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Bridging the Implementation-Capacity Disconnect: A HGDG Assessment of Infrastructure Projects and GFPS Technical Readiness in the Subic Bay Metropolitan Authority

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Abstract

This study diagnosed the institutional gaps hindering gender-responsive engineering within the public works pipeline of the Subic Bay Metropolitan Authority (SBMA). The inquiry evaluated the demographic readiness of the agency's Gender and Development Focal Point System, analyzed their application of the Harmonized Gender and Development Guidelines (HGDG) Box 10 checklist, isolated operational challenges, and mapped societal impacts toward UN Sustainable Development Goals 5,8,9 and 11. Using a descriptive quantitative design, data were analyzed by pairing the Weighted Mean with the Sample Standard Deviation. Results revealed a clear implementation-capacity disconnect and a distinct "Thinking-Doing Gap," where back-office administrative personnel dominated committee representation over marginalized frontline technical engineering groups. Furthermore, rapid turnover of novice members caused a recurring loss of specialized expertise. Consequently, high conceptual policy awareness failed to translate into physical outcomes, as severe baseline data deficits forced the agency to misallocate specialized budgets toward generic seminars rather than structural engineering revisions, ultimately perpetuating local commuter travel time poverty. To bridge these gaps, a 3-Pillar Institutional Enhancement Plan was proposed by establishing a GIS-mapped sex-disaggregated data hub, embedding decentralized HGDG technical review panels into engineering procurement gatekeeping, and stabilizing expertise through formal mentorship with tiered professional certification tracks. This plan provides a doable mechanism that transforms abstract gender policies into universally accessible public infrastructure.

Keywords: Harmonized Gender and Development Guidelines (HGDG) Box 10 Checklist, infrastructure procurement, implementation-capacity disconnect, thinking-doing gap, Sustainable Development Goals (SDG), Subic Bay Metropolitan Authority (SBMA)

INTRODUCTION

The historical paradigm of infrastructure development has long been anchored in the myth of technical neutrality – the assumption that physical structures serve all citizens with equal efficiency. In practice, this neutrality defaults to "universal user," which treats male mobility patterns as the human experience (Criado-Perez, 2019; Illo, 2010). Modern development discourse challenges this premise, recognizing infrastructure as a socially constructed space that can either reinforce or dismantle systemic inequalities (Levy, 2021). Central to this discussion is gendered mobility: while men typically engage in linear commutes, women frequently navigate complex, multi-stop journeys ("trip-chaining") driven by caregiving duties. When public infrastructure fails to accommodate these patterns, it results in "time poverty" – a severe structural barrier that limits women's economic agency and spatial safety (UN Women, 2019; World Bank, 2023).

Globally, integrating gender perspective into public works operates at the critical intersection of United Nations Sustainable Development Goals (SDGs) 5,6,8,9 and 11, driving regional economic productivity and reducing spatial burdens (Asian Development Bank, 2023; United Nations, 2024). In the Philippines,

Republic Act No. 9710 (Magna Carta of Women) localizes these mandates by requiring all government agencies to allocate 5% of their budget to Gender and Development (GAD) initiatives (Philippine Commission on Women, 2009). Within the Subic Bay Metropolitan Authority (SBMA) a major industrialized freeport zone, this mandate is evaluated using the Harmonized Gender and Development Guidelines (HGDG) Box 10 checklist.

However, a critical "implementation-capacity disconnect" persists. While the SBMA successfully complies with fiscal budgeting requirements, a severe "thinking-doing gap" occurs during physical execution. GAD frameworks are routinely treated as retrospective administrative filters rather than upfront engineering blueprints (PCW, 2023). Social policy frequently evaporates during the transition to actual technical designs because planning bodies lack standardized training, centralized baseline data, and institutional memory to translate sociological metrics into spatial realities (Philippine Institute for Development Studies [PIDS], 2023). Existing literature extensively evaluates broad GAD policy compliance, yet limited empirical focus has been directed toward the specific organizational mechanisms, technical readiness, and institutional barriers that hinder engineering implementers from applying the HGDG Box 10 tool in hard infrastructure projects.

To address this gap, this study diagnoses the institutional mechanisms behind the implementation-capacity disconnect within the Subic Bay Metropolitan Authority (SBMA). Specifically, the study is guided by the following objectives:

1. To evaluate the demographic composition and organizational profile of the SBMA Gender and Development Focal Point System (GFPS) members and assess how their technical readiness impacts the application of the HGDG Box 10 checklist.
2. To assess the perceived extent of gender integration across SBMA infrastructure projects using HGDG sector-specific criteria.
3. To identify the technical, data-driven, and organizational challenges encountered by implementers I am executing gender-responsive infrastructure.
4. To evaluate the projected societal impact of SBMA public works on reducing time poverty, eliminating spatial silencing, and ensuring long-term infrastructural sustainability.
5. To propose an evidence-based Institutional Enhancement Plan that bridges the implementation-capacity disconnect and standardizes HGDG technical proficiency across the authority's engineering pipeline.

To operate these objectives, the study addresses the following research questions:

1. What is the profile of the respondents in terms of:
   1.1 Gender (Sex);
   1.2 Age;
   1.3 SBMA Strategic Business Unit (SBU) affiliation;
   1.4 Position (rank) within the GFPS; and
   1.5 Years of experience (tenure) as GFPS members?
2. How is the extent of gender integration in SBMA infrastructure projects perceived in terms of the Harmonized Gender and Development Guidelines (HGDG) sector-specific checklist parameters?
3. What are the technical, tool-specific, and institutional challenges encountered in the execution of gender-responsive infrastructure initiatives within the SBMA?
4. What is the projected societal impact of these infrastructure projects on the general public as perceived by the respondents in terms of:
   4.1 Alleviating time poverty;
   4.2 Eliminating spatial silencing; and

4.3 Ensuring long-term project sustainability?

5. Based on the empirical findings of this study, what institutional Enhancement Plan can be proposed to bridge the implementation-capacity disconnect and standardize technical HGDG proficiency across SBMA?

LITERATURE REVIEW

Global Frameworks and SDG Alignment. The conceptualization of gender integration in infrastructure has transitioned from a marginal administrative task to a core requirement for sustainable urban planning. According to Levy (2021), this evolution requires embedding gender perspectives across the entire project lifecycle from initial architectural design to post-construction evaluation. By doing so, physical assets evolve from being "gender-blind" structures into socially responsive tools for equity. This directly supports the mandates of the United Nations Sustainable Development Goals (SDGs), operating at the intersection of SDG 5 (Gender Equality) and SDG 9 (Industry, Innovation, and Infrastructure) (UN Women, 2021).

Within commercialized economic hubs, integrating these perspectives expands further to advance SDG 6 (Clean Water and Sanitation) via Target 6.2 for equitable hygiene, SDG 8 (Decent Work and Economic Growth) via Target 8.5 for equal-opportunity construction procurement, and SDG 11 (Sustainable Cities and Communities) via Target 11.2 for public transit expansion tailored to vulnerable groups (United Nations, 2024; World Health Organization [WHO] & UNICEF, 2024).

A primary driver of spatial inequity is the persistent "gender data gap," where global structural codes and zoning laws are historically modeled on a "universal male" baseline (Criado-Perez, 2019). This bias fundamentally ignores "trip-chaining", the complex, multi-stop mobility patterns typical of women balancing formal employment with household management and caregiving responsibilities. Ignoring these non-linear travel patterns induces time poverty, which restricts economic participation and comprises SDG 8 (Decent Work and Economic Growth) (UN Women, 2019; World Bank, 2023). Achieving time justice through infrastructure that accommodates diverse mobility patterns is essential for fulfilling SDG 11 (Sustainable Cities and Communities) (UN-Habitat, 2025; Venter et al., 2020). Furthermore, feminist geography highlights the "Safety-Utility Correlation," wherein gender-blind designs characterized by poor lighting or obstructed sightlines result in "spatial silencing," effectively excluding women from public spaces due to safety risks (Kalms, 2021). While these global frameworks establish the necessity of gender-responsive design, a gap remains in understanding how local public works authorities systematically translate these high-level SDG targets into physical engineering blueprints.

Implementation Challenges in International. Contexts. While international frameworks champion gender mainstreaming, significant operational gaps remain between policy and execution. World Bank (2020) notes that the mere legislative existence of a gender policy does not equate to physical execution, particularly in developing nations hampered by weak enforcement mechanisms and a lack of monitoring systems capable of tracking social outcomes in technical sectors. The World Bank (2023) emphasizes that successful gender-responsive infrastructure relies heavily on foundational sex-disaggregated data systems and sustained capacity building.

Crucially, the timing of gender interventions determines their financial and structural viability. The Asian Development Bank (2021, 2023) established that the most critical factor for success is integrating deep gender analysis during the initial conceptualization and procurement stages. Proactive integration significantly enhances equitable access at a fraction of the cost associated with retrofitting inclusive features into post-construction concrete assets. Despite these global insights, empirical literature provides limited evidence

on how technical civil engineering units within specialized economic zones operationalize these early-stage interventions when confronted with rapid personnel turnover and rigid procurement timelines.

Technical Tools and the HGDG Framework. In the Philippines, the Harmonized Gender and Development Guidelines (HGDG) operationalizes global equity imperatives into a quantitative quality control mechanism for public expenditure. Formulated by the National Economic and Development Authority (NEDA) and the Philippine Commission on Women (PCW), the HGDG transitions gender mainstreaming from theoretical discourse to technical validation (National Economic and Development Authority [NEDA], 2021; PCW, 2009). The guidelines employ a structured scoring system to objectively evaluate projects, compelling government agencies to integrate social inclusion into engineering designs.

Research highlights the specific efficacy of HGDG Box 10 (the Sector-Specific Infrastructure Checklist). When Gender and Development Focal Point System (GFPS) members possess the technical literacy to apply Box 10 during the pre-investment and planning stages, projects show measurable improvements in inclusive features, such as mandated minimum sidewalk illumination and universal design ramps (NEDA, 2021). By applying this checklist early in the pre-engineering design phase, agencies bypass the prohibitive costs of structural retrofitting, allowing the HGDG to function as a proactive architectural tool rather than a retrospective administrative audit (Illo, 2010). However, a clear gap persists regarding whether local implementation committees possess the specific technical literacy required to score Box 10 accurately, or if the tool is merely processes as a superficial paper-compliance exercise.

Systemic Barriers in Engineering Practice. Despite robust legal frameworks, systemic hurdles persistently derail gender integration at the project level. Asian Development Bank (2021) identifies chronic underfunding and a critical lack of technical capacity as primary barriers. In the construction sector, this manifests as a "Technical-Social Divide." Buitrago-Mora et al. (2021) describe an "epistemic exclusion" within civil engineering and architecture, where technical professionals dismiss social variables as subjective or unscientific compared to hard metrics like material loads. Consequently, technical teams often reduce the HGDG to a bureaucratic distraction rather than treating it as a vital design parameter.

This cognitive dissonance frequently leads to "policy evaporation," where executive-level gender mandates vanish before reaching field-level execution (Moser, 2023). A major catalyst for this failure is the "Average User Fallacy," where the needs of diverse end-users are ignored due to a lack of Sex-Disaggregated Data (SDD) to scientifically validate those needs (International Transport Forum, 2024). Within the Philippine bureaucracy, this produces "focal point fatigue," where GFPS members are overloaded with checklists but lack the engineering authority to alter physical blueprints. Consequently, without early integration backed by hard data, the mandatory 5% Gender and Development (GAD) budget risks being depleted on generic awareness seminars rather than the structural modifications necessary for an equitable built environment (PIDS, 2023). Investigating how epistemic exclusion and data deficits interact within local engineering pipelines is essential to addressing the root causes of policy evaporation.

Philippine Context and the "Thinking-Doing Gap". Philippine-based literature reinforces the presence of a pervasive "Thinking-Doing Gap" within the national bureaucracy. Abelgas and Salagubang (2020) demonstrated that while local government units successfully institutionalize GAD budgeting under Republic Act No. 9710 (Magna Carta of Women) (PCW, 2009), transitioning from financial allocation to structural fund utilization remains severely flawed. Without rigorous technical monitoring, public infrastructure often remains physically gender-blind despite achieving paper compliance.

This failure is compounded by an ongoing capacity deficit within administrative bodies. Illo (2010) found that even with specialized GAD offices in place, implementation is stifled by untrained personnel subjectively applying gender analysis tools. PIDS (2023) argues that mainstreaming effectiveness is not static; it requires continuous, progressive training and uncompromising adherence to the HGDG during project formulation. Recent assessments by the Philippine Commission on Women (PCW, 2023) confirm that while agencies are actively conduct workshops to build GFPS capacity, there is an urgent need to pivot from general awareness toward specialized technical competence in engineering projects. Collectively, these studies validate that addressing the "implementation-capacity disconnect" within specialized authorities like the Subic Bay Metropolitan Authority (SBMA) is critical for bridging the gap between legislative intent and a tangibly inclusive built environment.

METHODOLOGY

Research Design. This study utilized a quantitative, purely descriptive research design to systematically diagnose institutional capacity patterns across the administrative sectors of the Subic Bay Metropolitan Authority (SBMA). This design was selected as the most appropriate methodological framework because it objectively describes, categorizes, and exposes prevailing institutional challenges, specifically the "Implementation-Capacity disconnect" and the "Thinking-Doing gap," without manipulating the organizational environment. By evaluating baseline data, the descriptive approach captures the operational constraints of the workforce and transforms bureaucratic metrics into a verifiable narrative of organizational capacity. The design was uniformly applied to calculate the profile distribution of respondents, determine the perceived application of technical guidelines, evaluate the severity of implementation barriers, and map the projected societal impacts of engineering designs on public safety and mobility.

Participants. The target population comprised the institutional pillars of gender mainstreaming within the SBMA. The study secured a highly specialized sample of 67 active respondents drawn from the 88 official members of the agency's Gender and Development Focal Point System (GFPS). To ensure a comprehensive diagnostic of the infrastructure development lifecycle, participants were categorized into three distinct functional cohorts based on their mandated roles. The first group consisted of the Technical Working Group and Engineering Units, encompassing project engineers, architects, and planners responsible for physical project identification, structural blueprint design, and the practical field application of technical guidelines. The second group comprised the Administrative and Financial Units, representing personnel tasked with corporate budgeting, procurement, contract purchasing, and legal compliance reviews for infrastructure projects. The final group was the GAD Review Committee, who served as ultimate institutional checkpoint responsible for evaluation, scoring audits, and attributing infrastructure projects to the agency's mandatory 5% GAD allocation.

Sampling Technique. A purposive sampling technique was employed to select the participants. This non-probability selection procedure was critical, as evaluating the execution of the Harmonized Gender and Development Guidelines (HGDG) Box 10 checklist requires specialized exposure to the agency's internal infrastructure procurement and engineering design pipelines. Relying on simple convenience sampling would have compromised the validity of the data by inadvertently including personnel lacking technical HGDG literacy. To optimize data collection efficiency and guarantee a high return rate among this cohort, survey distribution was strategically aligned with the agency's scheduled GAD re-orientation activities. This ensured the final dataset exclusively represented the professional viewpoints of the exact practitioners tasked with translating social policy into physical infrastructure.

Research Instrument. The quantitative research instrument was purposefully structured to mirror the study's central empirical inquiries. The survey questionnaire was divided into four distinct descriptive parts:

Part 1 (Baseline Profile): Captured demographic and professional characteristics, explicitly tracking sex, chronological age, Strategic Business Unit (SBU) affiliation, rank within the GFPS, and years of service (tenure).

Part 2 (HGDG Technical Application Assessment): Evaluated the "Thinking" phase of gender mainstreaming by measuring perceptions of how effectively core gender issues and sector-specific checklist parameters (Box 10) are integrated into project blueprints.

Part 3 (Institutional friction Diagnosis): Measuring the perceived severity of technical, tool-specific (HGDG literacy), and institutional resource bottlenecks.

Part 4 (Projected Societal Impact): Evaluated the "Doing" phase by measuring perceived public engineering outcomes, specifically examining the mitigation of public time poverty, the elimination of spatial silencing, and the enforcement of post-construction facility sustainability.

Responses for Parts 2, 3, and 4 were measured using a uniform 4-point Likert scale. To ensure academic rigor and prevent neutral-response bias, the scores were statistically interpreted through structured mean ranges: 3.26 to 4.00 indicated High integration, severe barriers, or highly positive public impact; 2.51 to 3.25 indicated Moderate integration, moderate barriers, or moderate public impact; 1.76 to 2.50 indicated Low integration, minor barriers, or high risk of public exclusion; and 1.00 to 1.75 indicated Very Low or absent integration, negligible barriers, or severe public exclusion.

Data Gathering Procedure. The researcher executed a systematic, ethical protocol to guarantee data integrity, participant safety, and institutional compliance. The procedure commenced with the submission of a formal authorization letter to the SBMA GAD Chairperson to secure clearance for the descriptive survey. Upon receiving official institutional endorsement to access the GFPS cohort, data collection was synchronized with the agency's scheduled activities. Prior to distributing the pre-validated instrument, the researcher conducted an informed consent briefing. This briefing explicitly communicated the study's objectives, emphasized that participation was entirely voluntary, and provided an absolute assurance that all personal and professional data would be anonymized and treated with strict confidentiality in accordance with national data privacy standards. The respondents completed the survey sheets independently, drawing directly upon their specific technical, financial, or evaluative expertise. Following completion, the questionnaires were collected, verified for completeness, and systematically tabulated into a digital database in preparation for statistical processing.

Statistical Analysis. The tabulated dataset was processed using descriptive statistical tools to address the study's primary inquiries. Frequency and Percentage distributions were utilized to summarize and describe the baseline demographic and professional profiles of the respondents. Weighted Mean calculations were employed to determine the central value and overall consensus regarding the technical application of the HGDG, the perceived severity of organizational implementation barriers, and the projected societal impacts of the infrastructure designs. To descriptively map the consistency and consensus of the data across the Likert scale items, the sample standard deviation was calculated. This specific calculation utilized Bessel's correction to adjust for sample bias, ensuring that the mathematical variance was accurately estimated for a sub-segment rather than the complete population universe. The resulting central tendencies and dispersion metrics were directly mapped against the study's structured 4-point scale, providing a transparent and auditable diagnostic of the institution's infrastructure development pipeline.

RESULTS

Profile of the Respondents

Gender Distribution. Table 1 presents the frequency and percentage distribution of respondents according to gender (sex).

Table 1
Frequency and Percentage Distribution of Respondents According to Gender

Gender (Sex)	Frequency (*f*)	Percentage (%)
Male	23	34.30
Female	44	65.70
Total	**67**	**100.00**

The data indicates a predominantly female composition within the Subic Bay Metropolitan Authority (SBMA) Gender and Development Focal Point System (GFPS) with female personnel comprising 65.70% (*f*=44) of the total sample compared to male personnel at 34.30% (*f*=23).

Age Distribution. Table 2 outlines the age distribution of the GFPS respondents.

Table 2
Frequency and Percentage Distribution of Respondents According to Age

Age	Frequency (*f*)	Percentage (%)
25 and below	3	4.50
26-35	11	16.40
36-45	15	22.40
46-55	21	31.30
56 and above	17	25.40
Total	**67**	**100.00**

Respondents aged 46-55 represents the largest age cohort at 31.30% (*f*=21), followed by those aged 56 and above at 25.40% (*f*=17). Combined, personnel aged 46 and older account for 56.70% of the sample. The 36-45 cohort represents 22.40% (*f*=15), while younger age groups 26-35 years (16.40%, *f*=11) and 25 and below (4.50%, *f*=3) comprise smaller proportions of the system.

Organizational Affiliation. Table 3 shows the distribution of respondents across SBMA Strategic Business Units (SBUs).

Table 3
Frequency and Percentage Distribution of Respondents According to Organizational Affiliation (SBMA-SBU)

Subic Bay Metropolitan Authority-Strategic Business Units (SBMA-SBU)	Frequency (*f*)	Percentage (%)
Chairman and Administrator Group	15	22.40
Business and Investment Group	8	11.90
Support Services Group	11	16.40
Internal Services Group	23	34.30
Port Operations Group	10	14.90
Total	**67**	**100.00**

The Internal Service Group accounts for the largest proportion of respondents at 34.30% (*f*=23), followed by the Chairman and Administrator Group at 22.40% (*f*=15). The Support Services Group represents 16.40% (*f*=11), Port Operations Group accounts for 14.90% (*f*=10), and the Business and Investment Group comprises 11.90% (*f*=8). Frontline engineering and technical operations groups (Port Operations and Business Groups) represent a combine 26.80% of total respondents.

Position within the GFPS. Table 4 presents the distribution of respondents according to their official designation within the GFPS.

Table 4
Frequency and Percentage Distribution of Respondents According to Position in the Gender and Development Focal Point System (GFPS)

POSITION in Gender and Development Focal Point System (GFPS)	Frequency (*f*)	Percentage (%)
GAD Representative	43	64.20
Technical Working Group (TWG)	6	9.00
Secretariat	2	3.00
Budget/Planning Officer Representative	12	17.90
Member	4	6.00
Total	**67**	**100.00**

The majority of respondents hold the position of GAD Representative (64.20%, *f*=43). Budget/ Planning officer representatives account for 17.90% (*f*=12). Technical Working Group (TWG) members constitute 9.00% (*f*=6) of the respondents, general members represent 6.00% (*f*=4), and Secretariat personnel account for 3.00% (*f*=2).

Tenure within the GFPS. Table 5 presents the distribution of respondents based on their years of service within the GFPS.

Table 5
Frequency and Percentage Distribution of Respondents According to Years of Experience in Gender and Development Focal Point System (GFPS)

YEARS as Gender and Development Focal Point System (GFPS)	Frequency (*f*)	Percentage (%)
1 below	22	32.80
1-5	17	25.40
6-10	9	13.40
10 and above	9	13.40
No answer	10	14.90
Total	**67**	**100.00**

Respondents with less than one year of experience in the GFPS constitute the largest group at 32.80% (*f*=22), with an additional 25.40% (*f*=17) serving between 1-5 years. Combines, personnel with 5 years or less of GFPS tenure represent 58.20% of the sample. Equal proportions of respondents reported serving 6-10 years (13.40%, *f*=9) and 10 years or above (13.40%, *f*=9). A segment of 14.90% (*f*=10) did not indicate their length of service.

Perceived Extent of Gender Integration in SBMA Infrastructure Projects

Assessment of Gender Issues. Table 6 outlines the means ratings, standard deviations, verbal interpretations, and ranks for perceived gender issues in infrastructure projects.

Table 6
Descriptive Diagnostic of Gender Issues in Infrastructure Projects

Statement Parameter	Mean	Standard Deviation	Verbal Interpretation	Rank
2.1.1. Unequal access and impact	3.48	0.82	High	2
2.1.2. Gender-based employment	3.51	1.01	High	1
2.1.3. Participation in user group	3.34	0.86	High	3
2.1.4. Special Needs	3.22	1.19	Moderate	4
Overall Composite Metric	**3.39**	**0.77**	**High**	

The overall composite metric for perceived gender issues is 3.39 (SD=0.77), verbally interpreted as High. Gender-based employment received the highest mean score (Mean=3.51, SD=1.01, Rank 1), followed by unequal access and impact (Mean=3.48, SD=0.82, Rank 2) and participation in user groups (Mean=3.34, SD=0.86, Rank 3), all interpreted as High. Special needs received the lowest mean rating (Mean=3.22, SD=1.19, Rank 4), interpreted as Moderate.

HGDG Sector-Specific Checklist Application. Table 7 presents the descriptive outputs regarding the application of the HGDG Sector-Specific Infrastructure Checklist parameters.

Table 7
Descriptive Diagnostics of the HGDG Sector-Specific Infrastructure Checklist Application

Statement Parameter	Mean	Standard Deviation	Verbal Interpretation	Rank
2.2.1. Gender equality results	3.97	0.94	High	6
2.2.2. Involvement of both men and women	4.24	0.80	Very High	3
2.2.3. Gender analysis	4.25	0.84	Very High	2
2.2.4. Mechanism for sustainability	4.01	0.77	High	5
2.2.5. GAD budgeting	4.12	0.83	High	4
2.2.6. Policy support	4.27	0.81	Very High	1
Overall Composite Metric	**4.14**	**0.64**	**High**	

The overall composite metric for HGDG checklist application is 4.14 (SD=0.64), interpreted as High. Policy support recorded the highest mean score (Mean=4.27, SD=0.81, Rank 1), followed by gender analysis (Mean=4.25, SD=0.84, Rank 2) and involvement of both men and women (Mean =4.24, SD=0.80, Rank 3), all verbally interpreted as Very High. GAD budgeting (Mean=4.12, SD=0.83, Rank 4) and mechanisms for sustainability (Mean=4.01, SD=0.77, Rank 5) were interpreted as High. Gender equality results obtained the lowest mean score within the set (Mean=3.97, SD=0.97, Rank 6), interpreted as High.

Technical, Tool-Specific, and Institutional Challenges

Table 8
Descriptive Diagnostics of Challenges in Implementing HGDG in Infrastructure Projects

Challenge Parameter	Mean	Standard Deviation	Verbal Interpretation	Rank
3.1.1. Lack of awareness and understanding of HGDG	4.04	0.91	High	3
3.1.2. Insufficient resources	4.19	0.76	High	1
3.1.3. Lack of clear institutional policies and guidelines	3.81	0.97	High	5
3.1.4. Cultural resistance	3.75	0.94	High	6
3.1.5. Lack of data and monitoring	4.04	1.02	High	4
3.1.6. Inadequate gender analysis	4.01	0.96	High	5
3.1.7. Limitation participation of women	3.19	1.13	Moderate	8
3.1.8. Lack of gender-sensitive design	3.64	1.10	High	7
Overall Composite Metric	**3.84**	**0.71**	**High**	

Challenges in Implementing HGDG in Infrastructure Projects. Table 8 summarized the perceived severity of challenges encountered when implementing the HGDG framework in infrastructure projects.

The overall composite mean for challenges in HGDG implementation is 3.84 (SD=0.71), interpreted as High. Insufficient resources ranked highest (Mean=4.19, SD=0.76, Rank 1). Lack of awareness and understanding of HGDG (Mean=4.04, SD=0.91, Rank 3), lack of data and monitoring (Mean=4.04, SD=1.02, Rank 4), and inadequate gender analysis (Mean=4.01, SD=0.96, Rank 5) were all rated as High Constraints. Limited participation of women yielded the lowest severity mean (Mean=3.19, SD=1.13, Rank 8) interpreted as Moderate.

Challenges in Implementing Gender-Responsive Programs, Activities, and Projects (PAPs). Table 9 outlines the diagnostic scores regarding challenges faced during the execution of gender- responsive PAPs.

Table 9

Descriptive Diagnostics of Challenges in Implementing Gender-Responsive Programs, Activities, And Projects (PAPs)

Challenge Parameter	Mean	Standard Deviation	Verbal Interpretation	Rank
3.2.1. Lack of capacity	3.63	0.85	High	7
3.2.2. Insufficient integration	3.82	0.82	High	3
3.2.3. Budget attribution	3.60	0.92	High	8
3.2.4. Data collection and analysis	3.88	0.79	High	1
3.2.5. Policy and organizational context	3.85	0.93	High	2
3.2.6. Monitoring and evaluation	3.84	0.88	High	4
3.2.7. Funding and resources	3.84	0.93	High	5
Overall Composite Metric	**3.78**	**0.70**	**High**	

The overall composite metric for challenges in executing gender-responsive PAPs stands at 3.78 (SD=0.70), verbally interpreted as High. Data collection and analysis recorded the highest mean rating (Mean=3.88, SD=0.79, Rank 1), followed by policy and organizational context (Mean=3.85, SD=0.93, Rank 2) and insufficient integration (Mean=3.82, SD=0.82, Rank 3). Monitoring and evaluation (Mean=3.84, SD=0.88, Rank 4) and funding and resources (Mean=3.84, SD=0.93, Rank 5) were also rated as High challenge parameters.

Projected Societal Impact of Infrastructure Projects. Table 10 details the perceived societal impacts of SBMA infrastructure designs on the general public.

Table 10

Descriptive Diagnostics of Perceived Societal Impact of Infrastructure Designs

Projected Societal Impact Parameter	Mean	Standard Deviation	Verbal Interpretation	Rank
4.1. Alleviating Time Poverty	3.54	1.12	High	3
4.2. Eliminating Spatial Silencing	3.61	1.04	High	2
4.3. Ensuring long-term Project Sustainability	3.86	0.73	High	1
Overall Composite Metric	**3.67**	**0.65**	**High**	

The overall composite mean for projected societal impact is 3.67 (SD=0.65), verbally interpreted as High. Ensuring long-term project sustainability obtained the highest mean score (Mean=3.86, SD=0.73, Rank 1), followed by eliminating spatial silencing (Mean=3.61, SD=1.04, Rank 2) and alleviating time poverty (Mean=3.54, SD=1.12, Rank 3), all interpreted as High.

The Proposed 3-Pillar Institutional Enhancement Plan. Table 11 summarizes the strategic framework of the proposed 3-Pillar Institutional Enhancement Plan derived from the descriptive empirical findings.

Table 11

Strategic Framework of the Proposed 3-Pillar Institutional Enhancement Plan

Strategic Action Pillars	Target Objective	Core Empirical Drivers (From Descriptive Tables)	Targeted UN SDGs	Expected Institutional Output
Pillar I: Financial & Data Architecture Reforms	Deploy an automated, GIS-mapped Data Registry Hub; Move funds directly to field audits	High severity of data deficits (Table 8, Mean:4.04); High consensus on data collection barriers (Table 9, Mean:3.88. SD: 0.79)	SDG 5 SDG 16 (Institutional Transparency & Precision)	Live Sex-disaggregated data (SDD) registries actively feeding pre-investment phases
Pillar II: Engineering & Design Review Reforms	Decentralize the HGDG Box 10 checklist out of admin spaces and embed it into engineering procurement	Mismatch between corporate groups (Table 3, 34.30%) and frontline engineering units (Table 3, 14.90%); Gap in physical outcomes (Table 7, mean 3.97)	SDG 9 SDG 11 (Resilient Systems and Inclusive Spaces)	Mandatory, project-specific "HGDG Technical Review Panels" housed within active infrastructure groups
Pillar III: Staffing & Retention Reforms	Standardize professional certification tracks and deploy inter-generational mentorship loops	Heavy concentration of female administrative staff (Table 1, 65.70%); High late-career saturation (Table 2, 56.70%); High Turnover of novice staff (Table 5, 32.80%)	SDG 5 SDG 8 (Decent Work and Structural Equality)	Formal cross-functional, mixed-gender engineering pairs; contractually retained certified HGDG auditors

DISCUSSION

The findings of this study exposed a critical vulnerability within the Subic Bay Metropolitan Authority's (SBMA) approach to gender-responsive infrastructure, specifically a

profound disconnect between administrative policy intent and physical field execution. The empirical diagnostic demonstrates that while the agency exhibits high statutory compliance and conceptual awareness regarding gender inequality, these abstract metrics fail to translate into tangible, universally accessible public assets. Four major institutional patterns characterize this operational breakdown: a severe demographic and functional imbalance, a pronounced "Thinking-Doing Gap," persistent resource and data deficits, and high workforce volatility. Structurally, the Gender and Development Focal Point System (GFPS) is heavily skewed toward female personnel (65.70%) concentrated within back-office administrative units like the Internal Service Group (34.30%), whereas frontline technical engineering sectors comprise a combined minority of just 26.80% and the specialized Technical Working Group (TWG) accounts for a mere 9.00% of the assembly. Furthermore, a stark divergence exists between process compliance and real-world results; while the authority achieves high ratings for policy support (Mean=4.27) and gender analysis (Mean=4.25), physical gender equality outcomes score significantly lower (Mean=3.97), and addressing special spatial needs drops to a moderate level (Mean=3.22). These operational hurdles are heavily driven by shortages in functional audit resources (Mean=4.19) and baseline sex-disaggregated data collection (Mean=3.88), further aggravated by demographic pressures wherein 56.70% of personnel are over age 45 alongside a novice majority where 58.20% possess five years or less of GFPS tenure.

Critical synthesis with existing literature confirms and extends key theoretical models governing gender mainstreaming in public works. The over-representation of administrative personnel alongside the severe marginalization of frontline engineering units directly confirms the findings of Buitrago-Mora et al. (2021) and the PCW (2023). These benchmark studies documented a prevailing "Technical-Social Divide" in public work pipelines, where engineers routinely dismiss social variables as secondary or non-scientific. By confining compliance tracking to back-office representatives who lack direct technical authority over blueprints, the SBMA bakes this epistemic exclusion directly into its organizational hierarchy, causing qualitative social mandates under the UN SDG 5 (Gender Equality) to evaporate before reaching the physical construction stage of UN SDG 9 (Industry, Innovation, and Infrastructure). Moreover, the high composite scores for administrative procedures (Mean=4.14) paired with lower physical spatial outcomes (Mean=3.97) extend the policy evaporation framework articulated by Moser (2023) and Abelgas and Salagubang (2020). While prior Philippine studies established that local government units achieve paper compliance through fiscal budget allocations under Republic Act No. 9710, this inquiry demonstrates that policy evaporation in special economic zones occurs specifically during the pre-engineering design phase. Because focal points lack specialized technical literacy in HGDG Box 10, the mandatory 5% GAD budget is continuously diverted into generic awareness seminars rather than structural engineering revisions, thereby locking in commuter travel time poverty (Mean=3.54) under SDG 11. Finally, identifying baseline data collection as the primary operational barrier (Mean=3.88) validates global assessments by Criado- Perez (2019), the International Transport Forum (2024), and the Philippine Institute for Development Studies (2023), proving that without digitized baseline registries, infrastructure planners' default to a "universal male" baseline that completely ignores women's multi-stop trip-chaining mobility patterns.

To translate these empirical insights into actionable organizational reforms, the study proposes a targeted 3-Pillar Institutional Enhancement Plan integrated directly into the authority's practice and policy frameworks. Pillar I addresses data collection deficits (Mean=3.88) by deploying an automated, cloud-based GIS-Mapped Sex-Disaggregated Data (SDD) Registry Hub within the first two months,

supported by a corporate policy that ring-fences at least 40% of the 5% GAD budget exclusively for technical field audits and spatial data equipment in alignment with UN SDG 16. Pillar II corrects the structural marginalization of engineering groups by establishing decentralized, project-specific "HGDG Technical Review Panels" housed directly within active technical units by Months 5-6, while empowering the Bids and Awards Committee to enforce a non-negotiable HGDG Box 10 score 15.0 out of 20.0 as a mandatory procurement gatekeeper under UN SDGs 9 and 11. Pillar III resolves workforce volatility characterized by late-career saturation (56.70%) and rapid novice turnover (58.20%) by establishing an Intergenerational Mentorship Program alongside a mandatory Technical HGDG Professional Certification Track, contractually binding certified auditors to a three-year service commitment within their engineering units to lock in institutional memory and advance UN SDG 8.

The interpretation of these findings must be evaluated within the methodological limitations of the study. Primarily, data collection was restricted to a single-agency sample within the Subic Bay Metropolitan Authority, meaning that while the findings offer an exhaustive diagnostic of a major Freeport zone, organizational dynamics may differ in standard local government units or non-commercial public works departments. Additionally, empirical evaluations relied on self-administered perceptual ratings from active GFPS members across 4-point Likert scale, which despite statistical adjustment via Sample Standard Deviation using Bessel's correction remains inherently susceptible to self-reporting or institutional desirability bias. Finally, the cross-sectional design captures organizational capacity at a single snapshot in time, limiting the ability to measure longitudinal shifts in technical proficiency as personnel cycle through the authority.

To build upon these empirical baselines and overcome these limitations, a clear future research agenda is recommended for scholars and spatial planners. First, researchers should conduct longitudinal field evaluations of HGDG-certified infrastructure post-construction to empirically measure whether enforcing a pre-engineering gatekeeping threshold (≥15.0/20.0) tangibly reduces trip-chaining delays and alleviates travel time poverty for female commuters over multi-year operational lifecycles. Second, future studies should evaluate the real-time operational impacts of deploying live, GIS-mapped sex-disaggregated data registries during public procurement and pre-investment phases across municipal planning bodies. Lastly, scholars should expand this diagnostic framework into comparative, multi-site studies across diverse regional economic zones and national public works departments, investigating how contractually bound certification tracks and cross-functional pairing mechanisms influence personnel retention, technical proficiency, and spatial equity nationwide.

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Chairperson on July 1, 2025. Written informed consent was subsequently obtained from individual participants on July 16, 2025, during GAD Re-orientation meeting prior to data collection.

Data availability statement. All data supporting the findings of this study are included within the manuscript and its supplementary materials.

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