CBi - SDG AI Lab Webinar on innovation and new technologies for private sector disaster management











AGENDA

Opening 5 min Kareem Elbayar, CBi Gökhan Dikmener, SDG AI Lab

25 min

25 min Discussion, Questions and Answers

5 min

Closing Kareem Elbayar, CBi





Presentation of the planned New Technologies workstream

Jonas Nothnagel, Martin Szigeti and Ken Jung, SDG AI Lab



Introduction







TECHNOLOGY RESEARCH AND DEVELOPMENT FOR PRIVATE SECTOR DISASTER PREPAREDNESS, **RESPONSE AND** RECOVERY





General Remarks and What to Expect

Throwback to First Webinar
 Update on Research Insights
 Private Sector's Role



Throwback to First Webinar





Technologies ranked by usefulness for Private Sector Disaster Managément













Social Media Communication Networks

Technologies with high opportunities

Artificial Intelligence (Machine Learning)



Crowdsourcing



Cloud Computing



Geographical Information Systems (GIS)





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Communication Networks (5G)



Potential --

Simplicity

Major Use Cases



Disaster Assessment/Early warning system

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Event Simulation

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Disaster Detection



Private Sector Role - Win-Win Situation

What Private Sector can give



Know-How and Innovation



Existing Solutions.



Access to Data.



Role Model & Good Outreach to Population.



Increase local ownership.













What Private Sector can gain

Increased Resilience

Increased skills.

Spill-over effects.

Better branding.

New Partnerships



Promising Technologies for the Networks





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LAB

GIS Research and Prototype Solution

- GIS Introduction
- GIS Technologies
- Data for DRM and Prototyping
- The Prototype Solution
- Relevance for Member Networks





Geographic Information Systems



to capture, store, manipulate, analyze, manage, and present all types of geographical data.'





'A geographic information system (GIS) is a system designed

Overview of Core Activities for GIS related Research and Product Development



Predictive Analytics

Analytic methods and AI to find causal connections between data. Predict outcomes of a variable based on model assumptions. Draw conclusions on model outcomes.





Mapping

Maps help to visualize and contextualize complex information in a simple manner.

Information Gathering

To know where to get data and how to process it, is vital for any project.

GIS as a Technology in Disaster Risk Management

General Use Cases

- Hazard / Risk
- Vulnerability / Exposure
- Early Warning Systems
- Damage Assessments
- Preparedness, Response, Recovery

Disaster Types

- Floods
- Droughts
- Earthquakes
- Volcanoes
- Storms







Collect





Analyse

https://www.dronitech.com/how-drones-are-revolutionizing-gis/

Example: High Tech Solution for Flood Predictions







Major Innovations in the History of GIS





Airborne images (Drones, Planes, Balloons)



1960+70's : GIS Software

Data storage Data analysis Later: Predictions Mapping

1983 : First Satellite Positioning System



GPS, Galileo: Localization with high precision and Realtime

20. Century

2004: Crowdsourcing

OpenStreetMap HumData.org



Early 2000's : Drones + UAV's

Disaster Mapping Hazard Monitoring Emergency Delivery **Construction Management** Crop Monitoring



Building Footprint Detection Advanced Classification Oil Palm Detection

21. Century



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Google Earth Map services Google Maps OpenStreetMap ArcGIS Cloud

Early 2000's : Machine Learning goes Mainstream



21st Century: Integrated GIS

Virtual Reality GIS **Internet of Things Smart Citites Geolocated Devices**





Prototyping **Solutions for** the Member Networks



Background and Motivation

- Importance of MSME's
- Opportunites for increased Resilience
- Multi Purpose
- Online Format

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Like every drop of water that makes up the ocean, it is the MSMEs of any country that provide a reliable foundation for a strong economy. In Sri Lanka, MSMEs are the life and blood of the country, contributing an estimated 52% to the GDP.

> FIRZAN "HUSH" HASHIM, COUNTRY DIRECTOR The Asia Pacific Alliance for Disaster Management Sri Lanka (A-PAD SL), CBi Member Network in Sri Lanka

27 JUNE 2021 MSME DAY

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#MSMEDAY21 #DISASTERSDONTWAIT #BIZ4GOOD

MSME-Data for DRM and Humanitarian Studies



Mention poor data quality as the biggest bottleneck

Major Problem:

• MSME data often comes unlocalized or sparse



Earthquake Report Izmir, Turkey





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Typhoon Risk and MSME's

Digital Data Collection as a Technology

Collecting Data:

- Digital Data Collection on SME's + Critical Infrastructure
- **Crowdsourced and proprietary data sources** •
- **Online Volunteers: Building and Business Tagging** •
- Additionally: Building Structure Mapping







Collected Data



Crowdsourced

OPENSTREETMA AN OPEN SOURCE MAP PROJECT

Proprietary

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StreetView Validation

Usage of Data after Collection

Risk Exposure Assessments and Vulnerability Indices





Benefits for Member Networks



- What type?
- How many?
- Exact location
- Exact location in disaster context
- Building type: Earthquake Resilience
- Density Clouds, Clusters
- Use existing hazard maps
- Use Climada as a model







The

Key Objective & Expected Outcomes

Outcome

- **Exposure Database (MSME's, Critical infrastructure)** •
- Additional Data layer on Building Resilience •
- **Embedded as interactive online tools**

Use Cases

- Quantifying risk of locality of MSME's and population groups •
- Use data to feed existing models to calculate ,vulnerability indices'
- **Risk Exposure Mapping** •



Low time & resource requirements



Scalable



Replicable in most countries













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NATURAL LANGUAGE PROCESSING



between computer and human language.

social media posts, forums, documents, etc.

- 70% 80% of ALL data is text data.
- Text can preserve most complex and critical information.
- Text data can be historical or real-time data.



- Describes a subfield of linguistics, computer science and artificial intelligence concerned with the interactions
- Google Search queries, text messages, news items,

Information Retrieval for Private Sector Engagement in Disaster Risk Reduction



Deep Dive on Natural Language Processing (NLP)

- Key Objective
- Expected Outcome
- Development Process
- Interim Results



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Key Objective & Expected Outcome



- Prototype development for <u>Information Retrieval (IR)</u> pipeline, with particular focus on Corporate Social **Responsibility (CSR) reports highlighting private sector** activities in disaster preparedness, response, and recovery.
- Outcome of the NLP workstream is identified the corporate activities in disaster management scanned from <u>50,000+ PDF documents of CSR reports</u>.





Development & Interim Results



Interim Results: Dataset \checkmark Visualization \checkmark

Companies from the following CBi member

•Turkey (842 times) Philippines (335 times) •Sri Lanka (814 times) Mexico (454 times)



networks countries have submitted a report with disaster reference (# of mentions appeared):

- 2021;
- 2022





Wrap up - Next steps

Integrate insights and experiences of participants into finalized research report and functioning prototype - to be launched in Q3

 Bilateral conversations with interested Member Networks for pilot projects in Q4 2021 and













Thank you!

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