

Roadmap Implementation and Its Impact on Efficiency, Effectiveness, Quality, and Accessibility of Higher Education Institutions in Tawi-Tawi Province

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ABSTRACT:

This study assessed the extent of roadmap implementation and its influence on the performance indicators—efficiency, effectiveness, quality, and accessibility—of higher education institutions (HEIs) in Tawi-Tawi Province, Philippines, covering the academic years 2022–2025. Anchored on the CHED ACHIEVE Agenda 2025–2030 and the strategic framework for Philippine higher education, it utilized a descriptive-correlational and causal research design involving 320 respondents: administrators, faculty members, and graduates from four HEIs. Data were gathered using validated questionnaires and analyzed via weighted mean, standard deviation, Pearson r , and multiple regression analysis.

Results revealed a high extent of roadmap implementation across teaching pedagogy, quality assurance, curricular alignment, and general education reforms. Institutional performance was rated highly achieved in all four dimensions. Regression analysis confirmed that roadmap implementation significantly and positively predicts efficiency ($\beta=0.412$, $p<0.01$), effectiveness ($\beta=0.528$, $p<0.001$), quality ($\beta=0.487$, $p<0.001$), and accessibility ($\beta=0.553$, $p<0.001$). Quality assurance and curricular alignment emerged as the strongest predictors. The study concludes that strategic road mapping is a critical driver of institutional performance. Recommendations include strengthening digital transformation, expanding industry partnerships, and sustaining inclusive policies aligned with national reform agendas.

Keywords: Roadmap implementation, Efficiency, Effectiveness, Quality, Multiple regression analysis, Tawi-Tawi, Philippines

Introduction

Higher education worldwide is undergoing continuous reform to align with global standards, labor market demands, and national development goals. In the Philippines, the Commission on Higher Education (CHED) introduced the

Roadmap for Public Higher Education Reform (RPHER) and subsequently the ACHIEVE Agenda 2025–2030, designed to address longstanding challenges: lack of unified vision, uneven quality, and limited access to inclusive education. These reforms emphasize Advanced

and Accessible Lifelong Learning, Human Capital Development, and Quality Assurance as core priorities, directly shaping how HEIs plan, implement, and evaluate their programs.

Tawi-Tawi Province, part of the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM), hosts four major HEIs: Tawi-Tawi Regional Agricultural College (TRAC), Mindanao State University–Tawi-Tawi College of Technology and Oceanography (MSU-TCTO), Mahardika Institute of Technology (MIT), and Abubakar Computer Learning Center Foundation (ACLCFI). These institutions are the primary providers of tertiary education in the province, driving human capital development for regional needs in agriculture, fisheries, technology, and education. However, like many HEIs in geographically isolated and disadvantaged areas (GIDAs), they face unique barriers: limited infrastructure, inconsistent internet connectivity, small local funding pools, and the need to integrate indigenous cultural contexts with national and international education standards.

Research Gap and Significance of the Study

Earlier work by Jauhari et al. (2019) documented baseline levels of roadmap adoption in Tawi-Tawi's HEIs, but the higher education landscape has changed dramatically since 2017. Key shifts include the full implementation of the K–12 basic education program, the mass move to flexible learning during the COVID-19 pandemic, and the launch of the CHED ACHIEVE Agenda 2025–2030.

Most existing studies on strategic roadmapping in the Philippines focus on major urban centers or large state universities; very few examine how national reforms translate to practice in remote, conflict-affected regions like Tawi-Tawi. No recent empirical study has measured how roadmap implementation directly affects core performance metrics—efficiency, effectiveness, quality, and accessibility—for HEIs in the BARMM region.

This study fills this gap by providing updated, location-specific evidence on how strategic planning works in a GIDA context. Its findings

will help CHED, BARMM education agencies, and institutional leaders create policies that balance national standards with local needs. It will also serve as a reference for other remote regions seeking to improve higher education outcomes through strategic planning.

Objectives of the Study

To determine the extent of roadmap implementation and its impact on the performance of Higher Education Institutions (HEIs) in Tawi-Tawi Province during the period 2022–2025.

Specifically, it aimed to:

1. Assess the extent of roadmap implementation in terms of teaching pedagogy and flexible learning, quality assurance and accreditation, curricular alignment and industry responsiveness, and general education and foundational skills.
2. Evaluate the level of institutional performance in terms of efficiency, effectiveness, quality, and accessibility.
3. Determine if there is a significant relationship between roadmap implementation and the four performance dimensions of HEIs.
4. Measure the extent to which roadmap implementation predicts efficiency, effectiveness, quality, and accessibility.

Literature Review

Recent Empirical Evidence

Roadmapping is widely recognized as a tool to align institutional actions with policy goals. A 2023 study by Alvarez and Mendoza of 12 HEIs in Mindanao found that institutions with formal strategic plans scored 15–20% higher on quality assurance and graduate employability metrics, though implementation gaps remained in remote areas.

Similarly, a 2024 analysis by the Congressional Commission on Education (EdCOM II) noted that while 89% of public HEIs in the Philippines have adopted national roadmaps, only 41% of HEIs in GIDAs have fully integrated these plans

into day-to-day operations, citing limited technical capacity as the main barrier.

In the BARMM region, Basir et al. (2022) studied five HEIs in Sulu and found that inclusive policies aligned with national reform agendas were the strongest factor in expanding access for indigenous and low-income learners, but digital infrastructure gaps reduced the efficiency of service delivery.

These findings align with the 2019 baseline study by Jauhari et al., which found that Tawi-Tawi's HEIs had made initial progress in roadmap adoption but lacked data linking implementation to actual performance outcomes. This study builds on these works by using causal-predictive analysis to measure direct impacts, rather than just describing implementation status.

Methodology

Research Design

This research employed a descriptive-correlational and causal-predictive mixed-methods design (Creswell & Plano Clark, 2018). The descriptive component documented current levels of roadmap adoption and institutional performance.

The correlational component tested the strength and direction of links between planning practices and performance metrics. The causal-predictive component measured how much variance in performance could be explained by roadmap implementation. Quantitative survey data were complemented by qualitative interviews to explain why patterns occurred and to capture context not covered by closed-ended questions.

Research Locale

This research was conducted across all four higher education institutions operating in Tawi-Tawi Province, covering both public and private providers:

- **Public institutions:** Tawi-Tawi Regional Agricultural College (TRAC), focused on agricultural and related sciences; Mindanao State University–Tawi-Tawi College of Technology and Oceanography (MSU-TCTO), offering

specialized programs in technology, fisheries, and ocean studies.

- **Private institutions:** Mahardika Institute of Technology (MIT), providing technical and professional courses; Abubakar Computer Learning Center Foundation Inc. (ACLCFI), offering programs in computer science, business, and education.

This selection ensured representation across institutional types, program focuses, and governance structures.

Participant Selection and Sampling

The total sample of 320 respondents was calculated using Slovin's Formula with a 5% margin of error, applied to the combined population of 712 administrators, faculty, and recent graduates from the four HEIs. The sampling strategy was as follows:

- **Administrators (40 respondents):** Total enumeration was used, including all presidents, vice presidents, deans, and department heads across the four institutions to capture top-level planning perspectives.
- **Faculty members (180 respondents):** Stratified random sampling was used to ensure representation across disciplines (agriculture, education, technology, business, arts & sciences) and institutional type (public/private). Proportional allocation was used to match faculty size at each HEI.
- **Graduates (100 respondents):** Simple random sampling was applied to the 2022–2024 graduate cohorts of each institution, with invitations sent via contact information provided by institutional registrar offices.

This approach minimized selection bias and ensured views from all key stakeholder groups were included.

Research Instrument

The structured questionnaire was adapted from Jauhari et al. (2019), updated to reflect CHED's Flexible Learning Framework (2021), Program Standards and Guidelines (2023), and the

ACHIEVE Agenda (2025). It consists of four parts:

- Part I: 28 items measuring roadmap implementation across four domains (teaching pedagogy, quality assurance, curricular alignment, general education), using a 4-point Likert scale (1=Low/Strongly Disagree to 4=Very High/Strongly Agree).
- Part II: 24 items measuring institutional performance across efficiency, effectiveness, quality, and accessibility, using the same 4-point scale.
- Part III: 5 items on graduate employment and program relevance.
- Part IV: 7 open-ended interview questions exploring implementation barriers, successes, and suggested improvements.

Validity and Reliability

Content validation was conducted by three experts in educational management, curriculum development, and research methods, resulting in a Content Validity Index (CVI) of 0.92, indicating high alignment with study objectives.

A pilot test with 25 faculty members not in the main sample produced a Cronbach's alpha of 0.89, confirming strong internal consistency. Ethical clearance was granted by the Tawi-Tawi Regional Agricultural College Research Ethics Committee (Protocol No. TRAC-REC-616-623), and all participants provided written informed consent.

Data Collection Procedures

Data gathering took place between January and March 2025. To maximize participation across remote islands in the province:

- Paper surveys were distributed and collected in person at main campuses in Bongao and Sanga-Sanga.

- Digital surveys (via Google Forms) were sent to respondents based in outlying islands or working off-campus, with links shared via email and official institutional messaging groups.

- Follow-up interviews were conducted with 20 purposively selected informants (5 per institution: 2 administrators, 2 faculty, 1 graduate) via face-to-face discussions or secure video calls, each lasting 30–45 minutes. Interviews were audio-recorded with permission and transcribed verbatim.

All responses were anonymized, with no identifying information included in the final dataset.

Data Analysis Procedures

- Descriptive statistics: Weighted mean and standard deviation were calculated to summarize implementation and performance levels, using standard benchmarks for the 4-point scale.

- Correlation analysis: Pearson Product-Moment Correlation (Pearson r) was used to test the strength and significance of relationships between roadmap implementation and each performance dimension.

- Inferential statistics: Multiple linear regression was run to measure how much of the variance in each performance indicator could be explained by roadmap implementation, controlling for institutional type as a covariate.

- Qualitative analysis: Interview transcripts were coded using thematic analysis to identify recurring themes related to barriers, enablers, and impacts.

All quantitative analyses were performed using SPSS Version 26, with significance set at $\alpha=0.05$.

Results and Discussion

Extent of Roadmap Implementation

Table 1 Extent of Roadmap Implementation

Indicators	Mean	SD	Description
Teaching Pedagogy & Flexible Learning	3.28	0.42	High
Quality Assurance & Accreditation	3.35	0.39	High
Curricular Alignment & Industry Linkage	3.41	0.36	High
General Education & Foundational Skills	3.32	0.40	High
Overall Implementation	3.34	0.37	High

Scale: 3.51–4.00 = Very High; 2.51–3.50 = High; 1.51–2.50 = Moderate; 1.00–1.50 = Low

Simple Explanation: All four roadmap areas are being implemented well. The strongest progress is in updating courses to match what industries and local communities need, while flexible teaching methods are the most common area for improvement.

Results show high implementation across all domains. Curricular alignment had the highest rating (3.41), reflecting regular program reviews and consultations with industry partners—consistent with CHED’s push for labor market relevance (CHED, 2025). Quality assurance (3.35) was also high, though only 30% of programs hold formal accreditation, a gap seen across GIDA HEIs (EdCOM II, 2024). Teaching pedagogy (3.28) shows widespread adoption of

blended learning, accelerated by pandemic-era shifts. Qualitative feedback noted: “We now revise syllabi every two years and consult industry partners in Bongao and Zamboanga to ensure our courses are relevant” (Administrator, MSU-TCTO, 2025).

Comparison with Previous Research: This is a clear improvement over Jauhari et al. (2019), who found “moderate” implementation overall, with curricular alignment rated lowest. The gains likely stem from clearer national guidelines and stronger regional coordination since 2020. Like Alvarez and Mendoza (2023), we found compliance with national standards is strong, but formal accreditation lags due to limited funding and technical support.

Level of Institutional Performance

Table 2 Level of Performance Indicators

Dimensions	Mean	SD	Description
Efficiency	3.18	0.44	Highly Achieved
Effectiveness	3.31	0.41	Highly Achieved
Quality	3.27	0.38	Highly Achieved
Accessibility	3.45	0.35	Highly Achieved
Overall Performance	3.30	0.36	Highly Achieved

Simple Explanation: All four performance areas are meeting targets. Access to education has improved the most, while using resources efficiently remains the biggest challenge.

Accessibility was the highest-rated dimension (3.45), linked to the Free Higher Education Law (RA 10931) and expanded BARMM scholarships, which grew total enrollment from 12,000 in 2019 to 18,500 in 2024. Effectiveness (3.31) is supported by data showing 78% of graduates find work within six months, and 65% work in fields matching their degree (PSA & DOLE, 2024). Quality (3.27) reflects that 62% of faculty hold master’s degrees and 18% hold doctorates—

above regional averages. Efficiency (3.18) was the lowest, due to slow digitalization of administrative systems and limited budget for research and production facilities.

Comparison with Previous Research: The strong accessibility results match Basir et al. (2022), who found that targeted funding removes barriers for marginalized learners. However, efficiency scores here are lower than those reported for mainland Mindanao HEIs (Alvarez & Mendoza, 2023), confirming that remote locations impose extra costs and delays that reduce operational efficiency.

Relationship Between Roadmap Implementation and Performance

Table 3 Correlation Matrix

Variable	Efficiency	Effectiveness	Quality	Accessibility
Road Map Implementation	0.472*	0.584*	0.541*	0.612*

*p<0.01

Simple Explanation: Better roadmap implementation is consistently linked to better performance. The strongest link is between planning and expanding access to education.

All correlations were positive and statistically significant, meaning stronger roadmap

implementation is associated with better outcomes across all four dimensions. The link was strongest for accessibility (r=0.612) and effectiveness (r=0.584), supporting the theory that systematic planning is foundational to institutional success (Corominas et al., 2012).

Predictive Impact of Roadmap Implementation

Table 4 Multiple Regression Results

Dependent Variable	R²	F	β	p-value
Efficiency	0.223	22.47	0.412	0.000
Effectiveness	0.341	41.26	0.528	0.000
Quality	0.293	33.18	0.487	0.000
Accessibility	0.374	48.72	0.553	0.000

Simple Explanation: Roadmap implementation directly drives better performance. It explains

37% of improvements in accessibility and 22% of improvements in efficiency—meaning planning

matters most for access, but other factors also shape how well resources are used.

All beta coefficients were significant at $p < 0.001$. Quality assurance and curricular alignment were the strongest predictors across all outcomes. Roadmap implementation explains more than one-third of gains in accessibility and effectiveness, showing it is a key driver of positive change. Efficiency was affected by external factors like funding and infrastructure more than other dimensions, consistent with EdCOM II (2024) findings on GIDA constraints.

Conclusions

Fully supported by study findings, HEIs in Tawi-Tawi have implemented national higher education roadmaps to a high degree, with strong performance in updating curricula and meeting quality standards. All four core performance dimensions—efficiency, effectiveness, quality, and accessibility—are rated as highly achieved, with accessibility showing the strongest gains. There is a significant positive relationship between roadmap implementation and every performance dimension. Furthermore, roadmap implementation is a statistically significant predictor of performance, with quality assurance and curricular alignment having the greatest impact.

Practical Applications and Beneficiaries

The findings can be used directly by several key groups. For CHED and the BARMM Ministry of Basic, Higher, and Technical Education, the results can inform the design of targeted support programs, such as technical assistance for accreditation and funding for digital infrastructure, tailored to the needs of remote HEIs. Institutional leaders in Tawi-Tawi and other similarly geographically isolated and disadvantaged areas (GIDAs) can use these insights to prioritize roadmap activities—specifically quality assurance and industry partnerships—and allocate resources where they will have the biggest impact. Policymakers can draw on this study to strengthen inclusive education policies and recognize that strategic

planning requires accompanying investments in infrastructure for isolated regions. Finally, researchers can use the work as a baseline for future studies on higher education reform in conflict-affected and geographically isolated areas.

Study Limitations

This research has several limitations. Data were collected from four HEIs in one province, so findings may not fully represent all BARMM or Philippine GIDA HEIs. Self-reported survey data may reflect social desirability bias; administrative records and independent assessments were not used to verify responses. The study covers only the 2022–2025 period; long-term impacts and shifts after the ACHIEVE Agenda is fully rolled out cannot be measured. Additionally, external factors like local economic conditions and regional political changes were not included as control variables in the analysis.

Directions for Future Research

Future studies should expand the scope by including more HEIs across other BARMM provinces to enable regional comparisons. They should also combine survey data with administrative records and independent program assessments to reduce bias. Conducting longitudinal research will be valuable to track implementation and performance over 5–10 years. Finally, further work should examine how external factors such as local economic growth and cross-regional partnerships interact with roadmap implementation to shape outcomes.

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