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Editors' Notes

This issue of the *Philippine Journal of Public Administration* features scholarly papers presented during the inaugural conference of the Philippine Public Policy Network (PPPN) held on 21-22 November 2019 with the theme "Towards Adaptive Public Policy-Making in Anxious Times." The conference was organized by the PPPN with support from the International Public Policy Association. The Center for Policy and Executive Development, an extension arm of the U.P. National College of Public Administration and Governance (UP-NCPAG), served as the conference secretariat. The conference was held at the International Center for Public Administration of UP-NCPAG in Diliman, Quezon City. The articles developed from the papers presented in this conference delve on public policy concerns in the areas of transportation and population management.

The article by Anne Clarice Ng, Revka Perez, and Noriel Christopher Tiglao examines the policy capacity of the City Transport Development and Management Office (CTDMO) of the Pasig City Government in implementing transport policies using big data applications. The article explains that devolving public transportation franchising functions to the local governments entails building the capacities of local government offices to leverage the technologies that aid in crafting evidence-based public transport policies. To this end, a group of academics engaged the CTDMO personnel in a design-thinking workshop, which would help them improve their capacity in using big data analytics in local transport planning. BDA helps policymakers obtain quick information from readily available data, with which they can formulate decisions or policies for better government service delivery.

Nicomedes Alviar's article highlights the case of Republic Act No. 10354 (Responsible Parenthood and Reproductive Health Act of 2012) in probing into the roles of various international actors and platforms for action in domestic policymaking. Multilateral organizations, foreign governments, and international private organizations helped shape the population and reproductive health discourse and concretized it in the form of programs, financial support, and legislation in various states since the 1970s. In the Philippines, the prevailing discourse was tempered with moral perspectives put forward by the Catholic Church. As a result, RA 10354 incorporated contending arguments of international and domestic policy actors—the liberal ideas of planned parenthood and population management, and the Church's advocacy pertaining to the right to life and family, and the value of human dignity. Scholars and students of Public Policy may find this article relevant to their discussions about group theory in the international context.

Independently submitted articles dealing with policy issues related to housing and public health expand the scope of policy research featured in this issue. Teodoro Lloydon Bautista's article on collective leadership in informal housing communities offers insights on how collective leadership strengthens resilience in informal settler communities amid frequent displacement and relocations. In his study covering six relocation sites in Bulacan, Cavite, Rizal, Valenzuela, and Manila, Bautista found out that two predictor variables are strongly associated with community resilience, i.e., social capital and access to socioeconomic resources. These results imply that, apart from access to social services and livelihood opportunities, building mutual trust, goodwill and connectedness within the community should be also be a key consideration in crafting housing and relocation policies for informal settlers.

Finally, the article by Mamer Rosario and Ma. Loren Josephine Lantin compares two protocols of fracture care delivery by the East Avenue Medical Center (EAMC) for charity patients availing intramedullary (IM) nail implants—the selective SIGN nailing (SSN) and the upfront SIGN nailing (USN). The authors particularly compared the effectiveness and efficiency of these protocols in terms of the time it takes admitting the patient, procuring the implants, and providing surgical treatment. Results reveal that USN, which adopts a first-come, first-served approach for providing implants regardless of the patient's financial capability, is more effective and efficient owing to improved surgery rate and surgical timing. However, the effectiveness and efficiency of USN are contingent on the availability and procurement of implants by the EAMC. The findings shed light on the cumbersome process of availing medical treatment even in public hospitals, and they emphasize the need to reform the public health financing system in the Philippines to lessen the financial and transactional burden on indigent patients.

Editors

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Building Policy Capacity of Local Governments for Big Data Applications in Public Transportation

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Policy capacity—defined as the set of skills, resources, and capabilities necessary to perform policy functions—focuses on the managerial and organizational abilities to inform policy decisions with sound research and analysis and to facilitate policy implementation with operational efficiency. In June 2017, the Department of Transportation issued the Omnibus Franchising Guidelines, which set new guidelines for the issuance of franchise for road-based public transport services. It devolved the function of route planning to the local government units (LGUs) within their respective territorial jurisdiction and required the preparation of Local Public Transport Route Plan as a prerequisite. The policy capacity of local governments to address the complex public transportation planning and franchising problem in their respective areas has emerged as a major concern. The study aims to review and evaluate, using the policy capacity framework, the current capabilities of Pasig City in applying big data principles and techniques in transport planning. It particularly documents the experience of the City Transport Development and Management Office. Initial evaluation indicates that the local government possesses readiness and holds great potential in developing big data applications for local public transport planning and management. The results may help LGUs further improve and fine-tune their capacity for using big data, through which their overall policy capacity may be improved.

Keywords**:** *policy capacity, big data, public transportation, local government*

Policy capacity can be defined as the set of skills and resources—or competencies and capabilities—necessary to perform policy functions (Wu et al., 2015). It focuses on the managerial and organizational abilities to inform policy decisions through sound research and analysis and to facilitate policy implementation with operational efficiency. Generally, the competencies that comprise policy capacity can be categorized into three types: analytical, operational, and political. Recent literature points out that these competencies

involve resources at three levels, namely, individual, organizational, and systemic (Wu et al., 2015). The policy capacity of local governments to address the complex public transportation planning and franchising problems has emerged as a major concern.

On 19 June 2017, the Department of Transportation (DOTr) issued Department Order (DO) No. 2017-011, otherwise known as the Omnibus Franchising Guidelines (OFG), which envisions a restructured, modern, well-managed, and environmentally sustainable transport sector where drivers and operators have stable, sufficient, and dignified livelihoods while commuters get to their destinations quickly, safely, and comfortably. It sets new guidelines for the issuance of franchises for road-based public transport services. In particular, it devolved the function of route planning to the local government units (LGUs) as they are more familiar with the terrain and passenger demand within their respective territorial jurisdiction. Under the OFG, the LGUs are required to submit their own Local Public Transport Route Plan (LPTRP) as a prerequisite for the opening of public utility vehicle (PUV) franchises within their jurisdiction. Route rationalization studies shall also be conducted to determine the appropriate mode, quantity, and service characteristics of the public transport service in each area, making the routes more responsive to passenger demand and ensuring that the hierarchy of roads and modes of transportation are followed.

However, the OFG rollout has been slow as the policy capacity of most local governments for transport planning is virtually non-existent. At the local level, all technical planning functions have been delegated to the city or municipal planning and development office (C/MPDO). This office is responsible for the formulation and updating of all locally and nationally mandated plans, such as the comprehensive land use plan (CLUP) and the comprehensive development plan (CDP). In fact, LGUs are required to prepare 33 local plans on different sectoral or thematic concerns (Department of Transportation [DOTr], 2017). Among them, only one plan is about local transportation: the transportation master plan.

Aside from plan formulation, C/MPDOs are also mandated to collect and manage all local data and to monitor and evaluate the implementation of programs and projects proposed in the submitted plans. In view of many other duties they are assigned, C/MPDOs tend to outsource planning functions to consultancy services, employing professionals who may have general knowledge and training in planning or engineering but lack specialization in transport planning. In terms of plan implementation, LGUs delegate the plans to other local government offices. However, the crafting of the LPTRP will fall under the C/MPDO, as the 1991 Local Government Code (LGC) did not explicitly mandate the creation of a specific unit for transportation planning and management. The LGC places the responsibility of providing adequate transportation facilities

on cities (Sec. 17). Moreover, the *sangguniang panlungsod* or city council, the policymaking body of LGUs, can only regulate tricycle operations (LGC, Sec. 458). In the case of transportation, most LGUs tend to relegate traffic enforcement and parking management to the public order and safety office or department (POSO/D). However, traffic management and enforcement is different from transport planning and development.

Consequently, the administrative setup in local governments are severely constrained in terms of resources and manpower. Meanwhile, the LGC has relegated important provisions pertaining to the functions of LGUs in the areas of transport planning and management as follows:

- regulate the use of streets, avenues, alleys, sidewalks, bridges, parks and other public places and approve the construction, improvement, repair and maintenance of the same;
- establish bus and vehicle stops and terminals or regulate the use of the same by privately-owned vehicles which serve the public;
- regulate garages and conveyances for hire;
- designate stands to be occupied by public vehicles when not in use;
- regulate the putting up of signs on street;
- regulate traffic on all streets and bridges;
- prohibit encroachments or obstacles thereon and, when necessary in the interest of public welfare, authorize the removal of encroachments and illegal construction in public places; and
- regulate the operation of tricycles and grant franchises for operation thereof in coordination with the DOTC. (LGC, Sec. 447, 458)

An ALMEC (2008) survey targeting 120 member-cities of the League of Cities in the Philippines showed that transportation and traffic issues are ranked sixth overall among the most serious issues in Philippine cities. This problem is viewed as more critical in large cities, ranking second among 11 other citywide issues. To some extent, medium-sized cities consider transport and traffic as relatively lower in priority (Table 1).

Big Data Applications in Public Administration and Governance

Big data refers to the ability to process and analyze massive datasets to determine emerging trends and patterns (Zhu et al., 2019). Its use has expanded in the field of public administration and governance. Big data applications help improve the effectiveness and efficiency of policy and decisionmaking and public service delivery. As such, the capacity of the public sector to collect and use big data must be evaluated as part of the broader field of policy capacity in public transportation development and management. The evaluation will help local governments develop and enhance sustainable strategies to improve their policy

capacity in public transportation planning and management. While disparate studies have been done locally in the past, they have not tackled the expanding and empowering role of big data applications in promoting people-centered sustainable public transport systems in the country.

Table 1
Ranking of Citywide Issues in Selected Philippine Cities

Issue	Large City	Mid-sized City	Small City	Overall
1. Livelihood and employment	1	1	1	1
2. Environment	3	2	2	2
3. Health and nutrition	7	5	3	3
4. Sanitation and sewerage	8	3	6	4
5. Housing	4	7	7	5
6. Transport and traffic	2	6	9	6
7. Flood control	6	4	11	7
8. Tourism	9	8	3	8
9. Water	10	9	5	9
10. Security and criminality	4	10	8	10
11. Power and electricity	11	11	10	11

Source: ALMEC Study Team (2008)

Data Analytics for Research and Education

The National College of Public Administration and Governance, University of the Philippines (UP-NCPAG) has been conducting research on public transport government and policy. One of its recent studies in this field is the Data Analytics for Research and Education (DARE) Program supported by the Commission of Higher Education (CHEd) and Philippine-California Advanced Research Institute (PCARI). The DARE Program is a research collaboration between three institutions: University of California Berkeley (UCB), Mapua University, and the University of the Philippines (UP). It aims to create capacity-building infrastructures in research and education and to enhance the research capability of university-based research teams. The program involves expanding the UCB's Travel Routing, Assessment, and Control for Energy Savings (TRACES) platform to the Philippines. It entails the implementation and demonstration of the algorithms in computational platforms to be developed jointly by the American and the Philippine teams. For its part, the Philippine team is building a multi-scale transportation platform to assess and optimize Metro Manila traffic. Comprising the Philippine team of the DARE Program are Mapua University, UP National Institute of Physics (UP NIP), and UP-NCPAG. These academic institutions are working on three projects as follows:

- Project 1, Technical Design and System Deployment, is led by Mapua University. It focuses on the aspects of advanced next generation transportation modelling, traffic engineering, simulation, field measurements, and calibration. They are in charge of the platform's optimization, system integration, model calibration, validation, and deployment.

- Project 2, Design and Analysis of Algorithms, is handled by UP NIP. It focuses on data analytics algorithms and tools, i.e., large-scale data analytics modeling, inference, and optimization, as well as algorithm platform development and simulation.

- Project 3, Information Exchange Platform for the Public Sector, is conducted by UP-NCPAG. It focuses on the public administration viewpoint of setting, measuring, and understanding performance indicators, which can be synthesized from the computational backends, relevant to the Philippine setting. Project 3 involves data fusion, public sector information exchange, public sector information management, e-governance framework, data visualization, decision support system, and information architecture and policy. Project 3 proposes the development of a prototype information exchange platform (IEP) to improve the daily commute experience and provide maximum commuter benefits. The team envisions the platform to effectively engage all stakeholders through co-production activities by making transport services responsive to the changing needs of the commuters.

Review of Related Literature

Policy Capacity

"Policy capacity" or "policy analytical capacity" refers to the link between policy development at the bureaucratic level and policy decisions by elected and appointed government officials (Howlett & Wellstead, 2011). In the simplest example of the heuristic policy cycle, politicians establish a policy goal and rely on their civil servants—permanent employees of the state who are largely unaffected by elections, lobbying, and public pressure—to investigate options for achieving the politicians' goals. These civil servants then forward the results of their work to the political executive for possible policy implementation. As Howlett and Wellstead (2011, p. 615) point out, in practice, policy analysts can no longer be seen simply as technical experts who use specialized techniques to solve specific policy problems. They are now becoming generalists who engage in a variety of activities that are crucial to the policy process.

In the past, policy capacity has been used to refer to a state's ability to govern, in the context of the recent propensity of some governments to favor alternative service delivery mechanisms, austerity measures, and public administration approaches that mimic private sector corporations. A more precise term for this might be "state capacity," "governing capacity," or even "governance capacity." More recent definitions, by contrast, reflect the ability of civil servants to produce useful advice and to effectively communicate that advice to government decision makers. Earlier writers have used different or inexact terminology: Polidano (2000) uses the term "public sector capacity," Di Francesco (2000) refers to "policy advice," and Thissen and Twaalfhoven (2001) refer to "policy analytic activity." However, these authors have the same general intent as is pursued in subsequent literature that has converged on the term "policy capacity." Thousands of individual policy analysts working at the national and subnational level are engaged in activities that contribute to policy development. Recent survey-based quantitative analyses have provided greater detail on what these individuals do and how their work contributes to policy capacity (see Howlett, 2009; Howlett & Newman, 2010; Howlett & Wellstead, 2011).

Governments around the world have been increasingly focused on strengthening policy capacity, as the problems society faces are being ever more complex. Policy capacity is defined as "the ability of governments to make intelligent choices" (Painter & Pierre, 2005, p. 2), "to scan the environment and set strategic directions" (Howlett & Lindquist, 2004, as cited in Wu et al., 2015, p. 165), "to weigh and assess the implications of policy alternatives" (Bakvis, 2000, as cited in Wu et al., 2015, p. 165), and "to make appropriate use of knowledge in policymaking" (Parsons, 2004, as cited in Wu et al., 2015, p. 165). To simplify these concepts, researchers from the Lee Kuan Yew School of Public Policy and Simon Fraser University created a policy capacity framework—skills, resources, competencies and capabilities—needed to perform policy functions. They further broke down the idea of policy capacity into three general types of competencies: analytical, operational, and political. Each type of competency was then further defined at the individual, organizational and systemic levels. This framework covers all policy processes, including agenda setting, formulation, decision making, implementation, and evaluation (Wu et al., 2015).

Analytical capacity, the availability of individuals with analytical skills, along with machinery and processes for collecting and analyzing data, and organizational commitment to evidence-based policy are necessary for governments to begin developing their overall policy capacity (Davies et al., 2000). At the individual-operational level, policy managers play a key role in developing policy capacity, allowing organizational-operational capacity to flourish (Tiernan & Wanna, 2006). At the individual level, key players in the policy process need to have policy acumen to better contribute to policy formulation and implementation and navigate public opinion. At the organizational level, governments need to be

able to define an issue and engage the public in contributing to its resolution (Post et al., 2008). Systemic-political capacity, deemed the most wide-ranging of policy capacities, has the potential to shape all other capacities. It is largely determined by public trust in the sociopolitical and socioeconomic spheres of policy action and is thus necessary for policy implementation (Wu et al., 2015).

Smart Governance

Among the ways to support sustainable transport is through smart governance, the use of technology allowing citizens and the government to collaborate in advancing sustainable development (Tomor et al., 2019). Smart governance strengthens data-driven governance because direct inputs about existing issues from the community serve as data sources to guide policy and program formulation and implementation (Keller et al., 2017). Collaboration in the context of smart governance and smart cities in developing countries underscores the important role of information and communications technology (ICT) in supporting information sharing and integration among government agencies, external stakeholders, and citizens (Pereira et al., 2017). Smart city governance integrates ICT tools, citizen participation, and co-production of public policies and services (Webster & Leleux, 2018). This is reinforced by bottom-up approaches in city planning and mechanisms for smart city participation and co-production, such as living labs (ICT solution prototype testing with citizens and professionals), hackathons, citizen's dashboard, open datasets, and crowdsourcing, among others.

Living labs is an innovation platform method (Bergvall-Kåreborn et al., 2009) that can create user-centered solutions (Walravens et al., 2014). The Living Lab Bus project in Finland (Lusikka et al., 2020), aimed at developing personalized services to citizens, demonstrates the added value that co-production generates by introducing systemic changes throughout the bus service value chain. However, implementing urban mobility innovations entails keenness on local bureaucracies and decision-making structures, especially because transformative innovations can disrupt traditional market-based approaches (Aparicio, 2019).

Lastly, measuring and improving quality of service and experience through smart mobility performance monitoring systems requires a multi-stakeholder approach (service providers, government agencies, commuters, and passengers) (Longo et al., 2018). Modeling delivered and perceived quality factors supports data-based decisionmaking. By examining the public transportation system from different perspectives, decisionmakers and advocacy groups can analyze existing gaps and tackle them accordingly. They are able to (1) define service quality metrics for transportation service providers, (2) define quality level objectives, and (3) establish indicators and measurement policies (European Union, 2002).

Big Data Framework

The fact that data analysis is an important part of policy development is highlighted particularly with the advent of big data. Generally, big data has been described in terms of volume, variety, and velocity (Zhu et al., 2019). Volume refers to the quantities of data produced by multiple sources, such as from tracking transponders, environmental, and meteorological monitoring. Variety refers to the multiple kinds of data. For example, modern vehicles use internal system telemetry to report real-time status of crew members and passengers. Velocity, which refers to the speed of monitoring and processing data into results, has been increasing over time. Improved communications technologies, e.g., use of smart cards and tags used for ticketing transactions, have greatly aided in this regard (Zhu et al., 2019).

The proposed big data framework applicable to ITS, or intelligent transport systems, consists of three layers, namely, data collection, data analytics, and application. The data collection layer acts as the baseline layer for the framework, providing the necessary data for the upper layers. This layer consists of the various sources of data that is integrated into the ITS, such as induction loop detectors, GPS, microwave radars, video surveillance, and other applicable data. The second layer is the data analytics layer, which acts as the core of the framework. This layer is meant to receive data from the collection layer and to apply various big data approaches to allow for data storage, management, analysis, mining, and sharing. The last, top layer of the framework, the application layer, applies data process results into transportation functions, such as traffic flow prediction, traffic guidance, emergency rescue route planning, signal control, and other similar functions (Zhu et al., 2019). The framework allows for the integration of big data analytics with intelligent transport systems and has been extensively used in developing more specific frameworks.

A study by Xu and Geng (2019) developed the people-centric service intelligence framework, which is built on the aforementioned principles. The framework relies heavily on people-related theories, such as Maslow's theory of needs. In this framework, the infrastructure layer, or collection layer, is built on the digital city. It relies on GIS services, ICT, as well as political sensing, societal and people observations, and earth observations. "Hard" observations are made up of earth observation systems, transport and logistics systems, and building information modelling (BIM) for buildings, facilities, and utilities. "Soft" observations are provided by people observation systems, ICT and cloud infrastructure, and professional processing systems.

The analytics layer, or open city layer, relies on a core geospatial information system, interoperability capabilities, virtual platforms, data integration capabilities, and access to the cloud. This layer can be further split into the public

and the private data types. The public data consists of governance, business, and service data, while the private data consists of personal, social, and consumption data.

The application layer is the integration of the previous layers into an intelligent city, which allows the use of need detection, knowledge engineering, context sensing, and service optimization. These applications are further classified into the group level and the individual level. Group-level applications consist of aggregated status modeling, behavior interaction, and service customization. Individual-level applications entail personal status detection, behavior prediction, and service recommendation. The framework is designed to enable data intelligence functions to meet the human demands in urban functions, enhancing capabilities in building and developing smart cities.

Another framework, developed by Guido et al. (2017) is the decision support system (DSS), which focuses on aiding the development of transportation alternatives using big data. The DSS is an IT platform environment that makes use of multiple modules, such as trip pattern recognition, spatial-temporal matching, and decision analysis, in conjunction with persistent data provided through a user's and operator's database to provide the initial level. It requires a database management system that performs mining analysis on geographic data. While this model is dependent on an already existing IT infrastructure, DSS is able to gather and interpret consistent user trip information. It can thus integrate the transit demand management philosophy into transport planning and, in turn, help promote sustainable mobility.

Data Analytics

Transport-related data gathered through ICT will serve as inputs to data analytics, such as modelling mode choice and route choice, which are key steps in urban transport planning to support transport demand management and land-use policy evaluation. Intelligent transport system (ITS) based on mobile phone data is a low-cost method for generating a consistent stream of updated information about public transport trips, making the service reliable and attractive to users (Gheorghiu & Surugiu, 2016). As the most available mobility data source, big data analytics from mobile phone data can be used in studying social inequality in growing megacities. A large-scale study of Beijing's 1.8 million regular commuters used big data analytics to examine the trade-off between housing costs and long commute time, as well as demographic factors affecting job location choices (Zhao et al., 2020).

Mobile application and information exchange platforms relevant to stakeholders' needs may be designed collaboratively through a design thinking workshop. In Millan's (2019) study, these workshops culminated in a prototype

civic application for frontline local government transactions. While co-design has different stages and activities (Millan, 2019; Thoring & Müller, 2011), the process basically consists of (1) discovery and insight, (2) prototyping, and (3) evaluating and scaling co-design interventions (Evans & Terrey, 2016). Co-designing may be composed of different teams working together, although each team should ideally have a limited but diverse group of stakeholders (Dam & Siang, 2019). This activity may help transport stakeholders identify ICT solutions to attain sustainable transport.

Information Exchange Platforms

The advent of modern technology, especially in the ICT sector, has allowed for enhanced solutions to simplify and improve collaboration in transport networks and to improve core functionalities of transport operations. Problems in coordinating and reconciling data from different sources often lead to fragmented policy and decision making.

Information exchange platforms making use of modern technologies, such as the internet of things (IoTs) and radio frequency identification (RFID), are becoming more popular in supply chain management, but they have not been seeing as much development in the transportation sector. However, Zacharewicz et al. (2011) attempted to model a platform, the PRODIGE project, which made use of RFID elements in conjunction with geolocation and mobile technology to optimize route development. Their platform modifies supply chain solutions to better suit transport management. It focuses on traceability and resources follow-up, enabling a real-time transport situation characterization. The study deemed the platform promising in terms of maintaining a consistent data flow from vehicles on the field. However, it found that the mobile general packet radio service (GPRS)/global system for mobile communications (GSM) component hindered data flow management.

To address this issue, Fanti et al. (2017) proposed the AEOLIX platform, which is meant to simplify the capture of information flow and to aggregate data and output-actionable information, leading to more informed decisions. The AEOLIX platform architecture does not need software modifications. Rather, it allows multiple sources to connect to a singular platform, which coordinates information flows, and to share and view information in real time. The platform, which has been shown to improve logistics systems, depends on IoT technology to facilitate data transmission and constantly maintain an information flow. The platform can easily be repurposed to benefit intermodal transportation network users and to assist with future transportation policy development.

An example of a successful information exchange platform was shown by Bin et al. (2013) in a paper analyzing the case of Hangzhou City, particularly the

Hangzhou Decision-Oriented ITS Information Platform. This platform makes use of key technologies, such as integrated transport simulation, multisource transport information and simulation model merging design, geographic information systems for transportation (GIS-T) design and implementation, massive data online analysis process, and a planning-oriented transport analysis tool. The platform is able to analyze data from multiple sources, resulting in well-informed transport policy development.

Design Thinking

Design thinking is moving away from traditional command-and-control policy tools (e.g., regulatory agencies, subsidies, and public enterprises) towards the use of organizational resources, such as government reorganization, partnerships between government and nongovernment organizations (NGOs), and an increased reliance on stakeholder consultations (Majone, 1997; Peters, 1998; Klijn & Teisman, 1991; Bingham et al., 2005). With greater integration of public administration activities, a number of policy instruments are now applicable across all stages of the policy development process, with stakeholder consultations and government reviews being key factors in agenda-setting activities. Other links have been drawn between legislative rules and norms establishing decision-making behavior and outcomes as well as policy analysis and evaluation tools, such as ex-post facto cost-benefit analyses.

However, many of the tools deemed important in the agenda-setting, decision-making, and evaluation stages of the policy development process were considered less important in policy design. This is because policy design is mainly carried out at the policy formulation stage and is thus meant to assist with crafting strategies for implementation (Wu et al., 2017). Meanwhile, policy instruments, such as public enterprise, government subsidiaries, and regulatory agencies, are important in carrying out proper policy implementation (Salamon & Elliott, 2002). On the other hand, regulatory and environmental impact appraisals help shape and formulate policies, particularly through deliberations and assessment of possible policy alternatives (Turnpenny et al., 2009).

Thus, in modern policy development, policies need to fulfill certain criteria, such as coherence, consistency, and congruence, and lean towards integration in new designs. This integration is attained by relating design elements to the overall policy objectives, making them internally consistent to achieve the stated goal, and aligning policy goals with the means of achieving them, rather than working at cross-purposes (Meijers & Stead, 2004).

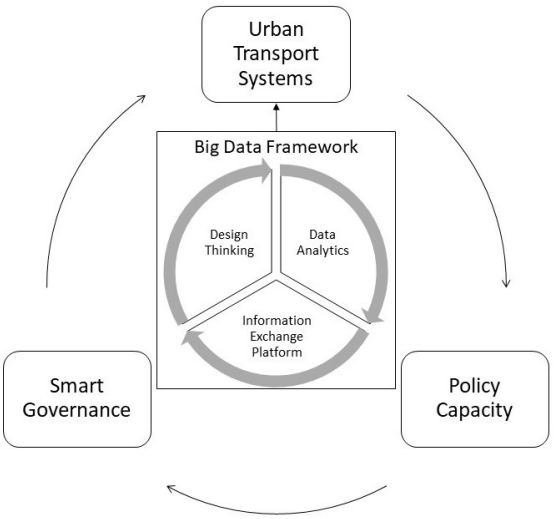
Framework and Methodology

Urban transport systems are made up of integrated public and private transport systems. In Metro Manila, the urban transport system consists mainly of private vehicles and public vehicles, such as bus systems, jeepneys, rail systems, and tricycles for point-to-point transportation. At present, the sheer volume of private vehicles, taking up 70-80% of the road space, indicates congestion, with little space or attention being afforded to public transportation. Further compounding the problem is the lack of an overarching public transport plan, resulting in haphazard route planning for public transport solutions, such as bus and jeepney routes. This underdeveloped focus on public transportation presents challenges to gathering relevant data and formulating effective transport policy plans.

The lack of planning and oversight seen in the Metro Manila transportation system shows a lack of policy capacity on multiple levels. At the individual level, little attention or priority is given to hiring trained transport planning specialists, tapping instead officials who only have minimal training or education in planning or transportation. At the organizational level, there is a lack of communication between the private sector and the government in terms of mapping out possible solutions to traffic congestion. Systemic difficulties also emerge in attempts to develop policy capacity, given that Metro Manila is actually made up of multiple constituent cities. Each city is expected to establish its own LPTRP. While the MMDA is meant to provide guidance and oversight, it has no power to put into action, beyond its administrative boundaries, a unified transport plan. This lack of capacity is compounded by the lack of data gathering tools for planning departments to better craft relevant and responsive transport plans.

One solution is to use smart governance tools, which rely on modern technology to better improve data gathering, both from citizen feedback and onboard telemetry data, among others. These tools, by applying big data methods to analyze and process information, help improve policy capacity. In particular, they allow planners to be better informed about the situation on the ground and to tailor policy responses to certain issues. Smart governance also helps urban transport systems improve their operations. In this regard, a big data framework may guide the use of these tools. The framework consists of three aspects: design thinking, data analytics, and information exchange platform (IEP). Figure 1 illustrates the relationship between smart governance, policy capacity, and urban transportation, and how big data framework guides this relationship.

Figure 1
Conceptual Framework



Source: Authors' own interpretation

Through the design thinking process, stakeholders are consulted on their thoughts about the current situation of the urban transport systems and are then encouraged to create and design an improved system. The process explores what and how data or information are to be collected, processed, and given to the public in support of the proposed improved system. Lastly, stakeholders help develop key performance indicators (KPIs) measuring the success of a proposed system. The results of the design thinking process contribute to the development or improvement of the IEP.

The IEP, which may take the form of an app or a dashboard, is a tool used for data collection and visualization. The primary users of the IEP are the stakeholders. The IEP collects and analyzes stakeholder data. It then visualizes and models the data for the stakeholders. Improvements in the big data framework continue with improvements in technology. Stakeholders may go through the design thinking process until all identified challenges are solved, and desired features and improvements are satisfied. Framework improvements, which may help develop policy capacity and enhance smart governance, will, in turn, help improve the urban transport system.

The study aims to review and evaluate, using the policy capacity framework, the current capabilities of transport planners in applying big data techniques and principles. Highlighting the case of the Pasig CTDMO and its Pasig Bus Service, the study specifically looks at the analytical, operational, and political

competencies of transport planning at the individual, organizational, and system levels. The first stage of the study describes the current status and capabilities of the CTDMO, including its organizational chart, mandate, functions, and daily operations. Ordinances pertaining to the CTDMO and data from informal interviews with the staff were used as bases for assessment. The second stage presents the results of the policy capacity survey measuring the analytical, operational, and political competencies of the CTDMO and Pasig Bus Service staff.

Selection of Meso-Scale Pilot Area

One of the program's deliverables is determining a pilot or operational area to deploy and establish a customized IEP. The project teams agreed to engage two pilot areas that would reflect travel behavior in a micro- and meso-scale. The micro-scale covers inter-barangay areas and routes while the meso-scale covers inter-city areas and routes. For the micro-scale pilot area, UP Diliman was selected as the operational area due to its own public transportation system within the campus. Meanwhile, for the meso-scale pilot area, the team evaluated 17 cities in Metro Manila (Table 2). Pasig City was eventually selected as the meso-scale pilot area since it is the first bus line conceptualized, funded, and operated by the local government. Furthermore, the city government of Pasig is one of the few LGUs, if not the only one, to establish a dedicated transport planning department. The political culture of the Pasig City government favors focusing on developing sustainable and integrated transport planning policies.

The Case of Pasig City

History

The city's name, Pasig, was believed to have come from the old Sanskrit word *pasega*, which means "sand" (similar to the Malay word *pasir*), referring to the tribal community beside the sandy edges of the river. During the American occupation, Pasig City was placed under interim military rule until 11 July 1901, when the Philippine Commission's Act No. 137 incorporated it in the newly created province of Rizal. It was the provincial capital until 1975, except for seven months in 1904, when San Felipe Neri (now Mandaluyong) was designated. Pasig became part of the Metro Manila Commission (MMC) upon the latter's creation through Presidential Decree 824. The local councils abolished during the MMC period were later reinstated upon the creation of the Metro Manila Development Authority (MMDA) after the 1986 People Power Revolution.

On 26 July 1993, Republic Act (RA) 7829 declared the Municipality of Pasig to be a Highly Urbanized City (HUC). Later in the same year, the law was signed by former President Fidel Ramos. It was ratified by the people of Pasig through a plebiscite held on 21 January 1994 (City Goverment of Pasig, 2018).

Table 2
Transport Governance and Planning Characteristics of Metro Manila LGUs

City or Municipality	Functional Area				Concerned Department and Initiatives
	Planning and Development	Traffic Management	Parking Management	Transport Planning and Development	
Caloocan	✓	✓			Department of Public Safety and Traffic Management
Las Piñas	✓	✓			
Makati	✓	✓			Urban Development Department; Public Safety Department
Malabon	✓	✓			Public Safety and Traffic Management Office
Mandaluyong	✓	✓	✓		Traffic and Parking Management Office
Manila	✓	✓	✓		Traffic and Parking Bureau
Marikina	✓	✓		✓	Transportation and Traffic Management and Development Office; Marikina City Bikeways Office
Muntinlupa	✓	✓			Muntinlupa Traffic Management Bureau
Navotas	✓	✓	✓		Traffic and Parking Management Office
Parañaque[a]	✓	✓	✓		Traffic and Parking Management Office
Pasay	✓	✓	✓		Traffic and Parking Management Office; Tricycle-Pedicab Franchising and Regulatory Office
Pasig	✓	✓	✓	✓	Transport Development and Management Office; Traffic and Parking Management Office; Tricycle Operations Regulatory Office
Pateros[b]	✓	✓			Traffic Enforcement Unit
Quezon City	✓	✓			Department of Public Order and Safety
San Juan	✓	✓	✓		Traffic and Parking and Management Office
Taguig	✓	✓			Traffic Management Office
Valenzuela	✓	✓			Traffic Management Office

[a],[b] Telephone interviews were conducted due to absence of websites.
Source: LGUs' websites

Location and Geography

Pasig City lies approximately 12 km east of Manila, along the banks of Marikina River and the southeastern end of Pasig River. It is bounded by Quezon City and Marikina City on the north, Mandaluyong City on the west, Makati City, Pateros and Taguig on the south, and Cainta and Taytay (Province of Rizal) on the east. The total population of the city based on the 2015 census is 755,300, with a growth rate of 2.31%. Pasig City is the fourth largest city in Metro Manila after Taguig City. With an area of 34.32 km^2, its population density stands at 22,008/km^2. The estimated number of households is 180,612, with an average household size of 4.2 (Pasig City Government, 2018). Figure 2 illustrates the location map of Pasig City and its barangays.

Figure 2
Pasig City Location and Barangay Map

Source: Villar (2003) (Left); Balingit (2012) (Right)

Pasig Green City Vision

Under former Mayor Robert Eusebio's first administration in 2007-2013, the Pasig City government envisioned a "Green City":

> A model of urban development, characterized by a vibrant and globally-competitive economy; disciplined, empowered and resilient communities; with world-class infrastructure systems; led by a responsive, transparent and [proactive] city governance with a heart and conscience for good governance. (Pasig City Government, 2018)

The city implemented ordinances, campaigns, and projects meant to promote this vision. For instance, in 2012, the city launched the "car-less day" project where Emerald Avenue, a street in Barangay San Antonio, which is part of the Ortigas Center Business District (CBD), is closed off to cars every Sunday to provide its citizens a space for recreational activities, such as biking. Pasig City's "green" initiatives have been globally recognized; the City garnered three gold awards, one silver award, and one bronze award in the 2013 International Awards for Livable Communities held in Xiamen, China. The award-giving body recognized the City as the Most Livable Community in Category E (i.e., cities with a population of less than 400,000).

Pasig City's growth was spurred mainly by the development of the Ortigas CBD, which attracted business investments and employment opportunities. However, this development also led to transportation and traffic concerns in the city. A study conducted for the Pasig City Government by Transport and Traffic Planners (TTPI), Inc. and University of the Philippines Planning and Development Research Foundation, Inc. (UP PLANADES) found that, amid rapid urbanization, public transport in the city remained at low levels (TTPI & UP PLANADES, 2011). The volume of smoke-emitting vehicles worsened air pollution in the city. The Pasig City air monitoring station of the Environmental Management Bureau recorded the fourth highest level of total suspended particles (TSP) among its ten stations in Metro Manila (PSA, 2016).

To address these problems, an ad hoc committee was formed in April 2016 to formulate policies and programs promoting sustainable transport, reducing traffic congestion, and improving air quality in the city. The committee consisted of the City Environment and Natural Resource Office (CENRO), City Planning and Development Office (CPDO), City Engineering Department, City Command Center (C3), City Traffic and Parking Management Office (TPMO), and Public Information Office. The CENRO head served as vice-chair of the committee, while the transport consultant hired at that time served as chair. In the absence of an official transportation master plan, the committee reviewed relevant transportation studies covering Pasig City and analyzed different traffic data sets. From these studies and data, as well as documentation of best practices from other countries, the committee strived to develop an integrated framework for crafting the policies and programs.

Pasig Bus Service and City Transport Development and Management Office

The project carried out by the ad hoc committee culminated in the deployment of the Pasig Bus Service. Launched in June 2016 under the CENRO, it aimed to help improve the city's air quality through sustainable transport. The

city government procured ten buses, which first served two routes plying around the central business district, and engaged the services of 24 workers (Table 3).

Table 3
Distribution of Pasig Bus Service Personnel by Role, June 2016

Position of Personnel	Large City
Drivers	10
Reliever Drivers	2
Conductors	10
Reliever Conductors	2
Total	24

Note. Data is culled from interview with Pasig Bus Service Ad Hoc Committee members.

With the deployment of the Pasig Bus Service, the ad hoc committee saw the need for an office to help continue the projects it started. The committee found that existing offices related to transportation, such as the Transportation Planning Division of the C3 and the TPMO, focus on traffic planning and management rather than transport planning. The committee thus lobbied for the creation of the City Transport Development and Management Office (CTDMO). An ordinance was drafted and, in June 2017, by virtue of Ordinance No. 25, s. 2017, the CTDMO was established.

The CTDMO is under the direct supervision and control of the Pasig City mayor and is tasked to undertake the transport planning and management of the city government. It provides planning and policy assistance to the City's *Sangguniang Panlungsod*. In June 2017, the CTDMO was authorized by way of Ordinance Nos. 26 and 76 to impose and collect fees for development of environmentally sustainable transportation.

In December 2017, the Pasig Bus Service, under transition in leadership from CENRO to CTDMO, introduced the Community Bus to provide morning and evening services for Pasig City Hall employees. The routes were also expanded from two to four routes to include roads in barangays Ugong and Kapitolyo. In 2018, the Pasig Bus Service, with additional ten bus units acquired from the budget allocated to CENRO, was fully transferred to the CTDMO by 2018. Table 4 presents the milestone events and achievements of Pasig City in public transport development and management.

Organizational Structure

The organizational structure of the CTDMO (Figure 3) consists of three main divisions, namely, Administration, Planning and Research, and Special Units. The Special Units Division is further composed of four sections, namely,

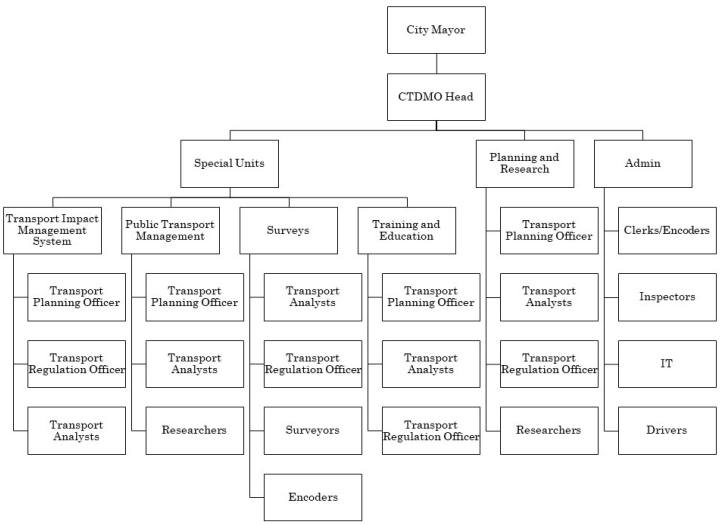
Transport Impact Management System Unit (TIMSU), Public Transport Management Unit (PTMU), Surveys Unit, and Training and Education Unit (Ordinance No. 25, s. 2017).

Table 4
Public Transport Development and Management Policies in Pasig City

Month and Year	Milestones/Achievements
June 2016	The Pasig Bus Service was launched with two routes plying the Pasig Central Business District.
June 2017	Ordinance No. 25 created the City Transport Development and Management Office (CTDMO); Ordinance No. 26 imposed Transportation Development Fees (TDF); and Ordinance No. 27 created the Environmentally Sustainable Transport (EST) Fund.
December 2017	The Pasig Bus Service introduced the Community Bus to shuttle city hall employees.
March 2018	Resolution No. 90 authorized the purchase of four units of ferry boats to ply the route along the Pasig-Marikina Rivers.
July-October 2018	Pedestrian walkways were opened along Julia Vargas Avenue, Meralco Avenue, and C-5.
October 2018	The Community Bus was opened to the general public with four new routes. The four routes were later consolidated to one.
November 2018	Resolution No. 302 endorsed the Pasig Bicycle Network.
March 2019	In coordination with CENRO, the Pasig Bike Share, the first LGU-led bike sharing initiative in the country, was launched.

Source: Rappler.com (2016), City Government of Pasig (2017a, 2017b, 2017c)

Figure 3
Pasig City CTDMO Organizational Chart



Source: City Government of Pasig (2017a)

Ordinance No. 25, s. 2017 requires plantilla positions for CTDMO (Table 5). Comparing the number of plantilla personnel with the organization chart, some personnel would be handling more than one unit. An example is the transport planning officer (TPO) position, which is open for only two personnel. However, in the organization chart, four units each need a TPO. This means two units each would have to be manned by two TPOs. Meanwhile, surveyors and encoders can be contracted out to research groups undertaking citywide surveys.

As the CTDMO has just been recently created in 2017, the office is still filling up its staffing requirements and gradually carrying out its responsibilities. There is currently a divergence between the required CTDMO plantilla personnel and the actual personnel present. From the ten plantilla positions, only half are filled; the rest are under job order/casual contracts.

Table 5
CTDMO Plantilla and Existing Personnel

Position	Number of Personnel per Ordinance No. 25, s. 2017	Present Number of Personnel	Type of Contract/ Position
Transport Administrative Officer IV (CTDMO Head)	1	1	Plantilla
Transport Planning Officer	2	2	Job order
Transport Regulation Officer	2	1	Casual
Administrative Officer III	2	None	
Transport Analyst II	3	None	
Transport Officer II	2	None	
Researchers II	2	None	
Inspector II	3	None	
Clerks/Encoder	3	2	Casual/Job order
Driver	2	14	Job order
IT	None[a]	1	Job order
Dispatchers	None	3	Casual/Job order
Conductors	None	18	Job order
Bus Operations Officer	None	1	Casual
Bus Boys	None	2	Job order

[a] Specified in the organizational chart but not in the list of plantilla personnel
Source: City Government of Pasig (2017a), CTDMO (2019)

Plan Development

Being primarily a planning office, the CTDMO is tasked to formulate the transportation master plan, comprehensive transportation system plan, transit-oriented plans, and technical inputs to the comprehensive land use plan. The Office also collects and maintains an updated transportation database of Pasig City by conducting surveys and coordinating with various offices, such as the TPMO, Disaster Risk Reduction and Management Office (DRRMO), Engineering Office, and City Planning and Development Office (CPDO) (Table 6; see Ordinance No. 25, s. 2017). Apparently, the CTDMO does not have any of these envisioned plans to date, nor has it collected transport data from other concerned offices. The Office has not yet formalized an agreement with other offices on this matter.

Table 6
Status of Plan Development per Ordinance No. 25, s. 2017

Basis	Plan to Be Developed	Status
Sec.11	MOU between CTDMO and the following offices for exchange of data, communication, and decisionmaking: • CPDO • Engineering Office • TPMO • DRRMO • Office of the Building Official (OBO) • CENRO	None of the MOUs were drafted yet
Sec.15	Transportation master plan	Will be developed as part of the comprehensive development plan (CDP), which is being updated for 2020
Sec.12	Transport database collected from various offices (TPMO, DRRMO, Engineering, CPDO)	None collected yet
Sec.13	Comprehensive transportation system plan	Ongoing Preparation of the City's local public transportation route plan (LPTRP)
Sec.16	Transit-oriented development plans	Not yet drafted

Source: CTDMO (2019)

Performance of Roles and Responsibilities

The CTDMO has been actively implementing sustainable transport such as walking, cycling, and public transport, especially the Pasig Bus Service. The Administrative Unit is handling administrative requirements and public

communications, coordinating with other offices, and providing logistical support. However, in terms of planning, the CTDMO has yet to finalize the plans and to gather data it was meant to collect for this purpose. Concerns on data collection from other offices and departments includes transposing data in hard copies into electronic form.

The CTDMO provides technical assistance to the Sangguniang Panlungsod in articulating its plans and addressing transportation concerns through policymaking. A member of the Traffic Task Force, CTDMO also evaluates the implementation of development programs, projects, and activities of the CPDO, Engineering Office, CENRO, DRRMO, TPMO, and other offices. The CTDMO also regularly coordinates the routes, terminals and implementation of the Public Utility Vehicle Modernization Program (PUVMP) with transport groups, operators, and cooperatives.

Among the responsibilities that the CTDMO finds difficult to fulfill are those involving national government agencies, especially the Land Transportation and Franchising Regulatory Board (LTFRB). To ensure that issuance of permits or certificates of public convenience are consistent with the plans of the city, the CTDMO needs to participate in LTFRB hearings, which requires invitation from the said office. Moreover, the CTDMO has to wait for the route rationalization study by the LTFRB before proceeding with its own plans. Coordination with other national government agencies in planning and monitoring programs and projects is also limited. The CTDMO technically has no authority to evaluate requests for changes in zoning and land use, which is mainly done by the CPDO. Likewise, the CTDMO can only provide technical inputs to the CLUP, the latest being prepared in 2015, prior to the creation of the CTDMO.

The CTDMO has achieved great gains in improving its policy capacity for local public transport in the past. However, it still has a long way to go in terms of complying with Ordinance No. 25 due to the absence of a memorandum of understanding (MOU) with other concerned agencies (i.e., CPDO, Engineering Office, TPMO, DRRMO, Office of the Building Official [OBO], C3, and CENRO) for exchange of data, communication, and decisionmaking. This lack of institutional framework limits the coordination with the said offices and formulation of a comprehensive transport database. For instance, CTDMO staff makes individual data requests to the C3 for the needed traffic count data for which a traffic impact assessment study needs to be done. On the other hand, per the LGC, since the offices are directly under the Office of the Mayor, an MOU may not be needed. Also, the Ordinance No. 25 explicitly states the mandate of the CTDMO in plan formulation. Hence, the agencies are tasked to help the CTDMO in the data collection. Table 7 outlines the roles and responsibilities of the CTDMO and the issues and challenges it faces in fulfilling its mandate.

Table 7
Status of Performance of Roles and Responsibilities by CTDMO

Roles and Responsibilities	Status	Issues and Challenges
Administration		
Provide administrative services	The department has dedicated staff that manage its administrative requirements.	
Liaise with various offices/ departments as identified in Ord. No. 25, s. 2017, Sec. 11	The department regularly liaises with other offices for data collection and coordination for projects related to transport development and traffic management.	Many offices that serve as data sources lack access to a stable internet connection. As such, the requested data usually come in printed form.
Handle the paperwork and documentation for implementation of the transportation master plan and other initiatives of special units	Not applicable	Not applicable
Information dissemination about CTDMO's activities	The department has an in-house communications and public engagement specialist that manages communications and social media (Facebook, Twitter) platforms of the Department (@PasigTransport). For this function, the department coordinates with the city's Public Information Office and the Mayor's Office.	
Planning and Research		
Provide technical inputs to the land use plan, particularly the long-term spatial development plan and road network plan	CTDMO shall be part of the team to update the CDP in 2020.	
Update and analyze public transport routes/lines and services covering public utility vehicles and other public transport modes	Ongoing in line with preparation of the LPTRP	Development of transport plans are contingent on the completion of route rationalization in Metro Manila, which is carried out by the LTFRB.
Provide the technical and staff support to the Sangguniang Panlungsod	Whenever necessary, the department sends representatives to council sessions to articulate department strategy and/or address transport concerns.	Appreciation of the benefits of sustainable transportation in terms of addressing road congestion, environmental issues, and in designing a more livable city

Table 7, continued

Roles and Responsibilities	Status	Issues and Challenges
Planning and Research		
Monitor and evaluate the performance of public transport operators in the provision of services and their operation of transport facilities like terminals, stations and waiting areas, etc.	The department regularly communicates with transport groups and operators, especially transport cooperatives, regarding routes, terminals, and the implementation of the PUV Modernization Program.	Data collection from informal transport groups and facilities
Appear in the hearings of the LTFRB to ensure that the issuance of permits or certificates of public convenience is consistent with the plans of the city	Yet to be practiced. In late 2019, the representatives from the city government were invited to attend a Senate hearing led by the Public Services Committee to look into the possibility of a Metro Manila-wide transport master plan.	
Evaluate requests for changes in zoning and land use in coordination with CPDO	Yet to be practiced	
Formulate and advocate programs that promote and encourage public and higher capacity mode of transportation	The department leads and collaborates with other agencies in events and other initiatives that promote walking and cycling. The city has five "open streets" and street auditing apps that promote walkability. The department has also led efforts to organize and collaborate with other organizations in events that promote cycling. Pasig City is one of the few LGUs in the country with laws that established protected bicycle lanes, prohibits obstruction of bike lanes, mandatory provision of bike racks, etc.	Public education on the benefits of sustainable transportation in terms of addressing road congestion, environmental issues, and in designing a more livable city.
	Pasig City is the first LGU to offer free bus rides to the public on select routes. In early 2018, the city government experimented on a lane for high-occupancy vehicles (HOVs) along Julia Vargas Avenue.	Maintenance of the bus fleet and procurement of parts.
Evaluate implementation of development programs, projects and activities of the CPDO, Engineering, CENRO, DRRMO, TPMO, etc.	Through the Traffic Task Force, CTDMO is able to provide inputs regarding transport-related initiatives of other offices.	
Plan and monitor programs and projects in coordination with other national government agencies, LGUs, and NGOs	Whenever invited, CTDMO sends representative/s to congressional hearings, NEDA board meetings, etc.	Coordination with national government agencies is limited and not regularly practiced.

In addition, the CTDMO has yet to prepare transit-oriented development (TOD) plans. Meanwhile, the transportation master plan is expected to be part of the city's comprehensive development plan, which is scheduled to be prepared in 2020. The office coordinates with national agencies, such as the DOTr and LTFRB, in route rationalization and enhancing the city's local public transport management policies.

Policy Capacity Survey

A survey was conducted among 50 of the 56 personnel of the CTDMO and Pasig Bus Service. The survey aimed to: (1) identify and analyze the employees' backgrounds, experiences, and skills; (2) assess their knowledge about the Pasig Bus Service and its goals; and (3) inquire their suggestions in improving the service and their work. The survey consists of two parts. The first part asked about the employees' educational and professional history as well as their current roles in the Pasig Bus Service operations. The second part explored their knowledge of the Pasig Bus Service and their thoughts on how they can better contribute to the service.

Background Information

Table 8 shows the sociodemographic profile of the respondents. Their distribution is equal in terms of sex. Meanwhile, almost half (48%) of the respondents are young adults (aged 18-35 years) while half of them are middle-aged adults (aged 36-55 years). Most (22) of the respondents took up college-level courses, while 11 respondents took up vocational or trade courses. The rest completed high school education.

Meanwhile, none of the respondents are eligible for civil service. No data is available to show whether they have taken the civil service exam or not. Nonetheless, 16 respondents claimed to have a driver's license.

Most of the respondents are drivers and conductresses directly providing services to the public. It is interesting to note that a few of them assume other roles as well, such as administrative support and dispatching of buses. Some of the respondents are office-based employees, such as the technical staff (Figure 4).

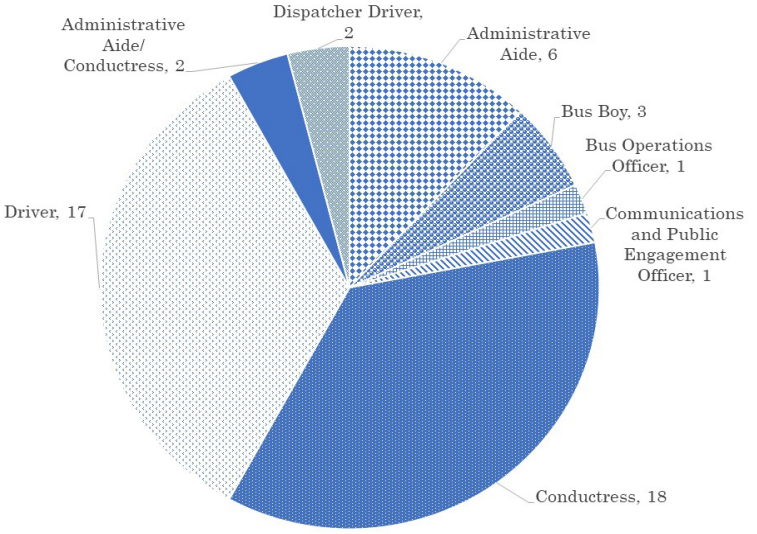
The administrative aides and conductresses assume the same set of functions, as follows: (1) cleaning the vehicle before and after the trip, (2) assisting passengers in boarding and alighting the vehicle, (3) monitoring the number of passengers and the odometer throughout the day, (4) announcing the succeeding stops and ensuring passengers board and alight on the designated stops, (5) maintaining safety and discipline in the vehicle and informing the

CTDMO immediately in event of accidents, and (6) regularly submitting quality and incident reports, including fuel consumption reports.

Table 8
Sociodemographic Characteristics of Respondents

Sociodemographic Characteristics	Frequency (N=50)	Percentage (%)
Age		
36-55	25	50
18-35	24	48
More than 55	2	2
Sex		
Male	25	50
Female	25	50
Highest educational attainment		
College degree	22	44
High school	17	34
Vocational/Trade courses	11	22
Civil service eligibility		
None	34	68
Drivers' license	16	32

Figure 4
Distribution of Pasig CTDMO Personnel, by Role



A bus driver, who is responsible for safely transporting passengers, is obliged to always observe and abide traffic rules and regulations. The driver is also tasked to inspect the overall condition of the bus and maintain its cleanliness before and after a trip. He/She also submits quality and incident reports. Bus boys help the driver in keeping the buses clean. Lastly, a dispatcher monitors the condition of the vehicles and bus staff attendance.

The bus service also employs technical staff. The bus operations officer monitors the overall bus service operations. The communications and public engagement officer relays information about the city's transport-related programs.

The respondents joined the Pasig Bus Service team in various years. Most of them joined the team within a few years after the program was launched in 2016. However, four respondents claimed to have been part of the program before 2016.

In terms of salary and compensation, the technical staff earns the most in the team. The communications and public engagement officer earns the highest salary at more than PhP30,000 per month, while the bus operations officer earns almost half as much. Meanwhile, compensation rates vary among drivers, with wages ranging from PhP8,000 to more than PhP13,000 monthly. Administrative aides are paid around PhP11,000 per month. Bus boys and conductresses earn at least around PhP450 daily (or between PhP7,000-10,000 monthly), which is below minimum daily wage in Metro Manila, i.e., PhP537. The rate depends on the number of shifts they make. None of the respondents are permanent employees. They are either casual/contractual personnel (40%) or job-order (JO) workers (52%).

Performance Feedback

Knowledge on Pasig Bus Service

Most of the respondents claimed that the bus service was established to provide safe and convenient transport service within the city for free. Some respondents believe that bus service eases traffic congestion and reduces air pollution. Moreover, some (18%) respondents narrated how the Pasig Bus Service began and its initial deployment, as well as the color coding of the buses (i.e., blue, red, green, and yellow).

Job Experience

Both bus drivers and conductresses are required to undergo a week-long training before deployment, including those who were already employees of other city offices before joining the Pasig Bus Service. Most of the respondents believe

that they help achieve the goal of the bus service by safely moving commuters to their destinations, following traffic rules, standard protocols, and instructions from superiors, and working well with other bus service employees.

Knowledge and Capacity Building

Most drivers attributed their performance of functions to their previous experiences, where they claimed to acquire more skills on the job, and participation in capacity-building activities, i.e., driver's training or vocational courses. They acquire knowledge or information through radio and conversations with the passengers. Respondents asserted that cooperation with other employees is needed to improve their work. They also believe that open communication is essential in improving the operations. Specifically, bus drivers and conductresses need to listen to and engage with the passengers for feedback.

Most recommendations stated by respondents are regarding compensation and vehicle condition. Employees suggested salary raise, while bus drivers urged the inclusion of hazard pay in their compensation. Moreover, the drivers hope for regular repair and maintenance of bus units by the supplier to deploy all units and lessen service interruptions. They are also requesting for the buses to have CCTV cameras installed for better monitoring. A bus boy even requested the procurement of vacuum cleaners. Conductresses also recommended seminars for bus personnel so they can better address on-the-job concerns. A few respondents proposed an awareness campaign for passengers to know more about the Pasig Bus Service.

Building Policy Capacity

As presented above, the Pasig CTDMO currently performs limited roles and responsibilities as stated in the OFG and Ordinance No. 25, s. 2017. Moreover, several issues and challenges in the operations and maintenance of the Pasig Bus Service have led the CTDMO to consider outsourcing operations with the private sector. To enhance the policy capacity of the CTDMO, the DARE Project 3 tries to realize its vision of a co-designed people-centric public transport service by providing an information exchange platform that would allow stakeholders to use data to improve the Pasig Bus Service. This involved two main activities: (1) the conduct of a design thinking workshop, and (2) deployment of IoT devices in buses.

Design thinking, usually applied in industrial production, engineering, business, management, and product development, is considered a "creative human-centered discovery process and followed by iterative cycles of prototyping, testing, and refinement" and is characterized by empathy, integrative thinking, optimism, experimentalism, and collaboration (Brown, 2008, p. 89). Pasig

Bus Service stakeholders, such as the bus service staff, city hall employee commuters, and public commuters were invited to participate in the workshop. The activity consisted of six stages based on the process by Millan (2019). The first stage, "Understand," involved sub-activities aimed to build empathy among the stakeholders and take into consideration each other's needs and concerns. The sub-activities for Step 1 are: (a) journey mapping – participants identified the decision points and activities per step or aspect of their journey (in the stops, on board, upon alighting, others); (b) experience mapping – participants recalled experiences (positive, neutral, negative) per step in the journey map; and (c) completing "how might we"/ *"paano kaya natin*" (HMW/PKN) statements. Thereafter, participants voted on which HMW/PKN statements they think should be prioritized.

Guided by the outputs of the previous activities, the second stage, "Define," allowed the participants to identify goals for the bus service and the metrics for measuring success. The third stage, "Diverge," involved sketching eight ideas that would answer the prioritized HMW/PKN. In the fourth stage, "Decide," participants voted on their desired sketches. The fifth stage, "Prototype," involved characterizing the components of the information exchange platform. Participants also identified the actors of the Pasig Bus Service and the information flows per actor. Then prototyping was made by IT specialists based on the results of the previous stages to ensure the responsiveness of the platform to the participants' identified needs and recommendations. Lastly, in the sixth stage, the prototype mobile application and dashboard for the CTDMO was presented to the participants for further improvements.

Workshop outputs then served as a basis for deploying IoT devices in two pilot buses. Sensors and GPS were installed in bus units. Information was transmitted to cloud-based data storage, which is, in turn, accessible via the mobile application and dashboard designed in the workshop. Data on real-time location of buses, origin and destination of passengers, idling time and passenger feedback help enhance the capacity of the Pasig CTDMO to operate and manage the bus service.

Conclusion

The issuance of Department Order No. 2017-011, known as the Omnibus Franchise Guidelines (OFG), has given the LGUs greater control in transportation planning and policymaking. Despite the slow implementation of the OFG by the LGUs, the case of Pasig City certainly holds promise in local public transportation development and management. However, there is much to be desired from a policy capacity perspective. Its recently established CTDMO is still in the process of filling vacancies and empowering existing personnel. Nonetheless, despite

the challenges, the CTDMO has been actively addressing the city's local public transport planning and management concerns.

It is hoped that the support given by academic partners in terms of providing enabling technologies and research innovations will strengthen the city's capacity in providing policy advice to the local chief executive and other key policy and decisionmakers involved in the public transport arena. The conduct of design thinking and collaborative governance workshops provide a positive and proactive venue for stakeholders to help design appropriate big data applications that enhance the policy capacity of the CTDMO. The outputs from the design thinking workshop and data gathered and analyzed from the IoT will be able to guide the Pasig CTDMO in preparing the LPTRP and other policies to enhance public transport, and in directly providing transportation services through the Pasig Bus Service.

The proposed framework and methodology for assessing policy capacity may serve as a guide in evaluating LGUs' readiness to employ big data analytics in formulating and implementing policies and their efficiency in providing transport services. Similar research may contribute to the body of scholarship on the use of big data in local public transport policies.

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Domestic Policymaking in a Globalizing World: The Relevance of International Factors as Context to the Reproductive Health Law (Republic Act 10354)

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The story of the passage of the Reproductive Health Law (Republic Act 10354) amid concerns that rapid population growth is affecting the country's economic growth highlighted domestic actors for and against the reproductive health (RH) bill. This article expands the context of the passage of RA 10354 by discussing how the prevailing international context and discourse shaped the population and reproductive health policies of the Philippine government for decades. The article describes the global actors and the platforms for action that led to the eventual passage of RA 10354. The article also presents the key opponents and counterdiscourse that challenged the law. The article suggests the need to recognize and to take into account the role and influence of international context, which helps discern the application of global agenda and interests in domestic policies.

Keywords**:** *domestic policymaking, population, reproductive health, international factors*

At the outset, the story of Republic Act 10354, or the Reproductive Health (RH) Law, highlighted the contending discourses at the domestic front. The clash between pro-RH and anti-RH groups composed of various stakeholders revolved around the link between population growth and prevailing socioeconomic realities, particularly poverty; threat of a looming HIV/AIDS epidemic; and overall acceptability of the population policies and programs of the government. Meanwhile, little is said about how global actors and the worldwide population discourse shaped the formulation of RA 10354.

This article explores the relevance of international factors as context to the population policies of the Philippine government, leading to the passage of RA 10354. The study mainly uses discourse analysis to examine the content and language of global actors and the platforms for action in the World Population Conferences. Gleaning from a limited number of programs implemented by international organizations in the Philippines, the study analyzes how global actors reinforced the prevailing discourse on population and reproductive health.

Laying the Groundwork for RA 10354

Global Actors

Various international actors collaborate with governments and other domestic actors in developing countries, particularly densely-populated ones, in pursuit of population policies and programs. Each of these actors has substantial resources, ideological positions, and interests on population and reproductive health. Among the key players are the United Nations (UN) and its agencies, i.e., the UN Fund for Population Activities (UNFPA), World Health Organization (WHO), and UN International Children's Emergency Fund (UNICEF); the United States government, particularly the US Agency for International Development (USAID); the World Bank; and private associations, such as the International Planned Parenthood Federation (IPPF).

UNFPA, the UN's primary arm for population activities and programs, started in 1969 as a subsidiary of the UN Development Program (UNDP). Rafael Salas, a Filipino, served as its first Executive Director. Under Salas' leadership, the UNFPA successfully drew in funds and institutionalized family planning (Finkle & McIntosh, 1994). Since its creation, the Fund has provided a total of USD 3.7 billion to support population programs in developing countries (Suaudeau, 1998).

The UNFPA's mission is "to deliver a world where every pregnancy is wanted, every childbirth is safe and every young person's potential is fulfilled" (UNFPA, 2020, para. 1). To achieve its mission, UNFPA collaborates with governments, non-government organizations (NGOs), foundations, and the private sector in raising awareness, providing services, and mobilizing the needed support and resources. UNFPA consists of five regional and six sub-regional offices that help coordinate work in about 150 countries, areas, and territories through a network of 129 country offices (UNFPA, 2020).

The UNFPA is sponsoring the Philippines' population program since 1969. Before the passage of the RH Law, the UNFPA carried out six country programs that aim to promote family planning, prevent gender-based violence, and widen access to reproductive health information and services. Consequently, much of the program budget is usually dedicated to reproductive health care and family planning services, as well as information, education, communication, and advocacy. Partner governments also provide counterpart funds and logistical support. Table 1 compares the budgets from Pre-Program (1970-1971) to the 5th Country Program (2000-2004).

Table 1

Percentage Distribution of UNFPA Philippines Country Program Expenditures by Sector/Workplan Category, Pre-Program to Fifth Program[1]

Sector/Work Category	Pre-Program 1970-1971	First Program 1972-1979	Second Program 1980-1988	Third Program 1989-1993	Fourth Program 1994-1998	Fifth Program 2000-2004
Distribution (%) [2]						
Basic Data Collection	7.1		8.6	3.4	1.4	
Population Dynamics	3.9	8.6	2.3	2.5	2.0	
Population Policy/ Formulation and Evaluation		0.6	25.2	12.4	6.9	6.3 [4]
RH/MCH/Family Planning Services/ Training/Research	88.2	36.6	40.4	64.5	62.9	80.0
Population Information Education, Communication, Advocacy		38.8	10.5	10.4	14.9	11.7
Special Programs		3.1		1.6	10.6 [3]	
Program Development Monitoring and Evaluation/Program Reserve	1.0	12.2	13.0	5.2	1.4	2.0
Budget (Million USD)	1.103	6.789	9.125	20.574	35.000	30.000 [5]

[1] Based on original work programs
[2] May not add up due to rounding
[3] Women, population, and development
[4] Population and development strategies
[5] Original, but USD 6.4 million was added when program was extended for a another year, for a total of USD 41.4 million

Source: Orbeta et al. (2002, p. 49)

Working alongside UNFPA are other UN offices such as the WHO, which actively supports governments in crafting reproductive health, family planning, and safe abortion programs (WHO, 2002; WHO, WHO Staff, & UNAIDS, 2003), and UNICEF, which focuses on children's rights, nutrition and health (Walker et al., 2010). The three agencies work together in various initiatives that involve the youth, such as sexuality education (UNICEF, 2006).

The World Bank's involvement in population and reproductive health policy also began in the 1970s when, under the leadership of Robert McNamara, the organization introduced population control as a means for alleviating world poverty (Essig, 2007). In the Philippines, the World Bank funded the USD

136-million Women's Health and Safe Motherhood Project, implemented from 1995-2002 with the aim to reduce fertility (Essig, 2007).

The European Union (EU) also funded population programs and backed legislative proposals promoting reproductive health in the Philippines. Prior to the passage of RA 10354, the EU provided grants amounting to EUR 88 million (around PHP 5.1 billion)to support the Philippine government in delivering reproductive health care services (Lee-Brago, 2010).

Another international organization dedicated to family planning and reproductive health is the IPPF. The federation aims to promote sexual and reproductive health rights and to provide and facilitate delivery of reproductive health services in underserved communities. The IPPF consists of 118 member associations working in 129 countries. A secretariat coordinates work in the central office and six regional offices, which, in turn, fund the initiatives of member associations (IPPF, n.d.). The IPPF claims that, as of 2019, it was able to provide 252 million sexual and reproductive health services worldwide (IPPF, n.d.).

The United States government was initially reluctant to be directly involved in population initiatives, but "once committed to the UN's population program, the US rapidly became not only the major source of funding, but also of intellectual stimulation" (Finkle & McIntosh, 1994, p. 9). Later, the US National Security Council issued the National Security Study Memorandum (NSSM) 200, a policy document that guided American foreign policy on population for decades. The document outlined the US government's plan of action after the 1974 World Population Conference in Bucharest. It pointed to rapid population growth as a potential security threat in countries where the US has political and strategic interests and confirmed US leadership in world population efforts (NSSM-200, nos. 10, 19, 30).

The USAID is one of the primary instruments of the US government in pursuing its population policy in developing countries, including the Philippines. Even before the RA 10354 was passed, the USAID has already been implementing and funding population and reproductive health projects in the Philippines. The agency partnered with Georgetown University's Institute of Reproductive Health in implementing the Awareness Project, which entailed developing and testing fertility awareness methods in various regions in the country (Institute for Reproductive Health, 2008). In 2007, the agency carried out four large-scale projects and has contributed around USD 245 million in grants and USD 27.0 million in loans (Walker et al., 2010). Table 2 shows the costs of USAID's population and reproductive health projects from 1970 to 2000 (Orbeta et al., 2002).

Table 2
Costs of Population and Reproductive Health Projects Implemented by USAID, 1970-2000

Project	Year	Cost (in USD)
Population Planning I	1970	11 million
Population Planning II	1977	14 million
Population Planning III	1980	30 million (grant); 27 million (loan)
Family Planning Assistance	1990	40 million
Integrated Family Planning/ Maternal Health Program	1994-2000	90 million (bilateral); 60 million (central funds)

Source: Orbeta et al. (2002), pp. 17-19

Other donor agencies that have also supported and implemented reproductive health programs, and were influential in the passage of RA 10354, are the Asian Development Bank (ADB), Australian Agency for International Development (AusAID), European Commission (EC), Canadian International Development Agency (CIDA), Agencia Española Cooperacion Internacional (AECI), and Japan International Cooperation Agency (JICA). Private organizations, such as the Ford Foundation, Rockefeller Foundation, and the David and Lucille Packard Foundation, provided financial and technical assistance to local NGOs and government agencies (Walker et al., 2010).

Much of the work done by the NGOs include introducing reproductive health services and setting up service delivery models in communities. Administrative flexibility and freedom from political interference allowed the NGOs to experiment with and introduce contraceptives and other reproductive health strategies and methods. The NGOs helped expand clinical services, which the Philippine government later on institutionalized. Trained personnel, network of clinics and centers, and informal groups that consisted the public health infrastructure were instrumental in disseminating information and mobilizing public opinion on family planning (USAID, 1992).

These key actors altogether helped lay the groundwork for lobbying population policies in the Philippines, eventually leading to the enactment of RA 10354. While the actors have diverse interests and stakes in the global population policy, they find common ground in international conferences where global principles on population and reproductive health are articulated.

World Population Conferences

The World Population Conferences (WPC) are one of the platforms for state governments to share their experiences, policies, and strategies on population. The conferences culminate in action plans for the governments and other

stakeholders. The first WPC was organized in Rome by the UN in 1954 for demographers and population specialists who did not represent governments. The sole purpose of this conference was the scientific exchange of information on demographic research (UN, 2003). However, the second WPC in Belgrade in 1965 took a broader approach to the population problem. It included discussions on the effectiveness of national family planning programs in 20 developing countries (UN, 2003). In the 1970s, the US government, UN, and the World Bank began implementing programs that aim to slow down rapid population growth in developing countries (Sinding, 2007).

The 1974 WPC in Bucharest led to the World Population Plan of Action (WPPA), which emphasized the urgent need for a concerted effort among nations to control population growth and facilitate development through socioeconomic policy (UN, 2003). Two decades after the Bucharest conference, several countries had already instituted family planning programs, resulting in a global decrease in fertility (Sinding, 2007). The 1984 WPC in Mexico City highlighted the provision of modern contraceptives as a right of couples and individuals (UN, 2003).

Meanwhile, two major factors shaped the agenda of the 1994 International Conference on Population and Development (ICPD) held in Cairo. First, the rapid and massive fertility decline in developing countries in Asia and South America suggested that the global population explosion is no longer a threat. Second, feminist groups have gradually transformed the population and family planning discourse into that of reproductive health and rights (Sinding, 2007). The conference called for the dropping of demographic and family planning program targets in favor of a broader policy agenda, which includes measures protecting women's reproductive health needs and socioeconomic policies designed to empower women (Sinding, 2007). Consequently, the 1994 ICPD Program of Action (PoA) shifted the intended outcome of population policies from economic development to human rights, reproductive health, and gender equality. While both WPPA and ICPD PoA recognize quality of life as the end of development, the ICPD PoA expands the understanding of what this quality of life means, i.e., rights, liberty, security, equality, education, and physical and mental health. The ICPD PoA also provides more specific indicators in line with promoting women's rights. The proposal stresses the need to eliminate all violence and discrimination against women, to encourage men to take an active role in achieving gender equality, and to uphold the women's ability to control their own fertility.

Since 1994, the ICPD PoA has been the dominant basis of population policies in various countries. In lieu of the WPC, the UNFPA holds regional and technical meetings with state governments and other key stakeholders to review and reformulate the plans of action. International NGOs actively involved in population concerns have taken prominent roles in these meetings.

The discourse on population and development that focused on rights and health continued with the UN-sponsored Fourth World Conference on Women in Beijing in 1995. The Beijing Declaration that resulted from the conference affirmed that "the human rights of women include their right to have control over and decide freely and responsibly on matters related to their sexuality, including sexual and reproductive health, free of coercion, discrimination and violence" (*Beijing Declaration and Platform for Action*, No. 96).

The Philippines is one of the signatories to the ICPD PoA. In fact, the language and content of legislative proposals on reproductive health filed in the Philippine Congress through the years follow closely the worldwide population discourse and plans of action developed in the international conferences (Table 3). Soon after the ICPD, bills that contain the substance and the language of the PoA were filed in the Philippine Congress. For instance, House Bill 4110 (*An Act Establishing a Reproductive Health Care Act*), filed in the 12th Congress, echoes the principles of the ICPD PoA. Likewise, House Bill 5043 (*An Act Providing for a National Policy on Reproductive Health, Responsible Parenthood and Population Development*), filed in the 14th Congress, adopts verbatim the ICPD definitions of key concepts, such as reproductive health, responsible parenthood, family planning, gender equality, reproductive health rights, and sustainable human development. Meanwhile, the Department of Health (DOH) issued Administrative Order No. 1-A, s.1998, creating the Philippine Reproductive Health Program. The policy further cemented the principles of ICPD onto the government's population policy (see Table 3).

The Beijing Declaration found enthusiastic support among domestic policymakers, particularly legislators lobbying for proposed policies promoting sexual and reproductive rights of women. NGOs and interest groups promoting women empowerment, such as Reproductive and Health Advocacy Network (RHAN), EnGendeRights, Gabriela, and the Democratic Socialist Women of the Philippines, actively supported bills ascribing to the Beijing Declaration. These groups sought population and reproductive health policies that are women-centered, focusing on the women's "total sense of well-being... [going] beyond health care delivery systems and fertility regulation and involves an upgrading of women's overall status" (Guerrero, 2002, p. 4).

The Philippine Legislators' Committee on Population and Development (PLCPD) pushes for reproductive health bills in the Congress. An advocacy group made up of lawmakers, PLCPD subscribes to the ideals of ICPD and is working to formulate and lobby policies tackling population and human development, reproductive health, and gender equality. PLCPD provides assistance in the drafting of bills, resolutions, and position papers; training and orientation of legislative staff; and access to popular information materials on population and human development for distribution to constituency (PLCPD, n.d.). In the 14th

Congress, some of the population and development bills filed with the help of PLCPD are House Bill (HB) 17 (*Reproductive Health, Responsible Parenthood and Population Development Act of 2007*); HB 812 (*The Reproductive Health Care Act*); Senate Bill (SB) 40 (*The Reproductive Health Care Act*); and SB 43 (*Reproductive Health Act of 2007*).

Table 3
World Population Conferences and Philippine Population Policies, 1969-2010

Date and Venue	Conferences	Philippine Population Policies
1954 Rome	World Population Conference Exchange of scientific information on population variables, their determinants, and their consequences	
1965 Belgrade	World Population Conference Fertility as part of a policy for development planning	1969 EO 171: Creating the Commission on Population 1971 RA 6365: An Act Establishing a National Policy on Population 1972 PD 79: Revising Population Act of 1971 (RA 6365) December 8 1973 PD 166: Amending PD 79
1974 Bucharest	World Population Conference Relationship between population issues and development	1976 LOI 436: Integration of Population and Family Planning in the Overall Socio-Economic Development Plan
1984 Mexico City	International Conference on Population Human rights of individuals and families, conditions of health and well-being, employment, and education	1987 EO 160: Further Amending PD 79 1990 EO 408: Placing the Commission on Population under the Office of the President 1991 EO 476: Placing the Commission on Population under NEDA
1994 Cairo	International Conference on Population and Development Relationship between population and development; meeting the needs of individuals within the framework of universally recognized human rights standards	1996 EO 307: Implementing a Family Planning Program at the LGU Level 1998 Philippine Population Management Program (PPMP)
1999	ICPD + 5 First review of progress made in the implementation of the ICPD PoA	2003 EO 188: Transferring the Commission on Population from NEDA to the Office of the President and then Placing it under the Supervision of DOH 12th Congress (2001-03): HB 4110 Establishing a Reproductive Health Care Act
2004	ICPD@10 Second review of ICPD	14th Congress (2007-09): HB 5043 Providing a National Policy in Reproductive Health
2009	ICPD at 15 Third review of ICPD	

Source: UN (n.d.)

In a 2010 interview, Population Commission (POPCOM) Director Tomas Osias stressed the importance of the World Population Conferences in formulating the country's population policy. He said that, in the first place, the country is a signatory to the UN Population Growth Declaration in 1967 and should thus be committed to the principles outlined in the agreement (T. Osias, personal communication, October 21, 2010). Meanwhile, Representative Edcel Lagman, the primary proponent of the RH bills in the Lower House for the past several Congresses, emphasized the commitment of the Philippines to the ICPD and the Millennium Declaration (i.e., the MDGs), which linked maternal and child health to gender equality and reproductive rights (E. Lagman, personal communication, October 12, 2010).

In sum, the domestic population and reproductive health discourse in the Philippines was largely shaped by key international actors. The consensus on principles and plans of action from the WPCs and the 4th UN Conference on Women became the reference points for domestic policymaking among participating countries, including the Philippines. While the WPPA is anchored on the economic development framework, the ICPD PoA shifted the population discourse towards women's health and rights. Advocacy groups and nonprofits such as the PLCPD and feminist groups supported legislative proposals that eventually secured the passage of RA 10354.

Opponents of RA 10354 and Counterdiscourse in Policymaking

On the other hand, one of the key opponents to the prevailing population and reproductive health discourse is the Vatican State. The issuance in 1968 by Pope Paul VI of *Humanae vitae*, a landmark document outlining Catholic doctrine on the concepts of life, marriage, and family, with specific guidelines on responsible parenthood, and birth regulation, among other areas, confirmed the opposition of the Catholic Church to the prevailing global population and reproductive health agenda. In response to the WPCs, the Holy See rallied support among developing nations and even Muslim nations to oppose the inclusion of abortion as a human right (Smeaton, 1998). With the publication of two other major encyclicals, *Familiaris consortio* (1981) and *Evangelium vitae* (1995), the Catholic Church supported initiatives in local churches to influence domestic policymaking. In March 2011, an interfaith rally was led by Gaudencio Cardinal Rosales, then Archbishop of Manila, in Rizal Park against the RH bills (Andrade, 2011). This rally followed the *ad limina visit* by Filipino bishops to Rome in December 2010, where Pope Benedict XVI encouraged them to continue defending human life at all stages, the integrity of marriage, and the family (Acuña, 2010).

The Catholic Bishops Conference of the Philippines (CBCP) led the counterdiscourse to the global population agenda since former President

Ferdinand Marcos launched an aggressive population policy in the Philippines in 1969. When the 1987 Constitution was drafted under President Corazon Aquino, Bishop Teodoro Bacani, who was member of the Constitutional Commission, with the backing of other bishops, argued persuasively to include the clause "to equally protect the life of the mother and the life of the unborn from conception" (See *1987 Constitution*, Article II, Sec. 12) (T. Bacani, personal communication, November 2, 2010).

The CBCP also issued pastoral statements tackling government population policies. The *Pastoral Statement on the Cairo ICPD* (1994) questioned the position of the Philippine delegation in ICPD and demanded that the representatives uphold the constitutional principles defending the sanctity of marriage and the family. Since then, the CBCP also issued pastoral letters dealing with population and reproductive health, such as *We Must Reject House Bill 4110* (2003), *Standing Up for the Gospel of Life* (2008), which opposed HB 5043, and *Choosing Life, Rejecting the RH Bill 4244* (2011). In these letters, the bishops denounced the RH bills as a reflection of a secularist-materialist spirit and an attack against human values. Some policymakers in the Congress also argued against the legislative proposals on the basis of their faith. Strong opposition from the Church and its allies stalled the passage of bills for many years.

The conflict between the proponents and opponents of the RH bills highlights differences in perspectives on certain key issues. The proposed bills support the use of safe, legal, affordable, and effective contraceptives for family planning and prevention of sexually transmitted diseases (STDs). The bills also pushed for state subsidy to make contraceptives accessible to the poor. Meanwhile, citing moral grounds, the CBCP considers contraception intrinsically evil because it separates love (unity) from life (procreation). The CBCP also argued that contraception would only promote sexual promiscuity, premarital sex, spread of STDs, corruption of the youth, and disintegration of families.

Another point of contention is defining responsible parenthood. For the legislators supporting the RH bills, responsible parenthood meant parents learn to consciously plan their families and beget only the children that they can raise and nurture within their means. The HB 4244, for instance, required mandatory age-appropriate reproductive health and sexuality education so that adolescents are taught early on to be responsible parents in the future. On the other hand, for the CBCP, responsible parenthood is intrinsically linked with the integrity of the family, marriage, and conjugal love as part of the moral law. Thus, while parents are solely responsible for deciding the number of children they want to have, they should always be open to life.

Arguments have also been put forward in defining reproductive rights. The RH bills argued that the state needs to include reproductive rights as part of

women's rights and gender equality rights. The Beijing Declaration stated that reproductive rights empower women to make decisions for their own good and to achieve equality with men in matters related to sexual relations and reproduction, "free of coercion, discrimination and violence" (*Beijing Declaration and Platform for Action,* No. 96). Meanwhile, the Church teaches that women's rights need to be understood within the larger context of human rights and the Christian idea of human dignity. It also places greater emphasis on what it deems the more essential right of every human being: the right to life.

Other groups sought alternative proposals that they claimed could be acceptable to the majority. For example, some academics from two Catholic educational institutions, the Ateneo de Manila University and De La Salle University, supported a version of the RH bill that would allow certain uses of contraceptives and family planning methods and emphasize reproductive health care services for women, particularly the poor (Fernandez, 2012).

When RA 10354 was signed by President Benigno Aquino III in December 2012, 14 petitions were immediately filed before the Supreme Court questioning the law's constitutionality. After 16 months, the high court promulgated a decision that was considered a victory on both sides. While the Supreme Court did not declare RA 10354 wholly unconstitutional, eight provisions of the law were rejected. These provisions limited the government's coercive powers on matters pertaining to freedom of conscience on certain aspects, such as providing minors access to contraceptives without parental consent; penalizing healthcare providers for refusing or failing to disseminate information about reproductive health programs and requiring parental consent from a minor in non-emergency situations; and penalizing public officers who refuse to support RH programs (Avendaño, 2014).

Conclusion

The role and relevance of the international context in domestic policymaking needs to be recognized for the passage of RA 10354 to be more fully grasped. The key players in this context include (a) multilateral organizations, foreign governments, and international private organizations that sponsored reproductive health and population management programs, paving the way for public policy; and (b) population discourse shaped by the WPCs held in Bucharest (1974) and Cairo (1994) and the 4th UN Conference on Women (1995) that culminated in the Beijing Declaration. The principles and programs of action outlined in these conferences guided domestic policymaking among participating countries—including the Philippines—which are obliged to fulfill their commitments to these principles and programs.

Amid globalization, policymaking can no longer be confined within national boundaries as international factors exert increasingly larger influence and power over domestic concerns. Policymakers need to pay close attention to developments beyond state borders, to understand the international context, and to acknowledge the role of global actors. Taking the broader context into account helps states craft policies that are relevant and attuned to generally accepted standards worldwide on various issues that are more or less interrelated, such as security, economic development, health, environment, culture, and education. From other countries, policymakers can deduce experiences, adopt pragmatic solutions and innovations, learn from failures and successes, and benefit from interstate cooperation and assistance.

Viewed in this regard, this study may help provide noteworthy inputs for future policy research. Understanding the broader context may guide policymakers and warn them of the pitfalls of indiscriminately applying global agenda and interests in domestic policies. Without due discernment and precaution, policymakers may unwittingly submit to the greater forces at play, harboring a particular agenda and ideology, which may be detrimental to the domestic conditions and may do away with respect for diversity, national interests, and sovereignty. In the case of RA 10354, the law could have posed serious threats to the exercise of freedom of conscience if it remained unopposed. Globalization should also strengthen state capacity to chart national destiny.

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Effects of Collective Leadership on Community Resilience of Relocated Informal Settlers

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This study explains the influence of collective leadership on community resilience arising from the dislocation of informal settler families (ISFs) relocated in resettlements outside of Metro Manila. This research extends prior literature on collective leadership, social capital, and resilience to crisis, particularly in forced relocation of informal settler families. ISF respondents (n=204) were asked to accomplish a survey to determine the extent of their agreeableness to the predictors of collective leadership—social capital, participatory action, access to socioeconomic resources, and structures and processes for participation—and the predictors' effect on community resilience. Relationships between these predictor variables on the outcome variable of community's resilience were analyzed through correlation and three-step hierarchical regression. Results show that social capital and access to socioeconomic resources are strongly associated with community resilience. Meanwhile, the weak to nil relationship between participatory action and community resilience suggests the lack of, and need for, participatory mechanisms that empower ISFs as partners in the resettlement process.

Keywords**:** *collective leadership, social capital, resilience to crisis*

Housing remains one of the pervasive development problems that have plagued most especially the poor, marginalized, and vulnerable communities. Metadata from the United Nations Human Settlement Program (UN-Habitat, 2020) indicate that more than 1.6 billion people are living without adequate housing, and one billion are in slums. In the Philippines, rapid urbanization associated with the dramatic pull of people into metropolitan corridors has led to an increase in the proportion of people living in slum areas. World Bank (2017) pegs the number of Filipinos residing in informal settlements at 2.2 million, or around 5.45% of the urban population. These areas are largely characterized by poverty, urban blight, congestion, criminality, and lack of basic social services.

One of the pressing challenges for the Philippine government is striving to ensure accessible, affordable homes for informal settler families (ISFs), who are most vulnerable to displacement due to road constructions, big-ticket infrastructure projects, and accelerated private land development.

The government's initial solution had been to relocate the urban poor to housing settlements nearest the peripheries of the metropolis, giving them access to health, social services, and economic opportunities in these areas to keep them from going back to the slum areas. But due to poorly-planned development and the ensuing congestion in cities, relocation sites have been pushed farther away from the peripheries, making basic social services and economic opportunities scarcer for the relocated communities. These areas have become the new global hotspots of vulnerability, prompting national and international actors to think of creative solutions that address physical and material concerns of these communities and wider-ranging socioeconomic and institutional problems. The forced relocation of ISFs has profound effects on their lives, resulting in income loss, emotional stress, anxiety, uncertainty, social exclusion, and marginalization.

Given the urban reality largely determined by informal settlements, another great challenge for sustainable development is making communities in informal settlements more resilient in the face of displacement and disruption. UN-Habitat, in its 2020 briefer on the project "Resilient Settlements for the Urban Poor," identified political and institutional marginalization as one of the factors that make communities living in informal settlements vulnerable to the impacts of displacement. In particular, exclusion of informal settlers from the larger framework of city planning and development leads to the "absence of meaningful investments in risk-reducing services and infrastructure" (UN-Habitat, 2020, "Rationale"). Empowering the urban poor, helping them to build resilience and adaptive capacities, requires external assistance from the government and other stakeholder groups, as well as strong leadership from within the community.

In 2013, the Philippine Government funded PHP50 billion into the ISF Relocation and Resettlement Program, which saw the transfer of over 100,000 ISFs to relocation sites outside Metro Manila. The government adopted a relocation model that promoted inclusive participation among the ISF beneficiaries and mutual collaboration with the receiving local government units (LGUs). In particular, the model strived to equip and empower the ISF community leaders to help their respective communities better anticipate and respond to disruptive events. The government assumed that the involvement and empowerment of the ISF beneficiaries were essential to make relocated communities resilient.

However, the implications of collective leadership on the ability of ISFs to rebuild and adapt amid disruptive events have been understated. Likewise, few studies have been able to explore the link between collective leadership and the resilience of relocated ISFs (Canyon, 2015). Meanwhile, most public administration studies focus on internal processes in the public sector, such as policy and program implementation, structural barriers, monitoring and evaluation, and resource and financial mobilization. This study, instead, looks beyond internal processes and institutions and examines how collective

leadership in civil societies and informal groups exerts influence on the ability of communities to be resilient. It examined the relationship of collective leadership and community resilience in the context of the relocation of ISFs living in danger zones and slum areas in Metro Manila. It also evaluated the results of the government's relocation program. The empirical findings can help government decisionmakers enhance and redesign their current models for relocating ISFs and support their succeeding interventions.

Research Problem

The research attempts to fill in the gap in leadership and resilience studies by analyzing the link between collective leadership and community resilience in the context of the relocation program undertaken by the Philippine government for informal settler communities. The following research questions are thus addressed:

1. What is the relationship between social capital, participatory action by the community, access to socioeconomic resources, structures and processes for participation, and community resilience?

2. Do the effects of social capital, participatory action by the community, access to socioeconomic resources, structures and processes for participation predict community resilience?

Research Objectives

Dimensions of collective leadership on community resilience, namely, (1) social capital, (2) participatory action by the community, (3) access to socioeconomic resources, and (4) structures and processes for participation, are the main variables of analysis for this research. Specifically, the study sought the following objectives:

1. to determine the magnitude and direction of relationships between the variables of the social capital, participatory action by the community, access to socioeconomic resources, structures and processes for participation, and community resilience; and

2. to analyze to what extent social capital, participatory action by the community, access to socioeconomic resources, and structures and processes for participation predict community resilience.

Hypotheses

The main hypotheses are as follows:

Hypothesis 1: Social capital will be associated with higher levels of participatory action, access to socioeconomic resources, and structures for participation.

Hypothesis 2: Higher levels of social capital, participatory action, access to socioeconomic resources, and structures for participation will predict higher levels of community resilience to crisis, risks, and disruptions.

Literature Review

Community Resilience

Masten et al. (1990) defines resilience as "the process of, capacity for, or outcome of successful adaptation despite challenging or threatening circumstances" (p. 426). In contrast to "the mere ability to bounce without breaking," termed by scholars as passive resilience, active resilience involves "a deliberate effort to become better able to cope with surprise" (Lovins & Lovins, 1982, as cited in Wildavsky, 1988, p. 98). In this context, resilience is the ability to identify potential risks and take proactive steps (Longstaff, 2005) to ensure an organization or community thrives in the face of adversity (Kanigel, 2001).

Amid extensive research on individual resilience (Bonanno, 2005; DuMont et al., 2007) is a growing body of scholarship tackling what makes communities resilient in the face of adversity and disruption. A resilient community is "one that can respond to unexpected and unwelcomed events in ways that enable groups and individuals to work together to minimize the adverse consequences of such crises" (Ozawa, 2012, p. 19). Norris et al. (2008) defined community resilience as a "process linking a set of networked adaptive capacities to a positive trajectory of functioning and adaption" in a community after a threat or a disruption (p. 131).

The underlying implication of these definitions is the importance of social cohesion and collective action in building community resilience. Ellis and Abdi (2017) underscored the role of social connection through collective action, which can reduce the risks of threats. Strengthening of social bonds and networks can, in a way, contribute to building community resilience. In Aldrich's (2008) study, social connectedness and participatory action are measured by proxies, such as levels of trust (among fellow citizens and in government officials), tendency to give time and effort on civic duties (voting), and ability to cooperate for civic initiatives (neighborhood cleanup or other collective action). A case in point is

Chamlee-Wright and Storr's (2009) study of a low-income Vietnamese immigrant community in New Orleans, which was able to recover and rebuild more efficiently in the aftermath of Hurricane Katrina compared to less damaged and richer neighborhoods. The participation of the local church and bonding social capital within the community made the recovery easier and the political action more cohesive.

Collective Leadership

In a crisis event, centralized unitary leadership is deemed essential to help communities effectively weather through disruptions. The "great man" theory in leadership studies resonates well with strong leadership, characterized by charisma, intelligence, and political will of great men in history (Raelin, 2017). The bulk of responsibility is, thus, put on the individual leader. Friedrich et al. (2014) explained that this view arose from the general notion that leadership is solely an individual-level phenomenon. Here, the concept of leadership is simplified into a binary relationship between the leader and the led (Collinson, 2005). Indeed, much of the leadership literature overtly emphasizes the individual traits of the leader or the top-down influence of the leader on the followers.

However, some scholars also consider leadership as a collectivist phenomenon, which entailed that emerging formal and informal leadership roles can be shared by multiple individuals over time (Contractor et al., 2012). This proposition came from the notion that the individual model of leadership was inadequate with current organizational needs (Pierce & Conger, 2003). Gronn (2002) argued that leadership, being a concerted action among multiple players, gained currency due to the increasing demand for flexibility and innovation. Yammarino et al. (2005) indicated that leadership is, in fact, a dynamic multilevel process in which leadership may be assumed by multiple individuals and passed on between leaders and members.

Collective leadership is described as a process in which the leader or group of leaders distributes the leadership role or aspects of such role to others based on the skills and expertise demanded by the situation (Friedrich et al., 2009). It assumes that leadership can be embedded in the dynamics of a social system (Dachler, 1992) and should not be confined in the noble acts of an individual alone (Hunt, 2004). Collective leadership thus highlights the importance of empowering members of the community to assume leadership roles where their expertise would be applicable (Carmeli & Schaubroeck, 2006; Yammarino et al., 2005).

Collective leadership also entails delegation and autonomy of subordinates and respect for the opinion and expertise (Clarcq et al., 2011). The concept is articulated through theories of shared leadership (Carson et al., 2007),

distributed leadership (Gronn, 2002), participative leadership (House, 1996), and empowerment (Mathieu et al., 2006).

Collective Leadership in Building Resilience

The construct of collective leadership jibes well with the need to explore and analyze the capacity of communities to better cope with disruptions. Scott et al. (2018) stressed the importance of strengthening leadership capacity among members in complex situations. Bongo and Manyena (2015) asserted that collective leadership promotes dialogue, which is an important mechanism for building community resilience.

In much of the literature on disaster preparedness and response, community resilience involved several areas where networked adaptive capacities can be developed, such as economic development, effective communication, social capital, community competence, physical and psychological health, comprehensive engagement of stakeholders in planning, and social connectedness (Norris et al., 2008; Chandra et al., 2013). Meanwhile, Pfefferbaum et al. (2015) suggested that, besides economic well-being, social capital and networks are important elements for building community resilience.

Zooming in to the local context, Pacoma and Delda (2019) shared that strong grassroots ties significantly contributed to the restoration and building of psychosocial resilience in the aftermath of major disasters. Psychosocial resilience refers to the capacity of people to navigate their way through the psychological and social resources that sustain their well-being as well as their collective capacity to negotiate for resources in the context of local culture. Increase in social capital was attributed to the networks and resources that people were able to tap for recovery and reconstruction. These links led to collective leadership and, consequently, efficient allocation of resources (Pacoma & Delda, 2019).

Some studies showed the improvement in predicting resilience to crisis by strengthening the capacity to distribute leadership roles and empower followers to become leaders (Ellis & Abdi, 2017; Masten et al., 1990). These studies highlighted how social capital and access to socioeconomic resources can reduce the risks of threats and, thus, strengthen social bonds and networks that can contribute to building community resilience.

While several studies have demonstrated the influence of collective leadership in improving the performance and efficiency in small groups or teams, few examined its influence on resilience in a broader context, that is, in communities. In particular, only a few studies applied collective leadership approaches to look into enhancing the capacity of vulnerable communities, such as informal settlers, to build resilience amid frequent disruption and dislocation.

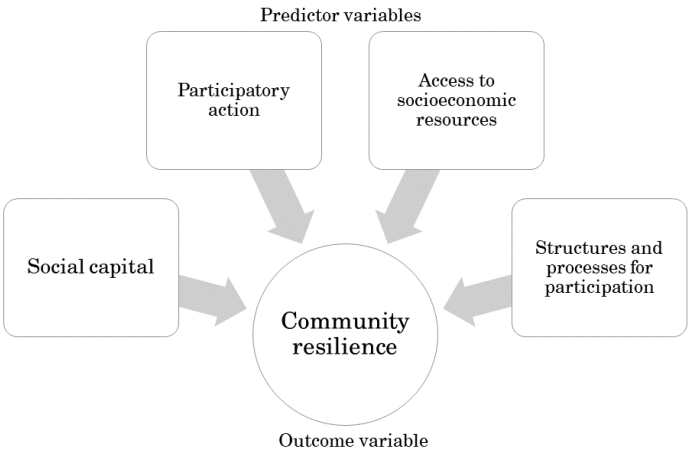
Moreover, the link between collective leadership and community resilience remains inconclusive due to the influence of other variables and contextual interpretations (Castleden et al., 2011; Hiller et al., 2006).

Theoretical Framework

Collective leadership is operationalized in this research through the following variables: (1) social capital, (2) participatory action, (3) access to socioeconomic resources, and (4) structures for participation. Some scholars considered these facets of collective leadership as cognitive and behavioral manifestations of high trust levels and shared norms within the community (Hausman et al., 2007; Nakagawa & Shaw, 2004). Consequently, communities with more trust, civic engagement, and stronger networks can better bounce back after a crisis than fragmented, isolated ones. Social capital, which makes collective action easier among community members (Labonne & Chase, 2011), requires greater participation, engagement, and symbiotic relations among leaders and members of a community in terms of knowledge sharing, mutual support, and resource exchange. At the core of collective leadership is the trust, reciprocity, and social norms to take the initiative in a community on the assumption that the others will respond to their expectations (Aldrich, 2008). Meanwhile, Labonne and Chase (2011) argued for collective leadership as a function of participatory action. Its indicators include measures of participation in institutions and those of connectiveness between constituents at the local level.

Social capital is defined as the extent of connectedness, mutual trust, and goodwill among the relocated settlers. Participatory action is the extent to which the community is involved in deciding and implementing resettlement programs that directly affect them. Access to socioeconomic resources refers to the extent of psychosocial support, key services and economic opportunities afforded to the communities. Finally, structures for participation is the extent of systems, processes, and spaces afforded for community participation. Meanwhile, community resilience, the dependent or outcome variable, entails safety from all forms of dislocation, vulnerabilities, or forced eviction. The variables were based on the constructs and subdimensions in the body of literature and interviews with key informants. Figure 1 illustrates the hypothesized relationship between the four dimensions of collective leadership and community resilience. Changes are assumed in any of the four predictor variables linked to collective leadership affect community resilience.

Figure 1
Theoretical Framework



Source: Author's own interpretation

Methodology

Data was gathered through a survey of selected informal settler families from 1 September to 30 November 2019. In administering the survey to the participants, the researcher secured the participants' consent and ensured confidentiality of their personal information and responses. Respondents were asked to accomplish consent forms, which included data privacy and identity protection provisions, after the goals of the study were explained to them. A sample of 204 informal settlers (168 women, 36 men), who were relocated to six resettlement sites, participated in the study. Among the respondents, 65% are unemployed, 24% are employed, and 11% are business owners. Around one-third (33.3%) were able to obtain at most a high school diploma.

Six out of the 18 relocation sites were selected by the Department of the Interior and Local Government (DILG) as pilot areas for assessing the performance of the government's relocation program. The survey is employed as one of the inputs to the DILG's baseline assessment. Systematic sampling was done through both random and non-random techniques. The sampling frame of 10,000 participants had been divided into number of segments called intervals (N=204). With the first interval, a specific element was selected through stratified random sampling. The subsequent elements from other intervals followed the element on the first interval.

The average age of the participants is 47 years (SD = 13.61; ranging from 14-81 years). Out of 204 respondents, 25% are community leaders, 15% are local government designates, and the remaining 60% are residents. The average length of residence is 4.93 years (SD = 1.43; ranging from 1-14 years). The average number of household members is five (SD = 2.37; ranging from 1-14 members). The participating resettlement communities are enumerated in Table 1.

Table 1
Respondents of the Study, by Community

Community	Number of Respondents
Balagtas Heights, Balagtas, Bulacan	31
Sunshine Ville I, Trece Martires, Cavite	38
Southville 10, Tanay, Rizal	35
Pandi Residences 2, Pandi, Bulacan	34
Disiplina Village, Ugong, Valenzuela	34
Paradise Heights, Tondo, Manila	32
Total (n)	204

Before administering the survey questionnaire, the researcher pretested the draft questionnaire with 35 respondents to evaluate the internal reliability of the survey items. After a brief interview, the respondents were given five minutes to read an information sheet and undertake a pretest survey. The researcher explained the rating scale, the key terms and variables of the study, and reasons why the study was undertaken. The respondents answered their survey forms, occasionally with the help of the researcher. The draft questionnaire was administered in Filipino for easy comprehension and to ensure that the respondents do not misinterpret the survey items. The researcher repeated and explained the item to the respondents when they seemed confused or when they need clarification.

Cronbach alpha was run on the pretest results and obtained .897 reliability. After the pretest, the survey form was reduced to 17 items that solicited the respondents' agreement or disagreement with given statements about collective leadership and community resilience. The survey also obtained the respondents' opinions, perceptions, and insights, and it drew out their sociodemographic profile (e.g., age, income, residence, etc.). The survey form was further translated to Filipino and reviewed by DILG representatives, local government implementers, community leaders, and selected ISF beneficiaries to assure that the items can be comprehended by the respondents and to avoid misinterpretation.

The survey items are rated using a ten-point scale, with one (1) implying strong disagreement and ten (10) implying strong agreement with the statement. The ratings for each variable were made on a 10-point scale as reflected below:

Absolutely Disagree		Partially Disagree			Partially Agree			Absolutely Agree	
1	2	3	4	5	6	7	8	9	10

SPSS version 2.0 software was used to compute both the descriptive and interpretive statistics in the study. Correlation and three-step hierarchical regression were used to test the effect of different predictor variables of collective leadership on community resilience.

Correlation analysis determined if the predictor variables covaried with the outcome variable of resilience. It indicated how far each variable deviated from the mean while the other directly or inversely deviated. The study also employed three-step hierarchical regression to evaluate different models or relationships of the predictor variables of collective leadership with the dependent outcome of resilience. The R square (R^2) would explain the variance shared by the predictors in total as well as per model with the outcome. The ANOVA determined the F-ratio of predicting the results from fitting the regression line to the observed data instead of using the mean as the estimate of the outcome.

In hierarchical regression, each model demonstrated the extent the addition of predictor variables can explain the variance on the outcome variable of community's resilience. Step 1 included the community's social capital and participatory action. Step 2 added access to socioeconomic resources, while Step 3 added structures and processes for participation. Each model produced beta coefficients indicating the increase or decrease in the outcome variable for every one-unit increase or decrease in each predictor variable. In this way, the study can evaluate the relationship that represented each predictor variable had uniquely explained on community resilience. The semi-partial correlation showed the proportion or percent of variance in the outcome variable that was also regressed by each predictor.

Results

Descriptive

The ISF respondents reported that they "partially agree" to the level of community's resilience, social capital, participatory action, and access to socioeconomic resources. However, the respondents "partially disagree" to the structures for participation (Table 2).

Correlations

Bivariate correlation was used to test the effect of the different predictors of collective leadership on community resilience to crisis. The independent variables

are social capital, participatory action, access to socioeconomic resources, and structures for participation. Meanwhile, the outcome variable was community resilience (Table 3).

Table 2
Mean and Standard Deviation of Responses

Variables	Mean	Std. Deviation	n
Community resilience	6.62	2.602	203
Social capital	6.00	2.796	203
Participatory action	5.67	2.961	203
Access to socioeconomic resources	7.60	2.961	203
Structures and processes for participation	5.47	2.790	203

Table 3
Correlations

Variables	1	2	3	4	5
Community resilience	--	.51***	.22***	.27***	.25***
Social capital	.51***	--	.20***	.16	.32***
Participatory action	.22***	.20***	--	.24***	.36***
Access to socioeconomic resources	.27***	.16	.24***	--	.10
Structures and processes for participation	.25***	.32***	.36***	.10	--

Note. Pairwise n ranges from 203 to 204: *p < .05, **p < .01, ***p < .001

Results of the bivariate correlation analysis indicate that community resilience has significant, moderate, positive correlation with social capital, $r = .51$, $p < .001$, but has significant, low, positive correlation with participatory action, $r = .22$, $p < .001$, access to socioeconomic resources, $r = .27$, $p < .001$, and structures and processes for participation, $r = .27$, $p < .001$.

Social capital has significant, moderate, positive correlation with structures and processes for participation, $r = .31$, $p < .001$, but has significant, low and positive correlation with participatory action, $r = .20$, $p < .001$. However, social capital has low significant correlation with access to socioeconomic resources, $r = .15$, $p = .013$.

Participatory action has significant, low, and positive correlation with access to socioeconomic resources, $r = .24$, $p < .001$, and significant, moderate and positive correlation with structures and processes for participation, $r = .36$, $p < .001$. However, access to socioeconomic resources is not significantly correlated with structures and processes for participation, $r = .10$, $p < .084$.

Hierarchical Regression (Three Steps)

Hierarchical regression was used to test the effects of the dimensions of collective leadership (i.e., social capital, participatory action, access to socioeconomic resources, and structures for participation) as predictors of community resilience. The predictors were entered in the order of their importance in predicting the outcome. Table 4 illustrates the omnibus model.

Table 4
Omnibus Model

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R^2 Change	F Change	df1	df2	Sig. F Change	
1	.527[a]	.278	.271	2.223	.278	38.458	2	200	.000	1.934
2	.555[b]	.308	.297	2.182	.030	8.573	1	199	.004	
3	.558[c]	.311	.298	2.181	.004	1.103	1	198	.295	

[a]Predictors: (constant), participatory action, social capital
[b]Predictors: (constant), participatory action, social capital, access to socioeconomic resources
[c]Predictors: (constant), participatory action, social capital, access to socioeconomic resources, structures and processes for participation

Hierarchical regression results predicting change in community resilience with participatory action and social capital were entered at Step 1, access to socioeconomic resources at Step 2, and structures and processes for participation entered at Step 3. The final model was found to be significant, $F(4, 198) = 22.39$, $p < .001$, $R^2 = .31$ (Table 5).

As shown in Table 6, Step 1 of the regression model is statistically significant, $F(2, 200) = 38.46$, $p < .001$, $R^2 = .28$. In particular, social capital (B = .45, SE = .06, 95% CI[.341,.566]) has significantly predicted community resilience, with $t(204) = 7.94$ ($p < .001$). Every unit increase in social capital is associated with a .45-unit increase in community resilience. Meanwhile, participatory action did not significantly predict community resilience in the Step 1 model (B = .11, SE = .05, 95% CI[.004,.216]), with $t(204) = 2.04$ ($p = .043$).

Step 2 of the regression model is significant, $F(3,199) = 29.47$, $p < .001$, $R^2 = .31$. This significance implies that the increase in access to socioeconomic resources explains the increase in community resilience, $R^2 = .03$, $p = .004$. In particular, access to socioeconomic resources (B = .15, SE = .05, 95% CI[.051,.264]) significantly predicts community resilience, with $t(204) = 2.93$ ($p = .004$). Social capital also significantly predicted community resilience (B = .44, SE = .06, 95% CI[.324,.546]) with $t(204) = 7.71$ ($p < .001$). It means that a unit increase in access to socioeconomic resources is associated with 0.16-unit increase in community resilience, holding participatory action and social capital constant. However,

participatory action has not significantly predicted community resilience in the Step 2 model (B = .08, SE = .05, 95% CI[-.032,.182]), with t(204) = 1.38, (p = .17).

Table 5

ANOVA & F-Ratio Results[a]

	Model	Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	379.982	2	189.991	38.458	.000[b]
	Residual	988.047	200	4.940		
	Total	1368.030	202			
2	Regression	420.790	3	140.263	29.467	.000[c]
	Residual	947.239	199	4.760		
	Total	1368.030	202			
3	Regression	426.036	4	106.509	22.387	.000[d]
	Residual	941.993	198	4.758		
	Total	1368.030	202			

[a]Predictors: (constant), participatory action, social capital
[b]Predictors: (constant), participatory action, social capital, access to socioeconomic resources
[c]Predictors: (constant), participatory action, social capital, access to socioeconomic resources, structures and processes for participation
[d]Predictors: (constant), participatory action, social capital, access to socioeconomic resources, structures and processes for participation

Table 6

Hierarchical Regression Predicting Influence of Social Capital, Participatory Action, Access to Socioeconomic Resources, and Structures for Participation on Community Resilience

Predictor	R^2	ΔR^2	Unstandardized B	95% CI B	SE
Step 1	0.27***	0.28***			.06
Social capital			0.45**	.341, .566	
Participatory action			0.11**	.004, .216	
Step 2	0.31*	0.03*			
Social capital			0.44***	.324, .546	.06
Participatory action			0.08	-.032, .182	.05
Access to socioeconomic resources			0.16*	.051, .264	.05
Step 3	0.31	0.00			
Social capital			0.42***	.303, .534	.06
Participatory action			0.06	-.057, .169	.06
Access to socioeconomic resources			0.16**	.053, .265	.05
Structures for participation			0.06	-.057, .185	.06
Total	0.06**				

Note: *p < .05, **p < .01, ***p < .001

Step 3 of the regression model is also significant, $F(4,198) = 22.39$, $p < .001$, $R^2 = .31$. Adding the variable on structures and processes for participation has not significantly explained the variance in community's resilience, $\Delta R^2 = .04$, $p = .295$. Likewise, the presence of structures for participation (B = .06, SE = .06, 95% CI[-.057,.185]), with $t(204) = 1.05$ ($p = .30$) and participatory action (B = .06, SE = .06, 95% CI[.330,.-.057]), with $t(204) = .98$ ($p = .33$) did not significantly predict resilience in the Step 2 model. However, access to socioeconomic resources (B = .16, SE = .05, 95% CI[.053,.265]) with $t(204) = 2.96$ ($p = .004$) and social capital (B = .42, SE = .06, 95% CI[.303,.534]) with $t(204) = 7.14$ ($p < .001$) significantly predicted resilience.

Based on the semi-partial correlations, social capital uniquely accounts for about 23% of the change in resilience (sr = .23), while other predictors, i.e., participatory action (sr = .015), access to socioeconomic resources (sr = .030), and structures and processes for participation (sr = .004), have lower variances to explain change in resilience. The sum of total squared semi-partial correlations is 28%, which was less than the R^2 of 31%. This indicates that a large portion of the variance was attributed to one predictor: social capital (Table 7).

Table 7

Regression Indicating Correlations Between Independent Variables and Community Resilience[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations		
		B	Std. Error	B			Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	3.268	.440		7.433	.000	2.401	4.135			
	Social capital	.454	.057	.487	7.943	.000	.341	.566	.513	.490	.477
	Participatory action	.110	.054	.125	2.038	.043	.004	.216	.223	.143	.122
2	(Constant)	.2381	.527		4.517	.000	1.342	3.421			
	Social capital	.435	.056	.467	7.708	.000	.324	.546	.513	.479	.455
	Participatory action	.075	.054	.085	1.384	.168	-.032	.182	.223	.098	.082
	Access to socioeconomic resources	.158	.054	.179	2.928	.004	.051	.264	.273	.203	.173
3	(Constant)	2.228	.547		4.075	.000	1.150	3.307			
	Social capital	.418	.059	.449	7.136	.000	.303	.534	.513	.452	.421
	Participatory action	.056	.057	.064	.977	.330	-.057	.169	.223	.069	.058
	Access to socioeconomic resources	.159	.054	.181	2.951	.004	.053	.265	.273	.205	.174
	Structures and processes for participation	.064	.061	.069	1.050	.295	-.057	.185	.254	.704	.062

[a]Dependent variable: Community resilience

Discussion

This research demonstrated the effects of the four dimensions of collective leadership (social capital, participatory community action, access to socioeconomic resources, and structures for participation) on community resilience. The study found that certain predictors of collective leadership are strongly associated with resilience. Social capital and access to socioeconomic resources are, in particular, strongly linked to resilience. These results indicate that the respondents deemed mutual trust, reciprocity, and social norms important for them to cope with and bounce back from disruptions, especially during relocation to another resettlement area. The findings support Aldrich's (2012) study, which asserted that social capital, developed in resource sharing and psychosocial support, influenced the ability of disaster-affected communities to exercise collective leadership and recover faster than others.

Meanwhile, participatory action and structures for participation do not predict any change in access to socioeconomic resources and in community resilience. Results of correlation analysis revealed that structures for participation had no significant relationship with access to socioeconomic resources ($p = .084$). In results of Step 2 hierarchical regression, participatory action had no effect on resilience ($p = .17$). In Step 3, participatory action and the structures and processes for participation did not predict changes in resilience, $p = .330$ and $p = .295$, respectively. The results seem contradictory at the outset, since social capital had been closely linked with the active participation and involvement of the community in initiatives that improve their quality of life.

These findings suggest that the availability of participatory mechanisms may not have mattered to the respondents. The treatment of the ISF beneficiaries as mere passive recipients of government dole-outs may also be considered a possible explanation. The study findings support the proposition that low community participation was associated with the lack of structures for participation. The correlation analysis results found a strong association between participatory action and structures for participation, $r = .36$, $p < .001$. While opportunities were limited for ISF beneficiaries to be actively involved in housing planning and management decisions, it did not keep them from searching for sources of income, livelihood, credit, and basic social services needed to cope with and bounce back from abrupt relocations.

Study Limitations

The study acknowledges methodological limitations despite its significant contribution to future research. The findings were based on self-rated measures of participants from ISF communities affected by relocation and resettlement

activities at a specific period. Although systematic sampling design was undertaken to ensure data integrity, the results may still be limited due to the relatively short timeframe, i.e., three months, for data gathering. The study also acknowledges that other unknown intervening variables might have affected the relationships between the main variables studied.

Conclusion

Keeping the ISFs from returning to slum areas demands better strategies to improve their living conditions in the new resettlement. This research demonstrates the importance of building the capacity of relocated families through collective leadership. Findings revealed that social capital is significantly and positively associated with community resilience, participatory action, and access to socioeconomic resources. However, participatory action and access to socioeconomic resources are not correlated with each other, implying the lack of participatory mechanisms in resettlements and heavy focus on dole-outs. Meanwhile, both social capital and access to socioeconomic resources significantly predicted changes in community resilience.

The findings support the notion that social capital reinforces collective leadership (see Chandra et al., 2013; Norris et al., 2008). These findings also confirm the importance of social capital, social networks, and economic well-being to community resilience (see Pfefferbaum et al., 2015). They also suggest that social connectedness and resource-based assets are deemed more important for community resilience by the ISF communities studied. Some respondents pointed out some gaps in government's approaches to housing programs and projects, such as a lack of participatory mechanisms in resettlement sites. This insight may probably explain the weak to nil association between participation and community resilience.

Contributions to Public Administration and Leadership Studies

This article advances further research and theories on collective leadership and community resilience in two fronts. First, it emphasizes the role of collective leadership in increasing community resilience. Second, it highlights the need for genuine participation in building social capital. As the findings suggest, high mutual trust and connectedness among community members can help foster meaningful inclusive participation and reinforce community resilience. The strong correlation between structures for participation and participatory action implies the need to empower the poor and marginalized as partners in government initiatives.

The research offers practical suggestions for designing government relocation programs. Previous socialized housing initiatives for the poor emphasized the provision of physical infrastructures and facilities, with little attention on establishing mechanisms for meaningful participation of the relocated communities in governance. Nonetheless, strengthening collective leadership by building up social cohesion and community participation helps improve community resilience. The ISFs should thus be empowered to participate in the planning, design, construction, and post-relocation management of their resettlement sites. Giving the ISFs' agency in this area will help them assume control and direction of their community's future and destiny.

Areas for Future Research

This study suggests that the effect of social capital on collective leadership depended on the strength of participation and empowerment of the community members. It also gives new evidence on the effect of collective leadership to community resilience. However, collective leadership may just be one of the possible predictive variables determining community resilience. Future research on culture, environmental conditions, institutions, technologies, and innovative behavior may possibly explain resilience as a function of other variables. Further research may also evaluate the extent to which the current findings may be mediated by other variables, such as length of residency and priorities of the local government. Studies seeking to determine the relationship between collective leadership and community resilience may also benefit from using qualitative methods that can triangulate data drawn from surveys.

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Towards a More Efficient Fracture Care Delivery by a Public Tertiary Facility in the Philippines

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The intramedullary (IM) nails, donated by the non-profit organization SIGN Fracture Care International to the East Avenue Medical Center (EAMC), have allowed the facility to provide low-cost fracture care. However, the SIGN nails were provided selectively (selective SIGN nailing, or SSN) to indigent patients who are unable to come up with funds to procure commercial implants. Charity patients needing IM nail for fracture treatment are asked to settle the cost of a commercial implant, and only when a patient cannot provide the funds will he or she receive a SIGN nail. Therefore, it may take days or even weeks before it is decided that a patient can be treated using the donated implant. To expedite fracture care, upfront SIGN nailing (USN) for indicated cases has been strategized. Through USN, SIGN nails are provided to charity patients needing fracture care on a first-come-first-served basis, regardless of the patient's financial capability. This article analyzes the efficiency of USN through mixed methods approach, utilizing focus group discussion (FGD) and analyses of surgery rate, SIGN utilization rate, and surgical timing from both USN and SSN policies. Themes elicited from the FGD emphasize USN's pro-poor approach in improving surgical timing and expediting patient discharge. USN was also found to significantly improve surgery rate and surgical timing. However, the difference in SIGN nail use was found to be not significant, which may be due to a limitation of SIGN nail stocks at the EAMC. Therefore, the researchers conclude that performing USN surgeries demonstrates effective and efficient trauma care delivery despite an inadequate supply of SIGN nails.

***Keywords*:** *low-cost fracture care, health care delivery, health policy*

Orthopedic implants are manufactured devices designed to fulfill certain functions when implanted into the living body, and usually for specific indications (Wang et al., 2011). The non-living materials used in their manufacture are termed biomaterials, which are meant to survive and function as foreign bodies within a biological environment. The orthopedic implant sector forms a significant portion of the worldwide biomedical industry, with a market estimated at over USD 14 billion in the US alone in 2008 (Freedonia Group, 2008). The four major implant

applications in the orthopedic surgical practice are (1) reconstructive joint replacements, (2) spinal implants, (3) orthobiologics, and (4) trauma implants. The clinical demand for orthopedic implants is likely to continue, furthered by local and worldwide aging populations, increasing prevalence of physically active lifestyles, higher expectations of quality of life in older age groups, and increasing injury rates especially in less-developed countries (Mock et al., 2004; Wang et al., 2011).

At present, the Department of Orthopedics of the East Avenue Medical Center (EAMC), a public tertiary hospital in Quezon City, Philippines, works with five implant companies offering a complete assortment of essential implants and prostheses the Department needs for its trauma service delivery. While a medical specialist can choose a preferred company that can provide the implant needed for a private case, all five companies follow strict rotational decking for the charity cases. As implant costs are presently not covered by the National Health Insurance Program (NHIP) at the EAMC, implants are provided out-of-pocket, with help from the Philippine Charity Sweepstakes Office (PCSO), or donated by local companies and international organizations.

Given fewer options to procure needed implants, the EAMC resorts to helping its charity patients get financial assistance through the PCSO for most of its orthopedic fracture cases (G. Battad, personal communication, 11 November 2019). The Individual Medical Assistance Program (IMAP) of the PCSO serves as the agency's platform to deliver financial assistance to patients with health-related needs, including the cost of hospitalization, medicines, medical supplies, diagnostic procedures, chemotherapy drugs, dialysis, hearing aids, implants, and prostheses, among others (Lagniton, 2019). The IMAP was launched in 1993 with the objective of providing timely and responsive financial assistance to individual patients through guarantee letters addressed to hospitals, diagnostic laboratories, pharmacies, and other health care facilities. In January to November 2018, a total of 481,712 individuals received PCSO assistance amounting to around USD 1.6 million (Lagniton, 2019).

Considering out-of-pocket payments as the primary source of health financing in the country and the limited coverage by the NHIP, the cost of an implant is one significant obstacle to fracture care delivery by the EAMC. Partnerships between organizations from high-income and resource-constrained settings have been suggested to strengthen advocacy and funding efforts, and to support the development of training and research in low- and middle-income countries (LMICs) (Christie et al., 2019). SIGN Fracture Care International (SIGN), a nonprofit organization based in Richland, Washington, has developed and donated an interlocked, intramedullary prosthesis known as the SIGN nail, allowing low-cost fracture care in resource-limited settings (Carsen et al., 2015). The SIGN nails have been approved by the US Food and Drug Agency (FDA).

They have shown good clinical results in small clinical series. They are donated to affiliated hospitals like the EAMC where SIGN-trained surgeons can thus treat fractures using intramedullary prosthesis without much concern for implant-related costs (Carsen et al., 2015).

Despite the availability of implant donations like the SIGN nail, the Department of Orthopedics selectively provide cheaper implants to patients who were not able to come up with funds to procure a commercial implant. Therefore, it may take days or even weeks before it is decided that a patient receives the SIGN nail. Through selective SIGN nailing (SSN), charity patients needing fracture treatment using an IM nail are first asked to settle the cost of a commercial implant. Only when a patient is not able to raise the funds will he/she be provided with a SIGN nail. Following admission of a patient with a fracture that needs fixation, implant procurement can delay surgical timing, or the interval from day of admission to the time of surgery. Therefore, time of surgery most commonly falls at a time there is fracture callus formation already, making the surgery more difficult to perform and at risk for perioperative complications. With longer in-patient stay, inability to settle the hospital bill prolongs interval to discharge. Thus, an inefficient cycle of trauma care only gathers few cases for training and leads to low public service output by the organization.

In the aim of improving fracture care delivery, an upfront surgical treatment using the SIGN nail for all indicated charity cases has been strategized and implemented by the Department in the second half of 2018. Through upfront SIGN nailing (USN), the SIGN nails are provided to charity patients needing fracture care on a first-come-first-served basis, regardless of a patient's financial capacity to procure a commercial nail. A charity patient needing an IM nail upon admission at the EAMC, through the USN policy, can therefore be promptly treated using the SIGN nail, as long as supplies last. Whether the USN policy is more effective and efficient than SSN in providing fracture care to charity patients is the main subject of this study.

Statement of the Problem and Objectives

The research investigates the fracture care delivery system by the Department of Orthopedics of the EAMC in the treatment of diaphyseal fractures of the lower extremities among charity patients. The investigation is anchored on a historical analysis of fracture treatment among service patients using the SIGN system, highlighting treatment protocols initiated by the Department of Orthopedics to promote prompt fracture care. The study covered the implementation of the selective SIGN nailing (SSN) protocol from 1 January 2018 until the subsequent approval of the upfront SIGN nailing (USN) protocol on 1 July 2018, and up to the ongoing implementation of the latter until 30 June 2019.

Specifically, the research addresses the following questions:

1. What are the flaws of the SSN protocol that could possibly give rise to higher cost of care and prolonged surgical timing?

2. Why is the USN protocol a major reform necessary to address inefficiencies in the present fracture care system at the EAMC?

3. Is the USN protocol the more effective and efficient strategy of fracture care delivery?

The objectives of the study are:

1. to discuss salient features of the Department's SSN policy, as well as its flaws that led to the strategy of developing an USN policy;

2. to understand the policy direction of the Department to improve organizational output, which must be supported by its USN policy; and

3. to validate the Department's policy direction by analyzing both effectiveness and efficiency of its USN policy.

Review of Related Literature

Injuries are a neglected global epidemic, causing more than five million deaths each year (Debas et al., 2006). A study done in 1990 estimated that injuries accounted for more than 15% of all ill health in the world, and projected this to increase to 20% by 2021 (Lopez et al., 2006). While injury is a major cause of death and disability at all economic levels globally, a common misperception is that injuries are primarily a health problem of high-income countries (HICs) (Gosselin et al., 2009). Injury mortality rates are, on the contrary, significantly higher, and have been steadily rising, in most LMICs (Mock et al., 2004). More than 90% of injury deaths happen in LMICs, where preventive efforts are often missing, and health care systems are least equipped to mitigate complications (Gosselin et al., 2009). In 2016, accidents were the fifth leading cause of mortality in the Philippines, accounting for around eight percent of the total deaths registered that year (Department of Health, 2016). As majority of the global population live in LMICs, the trends show increasing rates of injury globally (Mock & Cherian, 2008). If these trends continue, injury-related deaths will only rise in the ranking of global disease burden.

Road traffic crashes have received the most attention. Economic development in LMICs is accompanied by an increase in the number of vehicles, along with the associated rise in traffic-related crashes and deaths (Mock et al., 2004). The estimated annual cost of road traffic injuries is more than USD 500 billion, far exceeding total global expenditures in development assistance (Gosselin et al., 2009). For every traffic-related death, many more are injured with temporary or permanent disability, and available data show a huge burden of disability from orthopedic injuries (Ntakiyiruta et al., 2016).

One population-based survey found that 0.83% of Ghanaians had an injury-related disability, with the vast majority due to extremity injuries (Mock et al., 2003). The Global Burden of Disease study done in 2003 found that the majority of nonfatal injuries were orthopedic in nature, mostly affecting those living in LMICs (World Health Organization, 2003). The study found that combined rates of extremity injury from falls and road traffic crashes ranged from 1,000 to 2,600/100,000 per year in LMICs, compared with 500/100,000 per year in HICs.

The socioeconomic impact of injury-related disability is magnified in low-resource settings like the Philippines (Ponce, 2008), where trauma care, rehabilitation systems, and social welfare infrastructure are poorly developed (Gosselin et al., 2009). As such, injuries significantly contribute to the cycle of poverty, with the economic and social costs greatly affecting individuals, communities, and societies. The economic burden becomes unbearable when the total expenditure incurred by patients is higher than the minimum wage (Makkar et al., 2019).

Despite the weight of evidence, the importance of preventing and treating injuries in LMICs has yet to be accepted by the global public health community (McDermott et al., 2016). Research is grossly underfunded, and resources have been insufficient for improving the delivery of fracture care and related medical services (Reynolds et al., 2017). Data on burden and epidemiology of injuries and the effectiveness and cost-effectiveness of interventions in developing countries are lacking, perhaps explaining why other problems may be seen as more urgent, thereby making trauma care advocacy challenging.

While recognizing that policies aimed at prevention must be proposed and supported, strengthening the delivery of fracture care to the injured, especially the marginalized, is urgently needed (Bautista, 2008). It is only recently that surgery has been recognized as a cost-effective public health intervention. Disability-adjusted life years (DALYs) have been suggested as a feasible metric to estimate the burden of surgical disease (Bickler et al., 2010). DALYs averted by surgery have been used to estimate the averted burden of surgical diseases (Gosselin & Heitto, 2008). A recent study from Cambodia found out that a cost-effectiveness of USD 78 per DALY averted by surgical interventions for injuries

in a trauma hospital (Gosselin & Heitto, 2008). Meanwhile, Rodriguez-Llanes et al. (2018) analyzed systematically collected data by a tertiary care facility close to the epicenter of the 2008 Wenchuan earthquake in China and found that lower leg and femur fractures produced nearly 30% of the DALYs, with surgical management averting 48% and 69% of the burden from lower leg and femur fractures, respectively.

Looking at a broader context, Kotagal et al. (2014) analyzed the global burden of disease (GBD) data using economic modeling, and found reducing injury mortality in LMICs could save over two million lives per year. Providing safe, timely fracture care can only be achieved by addressing weaknesses within the orthopedic care system, one of which is and must be a rate-limiting step in the delivery of standard care: the provision of orthopedic implants.

High implant costs limit fracture care delivery in LMICs. When public financing is unlikely, more private financing through a voluntary insurance system has been proposed (Yuen, 1992). But having out-of-pocket payments as the major source of health financing by Filipinos, a voluntary insurance system may lead to misfortune instead of financial risk protection. Hospital costs increase with prolonging hospital stay and, given a monthly income of not more than USD 50, total expenditure goes beyond charity patients' means (Makkar et al., 2019).

In some countries, regulation of implant costs and widening public health insurance coverage are some of the steps being taken by governments to rationalize healthcare costs for the benefit of orthopedic patients, especially the indigents. In India, the national government has placed knee implants under price control, slashing prices by between 59-69% using a special provision in the Drug Pricing Law that enables it to intervene in "extraordinary circumstances" for public interest (Dey, 2019). In Japan, a government panel has approved coverage, under the national health insurance, of a new therapy to treat leukemia that carries the highest price tag, currently around USD 305,000, of any single drug in the country (Kyodo, 2019). Such a move is believed to significantly ease the burden on cancer patients under the nation's public health insurance system, with at most 90% of the cost incurred in medical institutions being covered by the policy.

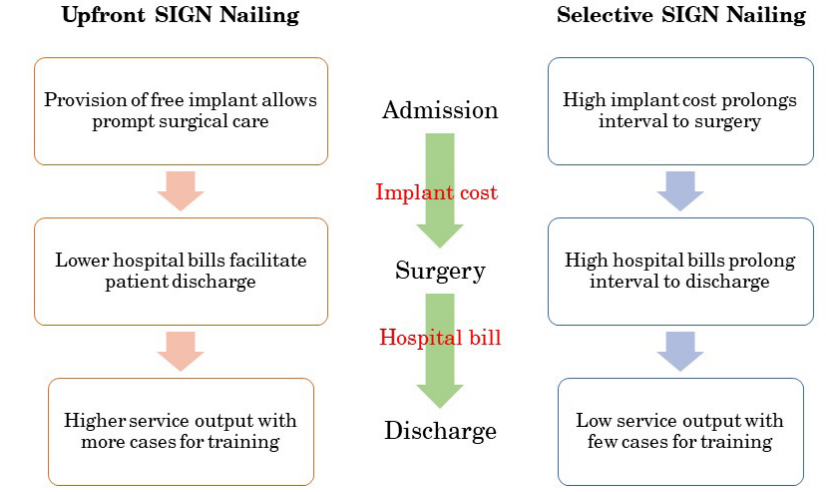
The establishment of social health insurance through the NHIP was envisioned to reduce out-of-pocket spending and inequities in health financing. By targeting the NHIP as the main source of financing, government spending through the Philippine Health Insurance Corporation (PhilHealth) is maximized, thereby lessening the financial burden shouldered by patients. However, implant-including benefit packages for trauma care from this strategy are presently limited. The Z-Benefit packages for select orthopedic prostheses have been piloted by the NHIP, amounting from USD 965 for cases of femoral fractures to USD 3,350 for cases needing total hip replacement (PhilHealth, 2014). Discussions are ongoing

to increase the array of implants to include in the Z-Benefits program and the number of accredited institutions, of which the EAMC is being considered (G. Battad, personal communication, November 11, 2019).

Conceptual Framework

Figure 1 illustrates the key variables and assumptions on the effectiveness and efficiency of the USN and SSN protocols. The study assumes that USN is more effective and efficient than SSN in fracture care delivery for charity/indigent patients. In particular, it assumes that the USN protocol helps lower treatment cost and facilitates surgery and patient discharge. More patients are thus served at a given period. Likewise, high service output leads to more cases for training, which, in turn, help improve the quality of fracture care delivery.

Figure 1
Conceptual Framework



Source: Authors' own interpretation

Research Methodology

The study tried to determine the effectiveness and efficiency of the USN and SSN protocols by employing a before-and-after research design. It adopted a mixed-methods approach that consisted of the following research activities:

Desk Research

Medical records were reviewed to identify patients who underwent intramedullary (IM) nailing from January 2018 to June 2019 for cases of lower extremity fracture (LEF) using either a commercial nail or the SIGN nail. Various patient-, treatment-, and fracture-related factors were recorded and analyzed.

Discussion with the Department's Executive Committee

To generate primary information on salient features of the Department's two SIGN nailing policies, as well as to elucidate on the Department's policy direction in terms of achieving improved organizational output, a focus group discussion (FGD) with the Department's executive committee was conducted. Four members of the Department's executive committee, particularly the chairman, the vice chairman, the training officer, and the SIGN program head, gave their consent for and participated in the FGD. The discussion was conducted in English at the office of the Department of Orthopedics of the East Avenue Medical Center.

Effectiveness and Efficiency Analyses

To validate the Department's suppositions in support of upfront SIGN nailing, the effectiveness and efficiency of both SIGN nailing policies were analyzed and compared. Effectiveness of the treatment policy was estimated by calculating for the surgery rate (SR), which is the proportion of IMN surgeries performed to the total number of admitted LEF cases within the treatment policy time frame. To control for confounders, the researchers decided to limit our SSN SR analysis to the adoption of the SSN policy only until June 2018. Thus, the formula for computing the selective SIGN nailing (SSN) and upfront SIGN nailing (USN) SRs is as follows:

$$\text{SSN SR} = \frac{\text{Number of IMN surgeries (January-June 2018)}}{\text{Number of admitted cases of LEF (January-June 2018)}}$$

$$\text{USN SR} = \frac{\text{Number of IMN surgeries (January-June 2019)}}{\text{Number of admitted cases of LEF (January-June 2019)}}$$

To estimate the efficiency of either policy, both the SIGN utilization rate (UR) for each policy, or the proportion of SIGN surgeries to the total number of IMN surgeries, and mean surgical timing (ST), or the interval from day of admission to the time of surgery following both treatment policies, were calculated as follows:

$$\text{SSN SIGN UR} = \frac{\text{Number of SIGN surgeries (January-June 2018)}}{\text{Total number of IMN surgeries (January-June 2018)}}$$

$$\text{USN SIGN UR} = \frac{\text{Number of SIGN surgeries (July 2018-June 2019)}}{\text{Total number of IMN surgeries (July 2018-June 2019)}}$$

ST = interval from date of admission to date of surgery (in days)

The chi-square test was utilized to compare proportions and the independent t-test to compare means. All statistical analyses were performed using SPSS version 21.0, with the p-value of <0.05 considered statistically significant.

Results

Focus Group Discussion

Through content analysis, the following thematic units on LEF treatment by the EAMC using SIGN nails were elicited from the discussion.

1. *Pro-poor strategy.* The SIGN program at the EAMC started in 2009. All respondents agreed the program aims to provide IM prosthesis to poor patients presenting with LEF who cannot afford a commercial nail. The Department recognizes that most patients who come to the EAMC get admitted under charity service. One participant said it is fortunate that the program offers SIGN nails for humanitarian purposes, thereby making LEF treatment possible for patients who come to the EAMC with financial difficulties. Otherwise, as another participant said, these patients must procure the implant through government financial assistance, which could take at least four weeks before the guarantee letter is issued. All participants believe that procuring implants through government financial assistance will prolong in-patient stay.

2. *Training development.* The participants believe that the SIGN program at the EAMC helps improve the Department's residency training program. One participant acknowledged that the use of the SIGN nails, in anticipation of the increase in the number of surgical cases, will provide opportunities for the residents to enhance their skills in LEF care. Two consultants from the Advanced Trauma Unit of the Department affirmed that the SIGN's instrumentation system is easy to use, and adequate for the serial steps needed in performing IMN. At present, as one participant stated, the residents-in-training, on their own, are performing IMN using the SIGN nails without need for a consultant's intraoperative guidance. The participants do not see a problem with the present set-up, because they acknowledge an improved surgical skill set by the residents in performing IMN using the SIGN instrumentation system.

3. *Targeting patients.* The participants recognize one limitation of the SIGN program, which is the inadequate supply of nails being shipped to the EAMC. The hospital's supply of the SIGN nails is insufficient to address the number of service cases needing LEF care. In every shipment, which usually comes every six months, the Department gets only at most 20 SIGN nails. Thus, only 20 patients can avail LEF care throughout the six-month period. Given the scarce resources, the participants recognize the need to prioritize the poorest of the poor. This need, as explained by the participants, was the reason behind developing the SSN policy in 2009.

4. *Treatment efficiency.* The participants observed that, despite having the SIGN nails, surgical timing seemed to have not improved across the years. All participants mentioned that, with the Department's SSN policy, LEF cases took more than six weeks before IMN was performed. They acknowledged such delivery of care to be substandard. One participant believed that patients getting admitted for charity service at the EAMC are, more often than not, financially incapable of procuring commercial implants. Another participant admitted that waiting for one patient to secure enough funds in one or two weeks to procure a commercial nail before deciding that he/she must be one of the poorest of the poor did not make sense. The rest added it makes more sense to just provide the SIGN nails for all indicated cases while supplies last, since most charity patients are incapable of securing funds anyway. It was along these issues that the USN policy was conceptualized and finally executed in July 2018.

Patient Characteristics

From January 2018 to June 2019, a total of 102 patients with mean age of 36 years (ranging 15-79 years) were admitted at the EAMC and treated with IMN (Table 1). Of this number, 41 (40%) patients were admitted under the SSN policy, while 61 (60%) were under the USN policy. Eighty-seven (85%) patients were less than 50 years of age, and 95 (93%) were male. Majority (76, or 75%) of the cases were closed fractures and 22 (22%) were open fractures. Fifty-eight (57%) patients presented with multiple injuries and majority (65, or 64%) received the SIGN nails.

Effectiveness Analysis

A total of 69 patients were included in the analysis, with 28 (41%) admitted under the USN policy from January to June 2019. Thirty-four (82.9%) of the 41 patients admitted under the SSN policy eventually had IMN, while all 28 patients admitted under the USN policy underwent IMN. The difference in surgery rates

was found to be significant (82.9% vs. 100%, p=.036), describing USN to be the more effective treatment policy (Table 2).

Table 1
Patient Characteristics

Characteristic	Frequency (N=102)	Percentage (%)
Mean age (in years)*	36 (15-79)	
• <50	87	85
• ≥ 50	15	15
Sex		
• Male	95	93
• Female	7	7
Injury type		
• Closed fracture	76	75
• Open fracture	22	22
• Pathological fracture	1	1
• Malunion	3	3
With multiple injuries?		
• Yes	58	57
• No	44	43
Implant used		
• SIGN nail	65	64
• Commercial nail	37	36
Bone involved		
• Femur	67	66
• Tibia	35	34
Treatment policy		
• Upfront SIGN nailing	61	60
• Selective SIGN nailing	41	40

*Mean with range in parentheses

Table 2
Analysis of Surgery Rates

Nailing Policy	Number of Admissions	Number of Surgeries	Surgery Rate (%)	Pearson Chi-Square
Selective SIGN nailing	41	34	82.9	0.036
Upfront SIGN nailing	28	28	100	

Efficiency Analysis

To analyze USN efficiency, all 102 cases were included. Mean surgical timing for patients admitted under the USN policy was 18.5 days (range 1 to 53), while for patients under the SSN policy, 34.9 days (range 0 to 89). The USN policy was found to result in significantly shorter surgical timing than the SSN policy (18.5±14 vs. 34.9±24, p<.001) (Table 3).

Table 3
Analysis of Surgical Timing

Nailing Policy	Total	Mean Surgical Timing	SD	95% CI	T-test
Selective SIGN nailing	41	34.93	23.99	8.95 to 23.88	.000
Upfront SIGN nailing	61	18.5	13.97		

Twenty-three (56.1%) of the 41 patients admitted under the SSN policy received SIGN nails, while 42 (68.9%) of the 61 patients under the USN policy had SIGN surgeries (Table 4). Despite having more patients undergoing SIGN surgeries under the USN policy, the difference in SIGN utilization rates was not found to be significant (68.9% vs. 56.1%, p=.212). This result may be explained by the limitation of SIGN nail stocks at the EAMC, as revealed in the FGD. Therefore, it is posited that USN is still the more efficient treatment policy.

Table 4
Analysis of SIGN Utilization Rates

Nailing Policy	Total	Number of SIGN Surgeries	SIGN Utilization Rate (%)	Pearson Chi-Square
Selective SIGN nailing	41	23	56.1	.212
Upfront SIGN nailing	61	42	68.9	

Discussion

Providing prompt fracture care can be achieved by addressing weaknesses within the orthopedic care system, one of which is the timely provision of needed implants. With out-of-pocket payments being the primary source of health financing in the country, implant cost is considered an obstacle to fracture care delivery by the EAMC. Despite availability of implant donations like the SIGN nails, free implants were provided selectively for the patients who were not able to come up with funds to procure a commercial implant. With the goal of improving LEF care, USN for all indicated charity cases has been strategized. Thus, the study validates the Department's policy direction, having found USN to be the more effective and efficient treatment protocol for charity patients presenting with LEF.

The study is not without limitations. Views of selected members of the executive committee of the Department of Orthopedics were included purposely in the discussion. The members' direct involvement in service delivery by the Department, particularly in developing treatment policies, enables sharing of relevant experiences or opinions. The relatively small number of patients might have also prevented the researchers from identifying other variables associated with the outcomes of interest. Lastly, the study is also limited by its analysis being retrospective in nature.

Most (87, or 85%) of the patients are aged less than 50 years. Majority are males (95, or 93%). More than half (58, or 57%) of the patients presented with multiple injuries, possibly due to preferential allocation of polytrauma patients by pre-hospital triage systems to level 1 trauma centers. In the Philippines, trauma mechanism is one variable that significantly affects the triage decisionmaking by paramedics, which may have contributed to the described differentiation in allocation of LEFs to the EAMC. Differentiation and specialization must lead to optimization of care but with resulting higher demand on multiple resources. This concern is shown in what the study found to be relatively high incidence of open fractures (22 or 22%), which likely leads to vascular, neurological, or soft tissue damage needing serial operations (Chen & Vallier, 2016). A higher demand on resources can be expected in the near future, urging public tertiary care facilities such as the EAMC to develop effective but efficient trauma care systems to contain costs.

The themes elicited from the FGD substantiate this study's assumption that the SIGN program's improved surgical timing and facilitated patient discharge greatly benefits indigent/charity patients. Maximizing the use of the SIGN nails allows the prompt delivery of LEF care, which, in turn, advances bed turnover time and allows more surgical cases for training. The Department's shift from SSN to USN was mainly influenced by its goal to increase its service output in the belief that, with USN, in-patient stay must significantly shorten. The participants agreed that the Department's training program will improve with the increase in service output.

The study also found USN to be the more effective treatment policy (82.9% vs. 100%, p=.036) for delivering LEF care to charity patients. Affordability could be the main reason for seeking tertiary care in public hospitals, and upholding effective surgical protocols must be considered imperatives by public tertiary facilities to further social equity.

Providing safe and timely fracture care can be achieved by prompt provision of orthopedic implants, which the EAMC's USN policy is striving to promote. With USN, IM nailing for the treatment of LEFs can be immediately performed at the EAMC. A significantly shorter interval from admission to surgery with

the USN policy (18.5±14 vs. 34.9±24, p<.001) makes it the more efficient IM nailing protocol. With reduced surgical timing, the resulting short in-patient stay reduces total hospital cost, and accelerates bed turnover time.

Results from the FGD also indicate that a selective scheme of SIGN nail provision may not be favorable, as total cost of care will only rise up with prolonging duration to surgery. Charity patients need to ask for public assistance through the PCSO's IMAP to settle the cost of a commercial nail. These patients may eventually get financial guarantee only after at least four weeks of processing by the PCSO. From the day of submission of paper requirements, around two weeks ensue before an interview with the patient commences. From the time of interview, the approval, or even denial, of the application is made in about two weeks. By this time, the patient may have already developed exuberant fracture callus formation, making the surgery more difficult to perform and at risk for perioperative complications (Mahaisavariya & Laupattarakasem, 1995).

An upfront surgical treatment using SIGN nails for all indicated LEF cases must ensure prompt care and allow shorter interval to patient discharge. The Department's USN policy can therefore lower total hospital expenditure, reducing expenses with shorter in-patient stay and limiting incidence of fracture-related complications.

The difference in SIGN utilization between both policies (68.9% vs. 56.1%, p=.212) can be explained by the limitation of SIGN nail stocks at the EAMC. Whenever all the SIGN nails have been used and the following shipment has yet to arrive, procurement of commercial nails becomes an issue. Unless organizational reforms improving PCSO's frontline service delivery take place, a better way to secure commercial nails for charity patients presenting with LEF must be put in place. Financial assistance through the PCSO's IMAP cannot avail implants for emergency cases that require surgery at the soonest time possible. With less options available to procure implants, public hospitals like the EAMC resort to helping their charity patients secure guarantee letters from the PCSO for treating their fractures. However, such protocol will only allow a much later hospital admission for the surgery. Therefore, public financing through the PCSO must have no place in an ideal trauma care delivery system.

Alternatively, enrollment of charity patients for implant-including PhilHealth Z-Benefit packages in the Philippines may help lessen the need to apply for public financial assistance through the PCSO and allow prompt government-subsidized care. The Z-Benefit packages may augment the USN treatment policy in promoting a sustainable, and equitable, method of fracture care delivery by the EAMC.

Conclusion and Recommendations

The strategy of performing upfront SIGN surgeries through the USN policy demonstrates effective and efficient trauma care delivery by the EAMC. To the best of the authors' knowledge, the present study is the first to analyze strategies for efficient provision of SIGN nails, or implant donations, in the treatment of LEF. The study proposes that an upfront provision of implant donations to all charity patients may be adopted by public hospitals to promote an efficient and equitable fracture care delivery in the Philippines.

Whenever the SIGN nails have all been used and the next shipment is yet to arrive, the timely procurement of commercial nails becomes an issue. While there is no provision allowing our national government to place commercial implants under price control, the study recommends having the complete array of PhilHealth Z-Benefit packages for trauma care available to all public tertiary care hospitals to ensure prompt fracture care delivery and financial risk protection. As delivery of sound and timely fracture care would shorten hospital stay and limit incidence of fracture-related complications, such policy reform is expected to lower economic and social costs that presently put our patients into a cycle of poverty upon injury.

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The authors declare that, as of this writing, they are presently active employees of the East Avenue Medical Center, Quezon City, Philippines.

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