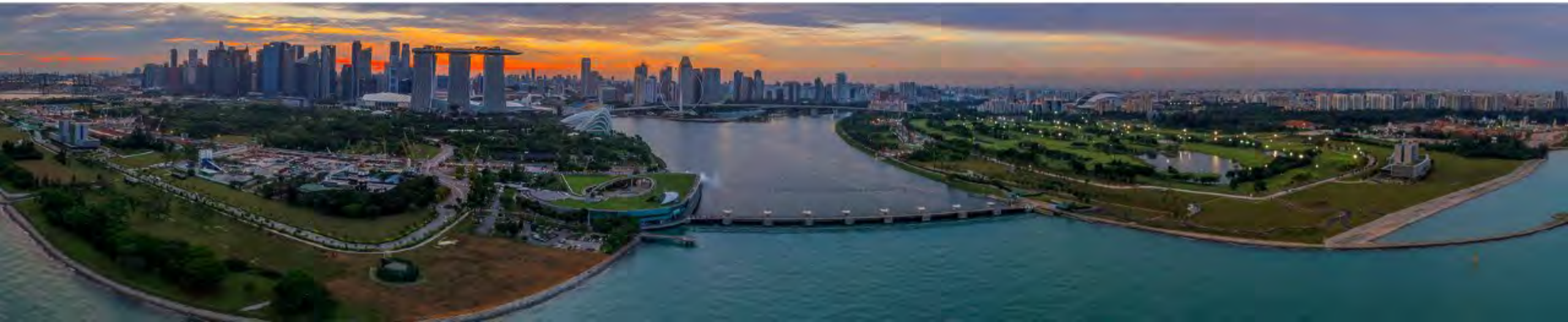


Geopolitics of Asia produces complex patterns of competition, conflict, cooperation, and potentially a disastrous disintegration, which are unfolding at the same time in a volatile environment characterised by uncertainty, exceptional disruption, and unprecedented change. These external events are typically interconnected and complex.

When making risk management decisions, organisations have to balance between shorter-term resource efficiency and longer-term resilience. The practice of futures thinking enables organisations to consider different external scenarios and interrogate the assumptions taken when making resource allocation decisions. By being more proficient in articulating these different possibilities, organisations can work towards more resilient outcomes.

The foresight-based workshop helped participants explore systemic patterns to surface assumptions and how the emerging trends can shape the future, and identify potential enablers and disruptions that might affect the future of geopolitics in Asia in 2040. Through the use of LEGO® bricks and the application of different scenario archetypes, participants brainstormed trends related to the scenario and embarked on an ideation process to articulate different futures and how it would impact the organisation.

The first archetype of “discipline” envisages a future which is established through the effortful management of geopolitics, resulting in a constrained equilibrium. The second archetype of “transformation” depicts a world radically changed by profound events. The third scenario of ”growth” is a realisation of an expected future where some of the assumptions currently identified have come to pass. The final scenario of ”collapse” pictures system failure in a dystopian future.

Enhancing Resilience of Smart Cities through Cognitive Computing Technology

Jonas Jörin,
Co-Director,
Future Resilient Systems,
Singapore-ETH
Moderator

Majeed Khader,
Director,
Home Team Behavioural Sciences Centre,
Ministry of Home Affairs

Mao Kezhi,
Associate Professor,
School of Electrical and Electronic Engineering, NTU

Martin Raubal
Professor of Geoinformation Engineering,
Swiss Federal Institute of Technology, ETH Zurich

The resilience of a modern society comprises both infrastructure and social resilience. Social and cognitive factors are essential for making a populated area such as a city, more resilient. Smart cities allow for the integration of cognitive computing technology (CCT) and cognitive engineering approaches with the goal of improving the quality of human decision making, e.g., less error-prone and faster. This simultaneously fosters sense-making and cognition at organisational and community levels, and helps to prevent, mitigate, respond to and recover from potential disruptions.

Martin Raubal discussed some of his work where different techniques are applied to address individual and organisational biases. This includes the visualisation of spatio-temporal uncertainty in control rooms to help address individual biases, and the use of cognition aware human-computer interaction to provide feedback loops to address organisational biases.

Mao Kezhi shared how social media analytics can be used to detect hazardous events such as earthquakes, flooding and terrorist attacks, as well as understand societal sentiments towards these events. He also discussed some challenges in using social media analytics, which include reliability and representativeness.

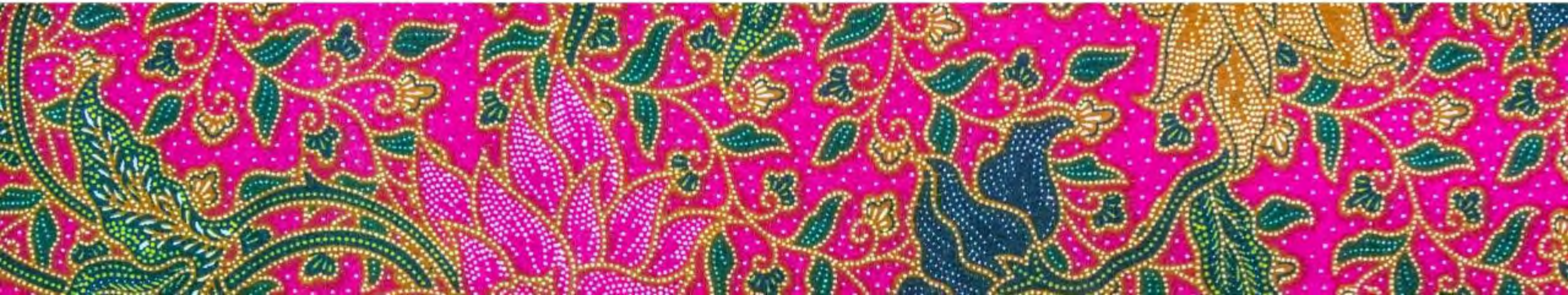
Majeed Khader discussed the applications and potential of cognitive computing in improving risk and crisis management, particularly for novel crises. He shared that there are seven qualities for effective crisis management and cognitive computing can augment these qualities by helping leaders process large amounts of data and avoid cognitive biases. He also outlined potential applications of cognitive computing to predict novel crises but cautioned against false positives.

Responsible AI for DRM

Olivia Jensen,
Lead Scientist,
Institute for the Public Understanding of Risk
Moderator

Robert Soden,
Assistant Professor,
University of Toronto

Caroline Gevaert
Assistant Professor,
University of Twente



Robert Soden and Caroline Gevaert, two of the authors of the “Responsible AI for disaster risk management” report published in 2021 by the Global Facility for Disaster Reduction and Recovery (GFDRR) spoke about the motivation for the report and introduced some of the key issues which were identified.

The report aims to draw attention to some of the risks surrounding the use of artificial intelligence and machine learning without losing sight of its great potential. It was the result of intensive consultations with a working group of global experts in the field. The working group was interdisciplinary and included designers, anthropologists, engineers, social scientists, data scientists. This helped to ensure a balanced perspective on the potential benefits and possible negative impacts of AI tools and technologies.

In disaster risk management (DRM), AI technologies are being used in early warning systems, infrastructure planning and insurance products like forecast-based financing. For example, machine learning techniques can be applied to the increasing volume of data from remote sensing to predict flood depths, or to identify buildings vulnerable to earthquake damage using “street view” imagery.

One of the main ethics issues with AI is the potential for bias. This has been a major concern relating to its use in criminal justice and bias can also show up in DRM applications due to different levels of data availability, such as between urban and rural areas, leading to disproportionate allocation of resources of urban areas. Another challenge with AI is the hype surrounding it. This leads on the one hand to exaggerated expectations and the use of untested tools in safety-critical situations. Deployment of AI should always start with a simple task to demonstrate strengths and limits to stakeholders.

People often find the black box of AI difficult to understand and AI developers find it difficult to explain to non-experts how it works. AI can be made more transparent and trusted by showing which variables drive the system’s decisions and by building processes for recourse.

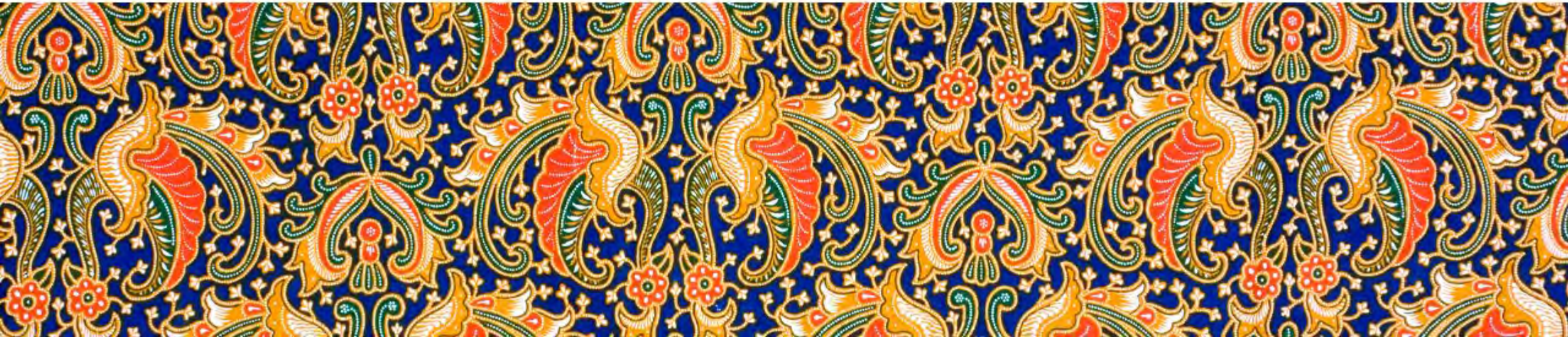
Understanding Extreme Urban Heat - Launch of the Digital Earth Technology Partnership Award

Lynette Tan,
Chief Executive,
Singapore Space &
Technology Ltd

Pedro Santa Rivera,
Founder,
Urban Hydrologics

Nicolette Yeo,
Head of Innovation Programmes,
Singapore Space &
Technology Ltd

Stéphane Hallegatte,
Senior Climate
Change Adviser,
World Bank



Stephane Hallegatte laid out the consequences of urban heat extremes and those who are most impacted by its effects. In Asian cities such as Hong Kong, Bangkok and New Delhi, mortality rates as a result of heat extremes increase by 4.1% to 5.8% for every 1 degree Celsius over 29 degree Celsius. Productivity and performance levels decrease in the work place due to soaring temperatures especially those working outdoors. Poor neighbourhoods in developing countries experience great heat exposure mostly due to living in areas with less vegetation and working outdoors more. Mr Hallegatte also pointed to the fact that extreme heat increases energy consumption used for air conditioning which contribute to climate change threats. He shared actionable steps which included better urban planning (more forests, green spaces and open water sources) and a behavioural change among individuals to be more responsible in their daily electrical usage.

Pedro Santa Rivera shared the action and solutions that businesses and consultants are taking to mitigate urban heat island effects. Using case studies and his experiences over the last 10 years in Singapore, he discussed various strategies that he has employed including water sensitive urban design, sustainable drainage systems, climate adaption strategies, diverse-based nature solutions and work in the Blue Green infrastructure sector.

Lynette Tan presented the work of The Singapore Space and Technology Ltd (SSTL), a non-government space organisation based in Singapore, serving as an advocate and thought leader in the industry. To combat the issue Urban Heat Island (UHI), Ms Tan announced the launch of the Digital Earth Partnership Technology Challenge to source for satellite and other technologies to better measure temperatures in cities and analyse the strength of the UHI effect in the region. In partnership with The World Bank, the final deliverable of the challenge will be a technical proposal on how teams plan to tackle the challenge statement and the goal would be to use the findings of the proposal to help the World Bank develop city-level strategies to mitigate risks in Asia.

City Leaders Speak: Maintaining Vision in a World with Increasing Risks

Lauren Sorkin
Executive Director,
Resilient Cities Network
Moderator

Francis Ghesquiere,
Practice Manager,
World Bank
Moderator

Mike Gillooly,
Former Chief Resilience Officer,
City of Christchurch

Hemali Boghawala,
Mayor,
Surat Municipal Corporation

Elaine Tan
Deputy Director,
Centre for Liveable Cities

In cities across the world, natural hazards collide with existing problems of aging and inadequate urban infrastructure, urban growth and climate change, making it more difficult for cities to bounce back after they experience a shock. These challenges have been magnified in the last two years by COVID-19.

Lauren Sorkin and Frances Ghesquire led a discussion with Asia-Pacific city leaders and resilience champions on the lessons they have learned on how to meet these challenges.
Mayor Hemali Boghawala emphasised the central role of the community in resilience building. In Surat (India), collaboration between the municipal corporation, state and national governments, industries and community organisations has been essential to maintaining trust during the pandemic and building the foundation to meet unknown future challenges. Cities today need to keep moving in order to keep up: the cost of doing nothing now far exceeds the cost of doing something.

Mike Gillooly drew on his experience as Chief Resilience Officer in Christchurch (New Zealand) to underscore the importance of having clear policy objectives and a strong legislative framework as the basis for long-term risk-based planning in cities. In a crisis, neither a top-down government-led nor a bottom-up community-led approach works by itself. Government and community groups need each other but meaningful collaborations take time to build and require mutual trust. Data and insights play an important role and governments need to ensure that data are publicly accessible.

Speaking about Singapore’s approach to building resilience, Elaine Tan explained how careful long-term planning and a systems approach linking physical infrastructure and soft assets of community spirit have contributed to Singapore’s resilience. When a shock hits, the infrastructure is already in place to enable society not just to survive but to thrive.

Risk Know-How

Olivia Jensen,
Lead Scientist,
Institute for the Public Understanding of Risk
Moderator

Bernard Okebe,
Programmes Coordinator
Community Empowerment and Media Initiative in Kisumu

Tracey Brown,
Director,
Sense About Science

Wandi Bruine de Bruin,
Sol Price School of Public Policy,
University of Southern California

Mariko Nishizawa,
Associated Member ,
Science Council of Japan

All over the world, people are talking to their communities about risk, helping others to make sense of risk with limited support and few tools. Despite the demographic and geographical distances between them and the diversity of challenges they face, from farmers and fisherfolk to communities faced with polluted rivers or exposure to earthquakes, these groups and individuals are making many of the same discoveries about what communities need to make sense of risk.

Tracey Brown introduced the **Risk Know-how Project**, led by Sense About Science in collaboration with the Institute for the Public Understanding of Risk (IPUR), which aims to gather the knowledge of these people at the centre of risk discussions in their communities into a Risk Know-how framework which reflects a respectful and empowering approach to making sense of risk. A group or community with risk know-how is able to examine a claim about the size of a risk and make reasoned comparisons between risks; find reliable information and revisit a decision when relevant new information becomes available; to recognise that different values lead to different risk decisions and accept the outcome of taking a risk.

Olivia Jensen, Mariko Nishizawa, Bernard Okebe, Wandi Bruine de Bruin and Padmini Ravi provided examples of the different elements of risk know-how from their own engagements with different communities. Olivia highlighted the challenges of conveying flood risk in Asian cities where exposure to and severity of flood risk is changing. Bernard drew on his experience as a farmer and journalist in Kenya where concepts like averages and recurrence intervals relating to rainfall patterns need to be conveyed in a way that makes sense to farmers who use the information to decide when to plant and harvest. Based on her experience working with communities affected by the Fukushima disaster, Mariko emphasised the need to reduce ambiguity in risk messages and to clearly distinguish probability and exposure when talking about risks. Wandi provided suggestions on how to talk about risk with groups with low numeracy, for example by supplementing numbers with key messages and guidance on what actions to take.

What have we learned about communicating risks?

Alex Freeman
Director,
Winton Centre for Risk & Evidence Communication,
University of Cambridge

In the Closing Keynote, Alex Freeman drew on 25 years of experience to distil what has been learned about risk communication across public health, natural hazards and other domains. Risk communication is a spectrum from purely informing, as in the case of an expert witness in court, to purely persuading, like an emergency alert message. Informative communication aims to help people understand risks and responses - including all the pros and cons - and use this knowledge to make their own decisions. With this type of communication, which aims to inform rather than persuade, what matters is not what the communicator wants, but what service and benefits they can provide to the audience.

For evidence to be communicated effectively, it must be useful and trustworthy.
"Useful" implies that the right information is communicated in the right way. Careful attention needs to be given to the way in which risk information is presented. For example, presenting only relative or absolute risks can be misleading. Reporting only relative risks in the case of thrombosis risks associated with the contraceptive pill led people to over-estimate risks and resulted in a large increase in abortions and unplanned pregnancies. In the case of earthquake risk, on the other hand, where the absolute probabilities are always very small, reporting increases over background risk may be important.

"Trustworthy" requires that information be balanced and accurate and is most important to those who are skeptical about the advice given. Organisations should aim to be *trustworthy* rather than seeking *to be trusted*. They can achieve this by providing full, balanced information. Although studies suggest that this does not necessarily change people's decisions, it does change their confidence in their choice. Accurate information means conveying the statistical significance of findings as well as the quality of the evidence.

Communicators also need to trust their audiences to be able to assess information in their personal context and take their own decisions. Understanding the interplay between statistical evidence and personal context is critical to successful communication.

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