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Predictive Role of Innovation Strategies on Organizational Performance among State Universities and Colleges in Region XII, Philippines

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Abstract
Despite the crucial role of state universities and colleges (SUCs) in regional development, achieving consistent organizational performance remains a challenge, particularly in adapting to evolving educational demands. This study assesses the impact of innovation strategies influence performance within SUCs in Region XII, examining how technological and management innovations affect organizational performance in instruction, research, and extension services. Using a descriptive-correlational research design, data were collected from 219 administrators and faculty members across five key institutions. The results show strong performance in instruction, research, and extension services. Both technological and management innovations are actively practiced, indicating a robust culture of innovation. Regression analysis demonstrates that technological innovation has a substantial effect on performance, with a coefficient of 0.485 ($p < 0.001$), compared to management innovation with a coefficient of 0.220 ($p = 0.001$). The model accounts for 62% of the variance in performance. Although performance levels are generally high, variability in research and extension services points to potential areas for improvement. The findings highlight the importance of advancing technological innovations and addressing performance inconsistencies to enhance institutional effectiveness. This research offers valuable insights for policymakers and administrators aiming to optimize innovation strategies to improve the performance of higher education institutions.

Keywords
Innovation Strategies, Organizational Performance, State Universities and Colleges, Region XII, Philippines

INTRODUCTION

In today's rapidly evolving global landscape, innovation strategies have emerged as a pivotal factor in achieving sustained organizational growth and competitiveness. Within the realm of higher education, these strategies encompass a range of initiatives designed to foster creativity, adaptability, and efficiency. Innovation strategies in educational institutions typically involve the integration of advanced technologies, the introduction of novel academic programs, and the refinement of administrative processes (Sharma & Sharma, 2021). Such strategies are not merely tools for enhancing operational efficiency; they represent a paradigm shift towards a more dynamic and responsive educational framework (Voulvoulis et al., 2022). In state universities and colleges, where resource constraints and bureaucratic challenges often impede progress, embracing innovation strategies is crucial to addressing the multifaceted challenges of globalization, technological disruption, and evolving workforce demands (Baron & Robles, 2023).

Organizational performance in state universities and colleges is a multifaceted construct that reflects the institution's ability to achieve its instruction, research, and extension objectives (Baron & Robles, 2023; Janer et al., 2022). High-performing institutions are distinguished by their commitment to delivering quality education, producing impactful research, and maintaining a robust reputation in the academic community (Casanova, 2021). For state universities and colleges, organizational performance is not only a benchmark of success but also a determinant of their ability to secure funding, attract and retain talented faculty and students, and fulfill their mission of serving as engines of societal development and innovation.

Despite the critical role of innovation strategies in shaping organizational performance, there remains a paucity of empirical research focused on their specific impact within state universities and colleges, particularly in Region XII. The extant literature predominantly examines the private sector or addresses innovation in a generic context, often neglecting the unique challenges and opportunities inherent in state-run educational institutions. Furthermore, the distinct cultural, economic, and educational characteristics of Region XII necessitate a detailed exploration of how innovation strategies are deployed and their subsequent effects on organizational performance. This research gap highlights the need for targeted investigations that consider regional specificities and provide actionable insights for leveraging innovation to drive performance improvements in higher education.

Thus, the purpose of this study is to explore the role of innovation strategies on organizational performance among state universities and colleges in Region XII. This research aims to elucidate the extent to which innovation strategies contribute to enhancing institutional effectiveness and achieving strategic objectives. Moreover, examining this relationship, the study seeks to advance the academic discourse on innovation in higher education and offer evidence-based recommendations for university administrators and policymakers. The findings are expected to inform strategic decision-making processes and underscore the importance of fostering an innovation-oriented culture within state universities and colleges, thereby ensuring their continued success and relevance in a rapidly changing educational landscape.

RESEARCH OBJECTIVES

This study aims to investigate the role of innovation strategies on organizational performance among state universities and colleges in Region XII. Specifically, it seeks to achieve the following objectives:

1. To assess the extent of innovation strategies employed by state universities and colleges in Region XII, focusing on technological and management innovations.
2. To evaluate the level of organizational performance among state universities and colleges in Region XII, using the following parameters: instruction, research, and extension services.
3. To determine the significant relationship between the extent of innovation strategies employed and the level of organizational performance among state universities and colleges in Region XII.
4. To predict the role of innovation strategies in organizational performance among state universities and colleges in Region XII, utilizing regression analysis to forecast the impact of technological and management innovations on performance outcomes.

HYPOTHESIS

The null hypothesis was tested at a significance level of $\alpha = 0.05$.

$H0_1$: There is no significant relationship between the extent of innovation strategies employed to the level of organizational performance among state universities and colleges in Region XII.

$H0_2$: Innovation strategies (technological and management) do not significantly predict the level of organizational performance among state universities and colleges in Region XII.

MATERIAL AND METHODS

This study utilized a descriptive-correlational research design to investigate the predictive influence of innovation strategies on organizational performance within state universities and colleges in Region XII. The research focused on five prominent institutions in the region: Mindanao State University (MSU), South Cotabato State College (SCSC), Sultan Kudarat State University (SKSU), University of Southern Mindanao (USM), and Cotabato Foundation College of Science and Technology (CFCST).

The study targeted administrators, faculty members, and staff with administrative roles across these institutions. To ensure a representative sample, a stratified random sampling technique was employed (Baron, 2022; Baron, 2024). From a population of 504 administrators, a sample of 219 respondents was selected.

Data collection was conducted using a researcher-developed instrument that was rigorously validated and pilot-tested to confirm its validity and reliability (Baron, 2024). The analysis involved descriptive statistics, specifically mean calculations, to summarize the data. Additionally, multiple linear regression analysis was applied to examine the relationships between innovation strategies and organizational performance. This approach facilitated an understanding of how different aspects of innovation influence performance outcomes in the sampled institutions.

RESULTS AND DISCUSSION

Table 1 Organizational Performance of SUCs in Region XII

Organizational Performance of SUCs in Region XII	Mean	SD	Qualitative Description
Instruction	4.17	0.57	Very Satisfactory
Research	3.95	0.68	Very Satisfactory
Extension	3.87	0.73	Very Satisfactory
Overall Mean	**3.99**	**0.61**	**Very Satisfactory**

Legend: 4.50-5.00 Outstanding Performance, 3.50-4.49 Very Satisfactory Performance, 2.50-3.49 Satisfactory Performance, 1.50-2.49 Unsatisfactory, 1.00-1.49 Poor Performance

Table 1 illustrates that state universities and colleges (SUCs) in Region XII exhibit a high level of performance across the evaluated domains. The mean score for instruction is 4.17, with a standard deviation of 0.57. This indicates that SUCs consistently fulfill their instructional responsibilities with notable satisfaction and uniformity.

In the research domain, the mean score is 3.95, with a standard deviation of 0.68. This score signifies a very satisfactory level of performance, though it exhibits slightly more variability than instruction. The variability suggests that, while most institutions perform well in research, there are discernible differences in research output and effectiveness among institutions.

Extension services show a mean score of 3.87 and a standard deviation of 0.73. Although this score is still within the very satisfactory range, it is slightly lower compared to instruction and research scores. The increased variability indicates that the effectiveness of extension services varies more significantly across institutions.

The overall mean score of 3.99, with a standard deviation of 0.61, confirms a generally high level of organizational performance among SUCs in Region XII. The strong performance across instruction, research, and extension services highlights effective institutional practices (Schueler et al., 2022). However, the observed variability, particularly in research and extension services, suggests that there are opportunities for targeted improvements. Addressing this variability could lead to enhanced performance consistency across institutions.

Table 2 Innovation Strategies Employed Among State Universities and Colleges in Region XII

Innovation Strategies Employed Among SUCs in Region XII	Mean	SD	Qualitative Description
Technological Innovation	3.73	0.72	Highly Practiced
Management Innovation	3.83	0.68	Highly Practiced
Overall Mean	**3.78**	**0.67**	**Highly Practiced**

Legend: 4.50-5.00 Very Highly Practice, 3.50-4.49 Highly Practice, 2.50-3.49 Moderately Practice, 1.50-2.49 Less Practice, 1.00-1.49 Least Practice

Table 2 provides an overview of the innovation strategies employed by state universities and colleges (SUCs) in Region XII. The data reveal that both technological and management innovations are extensively practiced across these institutions.

The mean score for technological innovation is 3.73, with a standard deviation of 0.72. This result indicates that technological innovations are actively implemented and are well-regarded within these institutions. Although the score is high, the moderate variability suggests that there is some inconsistency in how different institutions apply technological innovations.

For management innovation, the mean score is 3.83, with a standard deviation of 0.68. This score reflects a similar level of practice, demonstrating that management innovations are also highly valued and broadly employed. The slightly higher mean score and moderate variability imply a strong commitment to management innovation, though its application may vary among institutions.

The overall mean score of 3.78, with a standard deviation of 0.67, indicates a high general practice of innovation strategies among SUCs in Region XII. The consistently high scores across both technological and management innovations suggest a robust culture of innovation within these institutions (Scaliza et al., 2022). However, the observed variability in scores points to differences in the extent and effectiveness of innovation implementation across institutions. Addressing these differences could enhance the overall impact of innovation strategies within the region.

Table 3 Regression Coefficients for Innovation Strategies and Organizational Performance

Variable	B	Std. Error	β	t	p
Intercept	1.344	.147		9.128	.000
Technological Innovation (TI)	0.485	.065	.573	7.523	.000
Management Innovation (MI)	0.220	.068	.245	3.224	.001

Table 3 presents the regression coefficients for the model analyzing the impact of innovation strategies on organizational performance among state universities and colleges (SUCs) in Region XII. This table details the relationship between organizational performance and the predictors of technological and management innovations.

The intercept, with a coefficient of 1.344 and a standard error of 0.147, represents the expected level of organizational performance when both technological and management innovations are not applied. The statistical significance of this intercept is confirmed by a t-value of 9.128 and a p-value of 0.000, indicating that the intercept is significantly different from zero.

Technological innovation (TI) shows a coefficient of 0.485, with a standard error of 0.065. The standardized beta coefficient (β) of 0.573 and a t-value of 7.523 suggest a significant positive effect of technological innovation on organizational performance. The p-value of 0.000 supports the conclusion that increased technological innovation is associated with improved organizational performance, highlighting its substantial impact.

Management innovation (MI) has a coefficient of 0.220 and a standard error of 0.068. The standardized beta coefficient (β) of 0.245 and a t-value of 3.224 indicate a positive effect on organizational performance. Although this effect is statistically significant with a p-value of 0.001, it is less pronounced compared to technological innovation.

Overall, the regression coefficients reveal that both technological and management innovations significantly influence organizational performance, with technological innovation exerting a stronger effect. These results emphasize the critical role of technological innovation in enhancing the performance of SUCs, while also recognizing the positive contribution of management innovations (Duman & Akdemir, 2021). The findings underscore the importance of prioritizing technological advancements to drive improvements in organizational performance.

Table 4 Regression Analysis of Variance (ANOVA) for Innovation Strategies and Organizational Performance

Source	SS	Df	MS	F	p
Regression	49.791	2	24.896	178.555	.000
Residual	30.117	216	0.139		
Total	**79.908**	**218**			

Table 4 displays the results of the Analysis of Variance (ANOVA) for the regression model assessing the impact of innovation strategies on organizational performance among state universities and colleges (SUCs) in Region XII. This analysis evaluates the overall significance of the regression model.

The regression sum of squares (SS) is 49.791, with 2 degrees of freedom (Df), yielding a mean square (MS) of 24.896. The F-value of 178.555, accompanied by a p-value of 0.000, indicates that the regression model is highly significant. This result demonstrates that the model explains a substantial proportion of the variance in organizational performance, affirming its effectiveness.

The residual sum of squares is 30.117, with 216 degrees of freedom, resulting in a mean square for residuals of 0.139. The total sum of squares amounts to 79.908, with 218 degrees of freedom.

The high F-value and the statistically significant p-value confirm that the regression model provides a meaningful improvement in predicting organizational performance. This finding highlights that the combined effect of technological and management innovations significantly contributes to explaining the variance in organizational performance among SUCs in Region XII (Donbesuur et al., 2020).

Table 5 Model Summary

Model	R	R^2	Adjusted R^2	SE	F	p
Overall Model	0.787	0.620	0.616	0.373	178.555	.000

Table 5 presents the summary statistics for the regression model evaluating the impact of innovation strategies on organizational performance among state universities and colleges (SUCs) in Region XII. This table provides critical metrics including the correlation coefficient, R^2, adjusted R^2, standard error, F-value, and p-value.

The correlation coefficient (R) of 0.787 reflects a strong positive relationship between innovation strategies and organizational performance. This suggests that an increase in the extent of innovation strategies is associated with significant performance improvements.

The coefficient of determination (R^2) is 0.620, indicating that 62.0% of the variance in organizational performance is explained by the model, which incorporates both technological and management innovations. This substantial R^2 value underscores the model's considerable explanatory power, highlighting the importance of innovation strategies in accounting for performance variability.

The adjusted R^2 is 0.616, providing an adjusted measure of the model's explanatory power that accounts for the number of predictors included. This adjustment is essential for assessing the model's effectiveness in explaining performance variance while considering the complexity introduced by multiple predictors.

The standard error (SE) of 0.373 denotes the average deviation between observed values and model predictions. A lower standard error indicates a better model fit, reflecting the model’s accuracy in predicting organizational performance.

The F-value of 178.555, with a p-value of 0.000, signifies that the regression model is statistically significant. This high F-value demonstrates that the model effectively improves the prediction of organizational performance compared to a model with no predictors.

In summary, the model summary highlights the regression model's strong explanatory power and statistical significance. The substantial R^2 and adjusted R^2 values, along with the low standard error and significant F-value, confirm that technological and management innovations significantly account for variations in organizational performance among SUCs in Region XII. This emphasizes the effectiveness of these innovation strategies in enhancing institutional performance.

FINDINGS AND CONCLUSIONS

Findings

The assessment of organizational performance among state universities and colleges (SUCs) in Region XII indicates a high level of effectiveness across the three key areas: instruction, research, and extension services. The mean score for instruction is 4.17, with a standard deviation of 0.57, signifying that SUCs consistently deliver high-quality instructional services. Research performance is slightly lower, with a mean score of 3.95 and a standard deviation of 0.68, suggesting that while most institutions excel in research, there is some variability in output and effectiveness. Extension services, with a mean score of 3.87 and a standard deviation of 0.73, also fall within the very satisfactory range but exhibit more variability compared to instruction and research. The overall mean score of 3.99, with a standard deviation of 0.61, reflects a generally high level of performance across these areas.

Regarding innovation strategies, both technological and management innovations are highly practiced among SUCs in Region XII. The mean score for technological innovation is 3.73, and for management innovation, it is 3.83, with an overall mean of 3.78. These scores indicate that innovation practices are actively implemented and well-regarded across the institutions, highlighting a robust culture of innovation.

Regression analysis reveals that both technological and management innovations significantly impact organizational performance, with technological innovation having a more substantial effect ($B = 0.485$, $p < 0.001$) compared to management innovation ($B = 0.220$, $p = 0.001$). This finding underscores the greater influence of technological advancements on performance improvements. The model fit is strong, with an R^2 value of 0.620, indicating that approximately 62% of the variance in organizational performance is explained by the model. The F-value of 178.555 ($p < 0.001$) confirms the overall significance of the regression model in explaining performance variability.

Conclusions

The findings demonstrate that state universities and colleges in Region XII perform exceptionally well in instruction, research, and extension services, achieving high levels of effectiveness. Innovation practices, both technological and management, are integral to these institutions, with technological innovations playing a particularly significant role in enhancing organizational performance. The strong model fit and statistical significance further affirm the critical role of innovation strategies in influencing performance outcomes.

Despite the high overall performance, the observed variability, particularly in research and extension services, suggests areas for targeted improvement. Institutions could benefit from strategic initiatives aimed at addressing these disparities and leveraging innovation more effectively to achieve consistent excellence across all areas. Overall, the results underscore the importance of continuing to foster a robust culture of innovation to sustain and enhance institutional performance.

RECOMMENDATIONS

To build on the high levels of performance and innovation observed among state universities and colleges (SUCs) in Region XII, several recommendations are proposed. First, institutions should place a greater emphasis on technological innovations, as these have been shown to significantly enhance organizational performance. Investing in advanced technologies and exploring new tech trends can drive substantial improvements and ensure that SUCs remain competitive and effective.

Additionally, there is a need to standardize and elevate research practices across institutions. By establishing clear guidelines and support systems for research, SUCs can reduce variability and enhance the overall quality and impact of their research outputs. Regular training and workshops for researchers can further support these efforts.

To address the observed variability in extension services, SUCs should focus on enhancing the effectiveness and consistency of these programs. Implementing best practices and actively seeking feedback from communities can help standardize the quality of extension services and ensure that they meet high standards across the board.

Fostering a culture of continuous innovation is also crucial. SUCs should create environments that encourage ongoing experimentation and improvement. Innovation hubs or centers of excellence could be established to support and drive new ideas in both technological and management innovations.

Monitoring and evaluating the impact of innovation strategies on organizational performance should be a continuous process. Developing robust systems for tracking the outcomes of these initiatives can provide valuable insights for refining and enhancing their implementation.

Promoting collaboration and knowledge sharing among SUCs can facilitate the dissemination of successful practices and innovations. Joint initiatives and partnerships can lead to better resource utilization and improved overall performance.

Investing in the professional development of faculty and staff is essential for sustaining high performance. Providing training programs and career development opportunities can enhance skills and support the effective implementation of innovation strategies.

Finally, addressing performance variability is key. Tailored interventions should be designed to support institutions with lower performance levels, helping them align with best practices and improve their outcomes.

Hence, in implementing these recommendations, SUCs in Region XII can strengthen their organizational performance, more effectively leverage innovation strategies, and achieve greater consistency and impact in their operations.

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The author declares that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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