WEBINAR PRESENTATION OF POLICY BRIEFS

Data Science for Policy Making

Spatial and Text Data Mining Analysis

31 August 2024 | 1:00 – 5:00 PM

Compiled and written by Lea Perine B. Briones

Data Science for Policy Making

Spatial and Text Data Mining Analysis

31 August 2024 | 1:00 – 5:00 PM

Compiled and written by Lea Perine B. Briones

Cover image credit
"Financial Data - Stock Market, Trading And Investments, Business And Economy"

DKosig, iStock, https://www.istockphoto.com/photo/financial-data-stock-market-trading-and-investments-business-and-economy-gm1490620838-515149502

Table of Contents

Download related policy papers for *free*

MANAGEMENT AND POLICY RECOMMENDATIONS FOR THE IMPROVEMENT OF MPA MANAGEMENT IN MIAGAO, ILOILO, PHILIPPINES

■ DATA SCIENCE FOR PUBLIC POLICY PROGRAM

Joshua M. Regalado[1]

EXECUTIVE SUMMARY

Marine protected areas (MPAs) are widely used tools in managing coastal resources and regulating anthropogenic activity that may potentially negatively affect the resources. In 2015, the Miagao local government unit (LGU) established three MPAs as a response to declining fish catches in the nearshore fishing grounds. However, it is difficult to determine whether the MPAs have been effectively managed and are performing in line with the local government's resource management goals due to several gaps in important aspects of MPA management. It is important to identify and address these gaps to maximize the conservation of the coral reef resources and the economic benefits that the stakeholders can obtain. It is recommended that the MPA management body prioritize the establishment of a management plan for each MPA. The plan should include detailed financial plans, regular coral reef monitoring protocols, IEC activities, and other programs that can enhance the effectiveness of the MPA. It is also recommended that the socioeconomic benefits derived from MPAs are examined.

ESTABLISHMENT OF MARINE PROTECTED AREAS IN MIAGAO, ILOILO

Establishing a marine protected area (MPA) is a coastal management tool widely used in the Philippines to protect coral reefs from various stressors and overfishing. An MPA is defined as "the area of the sea established and set aside by law, administrative regulation, or any other effective means, in order to conserve and protect a part of or the entire enclosed environment, through the establishment of management guidelines" (White et al. 2014). They are classified based on governance levels as nationally managed MPAs (established through the Republic Act 7586 or National Integrated Protected Area System (NIPAS) Act of 1992) and locally managed MPAs (established through Republic Act No. 8550 or Fisheries Code of 1998). At least 1,800 MPAs are established in the Philippines, most of which are locally managed (Mualiil et al. 2019; Cabral et al. 2014).

[1] Assistant Professor IV, Fisheries Policy Laboratory
Institute of Fisheries Policy and Development Studies, College of Fisheries and Ocean Sciences
University of the Philippines Visayas, Miag-ao, Iloilo

Management and Policy Recommendations for the Improvement of MPA Management in Miagao, Iloilo, Philippines

---

A FRAMEWORK FOR THE SUSTAINABLE MANAGEMENT OF COASTAL TOURISM AND FISHERIES NEXUS

■ DATA SCIENCE FOR PUBLIC POLICY PROGRAM

Cherry Pilapil Añasco, Joy Lizada, Nathaniel Añasco, and Harold Monteclaro
College of Fisheries and Ocean Sciences
University of the Philippines Visayas
Miagao, Iloilo

Small islands like Boracay, Gigantes, and Guimaras are good case studies of natural resources utilized for various purposes, with focus on mainly tourism and fisheries sectors. Boracay represented tourism sites with mass tourism as a developmental goal where the contribution of the fisheries sector to the economy of the island is very minimal. Meanwhile, Guimaras represented tourism sites with ecological tourism (ecotourism) as a developmental goal, with considerably high contributions or activities of the fisheries sector. Gigantes represented tourism sites which are still considered in the middle developmental goal (in between mass tourism and ecotourism) with active mass tourism marketing despite low tourist arrivals and equitable contributions from the fisheries sector. These crucial differences are important inputs to the resilience and sustainability of both coastal tourism and fisheries in the respective islands.

SMALL ISLANDS AS SOCIAL-ECOLOGICAL SYSTEMS

The link between tourism and fisheries has been a topic of interest for many researchers for some time. The interlink between tourism and fisheries has been termed as coastal tourism and fisheries nexus (CTF), where CTF in the context of small islands is basically one social-ecological system (SES) with both extractive (i.e., coastal tourism) and extractive (i.e., fisheries) human activities interact within one coastal area and utilize the same coastal resources. The unique, scenic, and relaxing characteristics of coastal areas entice tourists to visit islands, while abundant and diverse coastal resources provide livelihood to island residents and food for both islanders and tourists alike. However, unregulated coastal tourism and fisheries activities may negatively impact coastal areas and resources. Overfishing and overtourism can cause fish biomass reduction and coastal/marine habitat degradation, respectively. This phenomenon, in turn, has socioeconomic repercussions as exemplified during the temporary closure of Boracay.

Our study revealed that tourism developments in the three small islands are largely private sector-initiated. The government came in later to regulate activities and sustain the surge of investments and revenues. The study also shows the similarity in perceptions of various stakeholders in the three islands, regardless whether

A Framework for the Sustainable Management of Coastal Tourism and Fisheries Nexus

---

cids.up.edu.ph/collection-database

Get your policy papers published.

Download open-access articles.

The Philippine Journal of Public Policy: Interdisciplinary Development Perspectives (PJPP), the annual peer-reviewed journal of the UP Center for Integrative and Development Studies (UP CIDS), welcomes submissions in the form of full-length policy-oriented manuscripts, book reviews, essays, and commentaries. The PJPP provides a multidisciplinary forum for examining contemporary social, cultural, economic, and political issues in the Philippines and elsewh ere. Submissions are welcome year-around.

For more information, visit cids.up.edu.ph.
All issues/articles of the PJPP can be downloaded for free.

Get news and the

latest publications.

Join our mailing list to get our publications delivered straight to your inbox! Also, you'll receive news of upcoming webinars and other updates.

bit.ly/signup_cids

We need

your feedback.

Have our publications been useful? Tell us what you think.

bit.ly/dearcids

Opening Remarks

Dr. Ebinezer Florano

Dr. Ebinezer Florano Convenor of the UP Center for Integrative Development Studies Program on Data Science for Public Policy (DSPPP) opened the webinar by expressing his gratitude to the participants who submitted their policy briefs following the three-day hybrid workshop on Spatial and Text Data Mining Analysis. He expressed hope that these five (5) policy briefs subject for peer review in this webinar will be published in the future, with some polishing from today's presentation.

He announced DSPPP's forthcoming roundtable discussion titled "Pathways to Convert Research into Public Policies," highlighting the participation of key speakers from the Presidential Management Staff, the Congressional Policy and Budget Research Department, and the Senate Economic Planning Office. Dr. Florano emphasized that policy research should align with the needs of policymakers and expressed the importance of institutionalizing cooperation between UP and policy institutions. He encouraged all attendees to join and engage in these discussions to enhance the impact of research at the national level.

Management and Policy Recommendations for the Improvement of Marine Protected Areas (MPA) Management in Miagao, Iloilo, Philippines

Prof. Joshua Regalado

Prof. Joshua Regalado from the UP Visayas' College of Fisheries and Ocean Sciences presented his policy brief titled, "Management and Policy Recommendations for the Improvement of MPA Management in Miagao, Iloilo, Philippines." This brief, developed through collaboration with the Miagao LGU, offers timely insights for planning upcoming MPA programs. It highlights gaps in MPA management in Miagao.

The brief discusses the importance of Marine Protected Areas (MPAs) in managing fishing and protecting coastal resources. In Miagao, where fishing is one of the major livelihoods, fishers have reported declining catches due to overfishing. The local government unit (LGU) responded by enacting the Municipal Marina Sanctuaries Ordinance of 2015 (Ordinance No. 2015-26), establishing three MPAs: Damilisan Marina Sanctuary (DMS), Lanutan Marina Sanctuary (LMS), and Gines-Calampitao Marina Sanctuary (GCMS).

Despite these ordinances, only two MPAs received baseline assessments, and no data on coral and reef fish abundance for DMS was found in 2019. "We need the MPA hopefully to perform as it is intended to; however, because of the lack of data, it is difficult to determine whether the MPA is performing well," Regalado noted. His study, along with his students' research, identified gaps including lack of an existing MPA Management Plan, no consistent budget allocation, lack of information, education, and communications plan and activities, limited infrastructure development, and lack of activities led by the

MPA management boards. No follow-up surveys have been conducted since the MPAs were established.

POLICY RECOMMENDATION

To improve the management of Miagao's MPAs, Regalado recommends establishing a comprehensive MPA Management Plan for each site. Currently, none of the three MPAs in Miagao have such plans. An effective plan should include:

■ Clear budget and financial plan for activities of the MPA. Allocate an annual budget covering coral reef monitoring, law enforcement, IEC activities, and MPA management board meetings. Financial support should extend beyond law enforcement.

■ Regular monitoring of MPA Effectiveness. Assess MPA effectiveness annually, using tools like the MPA Effectiveness Assessment Tool. This includes the following:

  □ Updated coral reef surveys

  □ Updated coral reef surveys to compare current data with baseline information, adopting recent and participatory survey methods

  □ Incorporating data-science methods in future studies.

■ Examine other aspects such as socio-economic benefits from MPAs. It is important to assess MPAs' effectiveness in providing benefits to local communities reliant on coastal resources, using tools like the Socio-Economic Assessment Tool (SEAT).

CONCLUSION

Prof. Regalado identified significant gaps in the management of MPAs in Miagao, Iloilo, and presented recommendations to enhance management effectiveness. He emphasized that MPA management should adopt a data-

driven and evidence-based approach to ensure the successful implementation of programs and activities for each MPA.

CONSTRUCTIVE FEEDBACK

Dr. Vladimer Kobayashi, DSPPP's research fellow and certified analytics professor at the University of the Philippines Mindanao is also an Erasmus Mundus Master Scholar in data mining and knowledge management who served as the main lecturer during the 3-days hybrid workshop. He provided the first feedback by briefly introducing a project he is proposing for the Department of Science and Technology (DOST) focused on monitoring MPAs in Davao Oriental. He suggested that the policy brief could serve as a guide or template for other regions with MPAs. Dr. Kobayashi also highlighted that their DOST project integrates AI, commending Prof. Regalado for successfully incorporating the benefits of AI in data monitoring and survey consistency.

Furthermore, he emphasized the importance of specific MPA legislation in supporting preservation efforts. Socio-economic factors are the biggest influence here since an implication of MPAs involves controlled and sustainable fishing. In other words, a regimen that can be applied without displacing communities can rely on fishing. "So napakaganda yung socio-economic, this is open sa mga proposal or plan that emphasizes technology and preservation [So, the socio-economic aspect is excellent; this leaves room for proposals or plans that focus on technology and preservation]," Dr. Kobayashi stated.

Dr. Kobayashi noted the importance of leveraging technology in the monitoring process from a data science perspective. He suggested that the plan should emphasize the role of technology, such as devices and satellite data, to establish baselines and ensure consistent monitoring. He proposed a ten-year evaluation period to assess the effectiveness of MPAs, acknowledging that while MPAs may be beneficial in certain aspects, they could potentially impact the livelihoods of nearby communities.

He also highlighted the value of tailoring policy briefs to their intended audience, emphasizing the need to adjust language and format when presenting to different stakeholders, such as lawmakers or councilors, to focus on key points and actions. Noting a data gap, he was surprised by the lack of an MPA

management plan and underscored its necessity, suggesting specific elements for inclusion.

Dr. Kobayashi concluded by encouraging collaboration on future proposals, especially those that could incorporate data science techniques, tools, and methodologies, and offered his assistance as needed.

Prof. Eliezer Diamante, lecturer from the University of the Philippines Mindanao, shared his reaction to the presentation, noting that he found the content clear and understandable. Drawing from his knowledge of MPAs, he referenced the related programs at UP Mindanao, such as the Mabida Project and the Abraham Project, which focused on marine biodiversity database. He mentioned that these projects have tools to incorporate data gathered directly from fieldwork.

He pointed out that data collection from the ground can be challenging, based on discussions he had with the project staff. To address this, the team initially focused on capacity-building efforts by collaborating with local governments, particularly barangay captains, who then engaged with higher local government units, including mayors. He suggested that capacity-building from the grassroots level could support future proposals for local laws to implement policy and management recommendations effectively. Prof. Diamante mentioned that this project received funding from the U.S.. Dr. Florano highlighted the potential in Prof. Regalado's work and encouraged adding more data to enhance its persuasiveness for policymakers. He specifically suggested including further coral reef assessments and fish census surveys, emphasizing the importance of ongoing follow-up beyond the initial baseline studies. He recommended incorporating high quantitative techniques and possibly using spatial analysis, a method taught by Dr. Kobayashi, which could strengthen the findings and broaden policy recommendations beyond MPAs While Dr. Florano could not guarantee funding, he invited Prof. Regalado to consider applying for a research fellowship through the DSPPP. He explained the fellowship options, which include single or multidisciplinary authorship.

A Framework for the Sustainable Management of Coastal Tourism and Fisheries Nexus

---

Prof. Nathaniel Añasco, Prof. Cherry Añasco, and Prof. Harold Monteclaro

Prof. Cherry Añasco of UP Visayas, on behalf of her co-authors, introduced the policy brief titled, "Framework for the Sustainable Management of Coastal Tourism and Fisheries Nexus."

Prof. Añasco described small islands as landmasses or territories surrounded by large bodies of water, with a land area of less than 10,000 square kilometers and a population of approximately 500,000 or fewer. She noted that fishing is one of the primary livelihoods for the inhabitants of these small islands.

She led the participants to recall the 2005 Millennium Assessment Framework, emphasizing that provisioning and cultural aspects—specifically recreation—are two ecosystem services provided by natural ecosystems on small islands, contributing significantly to human well-being.

She explained that the policy brief addresses these dynamics, illustrating examples such as island hopping, kayaking in mangrove areas, whale watching, diving, sports, fishing, or simply relaxing on the beach. These coastal tourism and fisheries activities, grounded in the unique coastal resources at the land-sea interface, occur within both the coastal zone—defined as extending one kilometer inland from tidal flats—and coastal waters, which stretch up to 15 kilometers from the tidal flats. The activities draw on water, scenic beaches, biodiversity, and cultural heritage, creating an experience reliant on the natural beauty and resources of these areas.

Goods and services from small islands
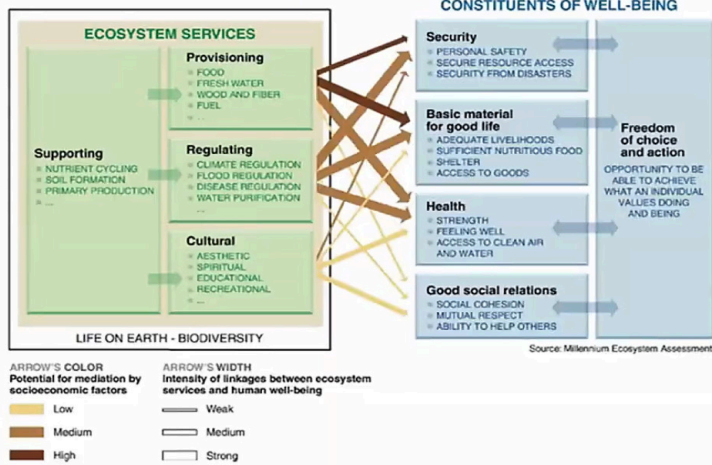
Millennium Assessment Framework (MEA 2005).

■ Figure 1.

Coastal tourism and fisheries nexus (CTF)
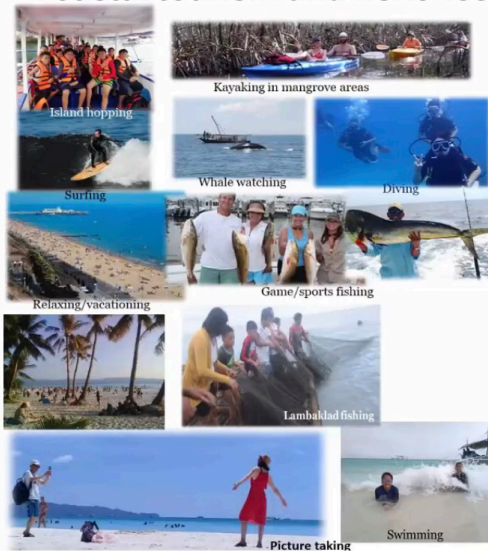
- Coastal tourism and fisheries activities
- Based on **exceptional coastal resources** at the interface of land and sea
- All **associated activities** that take place in both **coastal zone and coastal waters** involving **water, beaches, scenic beauty**, rich terrestrial and marine **biodiversity**, and **cultural heritage**
- People and nature interact in small islands
  - ✓ **Social-ecological system (SES)** is apparent

(Pilapil Añasco, 2022; Pilapil Añasco & Lizada, 2014; Sustain, 2012; UNEP, 2009)

■ Figure 2.

Prof. Añasco observed that these images clearly depict the interaction between people and nature on small islands, establishing a "social-ecological system" in these regions. Small islands are increasingly popular destinations for recreational visitors from the mainland. However, the presenter noted that tourism impacts local fishing operations. Tourism activities are often prioritized over fishing, with an assumption that local fisheries might benefit from tourism's economic multiplier effect. For instance, she referred to Gigantes Island, where surrounding waters have been designated as a Marine Protected Area (MPA) primarily for tourism purposes.

She shared that the government is now focusing on coastal and fisheries tourism as a significant economic driver, leveraging the Philippines' archipelagic layout. This sector is envisioned to provide supplemental or alternative income sources for local fishers, whom she referred to as "marginal futures." Referring to a visual, she noted the relaxing nature of coastal scenes and emphasized a universal love for seafood, connecting these to the challenge of sustainably managing the coastal tourism and fisheries sectors on small islands as a "social-ecological system."

■ Figure 3.
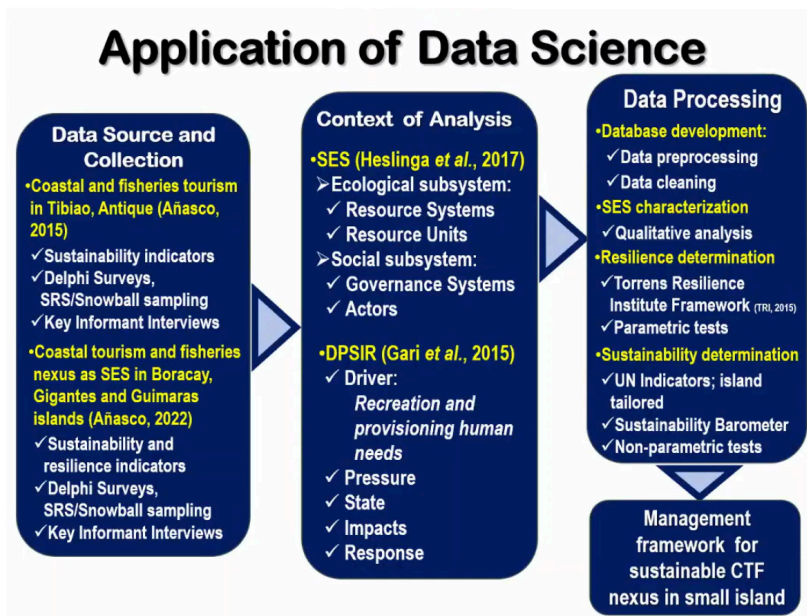
■ **Figure 4.**

To explore this, Prof. Añasco and her team conducted a study in 2015 in Tibiao, Antique, which examined "*lambaclad*" fishing—a form of tourism where visitors ride traditional fishing or bamboo rafts. The study employed sustainability indicators based on the United Nations' framework, using methods like Delphi surveys via simple or snowball sampling and key informant interviews for data collection. In 2022, they expanded this research to explore the nexus of coastal tourism and fisheries across Boracay, Gigantes, and Guimaras Islands. Prof. Añasco described each island's unique characteristics: Boracay is in an advanced stage of tourism development, while Gigantes gained tourism momentum only after Typhoon Yolanda, when relief efforts led to viral photos showcasing its scenic beauty.

Prof. Añasco noted that Guimaras Island has taken a more measured approach to tourism compared to Boracay, prioritizing ecological integrity while fostering tourism development. With these studies as a foundation, she explained that their analysis is grounded in the concept of social-ecological systems. This approach considers both ecological subsystems—like resource systems and resource units—and social subsystems, including governance structures and the communities involved.

For their analysis, the team utilized the Driver-Pressure-State-Impact-Response (DPSIR) framework, looking at recreation and resource needs as drivers of resource utilization on small islands. Their methodology included creating a database for data processing, cleaning, and standardizing. Using qualitative analysis, or "discretization," they examined resilience through the Torrens Resilience Institute's Framework, employing parametric tests after validating their assumptions. Additionally, sustainability was evaluated using UN indicators tailored to small islands, and the IUCN Sustainability Barometer helped gauge each small island's sustainability status within the coastal and fisheries tourism nexus.

Proposed management framework for the sustainable development of CFT SES in small islands

"State"
Ecosystem health, Natural value, Ecological sustainability
Extractive resource utilization vs *Non-extractive resource utilization*
= (conservation)

Resource System
(fishing grounds, coral reefs, beaches, mangrove forest, seagrass beds, etc.)

Resource Units
(fish and other marine organisms, island hopping, snorkeling, diving, swimming, etc.)

Ecological Subsystem

"Impacts"
Degraded habitats, overexploited natural resources, polluted waters, improper waste disposal, etc.

Social Subsystem

Users/Actors
(fishers, tourists, managers, entrepreneurs, and other community members)

Governance System
(international, national, local laws and policies, and institutions)

"Pressure"
Increasing population   Increasing tourist arrivals

"State"
Quality of life, cultural distinctiveness, experience value, etc.

"Impacts"
Socio-economic benefits, loss of cultural identity and heritage, resilient local community, socio-economic sustainability, institutional sustainability, etc.

"Drivers"
Provisioning (Fisheries)   Recreational (Tourism)

"Response"
CRM initiatives to address Impacts
(coastal clean-up, MPA management, PO strengthening, law enforcement, alternative or supplemental livelihood programs, networking with NGAs or NGOs, etc.)

■ Figure 5.

Prof. Añasco outlined the management framework that emerged from their study, emphasizing the interaction between ecological resources, such as fishing grounds, coral reefs, and mangrove forests, and social actors, including fishers, tourists, and community stakeholders. The framework underscores the importance of governance systems at local, national, and international levels to protect these resources while supporting sustainable tourism and fisheries.

Prof. Añasco highlighted the importance of balancing tourism and ecological conservation. She noted that unchecked tourism could lead to severe environmental impacts, such as habitat degradation, overexploitation, and pollution, alongside social disruptions that affect local culture and quality of life. Prof. Añasco discussed how local people might alter their customs to accommodate tourists, sometimes at the expense of cultural distinctiveness. She emphasized that a well-functioning governance system is essential to mitigate these adverse effects, with initiatives like Coastal Resource Management (CRM), MPA management, consistent law enforcement, and alternative livelihood programs.

OTHER POLICY CONSIDERATION/BASIS

Her proposed framework advocates for a balance between extractive (fishing) and non-extractive (tourism) resource use, equating balanced utilization with conservation. Prof. Añasco cited studies supporting this balance, such as Abacitas' 2005 research on whale-watching, which showed no harm to cetacean populations while benefiting locals economically, and Groa et al.'s 2011 study on shark tourism, where the preservation of live sharks yielded significant economic benefits over their lifetime.

RECOMMENDATIONS

Prof. Añasco recommended both immediate and long-term strategies for sustainable tourism development on small islands. Short-term measures include ensuring that development programs are well-coordinated, consistently funded, and implemented in a participatory manner to directly benefit stakeholders. She emphasized that when communities see immediate benefits from these initiatives, their engagement is likely to increase.

For long-term strategies, she recommended that development efforts, such as infrastructure and housing, should support the preservation of local culture and reduce potential harm to natural resources. She also advocated for empowering local actors to develop tourism offerings that respect local wisdom while aligning with international standards. This approach, she argued, allows coastal tourism and fisheries to serve as a form of CRM, promoting conservation as a primary strategy to mitigate the adverse impacts of unregulated development.

Prof. Añasco highlighted a recurring challenge in small islands: human tendencies to maximize economic returns through activities like overfishing and mass tourism, often leading to the rapid depletion of essential natural resources. This overexploitation, she noted, risks the collapse of socio-economic opportunities, especially where limited space and the constrained regenerative capacity of ecosystems are realities.

In response, she emphasized that CRM interventions are not merely conservation measures but practical solutions for sustainable development. However, balancing CRM with economic priorities can be challenging; for instance, marine protected areas often restrict fishing while allowing tourism, which can lead to conflicts between conservation and livelihood needs.

Prof. Añasco argued that for sustainable tourism to succeed, all stakeholders—environmental managers, tourism operators, and local fishers—must be beneficiaries, ensuring that economic gains are equitably shared. This balance fosters a "win-win" scenario, benefiting both society and the environment. The non-extractive use of coastal resources, she proposed, should be pursued through a participatory CRM process. This continuous, integrated approach to planning and decision-making encourages local engagement, resulting in higher appreciation and commitment to conservation.

Prof. Añasco ended her presentation by advocating for the coastal tourism and fisheries nexus as a strategic tool for CRM in small islands. This approach provides alternative income for fishers and promotes the preservation of coastal resources through recreational use, ultimately contributing to resilient communities and long-lasting ecosystem services. She also underscored the value of sustainable resource management for the enduring beauty and vitality of small island communities.

CONSTRUCTIVE FEEDBACK

Dr. Kobayashi expressed his admiration for Prof. Añasco's comprehensive research framework, highlighting its potential to serve as a strong foundation for developing multiple policy briefs. He noted that while there are currently no established policies specifically addressing coastal tourism management (CTM) in terms of sustainability and resilience in the areas studied, the framework could guide new regulations.

Dr. Kobayashi suggested focusing on policies related to sustainability and protection, potentially drafting an ordinance to address these areas. He also pointed out that the framework could serve as a template for evaluating policies, including aspects of policy analysis, monitoring, and evaluation. Additionally, he encouraged targeting socio-economic policies that streamline revenue generation, though he acknowledged that a sustainability-focused approach would be equally valuable.

In discussing the study's data science methods, Prof. Añasco explained that she had used Excel for the initial analysis, but noted the potential for more advanced methods, such as R, in future work.

Dr. Kobayashi offered assistance with text mining analysis, referencing his recent lecture as a resource. He also inquired about the survey's structure, upon learning that it involved nearly a thousand respondents and four types of questionnaires, each tailored to specific groups but with overlapping themes for comparison. Dr. Kobayashi suggested that a regular, standardized questionnaire for monitoring could be beneficial, especially considering the tendency for tourism to push boundaries and potentially lead to overexploitation of natural resources.

Dr. Kobayashi commended Prof. Añasco's presentation, highlighting the importance of finding a balance—or the "sweet spot"—in regulating tourism activities to avoid negative impacts on marine wildlife. He suggested that identifying and quantifying "overdoing" could help in crafting effective policies. This ensures that sustainability is prioritized. He recommended emphasizing that no specific laws currently exist in these areas, with the policy brief serving as a proposal for needed regulations.

He encouraged Prof. Añasco to underscore the framework's versatility in supporting the creation of various policies, stressing its potential as a guiding structure. Dr. Kobayashi pointed out that the framework's greatest contribution lies in its capacity to interconnect different policies, enabling a cohesive approach to sustainable tourism and coastal resource management. He concluded by expressing his appreciation for the well-delivered presentation.

Prof. Diamante praised Prof. Añasco's work, mentioning how reading her recent publication in the Philippine Journal for Policy Studies provided

inspiration, particularly for its approach in balancing fisheries and tourism. He appreciated the paper's relevance in exploring tourism industry resilience, especially in light of events like COVID-19 lockdowns and other ecological disasters, which highlighted the need for sustainable, resilient policies.

He noted the potential for further studies using the collected data, suggesting the application of text mining, statistical tools, and optimization models to deepen insights, especially in cost-effectiveness. Prof. Diamante expressed interest in the study's emphasis on the social subsystem, noting a trend where local fishermen shift toward tourism as a more sustainable livelihood.

He also commended the focus on assessing community perceptions and the trust in local officials, emphasizing that these communities would be directly impacted by any policy changes. Meanwhile, Dr. Florano directed a question at Prof. Añasco, inquiring if the paper had been written and published. She responded that the paper had not yet been published, explaining that the management framework she presented was derived from multiple studies currently in progress. She anticipates seven separate papers that will contribute to the main synthesis presented.

Recognizing the academic strength of her presentation, Dr. Florano recommended transforming the study into both an academic paper and a policy brief. He acknowledged Dr. Kobayashi's and Prof. Diamante's input on the study's scope and suggested narrowing it to focus on a single, practical policy area, such as coastal fisheries and tourism management. This, he proposed, could serve as an initial step toward creating comprehensive policies for small islands with unique characteristics.

An Analysis on Smart City Development Frameworks

Albert Florin, Mario Ugalino, and Kim Aguilan

Mr. Albert Florin and Mr. Mario Ugalino Jr. from UP Diliman's Training Center for Applied Geodesy and Photogrammetry presented their paper on "Smart City Development Frameworks," a study co-authored with Kim Aguilan. In his address, Mr. Ugalino highlighted the global urbanization surge, with rapid urban growth especially prominent in Africa and Asia. According to 2018 data from the United Nations Population Division of the Department of Economic and Social Affairs (UNPD-DESA), these two regions are projected to account for 90 percent of the anticipated global urban population increase of 2.5 billion by 2030. This underscores the extensive urban expansion expected in these areas.

Turning to the Philippine context, he discussed the country's urbanization trajectory, noting an increase in urban population from 45.3 percent in 2010 to 51.2 percent in 2015. Although slightly dated, he stressed that this data remains the most recent and reliable urban growth statistic from the United Nations for the Philippines.

ABOUT SMART CITIES

Mr. Ugalino introduced the rationale behind the focus on Smart Cities amidst the global trend of rapid urbanization. He explained that as urban populations grow, effective governance becomes critical to managing cities sustainably. This creates an imperative to adopt Smart City frameworks designed to address the challenges of urbanization by optimizing services, resources, and infrastructure.

He emphasized the importance of Smart City development for sustainable city management, stressing that the goal of their analysis is to compare the Philippines' approach to Smart City initiatives with international practices. By

examining the Philippine context within a global framework, the study aims to identify areas for improvement that could enhance urban development processes within the country.

Mr. Ugalino invited participants to consider the current state of urbanization in the Philippines as a starting point for exploring Smart City solutions.
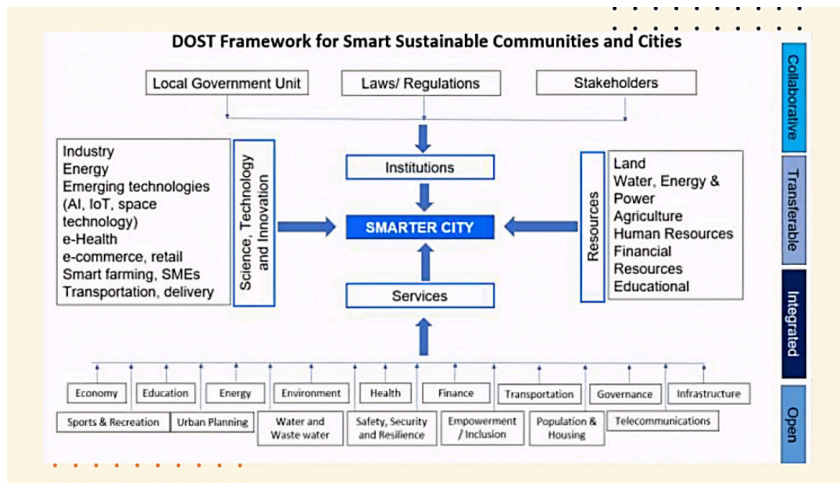
■ **Figure 6.**

Mr. Ugalino presented the Department of Science and Technology (DOST) framework for Smart Sustainable Communities and Cities, a strategic model released by the DOST-Philippines Council for Industry, Energy, and Emerging Technology in 2021. This framework focuses on the integration of sustainable practices within the development of Smart Cities across the Philippines.

The framework identifies several core contributors essential to the Smart City model:

1. **Institutions** – Includes local government units (LGUs), policies, regulations, and key stakeholders, such as investors.

2. **Resources** – Encompasses critical elements like land, water, energy, human capital, and agriculture, as well as financial and educational assets.

3. **Services** – Refers to the extensive range of public and private services necessary to support a SMART City. He noted that the service sector is broad and multifaceted, addressing diverse aspects of urban life.

4. **Science, Technology, and Innovation (STI)** – Encompasses advancements in industry, energy, and emerging technologies. The presenter highlighted that this includes AI, the Internet of Things (IoT), space technology, e-health, and e-commerce, all of which leverage digital platforms for smarter solutions. Examples such as smart farming and smart mobility demonstrate how innovations are applied to enhance city services and overall efficiency.

Each contributor plays a vital role in the Smart City framework, supporting a holistic approach to building resilient and sustainable urban communities. Mr. Ugalino illustrated these factors with specific examples to deepen understanding of the framework's application.

WHAT IS A SMARTER CITY APPROACH?

Collaborative	Transferable	Integrated	Open

- **Collaborative:** Convergence of existing technologies for driving smart city development further
- **Transferable:** Tools & Technologies are opensource, standardized, and transparent, allowing shareability
- **Integrated:** Data and technology enable communities to integrate local government efforts, prioritize sectors, and foster smart, sustainable solutions
- **Open:** The data being used is accessible, transparent, secured, and usable, empowering communities and decision–makers to help develop smart cities

■ **Figure 7**.

Mr. Ugalino also introduced the Smarter City approach, which is:

■ Collaborative – Integrating existing technologies to develop cohesive, scalable solutions that advance SMARTer City development beyond standalone applications.

■ Transferable – Ensuring that best practices and technological solutions are adaptable and replicable across various contexts and locales, facilitating broader implementation of SMART initiatives.

- Integrated – Utilizing data and technology to synchronize local government efforts, prioritize sectors, and support sustainable development.

- Open – Data should be accessible, transparent, secure, and usable, empowering communities and decision-makers in Smart City advancement.
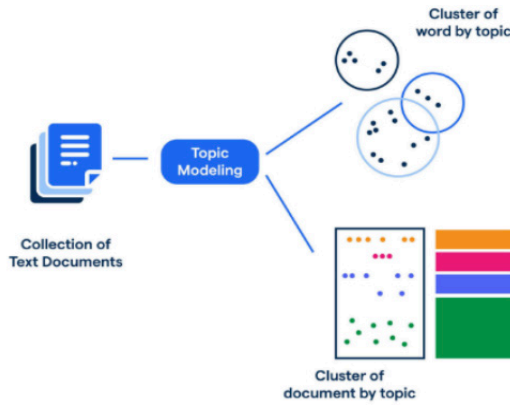
The DOST Smart City Development Framework serves as a foundational approach for building sustainable and technology-driven communities. However, the objective of this analysis extends beyond simply presenting the framework. Their goal was to employ data science techniques to compare the current state of Smart City development in the Philippines with global benchmarks. By examining this local-global context, the presenters aim to uncover insights that could enhance and adapt the Philippines' approach to align with successful practices observed internationally.

METHODOLOGY

Mr. Florin explained the data collection process to analyze the DOST framework's global applicability. The team sourced data from Google Scholar and Google News, filtering results using topic modeling to ensure relevance to Smart Cities. Pairwise correlation and a topic model were applied to compare DOST's framework with international datasets. Findings showed that topic 27, which included keywords like urban design and digital tools, most closely aligned with the DOST framework.

- Data Collection – Gathered top five results from Google Scholar and Google News on SMART City topics.

- Relevance Filtering (TF-IDF) – Used TF-IDF to retain articles specifically related to SMART Cities.

- Pairwise Correlation – Identified topic relationships across the data.

- Topic Modeling (LDA) – Applied Latent Dirichlet Allocation (LDA) to uncover new themes and subtopics beyond the initial scope (See figure at the right).

- Comparison of PH vs World – Analyzed and compared Philippine data against global SMART City development data.

- Policy Recommendations – Derived recommendations from correlated topics to align Philippine SMART City initiatives with global standards.
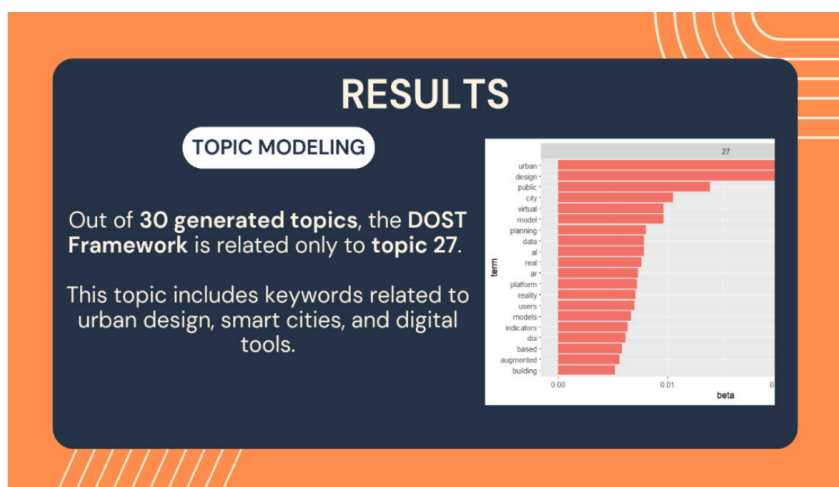

- Figure 8.

RESULTS

- Figure 9.

The analysis of the SMART City Development Framework in the Philippines yielded significant findings regarding the current context of Smart City initiatives. A total of 26 search topics were identified, with 215 articles related to Smart Cities, reflecting a robust engagement with the subject matter, and 5

topics correlated to the DOST Framework. Tools like Chatham GPT facilitated the generation of relevant search terms, ensuring comprehensive coverage of the topic. Notably, five topics were correlated with the DOST Framework, highlighting areas of alignment between national initiatives and global trends.

■ Figure 10.

A correlation graph visually represented these relationships, providing clarity on the focus areas. Additionally, topic modeling indicated that the DOST Framework primarily aligns with themes encompassing urban design, Smart Cities, and digital tools, suggesting a strong emphasis on integrating technology into urban planning. These insights underscore the need for continued exploration and enhancement of Smart City initiatives in the Philippines, particularly in addressing existing policy gaps and fostering institutional collaboration.

■ Figure 11.

The topic modeling analysis revealed that the DOST Framework is primarily aligned with a specific focus area, identified as Topic 27. This topic is characterized by keywords such as "urban design," "Smart Cities," and "digital tools," underscoring the emphasis within the DOST Framework on integrating technological advancements and digital innovation in urban planning. This alignment highlights the DOST's strategic focus on using digital tools to drive SMART City initiatives, with an orientation towards enhancing urban design and sustainable city management through technology.

POLICY RECOMMENDATIONS

Mr. Ugalino presented the findings of an in-depth analysis structured around key contributors to SMART City development, focusing on institutions, services, Science and Technology Innovations (STIs), and resources as foundational elements for policy recommendations.

1. Institutions

   Beginning with institutional aspects, he highlighted the policy gap that exists within the current Philippine Smart City landscape. Although the DOST has laid foundational guidelines, Smart Cities in the country remain at an emerging stage, lacking comprehensive legislative support. House Bill 8201 or the "SMART Cities and Municipalities Act," was identified

as a key piece of legislation under review in the 19th Congress. The bill seeks to provide a standardized approach to Smart City development, encouraging local governments to adopt these frameworks while respecting their autonomy. Mr. Ugalino emphasized that passing this bill would be instrumental in advancing Smart City initiatives, providing a policy backbone that would support the growth of such initiatives.

2. Resources

Analysis of resources indicates a weak correlation between digital infrastructure, IoT, and sensor networks with the DOST SMART City Framework, highlighting a gap in resource monitoring capabilities. To address this, deploying and standardizing sensor networks is recommended. As a critical component of IoT, sensor networks involve interconnected objects embedded with sensors for efficient data collection, essential for advancing resource management, public safety, and urban planning within SMART Cities in the Philippines.

3. Science and technology innovations + Smart City Approach

Analysis of resources indicates a weak correlation between digital infrastructure, IoT, and sensor networks with the DOST SMART City Framework, highlighting a gap in resource monitoring capabilities. To address this, deploying and standardizing sensor networks is recommended. As a critical component of IoT, sensor networks involve interconnected objects embedded with sensors for efficient data collection, essential for advancing resource management, public safety, and urban planning within SMART Cities in the Philippines.

4. Services

Turning to services, he identified transportation as a focal area. Transportation, a critical service within Smart Cities, frequently appears in policy discussions, especially in highly urbanized areas where traffic congestion is a daily challenge. Mr. Ugalino proposed policies integrating emerging Smart City technologies to enhance urban mobility. The application of DOST-developed technologies, optimized for sustainable and citizen-centered mobility, could significantly ease traffic congestion and improve transportation systems within urban centers.

Mr. Ugalino summarized their findings emphasizing the need for supportive legislation, enhanced sensor network infrastructure, data standardization, and technology integration within services like transportation to effectively implement Smart City frameworks in the Philippines.

CONSTRUCTIVE FEEDBACK

Dr. Kobayashi commenting on the presentation, emphasized its relevance to the evolving field of artificial intelligence (AI) and Smart Cities, a domain in which he actively works. He noted that while IoT and Smart City concepts have been developing for a decade, policies around them are still emerging. He appreciated the connection to House Bill 8201, which incentivizes Smart City development—an essential point given the Philippines' resource constraints affecting initiative prioritization and budget allocation. He also mentioned the current designation of Smart Cities through DOST programs, despite the lack of formal legislation, and expressed interest in the text mining approach used in the analysis.

Dr. Kobayashi praised the text mining method for effectively gathering and analyzing journal and news articles, showcasing both the potential and challenges of Smart City policies. He suggested incorporating public reactions to new technologies, as user acceptance is critical for policy formation and balancing technological benefits with social and cultural impacts. He stressed the importance of data standardization due to inconsistent data storage and interoperability issues, recommending that policy briefs focus on areas like data interoperability and urban development to align with House Bill 8201.

Dr. Kobayashi also recommended developing a policy discussion paper to explore various aspects of Smart City development while proposing targeted policy briefs on topics such as data interoperability and urban development. He highlighted challenges around data standardization, noting that while data storage is widespread, inconsistent data measurement and definitions complicate data sharing, emphasizing the need for standardized data policies. He pointed out that urban development, linked to automated city planning and information modeling, could benefit from dedicated policies to streamline growth.

His feedback stressed balancing technological progress with social and cultural considerations to enhance user acceptance and ensure practical implementation, promoting a comprehensive approach to Smart City policies.

Prof. Diamante expressed his appreciation for the presentation, noting its relevance, especially as we progress through the 2030s. He highlighted that based on his research, ASEAN has an ASEAN Smart Cities Network (ASCN), which initially identified 19 pilot cities in the Philippines, including major ones like Metro Manila, Cebu, and Davao, as candidates for Smart City development. While these cities have implemented some Smart City initiatives, there are currently no formal ordinances declaring them as such, which could change with the passage of the mentioned House Bill.

He appreciated the use of generative AI in data gathering as detailed in the policy paper and suggested that the information could serve as keywords for developing ordinances once the House Bill is passed. This would enable the creation of city ordinances to formalize Smart City initiatives.

Prof. Diamante also echoed Dr. Kobayashi's point on public technology acceptance and its importance in policymaking. He emphasized that lawmakers are mindful of public perception, which impacts policy effectiveness. He suggested that city ordinances declaring Smart City status could attract funding, leading to improved resources for local governments.

Adding to the discussion, Dr. Florano highlighted the ambition of the DSPPP to host a national or international conference on data science for public policy and noted that discussions with the international organization, United Kingdom's Data for Policy, about a potential regional conference had already begun. Dr. Florano emphasized the importance of using data science methods for policy research and encouraged campuses to contribute to this data-driven research culture. He urged coordination across UP campuses to build a comprehensive structure, preparing the entire system to host major conferences. Dr. Florano also mentioned that invitations had been sent to deans and directors, separate from the call for research fellows, requesting representatives from colleges interested in data science for public policy to join the working group. He encouraged participants to refer to the email sent and noted that some campuses had already nominated their representatives.

Dr. Florano suggested that Mr. Ugalino's work could align with Sustainable Development Goal (SDG) 11, focused on Sustainable Cities and Communities. Dr. Florano recognized the paper's potential but noted it would benefit from being developed into a discussion paper first, given its broad scope. He asked if a paper or data already existed to support this work, to which Mr. Ugalino responded that their basis was a framework published by DOST in 2021.

Dr. Florano emphasized the importance of giving policymakers specific recommendations and suggested that the paper could eventually lead to multiple policy briefs. He also reminded presenters of the importance of reviewing existing government policies before proposing new ones or suggesting modifications, as this ensures that policy recommendations are grounded and avoid duplicating or overlooking current regulations.

Dr. Florano pointed out that while existing policies might be lacking, researchers should be cautious about asserting this without thorough review, as recommendations might be rejected if they do not account for what already exists. Dr. Florano concluded by expressing interest in multidisciplinary research fellows who would contribute to smart city topics, potentially involving AI.

Someone from the audience posed a question: "His impression is that the DOST Smart City framework seems to focus too much on technology development. However, for Smart City tools to become useful in practice, would need for more responsive policy and governance framework. Can the paper review the uptake of various DOST-developed technologies in cities? What are the specific policy gaps and governance challenges experienced by leading LGUs?"

Mr. Ugalino responded by clarifying that he is a science research specialist at UP-TCAGP, not a professor. He acknowledged that reviewing specific policy gaps and governance challenges faced by LGUs was indeed part of their discussions and could be a valuable extension of their work. He saw this as a strong recommendation for future research and mentioned the importance of multidisciplinary collaboration.

As an early-stage researcher, Mr. Ugalino shared his eagerness to learn more, particularly about the policy aspects, which was one of the reasons for his involvement in the DSPPP. He expressed that while his background is stronger

on the technological side, he valued the opportunity to explore public policy further. He confirmed that future papers could incorporate these policy and governance analyses, concluding that it was an insightful recommendation to build on.

The session continued with a question raised by an anonymous attendee regarding the balance between data sharing and privacy, which was noted in the Q&A section.

Mr. Ugalino acknowledged the challenge of balancing data sharing and privacy, a topic currently being discussed within the product and design team for Smart Metro, where he serves as a Research Specialist. He emphasized that addressing this balance requires ongoing collaboration with stakeholders. The challenge lies in finding a compromise between acquiring the necessary data and ensuring the privacy of the data being collected.

Mr. Ugalino further explained that since no clear-cut standard exists for the amount or type of data that can be collected, this remains a learning process for the team. He specifically mentioned that when collecting data through sensor networks, it is important to understand the restrictions and limits on the type of data that can be gathered.

He proposed that this issue of data privacy and sharing could be explored further in a policy brief, suggesting the need for a specific document to address the limits and guidelines on data collection practices. He reiterated that the conversation about data privacy remains ongoing, and this issue should continue to be a subject of focus as it evolves.

Mr. Florin added a significant point regarding data privacy, particularly in the context of Smart City initiatives. He highlighted one of the key features of Smart City infrastructure—the panopticon network, which often relies on widespread CCTV surveillance.

He referenced a recent example in Metro Manila, where the suspension of contactless apprehension systems occurred due to concerns over privacy invasions. The use of CCTVs to monitor road rule violations sparked public backlash, as citizens felt their privacy was being compromised. Mr. Florin expressed concern that the implementation of such surveillance systems in

a Smart City, where the focus is on analyzing patterns of individuals, might provoke similar, if not stronger reactions.

He stressed that further study is necessary before fully implementing panopticon networks or similar systems within Smart Cities, especially in consideration of privacy concerns. The integration of such technology, while beneficial for data collection, must be approached carefully to ensure it does not infringe on individuals' rights to privacy.

Urban Design Wellness: Crafting Place-based Policy for Health and Wellness in Communities

_____

Prof. Richelle Baria and Prof. Allen Nazareno

Prof. Richelle Baria from the UP Diliman College of Architecture led the presentation on behalf of Prof. Allen Nazareno from the College of Arts and Sciences Math Division, UP Los Banos.. Their policy brief entitled, "Urban Design Wellness: Crafting Place-based Policy for Health and Wellness in Communities" emphasized the need for policies that translate national and city health goals into local strategies for barangays and districts by promoting Wellness Urban Design (WUD). This integrates design, mobility, and governance and helps build public support for healthy communities. Key elements include cleanliness, open spaces, walkable neighborhoods, efficient public transit, accessible services, clear policies, and community co-management of shared infrastructure.

She pointed out that historically spatial order has been integral to policy, from early Filipino settlements to colonial planning. However, she pointed out that existing and pending laws such as the Local Government Code, National Urban Planning and Housing Act, National Building Code, and the Philippine Development Plan 2023-2028 need clearer guidelines for incorporating health into urban planning. With this, she cited examples of environmental risks due to rapid urbanization. This includes:

■ Air pollution causing respiratory illnesses.
■ Water pollution, leading to diseases like cholera.
■ Deforestation linked to diseases like malaria.
■ Climate change and heat-related illnesses.

- ■ Noise pollution contributing to stress and sleep disruptions.
- ■ Malnutrition worsened by economic hardship, especially during crises.

Prof. Baria then highlighted the World Health Organization (WHO) research, which tackled the benefits of green spaces on mental health while addressing air pollution. Additionally, providing communal spaces, walkable streets, and availability of affordable healthy food have positive effects on the people's overall physical and mental well-being, thus enhancing the life of city dwellers. Similarly, she discussed a case study she has been working on regarding the people's acceptance of the WUD in Legazpi and Ligao, Albay, and their perception of its promotion to healthy cities. They were able to survey 408 respondents from the two cities.
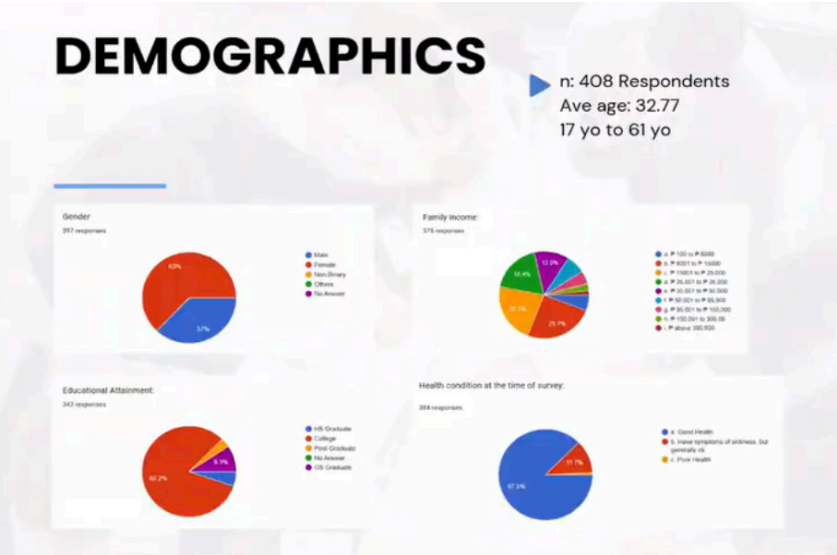
- ■ **Figure 12.**

CORRELATION STUDIES BY R STUDIOS DATA ANALYSIS

As seen in the results, age (r=0.13) and education (r=0.23) showed weak positive correlations with WUD index measures, indicating that older and more educated individuals tend to support WUD indicators. This may be due to their experience and understanding of how space and environment

influence health and well-being. There is a weak positive correlation (r=0.12) between gender and governance, suggesting that women place higher value on policy and governance in promoting health and wellness spatial strategies.

TEXT MINING ANALYSIS

■   **Figure 13.**

Respondents frequently used terms like city, proper, infrastructure, and health when discussing WUD and their neighborhoods. The emphasis on city and infrastructure highlights the importance of spatial elements in wellness policy. Frequent mentions of public and health show a focus on prioritizing public health, while proper and provide related to governance and policy.

SPATIAL ANALYSIS
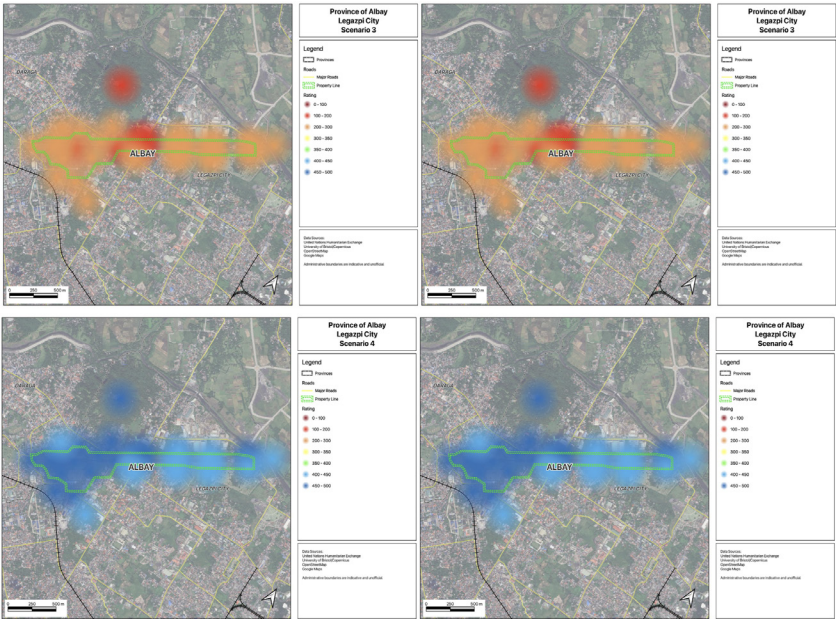
■ Figure 14.

Upon performing the onsite Spatial Analysis using QGIS, they were able to observe how the WUD performed in a given space. They developed four scenarios based on the WUD parameters—based on design, mobility, and governance. The scenarios included: (1) do nothing; (2) theme park development; (3) high-rise and high-density development with little open space; (4) a medium-rise, mixed-use, with a linear park development. Results showed that the fourth scenario received high ratings with a balance of the three WUD parameters.

DESCRIPTIVE ANALYSIS

Prof. Baria continued with the results of their conducted descriptive analysis where the respondents were asked to rate the WUD factors from 1-5, with 1 as the lowest or least disagreeable and 5 as the highest or most agreeable. This shows that community members in Ligao and Legazpi City recognize the importance of healthy urban spaces. Respondents expressed significant agreement with the proposed framework, which emphasizes the interconnectedness of built environment design, mobility quality, and governance effectiveness in achieving WUD.

CONCLUSION & RECOMMENDATIONS

Prof. Baria concluded that, "It is noteworthy that we can approach the way we conduct our policies to these three different themes: the first is design and environment, the second is mobility, and the third is governance." She proceeded by providing solutions to the problems and gaps pointed out earlier.

■ Figure 15.

1. Design & Environment

   ■ Urban Sprawl: Establish urban growth boundaries to promote denser, sustainable development.

   ■ Lack of Green Spaces: Prioritize the creation and preservation of parks and invest in urban greening to improve air quality.

   ■ Poor Urban Planning: Implement urban development plans that support sustainable transport, mixed-use zoning, and green infrastructure.

   ■ Density and Height Restrictions: Adjust zoning regulations to support higher-density development and reduce sprawl.

   ■ Poor Sanitation and Waste Management: Enhance infrastructure for sewage, waste treatment, and recycling programs.

2. Mobility

- Poor Walkability: Improve pedestrian infrastructure with safe sidewalks, street lighting, and pedestrian-friendly zones.

- Lack of Public Transport: Expand public transport options, including buses, trains, and bike-sharing.

- Segregated Land Use: Encourage mixed-use development to reduce travel distances and promote walking and cycling.

3. Governance Challenges

- Lack of Healthy City Policies: Develop policies addressing health issues like air and noise pollution, and healthcare access.

- Poor Inter-agency Coordination: Create inter-agency committees and partnerships to streamline urban development and health efforts.

- Inadequate Resource Allocation: Increase funding for health and urban development programs, prioritizing resources for sustainable city planning and implementation.

CONSTRUCTIVE FEEDBACK

Dr. Kobayashi noted the policy brief for its comprehensive use of data science. He was particularly impressed by the presentation's analysis of legal limitations.

He recommended expanding the correlation analysis with regression modeling to show the marginal contributions of different factors. Dr. Kobayashi also inquired about the research instrument's source, to which Prof. Baria explained that the variables came from her literature review and discussions with local leaders.

When asked if she planned to extend the study to other cities, Prof. Baria noted her current focus on Ligao and Legazpi but acknowledged the framework's potential to be adaptable to other contexts. Dr. Kobayashi agreed, suggesting that her methodology should be flexible enough for application in various settings.

He recommended integrating the text, spatial, and descriptive analyses with the questionnaires and demographics for a more cohesive data set. Prof. Baria mentioned using AI-generated images to analyze cityscapes, to which Dr. Kobayashi suggested incorporating satellite imagery to assess wellness scores through visual analysis of structures. He expressed enthusiasm for the study's potential, especially if it connects to smart city initiatives, and offered his assistance moving forward.

Prof. Diamante added that, on the potential for replicating the study, many cities, especially in Mindanao, would be eager to adopt WUD strategies. Prof. Baria expressed interest in collaborating with local governments on this. Prof. Diamante also recommended examining the costs and long-term effects of improving urban spaces, such as the impact on tourism and productivity, as additions to the study.

Dr. Florano, on the other hand, praised the study for its thorough use of data science — spatial, text, descriptive, and correlation analysis—and highlighted Prof. Baria's enumeration of existing policies. However, he viewed it more as a discussion paper at this stage, noting that it lacked a clear focus on policy. He had expected the conclusion and recommendations to specify which policy Prof. Baria aimed to introduce or modify within the existing government framework.

Based on previous presentations, Dr. Florano noted the need for an orientation on writing policy briefs. He mentioned that they are developing a software called "Policy Analytics," which guides users through step-by-step procedures for structuring problems, assessing policy alternatives, recommending solutions, designing implementation plans, and building evaluation frameworks.

Meanwhile, Prof. Noriel Tiglao remarked: ". Qualitative ranking of factors, which are self-reported, are very useful and quite valued. However, there may be a need to validate perception ratings with quantitative metrics across the urban design, mobility, and governance dimensions of wellness urban design. Relatedly, how would you address the inherent subjective biases from perception surveys?"

Prof. Baria responded by noting differences in perception across various demographics. Compared to lower-income groups, those with higher educational attainment tend to be more discerning, as they are familiar with minimum standards and best practices. She suggested finding ways to distill further and communicate this information to those groups. She acknowledged that biases come into play when discussing perceptions of space. She adds: "But then again, there's no other way of asking their opinions about how they use the space, how they perceive space without asking these questions directly."

Dr. Kobayashi acknowledged that perception can be subjective and that some biases might be present. "To establish validity, we need to triangulate," he suggested. This approach aligns with Prof. Baria's response, which includes qualitative data to capture key concerns and observations, complemented by validated questionnaires to strengthen findings. He also suggested looking into the validity of the convergence. He mentioned the possibility of introducing "more objective measures...to try and correlate...wellness to another measure." He explains that a positivity with the wellness should expect that it is also positively correlated with perception. With this, it is possible to establish convergence validity on assessing the perception. While it is difficult, there are some techniques to see whether the instrument or metric has captured the perception. He expressed, the possibility of shaping perception, "if it is not something that's static." He gives an example of how what may be beautiful correlates with wellness and overall health may be imposed.

On the other hand, a question from the comments was raised regarding the availability of the policy analytic software for beta testing. Dr. Florano clarified that there will indeed be a testing phase, ideally before November. The team is working towards completing the software within the month of September. This timeline aligns with their goal of presenting the software at a data analytics conference hosted by the Development Academy of the Philippines.

Furthermore, the speaker mentioned that those selected as research fellows would be invited to participate in the process, with the opportunity to refine their policy briefs as part of the testing and feedback phase.

Islamic Finance: Needed, Wanted but Unavailable: How Can Government Promote Islamic Finance in the Philippines?

Jane Lynn D. Capacio & Juan Carlos Rodriguez

Ms. Jane Lynn Capacio from the UP Center for Integrative and Development Studies was the last one to show their policy brief regarding how Islamic finance is needed and wanted but largely unavailable yet. She introduced the ongoing research, which addresses the need for Islamic finance in the Philippines, noting that while there is demand, it remains largely unavailable.

As per Abayoni Alawode, Head of Islamic Finance, "Islamic finance is equity-based, asset-backed, ethical, environmentally- and socially-responsible finance. It promotes risk sharing, connects the financial sector with the real economy, and emphasizes financial inclusion and social welfare." Key principles of Islamic finance were outlined as:

1. Prohibition of interest on transactions (riba)
2. Financing should be linked to real assets (materiality)
3. Returns (rewards) must be linked to assets
4. Engagement in immoral or unethically problematics businesses not allowed (e.g., arms manufacturing, alcohol production)

She also elaborated on how financial institutions in Islamic finance assess the use of funds—ensuring that they are used for assets, with the financing institution purchasing the asset and the borrower repaying gradually. Furthermore, she explained that engaging in immoral or unethical businesses is not permissible under Islamic finance principles.

Ms. Capacio compared Islamic finance to conventional capitalist finance. She explained that in Islamic finance, money should have a "GPS," meaning there must be clarity on where the money originates and where it is going, ensuring transparency and ethical use of funds.

She listed basic financial instruments in Islamic finance, such as cost-plus financing, profit sharing, leasing, partnerships, and forward sales. Over recent years, more complex financial instruments, including bonds, and non-bank instruments like mutual funds and insurance, have also emerged.

Financial instruments

Basic instruments include:
- Cost-plus financing (murabaha)
- Profit-sharing (mudaraba)
- Leasing (ijara)
- Partnership (musharaka)
- Forward sale (bay'salam)

Non-bank:
- Mutual funds
- Insurance (takaful)

More complex financial instruments:
- Islamic bonds (sukuk)

■ Figure 16.

Ms. Capacio delved into how Islamic finance diverges fundamentally from the capitalist system. She began by reiterating the traditional factors of production: capital, land, and labor. In conventional systems, profits are derived after the distribution of interest on capital, rent from land, and wages for labor.
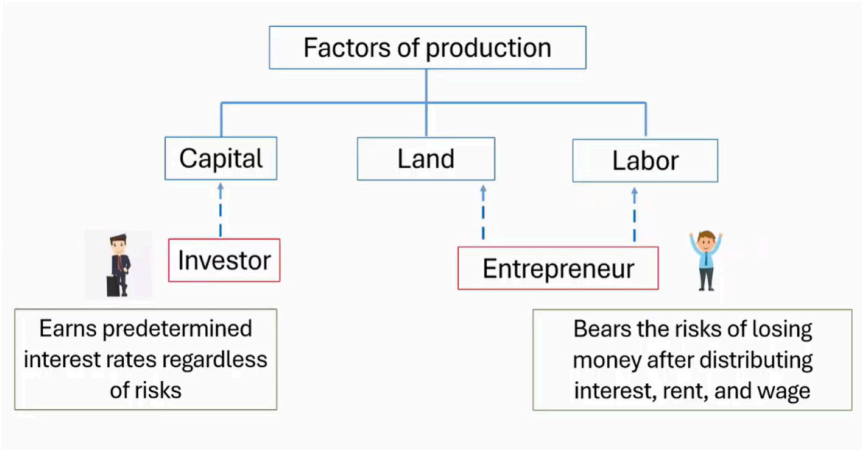
Typically, the investor who provides capital earns a fixed interest regardless of the associated risks, while the entrepreneur, who often possesses land and labor, bears the brunt of potential financial losses after fulfilling these obligations. This dynamic often places the risk on the entrepreneur while the capital investor remains protected.

In contrast, Islamic or Sharia-compliant financing mandates that every contributor to the production process—including the capital provider—must bear the risk of loss. As a result, the capital provider shares in the actual profit, rather than earning a guaranteed return. This fundamental approach to risk-sharing sets Islamic finance apart from its conventional counterpart.
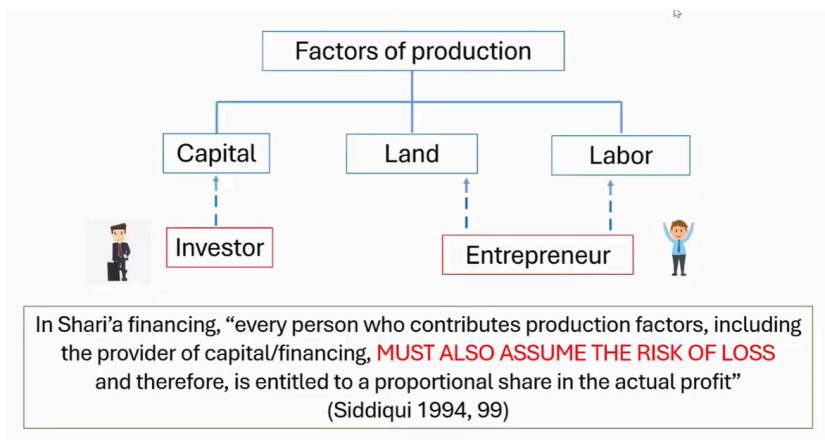
Ms. Capacio also emphasized that, in Islamic finance, money is perceived purely as a medium of exchange with no intrinsic value. Consequently, generating interest income on money without any risk involvement is considered non-compliant (haram) with Sharia law, as it violates the principles of fairness and ethical financial engagement.

■ Figure 17.

■ Figure 18.

In Shari'a financing, "every person who contributes production factors, including the provider of capital/financing, MUST ALSO ASSUME THE RISK OF LOSS and therefore, is entitled to a proportional share in the actual profit" (Siddiqui 1994, 99)
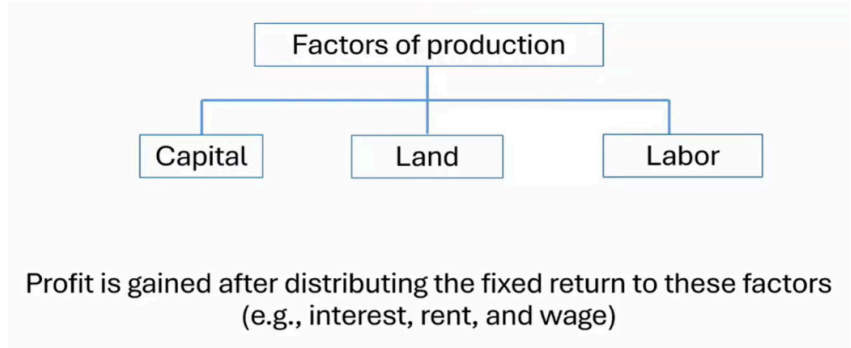
■ **Figure 19.**

WHAT WE KNOW SO FAR

As part of our ongoing action research under the Escaping the Middle-Income Trap: Chains-for-Change Program (EMIT-C4C) of UP CIDS, in collaboration with the Peace and Equity Foundation, Ms. Capacio emphasized the state of Islamic finance in the Philippines. The Peace and Equity Foundation has been a crucial partner, supporting both funding and research efforts.

KEY OBSERVATIONS FROM THE RESEARCH:

1. Demand for Islamic Finance

   There is evident interest and demand for Islamic finance among Muslim Filipinos, who make up a significant yet variably reported segment of the population. Despite global increases in Sharia-compliant assets, including in non-Muslim-majority countries, the Philippines has struggled with limited instruments and services specific to Islamic finance.

2. Progress in Recent Years

   Historically, progress in Islamic finance has been slow. Initiatives such as the establishment of Amana Bank in the past did not sustain, as it was eventually acquired by Development Bank of the Philippines (DBP). However, 2023 and 2024 marked significant progress. For instance:

- ☐ The Sharia Supervisory Board was set up in 2023.

- ☐ The maiden issuance of sukuk bonds by the Bangko Sentral ng Pilipinas (BSP) in November 2023 was oversubscribed.

- ☐ In 2024, Card MRI launched its first Islamic bank in Cotabato, followed by May Bank's new branch in Zamboanga in August.

3. Challenges and Successes in Pilot Testing

Historically, progress in Islamic finance has been slow. Initiatives such as the establishment of Amana Bank in the past did not sustain, as it was eventually acquired by Development Bank of the Philippines (DBP). However, 2023 and 2024 marked significant progress. For instance:

- ☐ Pilot tests conducted by various cooperatives, with support from Peace and Equity Foundation and other organizations, showed positive results in Islamic microfinance.

- ☐ Common issues encountered included challenges related to screening, business and financial models, and agreement enforcement, typical of any credit or financing setup.

- ☐ Sharia Advisory Boards established in these pilot programs played a significant role by providing policy guidance, screening, and enforcing agreements through religious teachings and the use of social capital and reputation. This highlights how Islamic finance can address conventional credit challenges effectively.

4. Educational Gaps and Institutional Needs

- ☐ Many Filipino Muslims lack a comprehensive understanding of Islamic finance.

- ☐ The necessity for individual Sharia Advisory Councils in financial institutions contributes to limited agreements on acceptable financial products and practices, suggesting a need for more unity and standardization.

SENTIMENT ANALYSIS ON "ISLAMIC FINANCING" AND "SHARI'AH FINANCING": GENERALLY POSITIVE BUT WITH A MIX OF NEGATIVE EMOTIONS ESPECIALLY AROUND RISKS

Ms. Capacio presented key insights from a sentiment analysis focused on Islamic and Sharia finance. This research aimed to deepen the literature review and provide a nuanced understanding of the sentiments surrounding these financial systems.

Ms. Capacio described the multi-step process of the sentiment analysis, which included reviewing abstracts from 62 different journals to ensure a comprehensive dataset. The data was then transformed into vectors and analyzed using three sentiment models: NRC, Bing, and the Lowland McDonald lexicon model. These models assessed the emotional and thematic undertones present in the literature, providing an enriched perspective.
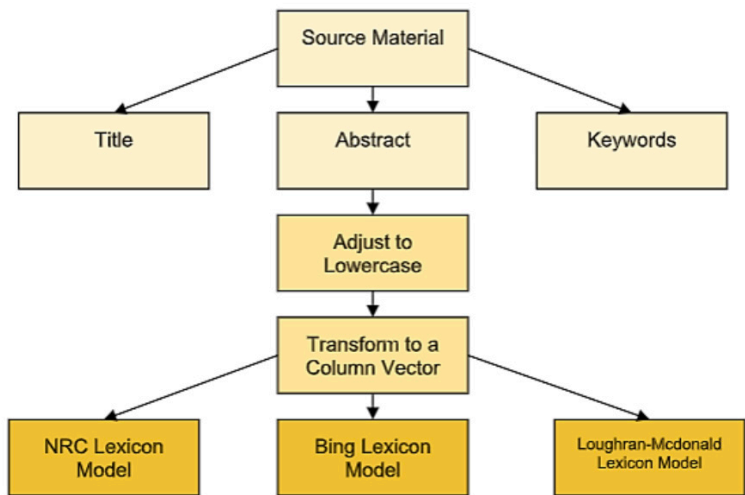
■ **Figure 20.** Operational Framework of the Sentimental Analysis

The analysis revealed that Islamic finance was strongly associated with positive sentiments, particularly trust, which was noted at approximately 290 counts. This trust was aligned with categories such as profitability, satisfaction, and opportunities. However, the analysis also highlighted about

140 counts of negative emotions, pointing to potential challenges in design or implementation phases. The Bing model further underscored compliance as a significant strength but also identified risk as a prevailing negative sentiment. The models revealed additional complex emotions such as "litigious," "constraining," and "uncertain," which had not been evident in prior models. These sentiments were particularly linked to risk, problems like usury, and issues of unemployment.
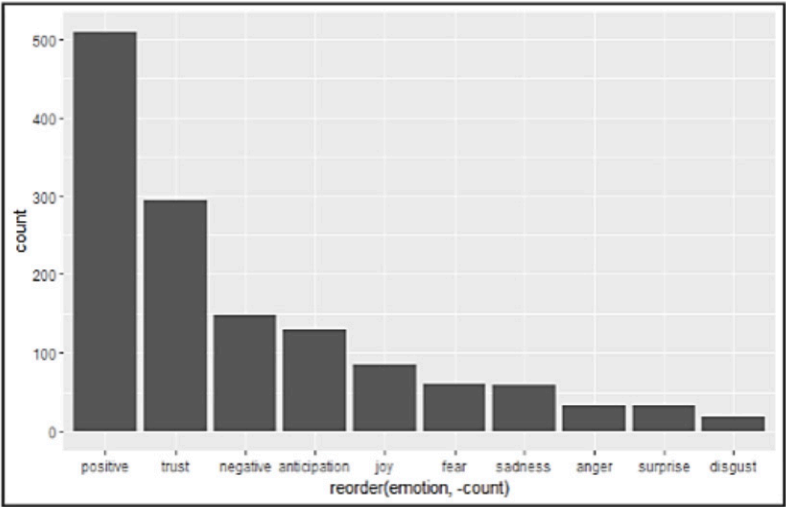
Figure 21.
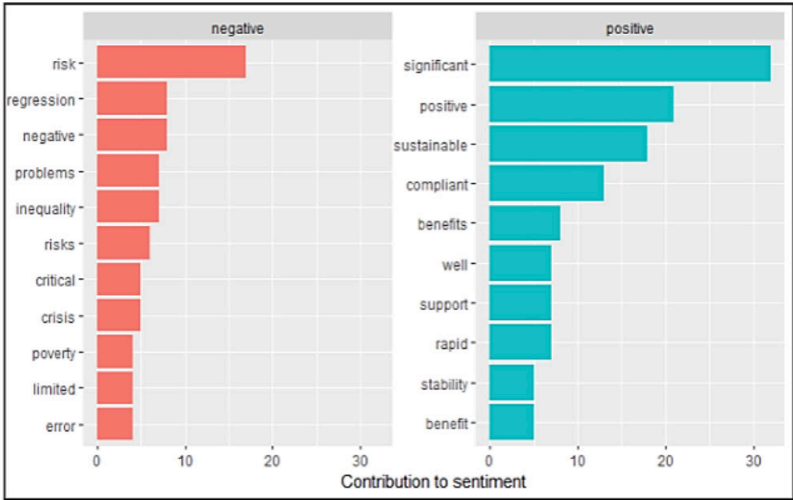
Figure 22.

Ms. Capacio recommended that the government take a balanced approach in promoting Islamic finance. While avoiding regulatory overreach—given that the banking sector is already highly regulated—she emphasized that the government could still play a proactive role in public advocacy. This approach would support the growth and understanding of Islamic finance without imposing additional constraints on the financial sector. Through this comprehensive sentiment analysis, valuable insights were gained, offering a clearer path for supporting the development of Islamic finance in the Philippines.

RECOMMENDATIONS

Ms. Capacio proceeded to outline recommendations aimed at addressing the negative sentiments of risk and uncertainty identified in the sentiment analysis on Islamic finance. The primary recommendation focused on enhancing financial literacy about Islamic finance, particularly in the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM), an area notably underserved by financial institutions. She highlighted that BARMM stands out as a region with a significant unbanked population, contrasting with other regions in the Philippines that have more robust access to financial services. This recommendation was directed toward the Philippine Statistics Authority (PSA), emphasizing the need for targeted educational initiatives.

She also advocated for supporting pilot models that had already demonstrated success, such as Islamic microfinance projects. This support could involve capacity-building programs, public awareness campaigns, and non-distorting incentives to foster trust and adoption. Ms. Capacio stressed the importance of building the capacities of key stakeholders, including the BSP, industry professionals, and religious leaders. While religious leaders are often well-versed in Sharia laws, they may lack expertise in economic and financial areas, highlighting the need for comprehensive training across sectors.

Another critical recommendation involved addressing concerns related to taxation, particularly the fear of potential double taxation under profit-and-loss sharing arrangements. Unlike conventional loans where only interest is taxed, Islamic finance may involve tax implications on profit markups. This recommendation was directed at the Bureau of Internal Revenue (BIR) to consider tax reforms that prevent double taxation and support profit-sharing models.

Ms. Capacio further emphasized the importance of fostering economic activities in BARMM, which presents challenges due to underdeveloped industry plans and uncertainty in selecting priority sectors. Without solid industry blueprints, even enticing large banks, such as Maybank and other international financial institutions, to invest would be difficult. She noted that current efforts are underway to solidify these plans and urged expediency to ensure that financial institutions, borrowers, and ancillary service providers could synchronize their efforts. She concluded by noting the importance of streamlining business processes and improving peace and order in the region to create a conducive environment for growth and investment.

CONSTRUCTIVE FEEDBACK

Dr. Kobayashi noted the detailed examination of journal literature, emphasizing its value. Furthermore, he expressed his interest in policy-based learning, specifically in what he terms "city-to-city learning" or policy analytics, which involves analyzing successful policies in various contexts to adapt them for local use. He noted that Islamic financing, while beneficial and established in Muslim-majority regions like the Middle East and Africa, has not yet been fully integrated into the Philippine financial landscape.

Ms. Capacio confirmed Dr. Kobayashi's points, adding that while Islamic finance is indeed well-developed in regions such as Middle East and North Africa (MENA), its implementation in the Philippines remains limited. Dr. Kobayashi then proposed expanding the sentiment analysis to include a broader range of data, suggesting that additional budget from the UP CIDS program for Islamic financing could support this effort. By understanding the sentiments and outcomes from other countries, local policymakers could potentially reduce reluctance and skepticism surrounding the adoption of Islamic finance in the Philippines, allowing for more informed comparisons and context-specific applications.

Dr. Kobayashi noted Ms. Capacio's policy brief as was well-focused and suggested that it could be expanded upon in future research. He emphasized the importance of continuing sentiment analysis and incorporating visual tools like mapping to illustrate the distribution of financial services and highlight why certain areas remain underserved.

He discussed the typical banking model, where banks profit from lending and interest, noting that in Islamic finance, concepts like interest are perceived differently and could impact the development of financial services in regions like BARMM. Dr. Kobayashi closed by expressing admiration for the work done and suggested that a customized sentiment analyzer tailored for Islamic financial terms be developed. He offered to share resources and collaborate to ensure terms that might be considered negative in general use are correctly interpreted within a financial context, such as terms like "loan" or "interest," which could hold different connotations.

Finally, Dr. Kobayashi encouraged the continuation of this research, reiterating his support and expressing a willingness to assist with further development. He highlighted the need to distinguish between common and financial-contextual meanings of terms, which could enhance the accuracy and applicability of sentiment analysis in Islamic finance studies.

Prof. Diamante noted that the methods used in the paper were concise and effective. He highlighted the challenge of enforcing agreements, especially in a region where risk and uncertainty remain significant concerns. Prof. Diamante agreed with the sentiment that engaging in financial transactions is often risky for Muslim residents who adhere strictly to Sharia law. He appreciated the acknowledgment of this issue, noting that charging high interest is considered haram, exploitative, and contrary to their beliefs.

He supported the recommendation to improve financial literacy, pointing out that rural banks dominate the area and accessing major banks can be difficult for reasons previously mentioned. He underscored the importance of recognizing the economic potential within BARMM and its neighboring areas. Banks, he suggested, should have more trust in the local economy and the income that workers and residents can generate, as there is more economic activity than some institutions might assume.

In response, Ms. Capacio agreed with Prof. Diamante that BARMM is heavily cash-based and emphasizing the importance of investments in Islamic finance remaining within the local banking system or transferring only between Islamic banks.

Dr. Florano emphasized that Ms. Capacio's work is relevant to various Sustainable Development Goals (SDGs), including SDG 10 (Reduced Inequalities), SDG 1 (No Poverty), and SDG 8 (Decent Work and Economic Growth).

He highlighted the promising use of sentiment analysis and encouraged further mastery of this technique. Dr. Florano noted ongoing research by Dr. Kobayashi and Dr. Margarita Lavides that aligns with sentiment analysis, recommending collaboration or learning from their work.

While he appreciated the paper's topic on Islamic financing, Dr. Florano expressed a desire for more detailed policy recommendations. He suggested clarifying whether systemic changes, policy tweaks, or entirely new policies are needed. He also echoed previous feedback on the importance of expanding data to ensure the study remains evidence-based, recognizing that data availability on Islamic banking may be limited.

Before the session concluded, Prof. Noriel Tiglao posed an insightful question: "How can your study on Islamic finance inform the establishment of banking institutions in BARMM? In this context, what is the potential of a micro-financing RAM-type banking system in BARMM, given the region continues to face serious poverty and economic inequality?"

Ms. Capacio pointed out that there has been significant progress in the region regarding Islamic microfinance. She noted that while it is not yet fully recognized as Islamic micro-finance, the current systems are at least Sharia-compliant, which is an essential step forward. Capacio emphasized that this process would unfold gradually, likening it to a phased "purification process" where the region learns and refines its practices over time.

OTHER COMMENTS POSTED BY THE PARTICIPANTS

Glenn Ivan Macitas: I've also worked with LDA in a paper before. I think increasing the "sample size" of the articles you analyzed would help better differentiate the topics (for better comparison).

Almira Andin: Sustainable smart cities are crucial because we want to avoid over-immigration to rural areas where people hope to build new "subdivisions,"

which will entail resource extraction. This context makes smart cities and public policies supporting them relevant. The reporters may want to check the *Balik Probinsya* program as a complementing policy.

Dan Gigantone: The BSP also developed a National Strategy for Financial Inclusion (NSFI) and part of the initiative was to promote Islamic Financing. But I think this was not thoroughly discussed in the document.

Summary of Constructive Feedback

1. Prof. Regalado to further consider expanding research, data gathering and monitoring of the marine protected area (MPA) management. MPA should be data-driven and evidence-based to support the decision-making and planning processes. It would also be beneficial to pursue research on assessment of the coral reef and fish census survey

2. The team of Prof. Añasco to develop discussion papers on coastal tourism and fisheries nexus framework with focus on sustainability and resilience.

3. The team of Mr. Ugalino and Mr. Florin on SMART Cities need to expand analysis on smart city development frameworks. It was recommended to have prioritization of policies in terms of efforts and budget. The policy discussion paper may focus on real-time data operability and automated planning and development of cities. Further, there was a request to review the uptake of various DOST-developed technologies in cities. Identify the specific policy gaps and governance challenges experienced by leading LGUs.

4. Prof. Baria and Prof. Allen Nazareno were asked to further develop wellness urban design framework and apply data science methods especially perception and sentiment analysis. Policy makers and implementers will be interested in the cost of improving urban spaces vis-à-vis if it will promote an increase in productivity, tourism, and employment.

5. Ms. Capacio will expand sentiment analysis on Islamic finance and develop more specific policy recommendations.

6. All presenters must consider reviewing existing policies related to their topics before making new policy recommendations.

CENTER FOR INTEGRATIVE AND DEVELOPMENT STUDIES

Established in 1985 by University of the Philippines (UP) President Edgardo J. Angara, the UP Center for Integrative and Development Studies (UP CIDS) is the policy research unit of the University that connects disciplines and scholars across the several units of the UP System. It is mandated to encourage collaborative and rigorous research addressing issues of national significance by supporting scholars and securing funding, enabling them to produce outputs and recommendations for public policy.

The UP CIDS currently has twelve research programs that are clustered under the areas of education and capacity building, development, and social, political, and cultural studies. It publishes policy briefs, monographs, webinar/conference/ forum proceedings, and the Philippine Journal for Public Policy, all of which can be downloaded free from the UP CIDS website.

THE PROGRAM

The **Program on Data Science for Public Policy (DSPPP)** aims to build the capacity of UP faculty in data science and apply this learned skill to public policy and governance. It seeks to engage a community of researchers within the university and encourage the pursuit of interdisciplinary problem-oriented research using high-level quantitative analyses.