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1. All articles must have a high degree of scholarship;
2. All articles must be evaluated thru double-blind system by selected referees for publication;
3. The articles may either be written in English or Filipino. All articles written in either languages must be accompanied by an Abstract which is written in English;
4. All contributions must be original;
5. Articles must use APA style sheet; and,
6. Articles must be typed single-spaced, Times New Roman 11 pts on letter-sized (8 x11) paper in not more than twelve (12) pages.

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THE INFLUENCE OF EDUCATIONAL ENVIRONMENT AND SELF-REGULATED LEARNING (SRL) ON THE SCIENTIFIC EPISTEMIC BELIEFS OF SENIOR HIGH STUDENTS

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ABSTRACT

The study explored the influence of educational environment and self-regulated learning on the scientific epistemic beliefs of senior high students. The researcher used a quantitative, descriptive, correlational technique in this study. The research involved 306 respondents from Cateel Vocational High School, S.Y. 2025-2026, using stratified sampling and an adapted 5-point Likert-type questionnaire as the survey instrument. In analyzing data, the weighted mean, Pearson- r, and linear regression were used in this study. Results showed that the level of educational environment is high, and Self-regulated learning on the scientific epistemic belief is also high. Educational environment and self-regulated learning significantly influence the scientific epistemic beliefs of senior high students. This study is anchored to Bandura's social cognitive theory, emphasizing that individuals can learned through observation and modeling. This study suggests that students should engage in self-regulated learning techniques, which allow them to set goals, monitor, plan, and reflect on learning experiences, supporting Zimmerman's social cognitive model of self-regulated learning.

Keywords: *Educational Environment, Self-Regulated Learning, Scientific Epistemic Belief*

INTRODUCTION

It is alarming how many students struggle to anticipate the lessons in the classroom. This phenomenon often starts with students becoming disinterested in participating in class, ultimately leading them to stop studying altogether. One of the factors that affects student engagement is epistemological beliefs. Keep in mind that our beliefs can shape how well we perform and how engaged we are in a task. Students today do not look forward to receiving instruction when they think about learning science. As a result, it became a matter of concern for parents and teachers to motivate students to participate actively and work together in class. According to Su et al. (2022), fostering responsibility requires students to actively engage in their education through scientific research and hands-on experience. These convictions are essential to the process and to how an individual interprets and understands the information.

Many studies have demonstrated that a learner's epistemological beliefs can impact various facets of their cognitive processes, such as performance, self-perception of competence, enjoyment of school, metacognitive practices, monitoring behavior, learning strategies employed, persistence, confidence levels, and overall academic success. Otherwise, it leads them to choose an asynchronous learning platform. According to Mughal A. W. (2020), some of the conditions that place students under significant pressure to quit studying and concentrate include large family sizes and Financial difficulties. Heibutzki (2019) claims that if students lack good time management skills, their motivation and academic performance will decline. The idea is for students to be able to prioritize their time so they do not skills overwhelmed by a large amount of work. Nevertheless, teachers' involvement will increase students' interest in class, leading to motivation. Still, the teacher's lack of time management during the class also caused low motivation to learn among the learners, thereby affecting their overall motivation to learn (Carnegie Mellon University, 2019).

By considering the scientific epistemic beliefs of senior high students in designing educational interventions and curriculum development, and understanding the factors that shape students` scientific epistemic beliefs, educators can design interventions and curricula that are more effective in promoting deep learning and critical thinking. Given the numerous obstacles to the Philippines' academic attainment, improving the curriculum is a crucial and pressing issue. According to the Program for International Student Assessment (Organization for Economic Co-operation and Development, 2023) (OECD, 2023), Filipino kids perform comparatively poorly in important academic subjects like science.

The Philippines prompts an intriguing inquiry about the curricular practices to enhance the quality of education in the Philippines, which is significant as we aim to improve the educational outcomes and opportunities for Filipino students through an effective, quality curriculum OECD PISA 2022. Furthermore, by providing quality education and enhancing students' epistemic beliefs, educators can develop a more informed, critical, and engaged citizenry.

Roff and McAleer (2019) have shown that a hostile, dictatorial, stressful, or competitive setting can demotivate students and reduce their interest in and dedication to the learning process. In line with this, Maya et al. (2019) observed that students will perform best in a controlled atmosphere that is conducive to the academic and social needs of the students. The atmosphere in the classroom needs to be relaxed, free from threats and anxiety, non-competitive, and thought-provoking to allow students to participate and enjoy the lesson. Therefore, the student's interest in and attitude toward the material being taught could be improved in such an environment, and the curriculum studies concerning curricular benchmarks must also be acknowledged. This disparity presents a priceless opportunity to learn more about the distinctive strategies employed by the educational system. The gap in outcomes and ranking from the Program for International Student Assessment (PISA). Hence, this study has a greater potential to create a more knowledgeable, skilled, and empowered population that can help solve complex challenges facing our world today.

REVIEW OF LITERATURE

The perception of the educational environment is a major contributor to the scholastic view and mindset of students in terms of their learning capacity and contentment. The way students influence and perceive their educational environment, like its ambiance, laboratories, facilities offered, the system of the institution, and even the behavior of teachers towards learning transfer, may affect the students` perception of the educational environment as a whole. According to Roff et al. (2020), the educational environment, as students see it, is one of the key factors that shape the success of a curriculum. Therefore, creating a positive and healthy classroom environment is advantageous for both teachers and students. One could argue that the classroom environment and its many facets are crucial in transforming the school into one of the key agents of social change, as it nurtures deep self-directed learning in students and promotes good practices in the classroom (Benali, A. & Chichou, H. 2020).

Teaching behavior is an important element in supporting student learning and achievement, as stressed by Andre et al. (2020) and Fernandez-Garcia et al. (2019). Students are increasingly recognizing that learning is not just about knowledge delivery, but a cognitive process of knowledge construction strongly influenced by social, cultural, and emotional factors. Teachers must ensure that their students are engaged in the learning process to optimize each student's learning and development and to prevent gradual disengagement, school failure, or dropout. Havik & Westergard (2019) found that the amount of a teacher's experience had a positive effect on student achievement. In line with this, Students can ask for assistance from teachers and more experienced peers who can scaffold them to find solutions when they run across issues that they are unable to resolve on their own or develop solutions (Jong, 2019). In particular, student evaluations of a teacher's efficacy guide a teacher's development (H. Chen et al., 2021), and receiving feedback on their teaching methods enables them to better understand how they educate (Göbel et al., 2021).

Including student voices in educational processes supports procedures that give students a forum for discussing their education (Finefter-Rosenbluh, 2022).

From the viewpoint of Flook et al. (2020), students` academic self-perception relates to their intrinsic academic motivation and self-confidence, which ultimately enhances students` engagement and focus on studies needed to succeed in today's demanding academic contexts. Flook et al. (2020) also suggest and believe that positive academic perceptions significantly affect students` academic achievement.

Building academic self-perceptions could involve aspects like self-esteem and self-confidence. Students' perceptions of themselves shape the effort they put into school, their educational aspirations, and their academic success. As a result, students may repeatedly go through cycles of forming and reforming their academic self-perceptions based on their experiences with successes and failures in their studies. Moreover, as noted by Flook et al. (2020), teachers' and parents' evaluations play a crucial role in shaping students' academic self-perceptions. Active learners who successfully manage the cognitive, motivational, and behavioral aspects of their learning are typically characterized as self-regulated learners. A strong sense of self-efficacy is part of academic self-regulation, and it is linked to a student's resilience—their ability to bounce back from setbacks.

In support of this, the pupils will gain from self-regulated learning as they strive to plan, cover, and estimate each literacy task, according to El-AdI & Alkharusi (2020). A pivotal element of scholars' education is self-regulated learning, which enables them to set literacy objectives, track their progress, select tactics, and produce literacy surroundings (McMillan & Moore, 2020). The systematic application of metacognition, motivation, and behavior is the main component of self-regulated learning. Hence, according to Mustofa, Nabela et al. (2019), self-regulated learning helps learners become aware of the mental processes they use when performing cognitive tasks and managing their learning activities. According to research by Zimmerman (2019), students are more likely to maintain focus and motivation during their learning journey if they set specific goals and create a plan to reach them. Students can concentrate on relevant tasks and manage their time and resources well by establishing clear objectives. By establishing realistic goals, students can evaluate their progress and modify their approaches. Through monitoring, students can pinpoint their weaknesses and adapt their learning strategies to address them. Students can achieve more effective learning outcomes by focusing on areas that need improvement when they regularly assess their understanding of the material, as noted by Pintrich and De Groot (2019).

A study conducted by Wang and Liu (2020) demonstrated that students who engaged in metacognitive strategies, such as self-monitoring and self-evaluation, were the ones who displayed higher levels of self-regulated learning as well as more sophisticated approaches toward scientific epistemic beliefs. Alternatively, students who stuck only to surface-level strategies, such as memorization, had lower levels of self-regulated learning and less developed scientific epistemic beliefs. Furthermore, Techniques and actions that support self-regulated learning, including setting a target, being self-critical, and metacognitive strategies, have been identified as the factors that positively affect the development of scientific epistemic beliefs. Therefore, teachers should establish a conducive environment where learners feel motivated to learn and can develop their self-regulated learning skills.

According to Roff et al. (2020), there is a demonstrated relationship between the educational environment and the positive outcomes of students' performance, achievement, and satisfaction, making it one of the most crucial elements in choosing an effective curriculum. Therefore, the effectiveness of a program depends on the caliber of environmental education students receive. The educational environment consists of the three components of the physical environment, as well as the intellectual and emotional climates. The phrase "educational climate" describes the various physical environments, situations, and ideals that students are taught in. However, Palmgren claims that the phrase "educational environment" is linked to "climate," "atmosphere," or "ambiance," which is a multifaceted idea that may be summed up as an educational institution's personality, spirit, and culture. Additionally, by speculating about what it might be like to be a learner within a particular organization, it forecasts students' success, achievement, and contentment.

METHODOLOGY

This section presents the research design, research respondents, research instruments, data gathering procedures, and statistical treatment of data.

Research Design

The researchers utilized a quantitative descriptive correlational approach in this study. McCombes (2019) asserts that the goal of descriptive research is to precisely and methodically describe a population, circumstance, or phenomenon. Those about what, where, when, and how can be answered, but those about why cannot. An experimental study is necessary to establish cause and effect. A descriptive research design can involve a wide variety of quantitative and qualitative methods to investigate one or more variables. In contrast to experimental research, the variables in this type of study are directly observed and measured by the researcher. On the other hand, Baht (2020) defines descriptive research as a "research method that describes the characteristics of the population or the phenomena that are studied. The 'what' of the research topic is given greater attention than the 'why' of the topic. It's critical to keep in mind that a correlation does not prove a cause and effect. Just because anyone finds a correlation between two things doesn`t mean that one causes the other. Although correlational research can`t prove causation, with a large amount of carefully collected and analyzed data, it can strongly support a causal hypothesis.

Research respondent

Grade 12 students from Cateel Vocational High School and San Antonio National High School, for the first semester of the 2025-2026 school year, were selected as respondents for this study. They are chosen through stratified random sampling, as defined by Hayes et al. (2023), which involves dividing the population into smaller subgroups known as strata. In Stratified random sampling, the strata are found based on members` shared attributes or characteristics, such as income or educational attainment. It is also used to highlight differences between groups in a population.

Raosoft determines 1500 populations with a sample size of 306 with a margin of error of 0.05. This means that 306 respondents are grouped according to school. The respondents are grade 12 students of Cateel Vocational High School and San Antonio National High School.

The study was conducted in two (2) different high schools located in the Municipality of Cateel, Province of Davao Oriental. The first is Cateel Vocational High School at Castro Avenue, Barangay Poblacion, Municipality of Cateel, Province of Davao Oriental, and the second one is San Antonio National High School at Barangay San Antonio, Municipality of Cateel, Province of Davao Oriental. Cateel Vocational High School is a public and technical Vocational School that covers 74,389 square meters, and the San Antonio National High School is a public and agricultural high school that covers 14 square meters.

Research Instrument

The main research instruments that the researcher used in the study are three (3) adapted survey questionnaires. The questionnaire for the independent variable, the influence of educational environment, was developed using a Delphi approach involving a range of professional health educators in different settings and countries. The Dundee Ready Education Environment Measure (DREEM) is a questionnaire developed by Roff et al. (2020) to measure the educational environment with the following indicators: students` perception of learning, students` perception of teachers, students` academic self-perception, students` perception of atmosphere, and academic self-perception. The second (2) questionnaire for the independent variable, Self-Regulated Learning, was measured by the Adaptive Self-regulated Learning Questionnaire (ASRQ) was used by (Magno, 2010) with the following indicators: Goal-setting, Environmental structuring, Task strategies, Time management, Help-seeking, Persistence, Self-evaluation, and Emotions and Experience.

On the other hand, the questionnaire for the dependent variable was measured by the scientific epistemic belief (SEB) Survey, which was developed by Conley et al. (2004) to investigate the students` epistemic beliefs with the following indicators: Source, Certainty, Development, and Justification. The following Likert scale is used to interpret the mean of the dependent variable.

The three (3) survey questionnaires were subjected to validity and reliability tests. To achieve validity, the researchers edited the survey questionnaire to fit the context of the study. Afterward, it was submitted to a pool of experts to assess the content of the questionnaires. Once the revisions were made based on the expert's comments and suggestions, the researcher proceeded to the pilot test.

The researcher will conduct the pilot test on 30 non-respondents of the study. Once the questionnaires are retrieved and tallied, they shall be forwarded to the statistician. Moreover, the utilization of Cronbach's alpha will determine the level of reliability of the questionnaire, with a result of at least 0.90 as reliable

Data Gathering Procedure

1. The researcher asked permission and asked for approval from the schools division superintendent of the Division of Davao Oriental, and the endorsement form was forwarded to the office of the principal of Cateel. Vocational High School and San Antonio National High School. In line with this, once the researcher has permission from the principal, the researcher seeks respondents.
2. Afterward, the researcher administers and distribute the questionnaires to the chosen respondents. and then gives the respondents instructions on completing the questionnaires correctly and thoroughly explaining each item individually to ensure valid and reliable results for the study.
3. The researcher ensured that consent from their parents was collected from the respondent, as they allowed their child to participate in the survey or interview done face-to-face in the study. The questionnaire will then be personally retrieved by the researcher during the retrieval of the questionnaire.

Statistical Treatment of Data

To answer the research objectives, the subsequent research statistical tools were used to compute and analyze the data:

1. The **Mean** was used to characterize the educational environment, Self-Regulated learning, and Students` epistemic beliefs of senior high students.
2. **Pearson's r** was used in this study to determine the significant relationship between Self-Regulated learning and students` epistemic beliefs in senior high students. Lastly, the linear regression was the tool in statistics used in this study. These tools were employed to depict the educational environment's level, examine the notable connections between the variables, and determine if significant influences exist among the variables concerning scientific epistemic belief in senior high school students.

FINDINGS

Level of Educational Environment of Senior High School Students

Table 1. Level of Educational Environment of Senior High School Students

Indicators	SD	Mean	Descriptive Level
Students' Perception of Learning	0.42	4.19	High
Students' Perception of Teachers	0.44	3.97	High
Students' Academic Self-perception	0.49	4.01	High
Students' Perception of Atmosphere	0.44	4.00	High
Students' Social Self-perception	0.54	3.77	High
Overall	**0.38**	**3.99**	**High**

Table 1 shows the overall mean score of 3.99 for the level of educational environment of senior high school students, with a computed standard deviation of 0.38, indicates a high level. This means that the majority of the students have similar opinions on their learning environment, which may indicate that all students have the same educational experience. The overall mean score of 4.19 for the students' perception of learning was the highest among other indicators. These results mean that students believe that their teachers are competent and efficient in imparting knowledge; students believe that '*the teaching helps to develop their competence and confidence'.* While students' perception of atmosphere received the lowest mean score of 4.00. This means that students have a favorable opinion of their classroom environment, where they may feel secure and protected in their classroom. As shown by the calculations, they feel relaxed during lectures, which *"motivates me as a learner."* Therefore, the high level of the educational environment indicated that these indicators were always observed.

The above result supports the claims of Slee 2019), as he stressed that it`s critical that children feel valued by their teachers and peers and that they provide an example of how to treat one another with respect and care in the classroom. Furthermore, the results are also in contrast to Mayya et al. (2019), who, in their study, found that students perform best in a regulated environment that supports their social and academic needs. However, for pupils to participate and enjoy the lesson, the classroom environment must be laid back, free from tension and threats, non-competitive, and stimulating.

Level of Self-Regulated Learning of Senior High School Students

Table 2. Level of Self-Regulated Learning of Senior High School Students

Indicators	SD	Mean	Descriptive Level
Goal Setting	0.63	4.14	High
Environmental Structuring	0.54	4.20	Very High
Task Strategies	0.57	4.19	High
Time Management	0.67	4.10	High
Help-seeking	0.70	3.78	High
Persistence	0.61	4.06	High
Self-evaluation	0.61	4.23	Very High
Emotion and Experience	0.58	4.12	High
Overall	**0.48**	**4.10**	**High**

Shown in Table 2 is the level of Self-regulated learning of senior high school students in terms of goal setting, environmental structuring, task strategies, time management, help-seeking, persistence, self-evaluation, and emotion and experience. As shown, the mean score for the level of self-regulated learning was 4.10, indicating a high level. These results mean that students know how to manage their learning process effectively. The self-evaluation has a highest mean score of 4.23. This means that students analyze their strengths and flaws in grasping the content. followed by the statement '*I study the materials more than once to figure out my problems in my lessons'*. and help-seeking is the lowest among other indicator mean result of 3.78. As reflected in the computed mean, this implies that students are aware of their needs and willing to seek support. believing with this statement that '*I contacted the instructor and/or knowledgeable peers to help me solve problems with content in their lessons'*.

This result on the Self-Regulated learning can be understood based on Zimmerman's (2019) studies, according to him, that students are more likely to remain motivated and focused throughout their learning process if they establish clear goals and create a plan to reach them.

This finding also supports the study of Brown and Lee (2019), where students who exhibit higher levels of self-regulated learning are more likely to participate in information-seeking behaviors, and to close knowledge gaps, deepen their comprehension, and gain a more thorough understanding of scientific ideas. These students should actively seek more information.

Level of Scientific Epistemic Belief of Senior High School Students

Displayed in Table 3 is the level of scientific epistemic belief among senior high students in terms of source, certainty, development, and justification. As shown, the overall mean score of the level of scientific epistemic belief is 3.99, or described as a high level. It implies that students had a favorable attitude towards engaging in science and scientific inquiry. The justification has very high results among other indicators, with a mean score of 4.32. These results indicate a significant connection between scientific principles and real-world issues, which can help maintain students' interest by demonstrating the relevance of science, as students believe that *'good answers are based on evidence from many different experiments' with a variability of 0.53,* and the lowest mean score was the source of 3.77. It determines which particular curriculum areas children find difficult or lack confidence, and by making sure that students grasp the scientific concept. The statement '*for me, everybody has to believe what scientists say'*. Hence, the very high level of scientific epistemic belief among senior high school students was consistently evident.

Table 3. Level of Scientific Epistemic Belief of Senior High School Students

Indicators	SD	Mean	Descriptive Level
Source	0.67	3.77	High
Certainty	0.64	3.85	High
Development	0.60	4.01	High
Justification	0.53	4.32	Very High
Overall	**0.48**	**3.99**	**High**

This finding supports the study by Mönch & Markic (2022), which highlights the significance of using appropriate language in the learning process. Particularly when it comes to science-related materials, where students need to understand complicated Ideas that are presented in an easy-to-understand manner. Hence, students' comprehension and memory of material can be enhanced by using clear language in learning instructions.

Significance of the Relationship among Educational Environment, Self-Regulated Learning, and Scientific Epistemic Belief of Senior High School Students

Presented in table 4, is the significance of the relationship among educational environment, self-regulated learning, and scientific epistemic belief of senior high school students which shows the data outputs of the significant tests examining the relationship between the educational environment and scientific epistemic beliefs. The overall correlation coefficient is .622, with a p-value of 0.000 < 0.05, labeled as significant. Thus, the null hypothesis of "no significant relationship between educational environment and scientific epistemic belief" is rejected. Likewise, the correlation coefficient, r = 0.622, suggests that the educational environment is correlated with and can be explained by scientific epistemic belief, to the extent of approximately 62 percent.

Table 4. Significance of the Relationship between Educational Environment and Scientific Epistemic Belief of Senior High School Students

Educational Environment	Scientific Epistemic Belief				
	Source	Certainty	Development	Justification	Overall
Students' Perception of Learning	$.295^{**}$	$.371^{**}$	$.426^{**}$	$.506^{**}$	$\mathbf{.503}^{**}$
Students' Perception of Teachers	$.409^{**}$	$.533^{**}$	$.245^{**}$	$.314^{**}$	$\mathbf{.487}^{**}$
Students' Academic Self-perception	$.456^{**}$	$.415^{**}$	$.323^{**}$	$.335^{**}$	$\mathbf{.494}^{**}$
Students' Perception of Atmosphere	$.513^{**}$	$.529^{**}$	$.346^{**}$	$.363^{**}$	$\mathbf{.568}^{**}$

Students' Social Self-perception	.319**	.391**	.307**	.341**	**.435****
Overall	**.495****	**.560****	**.416****	**.467****	**.622****

Legend: *(*) – p< 0.05 (Statistically significant, (**) – p < 0.01 (Highly Significant), (***) – p < 0.001 (Very Highly Significant)*

The results were supported by the study of Roff et al. (2020), which states that a teacher's excellent communication skills, knowledge, credibility, and readiness are not the only factors that contribute to teaching excellence. Hence, a good or effective learning environment fosters students' personal, physical, mental, and social development while also preparing them for their future careers. With this, both teachers and students benefit from an educational environment that transforms the classroom into a good and healthy one.

Significance of the Relationship between Self-regulated Learning and Scientific Epistemic Belief of Senior High School Students

Table 5. Significance of the Relationship between Self-regulated Learning and Scientific Epistemic Belief of Senior High School Students

Self-regulated learning	Scientific Epistemic Belief				
	Source	Certainty	Development	Justification	**Overall**
Goal Setting	.196**	.289**	.273**	.421**	**.369****
Environmental Structuring	.241**	.300**	.345**	.490**	**.430****
Task Strategies	.340**	.386**	.403**	.504**	**.516****
Time Management	.263**	.326**	.253**	.423**	**.399****
Help-seeking	.500**	.448**	.345**	.443**	**.557****
Persistence	.335**	.431**	.415**	.497**	**.531****
Self-evaluation	.401**	.420**	.452**	.550**	**.576****
Emotion and Experience	.364**	.454**	.282**	.317**	**.457****
Overall	**.422****	**.486****	**.438****	**.578****	**.610****

Legend: *(*) – p< 0.05 (Statistically significant), (**) – p < 0.01 (Highly Significant), (***) – p < 0.001 (Very Highly Significant)*

The significant test on the relationship between self-regulated learning and the scientific epistemic belief of senior high students within the province of Davao Oriental was shown in table 5. The overall correlation coefficient is .610, with a p-value of 0.000 <0.05, labeled as significant. Thus, the null hypothesis of "no significant relationship between self-regulated learning and scientific epistemic belief of senior high students" is rejected.

The above results of this study are aligned with the findings of Alharbi, M., & Alrabai, F. (2021). Based on their results, they indicated that there is a positive correlation between self-regulated learning and epistemic beliefs, which suggests that students who engage in self-regulated learning tend to have more sophisticated epistemic beliefs.

Significance of the Influence of Educational Environment and Self-Regulated Learning on Scientific Epistemic Belief of Senior High School Students

Presented in table 4 is the regression analysis that disclosed the influence of educational environment and self-regulated learning on the scientific epistemic belief of Senior High School students. The regression model with adjusted R^2=.440 explained that an educational environment and self-regulated learning had a 44.0 % of the total variability of self-regulated learning on the scientific epistemic belief of senior high students, F of 119.171 and p value of 0.001, which is lesser than the level of significance of

0.05, tells that educational environment and self-regulated learning significantly influence the scientific epistemic belief. However, among the indicators, only the perception of atmosphere and self-evaluation significantly influence the scientific epistemic beliefs of senior high students.

Table 4. Significance of the Influence of Educational Environment and Self-Regulated Learning on Scientific Epistemic Belief of Senior High School Students

Scientific Epistemic Belief					
(Variables)		*B*	β	*t*	*Sig.*
Constant		.915		4.545	.000
Educational Environment		.431	.380	6.094	.000
Self-Regulated Learning		.329	.334	5.349	.000
R	.664				
R^2	.440				
ΔR	.437				
F	119.171				
P	.001				

The findings support the study of Wang and Liu (2020), which found that students who used metacognitive techniques, like self-monitoring and self-evaluation, showed more advanced approaches to scientific epistemic views and higher levels of self-regulated learning. Hence, Students' perceptions of the educational environment are one of the most important factors affecting the completion of a successful curriculum, according to Roff et al. (2020). Likewise, this study claims that the educational environment and self-regulated learning influence the scientific epistemic beliefs of senior high students. This means that when students are motivated to learn, effectively manage their time, and feel safe and welcomed in a classroom can result in a good educational outcome because positive academic perceptions have a considerable impact on students' academic progress, according to Flook et al. (2020).

CONCLUSIONS

Through the deep contemplation of the findings of the study. The level of educational environment of senior high students is high. Along with it, five sub-points are also at a high level. These are students' perception of learning, students' perception of teachers, students` academic self-perception, students` perception of atmosphere, and students` social self-perception. The level of self-regulated learning in senior high is high. Six sub-points are high. These are goal-setting, task strategies, time management, help-seeking, persistence, emotion, and experience, among eight subpoints; environmental structuring and emotion and experience are labeled as very high. The level of scientific epistemic belief of senior high school students is high. Three sub-points are high: source, certainty, and development. However, justification is labeled as very high.

Based on the statistical tool used, there is a significant relationship between the educational environment and scientific epistemic belief. Self-regulated learning and scientific epistemic belief have a significant relationship.

Lastly, it reveals that the educational environment and self-regulated learning have a significant relationship with the scientific epistemic belief of senior high students. Moreover, the results show that the educational Environment, self-regulated learning has the potential to influence the scientific epistemic beliefs of senior high students.

RECOMMENDATIONS

Based on the initial findings and conclusions, the following recommendations are suggested. Implement more participatory and hands-on learning activities, such as group projects, discussions, and real-world applications of information. These approaches can improve comprehension and engagement. Aside from these, offer ongoing professional development for instructors that focuses on effective communication, engagement tactics, and building rapport with kids. Encourage instructors to build strong relationships with kids by offering mentorship programs, one-on-one check-ins, and a supportive classroom climate.

Hold workshops to assist students in defining realistic academic objectives and creating personalized action plans to attain them. Establish a culture of acknowledgment by honoring academic accomplishments, large and small, to boost students' confidence in their talents. Encourage inclusivity by providing team-building activities and diversity training workshops for students, which promote respect and understanding. Create safe locations for children to communicate their concerns and comments about the school environment, making them feel heard and respected.

Implement programs aimed at improving social skills such as communication, teamwork, and dispute resolution. This can make children feel more connected and confident in social situations. Provide opportunities for students to help one another, developing a sense of belonging and boosting social self-perception. Conduct regular assessments of student attitudes across all variables to identify opportunities for improvement and monitor progress over time. Engage students, teachers, and parents in collaborative activities to improve the overall educational environment. This may include school improvement groups or feedback forums.

To improve the clarity and attention of the students, it needs to set SMART (Specific, Measurable, Achievable, Relevant, Time-bound) goals. Review and adjust your goals regularly in light of your progress. Hence, to accommodate various learning styles and improve engagement, implement a variety of task methodologies, such as gamification or project-based learning. Aside from these, encourage the use of digital tools for scheduling and offer instruction in efficient time management strategies like time-blocking and the Pomodoro Technique. Create an environment where asking for assistance is encouraged. Establish mentorship programs and provide tools that encourage individuals to ask for help without hesitation. Encourage resilience training and disseminate success stories that demonstrate the advantages of perseverance. To assist people in seeing obstacles as opportunities, promote a growth mentality.

Give instructions on how to assess the reliability and credibility of sources. Promote the usage of reliable databases and peer-reviewed journals. Organize frequent feedback meetings so people can talk about their progress and make concrete improvement goals. Create comprehensive training programs that include all four indicators, emphasizing developing skills, source evaluation, certainty assessment, and justification strategies. Assess success in these areas regularly and modify tactics as needed to guarantee ongoing progress.

Since the result of the educational environment is high, administrators should be aware that by improving the classroom ambiance, teachers' behavior, and the stated factors can intensify students' satisfaction with their learning and knowledge transfer. On the other hand, teachers should realize the vital role they play in students' lives and strive to be more connected to them by portraying an image as a role model and practicing approachable behavior to foster a stronger bond between students. It needs to incorporate more interactive or hands-on experiences as the students engage in a learning process. Regular feedback should always be observed and implemented, as the students can express their learning needs and preferences, allowing themselves to adjust to a teaching method. In line with this, the learning materials should as much as possible connect it to a real-world application by making the topic more relevant and engaging for the students.

A self-assessment tool is vital to help students reflect on their academic strengths or areas for improvement, and with this, it can help develop a growth mindset in learners. Parents may always risk their children's perception of the educational environment through a thorough assessment of the holistic capacity and ambiance of an educational environment where they plan to send their child. They might have to check if the educational environment suits their child's needs to acquire a much higher quality and effective satisfaction towards knowledge absorption. To the students, this study might help them to learn to adjust and cope with the environment so that they can attain the knowledge and learning that they want to have. Aside from this, students need to engage in self-regulated learning behavior as they can set goals, plan, monitor their progress, and reflect on their learning experiences.

Moreover, the Department of Education needs to consider improving the school facilities that cater to the needs of the students, allowing them to experience a comfortable atmosphere, feel safe, and improve the educational system, resulting in a good educational outcome. Especially, teachers should tackle and implement practices by emphasizing instructional strategies that improve and encourage students to learn, and they should adopt a patient-centered approach to consultation. Aside from this, the teacher should be well-prepared, providing a clear example for their teaching session, and refrain from getting angry while teaching, because these practices can motivate students to study and participate in class. The researcher also recommended further studies to examine other variables or conducting a new study to update the data and findings on these concerns.

REFERENCES

André, S., Maulana, R., Helms-Lorenz, M., Telli, S., Chun, S., Fernández-García, C. M.,& Jeon, M. (2020). Student perceptions in measuring teaching behavior across six countries: A multi-group confirmatory factor analysis approach to measurement invariance. *Frontiers in Psychology*, *11*, 273. https://doi.org/10.3389/fpsyg.2020.00273

Baht, a. (2020). Descriptive research: Definition, characteristics, methods, examples, and advantages. Question pro. Retrieved from https://www.questionpro.com/blog/descriptive-research/.

Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory. Prentice-Hall. Nabavi, R. T. (2012). Bandura's social learning theory & social cognitive learning theory. *Theory of Developmental Psychology*, *1*(1), 1-24.DOI: https://dx.doi.org/10.24093/awej/vol14no3.3

Benali, A., & Chichou, H. (2020). Students' perceptions of the educational environment: A cross-sectional study from a Moroccan Medical University. *Psychol Psychother Res Study*, *4*, 1-8.DOI: 10.4103/jwas.jwas_123_24.

Brown, a., & lee, j. (2019). The role of self-regulated learning in information seeking: A study of high school students. *Journal of educational psychology*, 111(3567-578. Doi:10.1037/edu0000321.

Chen, Y. L., Huang, L. F., & Wu, P. C. (2021). Preservice preschool teachers' self-efficacy in and need for STEM education professional development: STEM pedagogical belief as a mediator. *Early Childhood Education Journal*, *49*(2), 137-147. https://doi.org/10.1007/s10643-020-01055-3.

Conley, a. M. M., pintrich, p. R., vekiri, i., & harrison, d. (2004). Changes in epistemological beliefs in elementary science students. Contemporary educational psychology, 29(2), 186–204. Https://doi.org/10.1016/j.cedpsych.2004.01.004

El-adl, a., & alkharusi, h. (2020). Relationships between self-regulated learning strategies, learning motivation, and mathematics achievement. *Cypriot journal of educational sciences*, 15(1), 104-111. Https://doi.org/10.18844/cjes.v15i1.4461.

Fernández-garcía c. M., maulana r., inda-caro m., helms-lorenz, m., & garcía-pérez, o. (2019). Student perceptions of secondary education teaching effectiveness: A general profile, the role of personal factors, and educational level. Frontiers in psychology, 10, 533–543. Https://doi.org/10.3389/fpsyg.2019.00533.

Finefter-Rosenbluh, I. (2022). Between student voice-based assessment and teacher-student relationships: teachers' responses to 'techniques of power'in schools. *British Journal of Sociology of Education*, *43*(6), 842-859. https://doi.org/10.1080/01425692.2022.2080043

Flook, l., enright, r. D., hirshberg, m. J., & davidson, r. J. (2020). Integrating mindfulness and connection practices into preservice teacher education improves classroom practices. Learning and instruction, 66, 101298. Https:// doi.org/10.1016/j.learn.

Göbel, K., Wyss, C., Neuber, K., & Raaflaub, M. (2021). Student feedback as a source for reflection in practical phases of teacher education. In *Student feedback on teaching in schools: Using student perceptions for the development of teaching and teachers* (pp. 173-189). Cham: Springer International Publishing.https://doi.org/10.1007/978-3-030-75150-0_11.

Havik, t., & westergård, e. (2019). Do teachers matter? Students' perceptions of classroom interactions and student engagement. Scandinavian journal of educational research, 63, 1–20. Https://doi.org/10.1080 /00313831.2019.1577754

Hayes, j., rahman, a., & mendis, c. (2023). Influencing project success outcomes by utilising advanced statistical techniques and ai during the project initiating process. In *computational statistical methodologies and modeling for artificial intelligence* (pp. 203-218). Crc press.

Heibutzki, ralph (2019). College students. Education seattlepi: Https://education.seattlepi.com/lack-timemanagement-affects-college-students-1093.html. doi: 10.7176/JEP

Jong, m. S. Y. (2019). Sustaining the adoption of gamified outdoor social enquiry learning in high schools through addressing teachers' emerging concerns: A three-year study. Br. J. Educ. Technol. 50, 1275–1293. Doi: 10.1111/bjet. 12767.

Magno, (2010). Assessing academic self-regulated learning among filipino college students: The factor structure and item fit. The international journal of educational and psychological assessment, 5, 61-76.

Maya, İ.,& uzman, e.,(2019). Self-leadership strategies as the predictor of self-esteem and life satisfaction in university students. *International journal of progressive education*, *15*(2), 78-90.

Maya, İ.,& uzman, e.,(2019). Self-leadership strategies as the predictor of self-esteem and life satisfaction in university students. *International journal of progressive education*, *15*(2), 78-90.

Mccombes, s. (2019). Research design: Types, methods, and examples. Available at https://www.scribbr.com › author › shona › page, accessed on 18th september, 2021

Mcmillan, j. H., & moore, s. (2020). Better being wrong (sometimes): Classroom assessment that enhances student learning and motivation. *The clearing house: A journal of educational strategies, issues and ideas*, *93*(2), 85-92.

Mönch, c., & markic, s. (2022). Exploring pre-service chemistry teachers' pedagogical scientific language knowledge. *Education sciences*, *12*(4), 244.

Mughal, a. W. (2020). Secondary school students who drop out of school in rural pakistan: The perspectives of fathers. *Educational research*, *62*(2), 199-215.

Mustofa, r. F., nabiila, a., & suharsono, s. (2019). Correlation of learning motivation with self-regulated learning at sma negeri 1 tasikmalaya city. International journal for educational and vocational studies, 1(6), 647–650. Https://doi.org/10.29103/ijevs.v1i6.1750.

Oecd. (2023). Pisa 2022 results (volume i): The state of learning and equity in education. Oecd publishing. Https://doi.org/10.1787/53f23881-en.

Panergayo, a. A. E. (2023). Self-efficacy, epistemological beliefs, and academic performance in physics: A mediation analysis. *Philippine social science journal*, *6*(2), 46-52.

Pintrich, p. R., and e. V. De groot (2019). "motivational and self-regulated learning components of classroom academic performance." Journal of educational psychology 82 (1): 33–40. Https://doi.org/10.1037/0022-0663.82.1.33.

Roff s, mcaleer s, harden rm, al-qahtani m, ahmed au, deza h, groenen g, primparyon p(2020) development and validation of the dundee ready education environment measure (dreem). Medical teacher 19:295-299,

Roff, s., mcaleer, (2019). A global diagnostic tool for measuring educational environment: Comparing nigeria and nepal. Medical teacher, 2, 378–382. Https://doi.org/10.1080/01421590120043080.

Slee, p. T. (2022). School bullying and violence: A matter of human rights. In *handbook of health and well-being: Challenges, strategies and future trends* (pp. 179-202). Singapore: Springer nature singapore.

Vygotsky, l. S. (1978). Mind in society: The development of higher psychological processes. Harvard university press.

Wang y, liu h. (2020) the mediating roles of buoyancy and boredom in the relationship between autonomous motivation and engagement among chinese senior high school efl learners. Front psychol. 2022;13:992279.

Zimmerman, b. (2019). Self-regulated learning: Theories, measures and outcomes. International encyclopedia of the social & behavioral sciences: Elsevier. Http://dx.doi.org/10.1016/b978-0-08-097086-8.26060-1

Zimmerman, b. J. (2000). Attaining self-regulation: A social cognitive perspective. In m. Boekaerts, p. R. Pintrich, & m. Zeidner (eds.), handbook of self-regulation (pp. 13 -39). Academic press.

INSTITUTIONAL INNOVATION OF FLAGSHIP PRODUCTS IN SELECTED STATE UNIVERSITIES AND COLLEGES IN REGION 4A: INPUTS FOR IMPROVED MARKETING PLAN

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ABSTRACT

State Universities and Colleges (SUCs) in Region IV-A (CALABARZON) serve as key drivers of innovation through research-based flagship products that support community development and local industries. Despite supportive policies, challenges in resources, infrastructure, funding, and intellectual property (IP) management limit the full potential of institutional innovation. This study assessed institutional innovation in selected SUCs, focusing on idea generation, research development, prototyping, IP management, and innovation culture. A descriptive-correlational design was employed, with a validated questionnaire administered to 465 respondents, including administrators, employees, and stakeholders. Data were analyzed using descriptive statistics, ANOVA, and Pearson's correlation. Results indicated that food, beverage, and agricultural products were the most prevalent innovations. Institutional innovation was rated "Highly Evident," while challenges were "Moderately Encountered," particularly in patenting, technical infrastructure, collaboration, and funding. No significant differences were observed across respondent groups, although relationships were noted between respondent profiles and specific innovation aspects. The study concludes that SUCs demonstrate strong innovation capacities but require targeted interventions in infrastructure, IP management, collaboration, and capacity building. Based on the findings, the study recommends implementing strategic initiatives, enhancing stakeholder engagement, and promoting interdisciplinary practices to strengthen innovation outcomes.

Keywords: *Institutional Innovation; Flagship Products; Research Development; Prototyping; Intellectual Property Management; Innovation Culture*

INTRODUCTION

Universities today are increasingly recognized not only as centers of education and research but also as engines of innovation that drive economic growth, social development, and technological advancement. In the Philippines, State Universities and Colleges (SUCs) in Region 4A (CALABARZON)—the country's leading economic and industrial corridor—have embraced this role by developing flagship products. These high-impact, research-based innovations showcase institutional expertise and contribute to economic value, employment, and community well-being.

Innovation in SUCs requires strategic planning, intellectual property management (IPM), technology transfer mechanisms, and collaboration with industry and government. Policies such as the Philippine Innovation Act (RA 11293) and the Technology Transfer Act of 2009 (RA 10055) provide critical support. However, challenges remain, including limited expertise, weak industry networks, inadequate funding for prototyping, and low IP awareness among researchers.

This study examines how SUCs in Region 4A develop and implement flagship products, focusing on institutional practices, IPM systems, technology transfer, and partnership strategies. The findings aim to strengthen university innovation capabilities, guide policy development, and promote stronger industry-academe collaboration, contributing to a dynamic innovation ecosystem and sustainable regional development.

Statement of the Problems/Objectives;

This study aimed to determine the institutional innovation and commercialization of flagship products in selected State Universities and Colleges in Region 4A.

Specifically, it answered the following sub-problems:

1. What is the profile of selected State Universities and Colleges in Region 4A?
2. How do the administrators, employees, and stakeholders assess the following:
    - 2.1 Institutional Innovation
        - 2.1.1 Idea Generation and Selection;
        - 2.1.2 Research Development;
        - 2.1.3 Prototyping and Testing;
        - 2.1.4 Intellectual Property Management; and
        - 2.1.5 Innovation Culture and Processes?
3. Is there significant differences as to the Institutional Innovation in selected state universities and colleges in Region 4A as assessed by the three groups of respondents?
4. Is there a significant relationship between the profile and institutional innovation?
5. What are the problems encountered by the respondents as to the institutional innovation?
6. Based on the findings, what inputs for an improved marketing plan may be proposed?

REVIEW OF LITERATURE

Local Literature

According to Zamora (2016), universities play a crucial role in generating knowledge and developing human capital, which are essential for fostering innovation. Moreover, globalization has heightened expectations for universities, particularly flagship institutions, to devise strategies that ensure sustainability while addressing national challenges such as poverty, resource depletion, social tensions, and underdevelopment in science and technology.

Similarly, Cabrera et al. (2021) found that while many UPLB research projects incorporate intellectual property (IP), only some effectively integrate IP strategies with technology commercialization. The implementation of IP audits, technology readiness assessments, and fairness opinion board reviews has strengthened the university's technology transfer mechanisms.

Finally, Yap and Hechanova (2023) emphasized that in low- to middle-income economies, innovation culture depends not only on strategy and leadership but also on tangible support mechanisms such as policies, processes, and resources. Thus, deliberately designing these systems enhances innovation culture and sustainability in contexts with limited infrastructure.

Local Studies

Leron and Baconguis (2021) found that innovation and innovation culture are embedded in both institutional statements and individual values in public HEIs. Moreover, their study highlighted that creativity, adaptability, availability of innovation resources, training, and mentoring are crucial components that enhance institutional performance despite R&D challenges.

Similarly, Lunag et al. (2023) emphasized that many Philippine HEIs struggle with weak research cultures, resulting in low academic productivity. Successful research universities exhibit strong leadership, supportive frameworks, and well-qualified faculty. Thus, fostering a robust research and innovation culture, supported by strategic actions and adequate academic, industry, and government support, is essential for maximizing talent and advancing national development.

Meanwhile, Ampo (2020) highlighted that strategic development plans in selected SUCs in Region 4A face inconsistencies due to insufficient funding, weak policies, and limited performance monitoring. However, effective faculty development through partnerships with government and private stakeholders was identified as a best practice, emphasizing the importance of participatory strategic planning.

Foreign Literature

Flagship universities should be recognized as academic leaders in both research and education. These research-intensive institutions are capable of producing both basic and applied research and effectively transferring knowledge to policymakers and decision-makers to promote economic and social progress. In developing countries, research universities serve as primary links to the international knowledge network, addressing local issues and supporting various sectors of the economy (Altbach, 2020).

Similarly, Hubert et al. (2017) emphasize that flagship products significantly shape perceptions of firm innovativeness, although this effect is influenced by product fit, consumer perception, and firm expertise.

In addition, Junsay (2021) asserts that strengthening innovation infrastructure—through institutional capacity, dedicated support mechanisms, and clear technology transfer guidelines—enables SUCs to continuously create and commercialize new products, enhancing innovation culture and contributing to institutional and national development.

Foreign Studies

Utanova (2021) asserts that universities are pivotal institutions where knowledge and human capital converge to drive development. Moreover, flagship universities facilitate the integration of theory and practice, advancing innovations into mainstream production. However, the rapid obsolescence of knowledge requires universities to adapt quickly and anticipate future skill demands. Autonomous governance, including independent curriculum development and financial management, further enhances their relevance and positions them as proactive contributors to economic growth through education and innovation.

Tseng et al. (2020) highlight university-industry collaboration (UIC) as critical for innovation performance, where management mechanisms, innovation climate, and reward systems drive creativity, knowledge sharing, and faculty engagement, ultimately attracting funding and enhancing technological outcomes.

Furthermore, Hailu (2024) stresses that successful commercialization requires operational capacity, including funding, IP management, and distribution systems, with weak infrastructure and limited entrepreneurial training impeding technology transfer. Internal mechanisms such as innovation offices and feedback-driven processes are therefore essential.

METHODOLOGY

This study employed a descriptive-correlational research design to examine the practices and challenges associated with institutional innovation in selected State Universities and Colleges (SUCs) in Region IV-A (CALABARZON). The descriptive approach was used to determine the existing level of institutional innovation practices, while the correlational component analyzed the relationships among key variables influencing innovation and commercialization performance. A total of 465 respondents were selected through purposive sampling to ensure inclusion of individuals with direct knowledge and involvement in innovation initiatives. The participants consisted of 5 administrators, 85 employees, and 375 stakeholders from Cavite State University, Laguna State Polytechnic University, and Southern Luzon State University. Data were collected using a researcher-constructed questionnaire that underwent expert validation for content validity and clarity. The instrument measured institutional practices in innovation, intellectual property management, technology transfer, partnership strategies, and related challenges using a five-point Likert scale. A hybrid data-gathering approach was implemented through face-to-face distribution and online survey administration, with prior approval from university authorities and assurance of voluntary participation and confidentiality. The collected data were analyzed using frequency, percentage, and weighted mean to describe respondent characteristics and levels of institutional innovation, while Analysis of Variance (ANOVA) determined significant differences among groups and Pearson Product-Moment Correlation examined relationships between variables. The findings provided the empirical basis for developing an evidence-based marketing plan aimed at strengthening innovation strategies and enhancing institutional performance in the selected SUCs.

FINDINGS

Profile of the Selected State Universities and Colleges in Region IV-A

Table 1. Profile of the Selected SUCs as to Types of Product Innovations

Types of Product Innovation	Cavite State University	Laguna State Polytechnic University	Southern Luzon State University	Total	Percen tage
Food and Beverage	1	1	1	3	27.3
Agricultural/Farm-based	1	1	1	3	27.3
Health and Wellness Products	1			1	9.1
Industrial/Mechanical Products or		1	1	2	18.2
Tech-Based Solutions (e.g., apps, devices)	1	1		2	18.2
Total	4	4	3	11	100.0

As presented in Table 1, Profile of the Selected SUCs as to Types of Product Innovations, Food and beverage, as well as Agricultural/Farm-based products, has a total frequency of 3 and a percentage of 27.3; Industrial/Mechanical Products and Tech-Based Solutions (e.g., apps, devices) has a total frequency of 2 and a percentage of 18.2; and Health and Wellness Products has a total frequency of 1 and a percentage of 9.1. As Lamoste (2021) noted, innovative research-based products from SUCs are increasingly recognized for their creative use of local materials and unique appeal, which supports the prominence of food, beverage, and agricultural product innovations identified among the selected SUCs in this study.

Table 2. Profile of the Selected SUCs in as to Number of Product Innovations Developed in the Last 5 Years

Number of product innovations developed in the last 5 years	Cavite State University	Laguna State Polytechnic University	Southern Luzon State University	Total	Percentage
4–6 products	1	1		2	66.7
1–3 products			1	1	33.3
Total	1	1	1	3	100.0

As reflected in Table 2, Cavite State University and Laguna State Polytechnic University each developed 4–6 products, representing 66.7 % of the total. Meanwhile, Southern Luzon State University developed 1–3 products, accounting for 33.3 % of the total Overall, the three selected State Universities and Colleges reported product innovations developed within the last five years, indicating active engagement in research commercialization and a strong commitment to transforming academic outputs into practical products. This supports Junsay's (2021) findings, which highlight that strengthened innovation infrastructure and institutional support systems enable SUCs to consistently generate new products.

Table 3. Profile of the Selected SUCs as to Departments or Offices Primarily Involved in Product Innovation

Departments or offices are primarily involved in the product innovation	Cavite State University	Laguna State Polytechnic University	Southern Luzon State University	Total	Percentage
Research and Development	1	1	1	3	33.3
Academic Departments	1	1	1	3	33.3
Business and Innovation Canters	1	1	1	3	33.3
Total	3	3	3	9	100.0

As shown in Table 3, Research and Development offices, Academic Departments, and Business and Innovation Centers each recorded 3 instances of involvement, representing 33.3% each of the total. Meanwhile, no SUC indicated the involvement of Extension Services. Overall, there were 9 recorded instances of departmental or office involvement in product innovation across the three universities. This implies strong internal collaboration and active participation among different units, reflecting a supportive institutional environment for innovation. This finding is supported by Dio et al. (2024), who emphasized that effective product innovation in SUCs is often driven by multi-departmental collaboration, particularly among research units, academic departments, and business innovation centers, which together foster a supportive environment for commercialization and technology transfer.

Table 4. Profile of the Selected SUCs as to Objectives of Product Innovation

Objectives of your institution's product innovation	Cavite State University	Laguna State Polytechnic University	Southern Luzon State University	Total	Percentage
Community Impact	1	1	1	3	27.3
Revenue Generation	1	1	1	3	27.3
Academic Advancement		1	1	2	18.2
Industry Collaboration	1	1	1	3	27.3
Total	3	4	4	11	100.0

As outlined in Table 4, Community Impact, Revenue Generation, and Industry Collaboration each recorded 3 instances, representing 27.3% each of the total. Meanwhile, Academic Advancement was cited 2 times, accounting for 18.2% of the total. Overall, there were 11 recorded objectives across the three selected State Universities and Colleges. This implies a clear and focused strategic direction in guiding their innovation and commercialization efforts.

This result supports the findings of Ampo (2020), who highlighted that SUCs often pursue product innovation with multiple objectives, including community development, revenue generation, academic contribution, and stronger industry partnerships, to ensure broader institutional impact and sustainability.

Assessment of Institutional Innovation

- **Idea Generation and Selection**

As shown in Table 5, respondents rated Institutional Innovation in Idea Generation and Selection as "Highly Evident" (overall WM = 4.40). The highest-rated indicator was the university's open submission platform for innovators (WM = 4.72, ranked 1st), followed by incentives for faculty and researchers through awards, grants, or recognition programs (WM = 4.52, ranked 2.5) and student integration via hackathons, innovation challenges, and entrepreneurship bootcamps (WM = 4.52, ranked 2.5). Clear guidelines for distinguishing high-potential ideas (WM = 4.39, ranked 4th) and collaborative idea generation (WM = 4.37, ranked 5th) were also highly rated. A structured system for collecting and prioritizing ideas (WM = 4.33, ranked 6th) and considering stakeholder inputs (WM = 4.32, ranked 7th) followed. Multidisciplinary collaboration (WM = 4.27, ranked 8.5) and formal committee reviews of submitted ideas (WM = 4.27, ranked 8.5) were next, with ideation workshops among faculty and students (WM = 4.26, ranked 10th) last.

These results imply that idea generation and selection mechanisms are well-established and consistently practiced, supporting Leron and Baconguis (2021), who emphasized that institutionalized systems, creativity, and capacity building enhance innovation in public higher education. While collaboration and inclusivity are evident, improving evaluation and incentive mechanisms can further ensure that ideas are developed into impactful outcomes.

Table 5. Assessment on the Institutional Innovation as to Idea Generation and Selection

Indicators	Administrator		Employee		Stake holder		Composite Mean		Rank
	WM	VI	WM	VI	WM	VI	WM	VI	
1. The institution regularly generates ideas through collaboration.	4.67	HE	4.22	HE	4.23	HE	4.37	HE	5
2. The institution regularly organizes ideation workshops to stimulate new product and research ideas among faculty and students.	4.24	HE	4.26	HE	4.27	HE	4.26	HE	10
3. A structured system is in place for collecting, evaluating, and prioritizing innovative ideas generated by different departments	4.33	HE	4.38	HE	4.29	HE	4.33	HE	6
4. Multidisciplinary collaboration is actively encouraged during idea generation to ensure diversity and inclusivity of perspectives.	4.27	HE	4.27	HE	4.28	HE	4.27	HE	8.5
5. A formal committee reviews submitted ideas based on set criteria like market potential, feasibility, and societal impact	4.23	HE	4.28	HE	4.29	HE	4.27	HE	8.5
6. Faculty and researchers are incentivized to submit innovative concepts through awards, grants, or recognition programs.	4.83	HE	4.46	HE	4.26	HE	4.52	HE	2.5
7. Students are integrated into the idea-generation process through hackathons, innovation challenges, and entrepreneurship bootcamps	4.34	HE	4.81	HE	4.41	HE	4.52	HE	2.5
8. The university maintains an open submission platform where innovators can pitch their ideas anytime during the academic year	4.45	HE	4.86	HE	4.86	HE	4.72	HE	1
9. Clear guidelines exist to help innovators distinguish between high-potential and low-priority ideas for commercialization	4.20	HE	4.48	HE	4.48	HE	4.39	HE	4
10. Stakeholder inputs (community, industry, alumni) are considered during the selection of flagship	4.50	HE	4.22	HE	4.23	HE	4.32	HE	7

innovation projects									
Overall Mean	4.41	HE	4.42	HE	4.36	HE	4.40	HE	

Legend: WM-Weighted Mean, VI-Verbal Interpretation

Scale		Range		Verbal Interpretation
5	-	4.20 – 5.00	-	Highly Evident (HE)
4	-	3.40 – 4.19	-	Evident (E)
3	-	2.60 – 3.39	-	Moderately Evident (ME)
2	-	1.80 – 2.59	-	Least Evident (LE)
1	-	1.00 – 1.79	-	Very Least Evident (VLE)

- **Research Development**

Table 6 illustrates that respondents assessed Institutional Innovation in Research Development as "Highly Evident" (overall WM = 4.31). The top-ranked indicator was alignment of research priorities with national development plans and regional economic needs (WM = 4.51, ranked 1st), followed by collaboration with external experts, industries, and government agencies (WM = 4.39, ranked 2nd) and promotion of interdisciplinary research initiatives (WM = 4.34, ranked 3rd). Transparent reporting and dissemination through journals, conferences, and technology forums (WM = 4.29, ranked 4th) and actively seeking external funding (WM = 4.28, ranked 5th) were also highly rated. Rigorous review of research projects (WM = 4.27, ranked 6th), dedicated funding for innovation and technology advancement (WM = 4.26, ranked 7th), clear project milestones (WM = 4.25, ranked 8th), investment in updated labs and research facilities (WM = 4.24, ranked 9th), and regular capacity-building activities (WM = 4.22, ranked 10th) completed the rankings.

These results imply that research development initiatives are well-established and actively implemented. Sarita (2024) supports this, noting that although many SUCs show strong research commitment, gaps in infrastructure, IP management, researcher incentives, and industry linkages can limit innovation. Institutions that succeed in research commercialization, she emphasizes, establish technology incubators, incentivize researchers, and build robust external partnerships.

Table 6. Assessment on the Institutional Innovation as to Research Development

Indicators	Administrator		Employee		Stakeholder		Composite Mean		Rank
	WM	VI	WM	VI	WM	WM	VI	WM	
1. Dedicated funding and grants are allocated to research projects focusing on product innovation and technology advancement	4.23	HE	4.26	HE	4.28	HE	4.26	HE	7
2. Research projects undergo rigorous review processes to ensure scientific validity, relevance, and potential for commercialization	4.33	HE	4.29	HE	4.20	HE	4.27	HE	6
3. Collaboration with external experts, industries, and government agencies is actively pursued to strengthen research development	4.67	HE	4.29	HE	4.22	HE	4.39	HE	2
4. Clear milestones and deliverables are set for each research project to monitor progress and outputs systematically.	4.23	HE	4.25	HE	4.28	HE	4.25	HE	8

5. The institution invests in updated laboratory equipment and research facilities to support advanced innovation projects	4.20	HE	4.31	HE	4.21	HE	4.24	HE	9
6. Research priorities align with national development plans (e.g., DOST, NEDA) and regional economic needs.	5.00	HE	4.32	HE	4.22	HE	4.51	HE	1
7. Interdisciplinary research initiatives are encouraged to foster holistic and cross-sectoral innovations	4.50	HE	4.26	HE	4.27	HE	4.34	HE	3
8. Capacity-building activities (e.g., research trainings, seminars) are conducted regularly to enhance the research skills of faculty and students.	4.20	HE	4.22	HE	4.24	HE	4.22	HE	10
9. Transparent reporting and dissemination of research findings are practiced through journals, conferences, and technology forums.	4.33	HE	4.26	HE	4.27	HE	4.29	HE	4
10. The university actively seeks external funding (local and international grants) to scale up research development projects.	4.33	HE	4.25	HE	4.27	HE	4.28	HE	5
Overall Mean	4.40	HE	4.27	HE	4.25	HE	4.31	HE	

- **Prototyping and Testing;**

Table 7. Assessment on the Institutional Innovation as to Prototyping and Testing

Indicators	**Administrator**		**Employee**		**Stakeholder**		**Composite Mean**		**Rank**
	WM	**VI**	**WM**	**VI**	**WM**	**WM**	**VI**	**WM**	
1. A formal process exists for moving research outcomes into prototype development stages	4.23	HE	4.67	HE	3.97	HE	4.29	HE	8
2.Facilities such as fabrication laboratories, pilot plants, or experimental fields are available for prototype creation and testing.	3.00	ME	3.24	ME	3.24	ME	3.16	ME	10
3. Standard operating procedures (SOPs) guide the prototyping activities to ensure quality and reproducibility	4.20	HE	4.27	HE	4.67	HE	4.38	HE	5.5
4. Researchers conduct iterative testing of prototypes to refine and optimize product performance and functionality.	4.50	HE	4.32	HE	4.32	HE	4.38	HE	5.5
5. End-user feedback is integrated	5.00	HE	4.21	HE	4.37	HE	4.53	HE	1

during prototype evaluation to ensure market fit and usability.									
6. Collaborations with industry partners are established for joint testing, refinement, and field trials of prototypes	4.20	HE	4.32	HE	4.22	HE	4.25	HE	9
7. Safety, durability, and environmental impact tests are standard components of the prototype evaluation phase	4.33	HE	4.48	HE	4.28	HE	4.36	HE	7
8.Proper documentation and version control of prototype iterations are maintained for transparency and patent purposes	4.67	HE	4.58	HE	4.28	HE	4.51	HE	2.5
9. Testing protocols adhere to national and international standards relevant to the specific innovation sector	4.43	HE	4.59	HE	4.29	HE	4.44	HE	4
10. Testing results are critically analyzed and used to determine the feasibility of scaling up for commercialization	4.50	HE	4.56	HE	4.47	HE	4.51	HE	2.5
Overall Mean	**4.31**	**HE**	**4.32**	**HE**	**4.21**	**HE**	**4.28**	**HE**	

Table 7 indicates that respondents assessed Institutional Innovation in Prototyping and Testing as "Highly Evident" (overall WM = 4.28). The highest-ranked indicator was integration of end-user feedback during prototype evaluation to ensure market fit and usability (WM = 4.53, ranked 1st), followed by proper documentation and version control (WM = 4.51, ranked 2.5) and critical analysis of testing results for commercialization feasibility (WM = 4.51, ranked 2.5). Adherence to national and international testing standards (WM = 4.44, ranked 4th), SOP-guided prototyping (WM = 4.38, ranked 5.5), and iterative testing to optimize performance (WM = 4.38, ranked 5.5) followed. Safety, durability, and environmental impact testing (WM = 4.36, ranked 7th), formal processes for moving research outcomes into prototypes (WM = 4.29, ranked 8th), and
collaborations with industry partners (WM = 4.25, ranked 9th) were next. Availability of facilities such as fabrication labs, pilot plants, or experimental fields (WM = 3.16, ranked 10th) was interpreted as "Moderately Evident."

These results imply that prototyping and testing mechanisms are well-practiced across the institutions, though improving access to specialized facilities could further strengthen innovation outcomes. This aligns with Putit et al. (2016), who emphasized that successful research commercialization depends on systematic prototyping, rigorous testing, effective documentation, and supply chain preparedness, noting that limitations in infrastructure and structured processes often hinder bringing innovations to market.

- **Intellectual Property Management;**

Table 8. Assessment on the Institutional Innovation as to Intellectual Property Management

Indicators	Administrator		Employee		Stakeholder		Composite Mean		Rank
	WM	VI	WM	VI	WM	WM	VI	WM	
1. The institution has a functional Intellectual Property (IP) Office or	4.33	HE	4.43	HE	4.43	HE	4.40	HE	5

Technology Transfer Office (TTO) responsible for IP management									
2. Researchers and innovators are educated on IP rights, patenting procedures, and technology licensing	4.33	HE	4.93	HE	4.44	HE	4.57	HE	2
3.An IP policy clearly outlines ownership rights between faculty, students, and the university	4.33	HE	4.88	HE	4.38	HE	4.53	HE	3
4.Processes for patent search, patent filing, and IP protection are systematically supported by the university.	4.33	EH	4.94	HE	4.25	HE	4.51	HE	4
5.Budget allocation for patent filing fees and maintenance is included in research or commercialization projects	3.23	LE	3.16	ME	3.66	ME	3.35	LE	10
6.Invention disclosures are formally required before commercialization or external presentation of innovations	4.23	HE	4.29	HE	4.10	E	4.21	HE	9
7.IP valuation processes are conducted to determine the commercial worth of technologies and products	4.17	E	4.29	HE	4.21	HE	4.22	HE	8
8.Partnerships with patent lawyers, IP consultants, or government IP offices (e.g., IPOPHL) are maintained.	4.17	E	4.34	HE	4.26	HE	4.26	HE	7
9.Licensing agreements and royalty-sharing mechanisms are in place for commercialized technologies.	4.33	HE	4.23	HE	4.24	HE	4.27	HE	6
10. Monitoring and enforcement activities are conducted to protect the institution's IP from infringement or unauthorized use.	5.00	HE	4.62	HE	4.62	HE	4.75	HE	1
Overall Mean	**4.25**	**HE**	**4.41**	**HE**	**4.26**	**HE**	**4.31**	**HE**	

Table 8 presents the assessment of Institutional Innovation in Intellectual Property (IP) Management, which was rated as "Highly Evident" by respondents (overall WM = 4.31). The highest-ranked indicator was monitoring and enforcement activities to protect institutional IP (WM = 4.75, ranked 1st), followed by educating researchers and innovators on IP rights, patenting procedures, and technology licensing (WM = 4.57, ranked 2nd) and a clear IP policy outlining ownership rights between faculty, students, and the university (WM = 4.53, ranked 3rd). Processes supporting patent search, filing, and protection (WM = 4.51, ranked 4th), a functional IP or Technology Transfer Office (WM = 4.40, ranked 5th), licensing agreements and royalty-sharing mechanisms (WM = 4.27, ranked 6th), and partnerships with patent lawyers or IP offices (WM = 4.26, ranked 7th) followed. IP valuation (WM = 4.22, ranked 8th), mandatory invention disclosures (WM = 4.21, ranked 9th), and budget allocation for patent filing and maintenance (WM = 3.35, ranked 10th, "Lowly Evident") completed the rankings.

These results imply that IP management practices are well-established in monitoring, policy, and education, though financial support for patent processes may need further enhancement These findings are supported by Audretsch et al. (2023), who emphasized that universities with dedicated funding and strong enforcement achieve higher patent filings and successful licensing agreements.

- **Innovation Culture and Processes**

Table 9. Assessment on the Institutional Innovation as to Innovation Culture and Processes

Indicators	Administrator		Employee		Stakeholder		Composite Mean		Rank
	WM	VI	WM	VI	WM	WM	VI	WM	
1. The institution promotes a culture of innovation by recognizing and rewarding creative and entrepreneurial initiatives	4.33	HE	4.29	HE	4.10	E	4.24	HE	8
2. Innovation is embedded as a core value within the university's strategic plan and operational programs	4.33	HE	4.29	HE	4.21	HE	4.28	HE	4
3.Cross-functional innovation teams are formed to drive product and technology development across departments	4.33	HE	4.24	HE	4.26	HE	4.28	HE	4
4.Continuous innovation training programs are offered for faculty, staff, and students	5.00	HE	4.67	HE	4.67	HE	4.78	HE	1
5.Success stories of university-based innovations are widely shared to inspire an innovation-driven mindset	4.30	HE	4.14	HE	4.16	HE	4.20	HE	9
6. Administrative support and streamlined processes facilitate the quick transition from research to market	4.33	HE	4.23	HE	4.94	HE	4.50	HE	2
7. Policies exist to support "risk-taking" behavior in research and product development without fear of punitive consequences	4.22	HE	4.21	HE	4.40	HE	4.28	HE	4
8.Strategic linkages with innovation hubs, business incubators, and accelerators are actively pursued	4.33	HE	4.22	HE	4.03	E	4.19	E	10
9.Feedback mechanisms (e.g., innovation audits, surveys) are implemented to continually assess and improve innovation processes	4.33	HE	4.20	HE	4.21	HE	4.25	HE	7
10. Innovation champions or mentors are identified within departments to spearhead	4.33	HE	4.22	HE	4.23	HE	4.26	HE	6

initiatives and provide guidance.									
Overall Mean	**4.38**	**HE**	**4.27**	**HE**	**4.32**	**HE**	**4.33**	**HE**	

As presented in Table 9, respondents rated Institutional Innovation in Innovation Culture and Processes as "Highly Evident" (overall WM = 4.33). The highest-ranked indicator was the provision of continuous innovation training programs for faculty, staff, and students (WM = 4.78, ranked 1st), followed by administrative support and streamlined processes facilitating the transition from research to market (WM = 4.50, ranked 2nd). Indicators ranked 4th include embedding innovation as a core value in the strategic plan, forming cross-functional innovation teams, and policies supporting risk-taking in research and product development without fear of punitive consequences (WM = 4.28). Innovation champions or mentors (WM = 4.26, ranked 6th), feedback mechanisms such as audits and surveys (WM = 4.25, ranked 7th), recognition and rewards for creative initiatives (WM = 4.24, ranked 8th), sharing success stories (WM = 4.20, ranked 9th), and strategic linkages with innovation hubs, incubators, and accelerators (WM = 4.19, ranked 10th, "Emerging Evident") completed the rankings.

The high overall means from administrators (4.38), employees (4.27), and stakeholders (4.32) imply strong readiness to foster entrepreneurial initiatives, strengthen cross-functional collaborations, and sustain continuous innovation, positioning the institution for greater impact and market relevance. These findings support Lunag et al. (2023), who emphasized that effective innovation culture in higher education relies on strong leadership, institutional policy alignment, stakeholder engagement, and collaboration with external partners.

Table 10. Summary of Assessments of the Administrators, Employees, and Stakeholders on the Institutional Innovation

Indicators	Administrator		Employee		Stakeholder		Composite Mean		Rank
	WM	VI	WM	VI	WM	WM	VI	WM	
1.Idea Generation & Selection	4.41	HE	4.42	HE	4.36	HE	4.40	HE	1
2. Research Development	4.40	HE	4.27	HE	4.25	HE	4.31	HE	3.5
3. Prototyping and Testing	4.31	HE	4.32	HE	4.21	HE	4.28	HE	5
4.Intellectual Property Management	4.25	HE	4.41	HE	4.26	HE	4.31	HE	3.5
5. Innovation Culture and Processes	4.38	HE	4.27	HE	4.32	HE	4.33	HE	2
Overall Mean	**4.35**	**HE**	**4.34**	**HE**	**4.28**	**HE**	**4.33**	**HE**	

Table 10 presents the summary assessment of Institutional Innovation as evaluated by administrators, employees, and stakeholders, rated as "Highly Evident" with an overall composite mean of 4.33. Idea Generation and Selection ranked 1st (WM = 4.40), reflecting strong collaborative ideation, student involvement, and open innovation platforms. Innovation Culture and Processes followed (WM = 4.33), highlighting robust support for commercialization, entrepreneurship, and institutional sustainability. Research Development and Intellectual Property Management tied at 3.5 (WM = 4.31), indicating alignment with national research priorities and functional IP systems, though infrastructure and patent support may require further reinforcement. Prototyping and Testing ranked 5th (WM = 4.28), showing established product development practices, with opportunities for improvement in facilities and technical support.

Overall, the findings imply that the institution has a strong foundation for innovation across key domains, with policies, processes, and resources largely in place. Targeted improvements in infrastructure, IP funding, and commercialization efforts are recommended. These results are supported by Baron (2024), who emphasized that leadership commitment, structured innovation frameworks, and an enabling environment are critical to achieving consistently high innovation outcomes in Philippine State Universities and Colleges.

Significant Differences in Institutional Innovation

Table 11. Significant Differences as to the Institutional Innovation

Variables	F value	p-value	Decision	Interpretation
Idea Generation and Selection	0.069	0.933	Fail to reject Ho	Not Significant
Research Development	0.521	0.594	Fail to reject Ho	Not Significant
Prototyping and Testing	2.345	0.097	Fail to reject Ho	Not Significant
Intellectual Property Management	0.426	0.653	Fail to reject Ho	Not Significant
Intellectual Property Management	0.518	0.596	Fail to reject Ho	Not Significant

Legend: df(0.05) 2 and 463=2.996

As shown in table 11, the analysis of variance (ANOVA) results indicates that there are no significant differences in the assessment of Institutional Innovation among the three groups of respondents in selected State Universities and Colleges (SUCs) in Region 4A. All computed F-values are below the critical value of 2.996, and the corresponding p-values are greater than the 0.05 level of significance. Specifically, the variables Idea Generation and Selection ($F = 0.069$, $p = 0.933$), Research Development ($F = 0.521$, $p = 0.594$), Prototyping and Testing ($F = 2.345$, $p = 0.097$), and Intellectual Property Management ($F = 0.426$, $p = 0.653$ and $F = 0.518$, $p = 0.596$) all resulted in the decision to fail to reject the null hypothesis. This implies that the assessments provided by the three groups of respondents are statistically consistent, reflecting a common perspective on innovation and commercialization practices across the institutions involved.

This result is supported by the findings of Tran and Park (2021), who observed that institutional innovation performance tends to show consistency across administrative levels and organizational subgroups when there is a unified strategic framework and shared innovation culture.

Significant Relationship Between Profile and Institutional Innovation

Table 12. Significant Relationship between Types and Institutional Innovation

Variables	X^2 value	df	p-value	Decision	Interpretation
Types vs Idea Generation and Selection	0.691	2	0.708	Fail to reject Ho	Not Significant
Types vs Research Development	6.225	4	0.183	Fail to reject Ho	Not Significant
Types vs Prototyping and Testing	6.553	2	0.038	Reject Ho	Significant
Types vs Intellectual Property Management	10.006	4	0.040	Reject Ho	Significant
Types vs Innovation Culture and Processes	7.478	4	0.113	Fail to reject Ho	Not Significant

Legend: df(0.05) 2=5.991, 4=9.488

As shown in Table 12, the Chi-square test results reveal a mixed relationship between respondents' classification and the components of Institutional Innovation. For Idea Generation and Selection ($X^2 = 0.691$, $p = 0.708$), Research Development ($X^2 = 6.225$, $p = 0.183$), and Innovation Culture and Processes ($X^2 = 7.478$, $p = 0.113$), p-values exceed 0.05, leading to a failure to reject the null hypothesis and indicating no significant relationship between respondent type and assessment of these variables.

However, significant relationships were found for Prototyping and Testing ($X^2 = 6.553$, $df = 2$, $p = 0.038$) and Intellectual Property Management ($X^2 = 10.006$, $df = 4$, $p = 0.040$), as their p-values are below 0.05 and their computed Chi-square values exceed the critical values (5.991 for df = 2; 9.488 for df = 4).

These results imply that respondent classification significantly influences perceptions of prototyping, testing, and IP management, while views on other innovation components remain largely aligned. This finding is supported by Ghosh and Srivastava (2022), who noted that stages such as prototyping, testing, and IP management often vary depending on the complexity and nature of the products, even when general innovation culture and idea generation remain stable.

Table 13. Significant Relationship between the Number of Product Innovations and Institutional Innovation

Variables	X^2 value	df	p-value	Decision	Interpretation
Number of product innovations developed in the last 5 years vs Idea Generation and Selection	0.361	1	0.548	Fail to reject Ho	Not Significant
Number of product innovations developed in the last 5 years vs Research Development	2.450	2	0.294	Fail to reject Ho	Not Significant
Number of product innovations developed in the last 5 years vs Prototyping and Testing	0.867	1	0.352	Fail to reject Ho	Not Significant
Number of product innovations developed in the last 5 years vs Intellectual Property Management	1.545	2	0.462	Fail to reject Ho	Not Significant
Number of product innovations developed in the last 5 years vs Innovation Culture and Processes	0.576	2	0.750	Fail to reject Ho	Not Significant

Legend: df(0.05) 1=3.841

Table 13 presents the Chi-square test results, indicating no significant relationship between the number of product innovations developed in the last five years and the components of Institutional Innovation. All p-values exceed 0.05, and corresponding Chi-square values are below the critical value of 3.841 for df = 1. Specifically, Idea Generation and Selection ($X^2 = 0.361$, $p = 0.548$), Research Development ($X^2 = 2.450$, $p = 0.294$), Prototyping and Testing ($X^2 = 0.867$, $p = 0.352$), Intellectual Property Management ($X^2 = 1.545$, $p = 0.462$), and Innovation Culture and Processes ($X^2 = 0.576$, $p = 0.750$) all led to failing to reject the null hypothesis.

These findings imply that the quantity of product innovations over the past five years does not significantly affect respondents' assessments of institutional innovation processes. This suggests that merely increasing product output is insufficient to strengthen institutional innovation unless supported by robust processes in idea generation, prototyping, and IP management. This is supported by Tseng et al. (2020), who emphasized that strong management mechanisms, a supportive innovation climate, and effective reward systems are crucial for translating product development into sustained innovation performance at the institutional level.

Table 14. Significant Relationship Between Department Involvement and Institutional Innovation

Variables	X^2 value	df	p-value	Decision	Interpretation
Departments or offices are primarily involved in the product innovation vs Idea Generation and Selection	0.328	2	0.849	Fail to reject Ho	Not Significant
Departments or offices are primarily involved in the product innovation vs Research Development	2.808	4	0.590	Fail to reject Ho	Not Significant
Departments or offices are primarily involved in the product innovation vs Prototyping and Testing	1.620	2	0.445	Fail to reject Ho	Not Significant
Departments or offices are primarily involved in the product innovation vs Intellectual Property Management	0.738	4	0.947	Fail to reject Ho	Not Significant

Departments or offices are primarily involved in the product innovation vs Innovation Culture and Processes	1.768	4	0.778	Fail to reject Ho	Not Significant

As presented in Table 14, there is no significant relationship between the departments or offices primarily involved in product innovation and the components of Institutional Innovation. All p-values exceed 0.05, and corresponding Chi-square values are below the critical values for their respective degrees of freedom. Specifically, Idea Generation and Selection ($X^2 = 0.328$, $p = 0.849$), Research Development ($X^2 = 2.808$, $p = 0.590$), Prototyping and Testing ($X^2 = 1.620$, $p = 0.445$), Intellectual Property Management ($X^2 = 0.738$, $p = 0.947$), and Innovation Culture and Processes ($X^2 = 1.768$, $p = 0.778$) all led to failing to reject the null hypothesis.

These findings indicate that respondents' assessments of institutional innovation are not significantly influenced by which departments lead product innovation. This is supported by Meroño and López (2021), who found that departmental involvement does not significantly determine innovation performance; instead, overall strategy, leadership commitment, and external collaboration are more critical. This suggests that assigning departments to lead innovation is insufficient without a cohesive and supportive institutional environment.

Table 15. Significant Relationship Between Product Innovation Objectives and Institutional Innovation

Variables	X^2 value	df	p-value	Decision	Interpretation
Objectives of your institution's product innovation vs Idea Generation and Selection	0.607	2	0.738	Fail to reject	Not significant
Objectives of your institution's product innovation vs Research Development	7.951	4	0.093	Fail to reject	Not significant
Objectives of your institution's product innovation vs Prototyping and Testing	2.073	2	0.355	Fail to reject	Not significant
Objectives of your institution's product innovation vs Intellectual Property Management	3.036	4	0.552	Fail to reject	Not significant
Objectives of your institution's product innovation vs Innovation Culture and Processes	0.903	4	0.924	Fail to reject	Not significant

Table 15 indicates the Chi-square test results indicate that there is no significant relationship between the objectives of the institution's product innovation and the various components of institutional innovation. All p-values exceed the 0.05 level of significance, and the corresponding Chi-square values are below the critical values for their degrees of freedom. Specifically, Idea Generation and Selection ($X^2 = 0.607$, $p = 0.738$), Research Development ($X^2 = 7.951$, $p = 0.093$), Prototyping and Testing ($X^2 = 2.073$, $p = 0.355$), Intellectual Property Management ($X^2 = 3.036$, $p = 0.552$), and Innovation Culture and Processes ($X^2 = 0.903$, $p = 0.924$) all resulted in the decision to fail to reject the null hypothesis.

These results suggest that regardless of the stated objectives of product innovation, the respondents' assessments of institutional innovation activities remain statistically similar.

Problems encountered by the respondents in the institutional innovation.

Table 16. Problems Encountered by the Respondents as to Institutional Innovation

Indicators	WM	VI	Rank
1. Limited funding support restricts the initiation and continuation of product innovation projects.	2.95	ME	5

2. Lack of structured programs for systematic idea generation and prioritization among faculty and students.	2.09	LE	8
3. Insufficient research development facilities and outdated laboratory equipment hinder innovation capacity	2.49	LE	6
4. Weak collaboration across academic departments affects the multi-disciplinary nature of innovations.	3.50	E	3
5. Absence of a clear institutional policy on ownership and incentives related to intellectual property rights.	2.07	LE	9
6. Delayed prototyping and insufficient testing processes due to lack of technical expertise and infrastructure.	3.55	E	2
7. Limited knowledge among researchers about patenting, licensing, and technology transfer procedures.	4.02	E	1
8. Poor documentation and tracking of innovation projects lead to loss of institutional knowledge and learning.	1.89	LE	10
9. Institutional culture tends to prioritize academic outputs over innovation and commercialization efforts.	3.05	ME	4
10. Lack of industry and community consultation during idea generation leads to innovations that may not align with actual market or societal needs.	2.32	LE	7
Overall Mean	**2.79**	**ME**	

Legend: WM-Weighted Mean, VI-Verbal Interpretation

Option	Range	Verbal	Interpretation
5	4.20 – 5.00	Highly Encountered	HE
4	3.40 – 4.19	Encountered	E
3	2.60 – 3.39	Moderately Encountered	ME
2	1.80 – 2.59	Least Encountered	LE
1	1.00 – 1.79	Very Least Encountered	VLE

As shown in Table 16, respondents assessed the problems encountered in Institutional Innovation as “Moderately Evident” (overall WM = 2.79). The highest-ranked problem was limited knowledge among researchers about patenting, licensing, and technology transfer procedures (WM = 4.02, Rank 1), highlighting gaps in IP awareness and commercialization skills. This was followed by delayed prototyping and insufficient testing due to lack of technical expertise and infrastructure (WM = 3.55, Rank 2) and weak collaboration across academic departments affecting multi-disciplinary innovation (WM = 3.50, Rank 3). Other notable challenges include a culture prioritizing academic outputs over commercialization (WM = 3.05, Rank 4) and limited funding for product innovation projects (WM = 2.95, Rank 5). Lower-ranked problems, interpreted as “Lowly Evident,” include lack of structured programs for idea generation (WM = 2.09, Rank 8), absence of clear IP policies (WM = 2.07, Rank 9), and poor documentation of innovation projects (WM = 1.89, Rank 10).

Overall, the results imply that institutional innovation faces systemic and operational barriers requiring improvements in researcher capability, technical resources, interdepartmental collaboration, and structured innovation processes. These findings are supported by Daniel and Alves (2020), who observed similar barriers to university-industry technology transfer in Portuguese public universities and concluded that successful commercialization requires early and continuous engagement with industry throughout research, protection, and commercialization stages.

Inputs for an improved marketing plan may be proposed based on the study’s findings.

A proposed institutional development plan entitled “Institutional Innovation Plan for Flagship Products of Selected State Universities and Colleges in Region 4A, FY 2026–2028” was created to guide these institutions in strengthening their research and innovation capabilities. The plan focuses on enhancing institutional support systems, fostering a strong innovation culture, building capacity through faculty development and specialized research centers, and improving intellectual property management. By aligning with the Sustainable Development Goals (SDGs) and establishing a robust monitoring and evaluation framework, this plan aims to strengthen institutional innovation, optimize knowledge creation, and maximize the universities' contribution to social and economic development across the region.

CONCLUSIONS

Based on the study's findings, several conclusions were drawn. Food, beverage, and agricultural product innovations dominate among Region 4A SUCs, reflecting their commitment to addressing local needs and effectively utilizing regional resources. The high mean ratings for institutional innovation and commercialization indicate strong and widely recognized efforts to transform research outputs into market-ready products. Furthermore, no significant differences were observed among the three groups of respondents, suggesting a shared understanding and unified support for innovation initiatives. However, significant relationships between respondent profiles and certain aspects of innovation imply the need for tailored strategies, particularly in prototyping, intellectual property management, and funding. Although innovation challenges were assessed as moderate, they are considered manageable with enhanced institutional support and continuous improvement. Overall, the proposed Marketing Plan presents a timely and comprehensive approach to strengthening commercialization efforts, maximizing market potential, and increasing socio-economic impact.

RECOMMENDATIONS

Based on the findings and conclusions established, the following recommendations are suggested:

1. SUC administrators and committees should implement the strategic marketing plan, focusing on market research, distribution, branding, capacity building, IP awareness, infrastructure, funding, SDG alignment, and monitoring.
2. Faculty, researchers, and extension officers should enhance stakeholder engagement and continuous capacity-building to support innovation initiatives.
3. University councils and innovation committees should promote cross-functional collaboration through interdisciplinary teams and joint projects.
4. Training and HR units should provide targeted programs in prototyping, IP management, and funding strategies to improve stakeholder competence.
5. Top management and finance committees should address innovation challenges by increasing R&D budgets, upgrading facilities, and establishing industry and government partnerships.
6. Technology transfer and external affairs units should enhance market access and compliance through collaborations, streamlined processes, and supportive policies.
7. Future researchers should examine long-term outcomes, regional comparisons, and community impacts to refine commercialization strategies.

REFERENCES

Altbach, P. G. (2020). Peripheries and centers: Research universities in developing countries. In *Tradition and transition* (pp. 85–112). Brill. https://doi.org/10.1007/s12564-009-9000-9

Ampo, R. C. (2020). *Strategic development plan of selected state universities and colleges (SUCs) in CALABARZON: An emerging process for faculty development program*. ResearchGate. https://www.researchgate.net/publication/347483551

Dio, R. V., Solano, S. S., Gonzales, I. R. B., & Guarte, H. B. D. (2024). Exploring faculty profile and technology transfer initiatives of a newly-instated state university in the Philippines. *International*

Journal of Evaluation and Research in Education, 13(4), 2335–2344. https://doi.org/10.11591/ijere.v13i4.27355
Hailu, A. T. (2024). The role of university–industry linkages in promoting technology transfer: Implementation of triple helix model relations. *Journal of Innovation and Entrepreneurship, 13*(1), Article 25. https://doi.org/10.1186/s13731-024-00370-y
Junsay, M. V. B. (2021). Philippine technology transfer offices: A best practice assessment. *Journal of Technology Management & Innovation, 16*(3), 99–109. https://doi.org/10.4067/S0718-27242021000300099
Lamoste, L. D., Lampara, E. C., Estrellado, J. E. O., De Leon, J. P. G., Meneses, J. L., Moreno, N. I., & Prado, J. C. (2021). NPS level of research-based products of state universities and colleges in the Philippines. *Psychology and Education, 58*(5), 260–264. https://doi.org/10.1108/EJM0520130240
Leron, P. J., & Baconguis, R. (2021). Exploring the dimensions of innovation culture in public higher education institutions: Towards improved organizational performance in research and development. *Journal of Research Management and Administration, 1*(1), 36–57. https://doi.org/10.18552/jorma.v1i1.759
Lunag, M. N., Posadas, C. L., Lamadrid, R. L., Ducas, A. G., Teehankee, A., De Guzman, M. K. B., Moncada, C. B., & Clemente, M. C. B. (2023). Building sustainable research and innovation ecosystem in Philippine higher education institutions. *Educational Research for Policy and Practice, 22*(1), 63–88. https://doi.org/10.1007/s10671-023-09355-2
Sarita, M. A. (2024). *Technology transfer and commercialization in Philippine state universities and colleges (SUCs): Challenges and strategic solutions*. DOST Science for Change Program. https://s4cp.dost.gov.ph
Tseng, F.-C., Huang, M.-H., & Chen, D.-Z. (2020). Factors of university–industry collaboration affecting university innovation performance. *The Journal of Technology Transfer, 45*(2), 560–577. https://doi.org/10.1007/s10961-018-9656-6
Utanova, U. A., Rajabov, K. I., Inoyatov, K. K., & Marufbaev, B. S. (2021). Entrepreneurial universities as a modern development stage of the University 3.0 concept. *Webology, 18*(SI05), 1053–1066. https://doi.org/10.14704/Web/V18si05/Web18281
Yap, R. J. C., & Hechanova, M. R. M. (2023). Constructing innovation culture for low middle economies: A systems approach. *Journal of Entrepreneurship and Innovation in Emerging Economies, 10*(2), Article 23939575231212059. https://doi.org/10.1177/23939575231212059

WORK-RELATED STRESS AND COPING STRATEGIES OF POLICE PERSONNEL IN FORENSIC GROUP FINGERPRINT IDENTIFICATION DIVISION

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ABSTRACT

Stress is a major concern of every individual. Police personnel in Forensic Group serves multiple types of clients which is not limited to the victim but even with the defense and counsel of the suspect. This quantitative research used the descriptive design. Respondents of the study are the personnel assigned at Forensic Group Fingerprint Identification Division. Data was gathered using a close-ended survey questionnaire. Based on the findings, majority of the respondents is at the age of 26-45 years old, male, non-commission officer, already serve for about 11 to 20 years in service and monthly salary ranging from Php 30,001 to 40,000. The level of stress of Organizational stressors are moderately stressful for respondent police personnel. Lack of available manpower to perform task or assignment, lack of equipment and multi-tasking are most notable moderately stressful among organizational stressors. As to personal stressors, the stress level of respondents police personnel is mildly stressful. Financial obligations and health problems are among the is moderately stressful personal stressors to the respondents police personnel. The frequently utilized coping strategies as to problem-focused coping is to recognize their failure and learn from it, preparing a well-planned schedule of activities, to know limitations, use-up energy and keep themselves busy to forget problem. In terms of emotion-focus coping strategies, respondents police personnel frequently remain calm even under stressful situations, viewed stressors as a challenge, concentrate at work even under pressure, frequently meditate or pray and adopt healthy lifestyles.
It is recommended that the Forensic Group strengthen manpower allocation and upgrade forensic equipment to reduce workload pressure and organizational stress. The organization should also institutionalize stress management programs, counseling services, medical checkups, and wellness initiatives to support the mental, emotional, and physical well-being of personnel. Additionally, policies promoting work-life balance, financial literacy programs, and peer-support systems should be implemented to reinforce positive coping strategies.

Keywords: *Occupational Stress, Organizational Stressors, Personal stressors, Coping Strategies, Forensic Police Personnel*

INTRODUCTION

Stress is widely recognized as a major occupational health concern affecting individuals across professions worldwide. The World Health Organization (2019) defines stress as a state of worry or mental tension caused by difficult situations, particularly when individuals perceive that job demands exceed their coping abilities. In law enforcement, occupational stress has been consistently identified as significantly higher compared to many other professions due to exposure to traumatic events, organizational pressure, workload demands, and public scrutiny (Violanti et al., 2017). Police work inherently involves high-risk situations, critical decision-making, and legal accountability, which may lead to chronic psychological strain if not properly managed.

Contrary to the common perception that police personnel are mentally resilient and immune to stress, research shows that officers frequently experience emotional exhaustion, burnout, and psychological distress. However, many officers hesitate to express their stress due to stigma, fear of being perceived as weak, or potential career consequences (Karaffa & Koch, 2016). Court-related duties have also been identified as a significant source of stress among law enforcement personnel because of repeated testimony, cross-examination pressures, and the risk of legal repercussions for procedural lapses (Garbarino et al., 2013). In forensic services, the stress level intensifies because examiners must maintain scientific accuracy and impartiality while facing scrutiny from prosecutors, defense lawyers, and the judiciary. Errors, delayed appearances, or failure to attend hearings may result in administrative sanctions or accusations such as obstruction of justice, thereby increasing performance pressure.

In the Philippine setting, occupational stress among police personnel is becoming an increasing concern, particularly within specialized units of the Philippine National Police (PNP). The intensified anti-criminality and anti-illegal drug campaigns have led to a surge in forensic casework, particularly within the PNP Forensic Group. According to local studies, Filipino police officers experience stress related to workload, administrative responsibilities, court appearances, and lack of manpower (Reyes, 2020). Forensic personnel assigned to the Fingerprint Identification Division serve multiple clients, including victims, prosecutors, defense counsel, and judges, requiring strict neutrality and technical competence. Frequent court appearances—sometimes reaching several hearings in a single day, particularly in drug-related cases—add to physical fatigue and emotional strain, which may contribute to burnout and even resignation.

At the local operational level, internal observations suggest that police personnel in forensic units often suppress discussions about stress due to organizational culture and expectations of toughness. Persistent exposure to heavy caseloads, repeated testimonies, documentation demands, and legal accountability can negatively affect well-being and job satisfaction. While several international studies have examined police stress broadly, limited research specifically focuses on forensic personnel and their coping mechanisms within the Philippine context. Therefore, this study entitled "Work-Related Stress and Coping Strategies of Police Personnel in Forensic Group Fingerprint Identification Division" seeks to examine the sources of occupational stress and the coping strategies employed by these personnel. The findings aim to contribute to the development of evidence-based interventions that promote psychological well-being, resilience, and organizational support within the forensic service sector.

STATEMENT OF THE PROBLEM

This study aimed to identify the work-related stress experienced by every police personnel in Forensic Group Fingerprint Identification Division and their coping strategies. The result of this study could serve as basis in developing a stress management program. Specifically, this study sought to answer the following questions:

1.What is the profile of the respondent police personnel as to:

1.1age; 1.2gender; 1.3civil status; 1.4rank; 1.5years in service;
1.6nature of assignment; and 1.7income?

2.What is the stress level of the respondent police personnel in terms of the Following areas of concern:

2.1Organizational stressors; and 2.2Personal stressors?

3.How do the respondent police personnel respond to their work-related stress utilizing the coping strategies:

3.1Problem-focused coping; and 3.2Emotion-focused coping?

REVIEW OF RELATED LITERATURE

According to the study of Frank et. al (2020) which stated that work stress causes a variety of behaviors to emerge, as well as a variety of difficulties and Hogh, Hansen, Mikkelsen, and Perrson (2019) speculate that long-term exposure to intense stressors can cause a loss of control and damage the psychological well-being of vulnerable persons. Police officers are subjected to traumatic and potentially fatal occurrences. Demou, E., Hale, H., & Hunt, K. (2020), asserted that long working hours, workload, culture, leadership, and organizational change were identified as the top perceived stressors. Bartolo, Faria, Fonseca, Marques, Silva, Periera, Kaiseler, Queirós, Passos, and Sousa (2020), resilient coping is negatively correlated to job stress and burnout, as well as task-oriented coping and enthusiasm towards job. It is important to invest on police officer's occupational health.

However, this research regarding stress and coping strategies covers unexplored features that recently have drawn research interest in other disciplines. In the previous research and literature, the researcher found gaps. First, population gap is evident after reviewing earlier research. A gap exists with the population of the study in which this research will cover the police personnel. In earlier studies, this population group received insufficient attention. Several aspects of stress have been covered in earlier study, including effects of stress in the studies of Frank et. al (2020) and Hogh, Hansen, Mikkelsen, and Perrson (2019), causes of stress in the studies of Demou, E., Hale, H., & Hunt, K. (2020). Coping strategies in the study of Kaiseler, Queirós, Passos, and Sousa (2014), is broad and generic which is not specific to stress experience by police personnel.

METHODOLOGY

Research Design. In this quantitative research, the researcher used the descriptive correlational design to understand the nature, characteristics, components, aspects of the situation or phenomenon regarding the stress of police personnel that they have experience and their coping strategies.

Respondents of the Study. The respondents of the study are the personnel assigned at Forensic Group Fingerprint Identification Division located at PNP National Head Quarter Camp Gen. Rafael T. Crame from year 2020-2023. Purposive sampling technique was used for this study. The criterion for choosing the respondents is that the respondent must be assigned at the Forensic Group Fingerprint Identification Division of PNP for more than 2 years and must have an experience to attend court duties to testify in court as expert witness. The respondent must either be a Police Commission Officer or Police Non-commission Officer.

Research Instrument. The instrument used in this study was a survey questionnaire which sought to identify the work-related stress and coping strategies of police personnel. The questionnaire is consisting of three parts. Part one is consist of profile of the respondents' police personnel about work-related stress according to age, gender, civil status, rank, years in service, nature of assignment and income. Part two is consistent with the questions concerning stress level of the respondents' police personnel in terms of organizational and personal stressors. Part three is consist of the questions to determine the coping strategies that the respondents police personnel used in terms of problem-focused and emotion-focused coping.

Statistical Treatment of Data. Percentage was used to determine the profile of the respondent police personnel as to their age, gender, civil status, rank, years in service, nature of assignment and income. Weighted mean was used to determine the stress level and coping strategies of the respondent police personnel. Ranking was used to show chronological sequence of the findings of the study.

FINDINGS

Sub-problem 1 What is the profile of the respondent police personnel as to***:***

1.1 age

Table 1. Profile of the Respondents Police Personnel as to Age

Criteria	Frequency	Percent	Mean	Std. Deviation	Rank
51 and above years old	0	0	-	-	6
46-50	3	6.3	-	-	5
41-45	15	31.3	-	-	1
36-40	11	22			3
31-35	8	16.7			4
26-30	13	27.1			2
25 and below	0	0			6
Total	**48**	**100**	**7.14**	**6.20**	

Table 1 Shows the profile of the respondents' police personnel as to age in which age 41-45 years old has 15 respondents or 31.3% percent in rank of 1 while 26-30 has 13 or 27.1% in rank 2. While 36-40 are 11 or 22% in rank 3 and in rank 4 are age 31-35 with 8 16.7% and in rank 5 are 46-50 with 3 respondents or 6.3%. On the other hand, 51- and above and 25 and below is 0 all with the total number of respondents of 48 or 100.0 percent.

1.2 gender

Table 2. Profile of the Respondents Police as to Gender

Criteria	Frequency	Percent	Mean	Std. Deviation	Rank
Male	32	66.7	-	-	1
Female	16	33.3	-	-	2
Total	**48**	**100.0**	**24**	**11.31**	

Table 2 shows the profile of the respondents in terms of gender is 32 male respondents or 66.7 percent in rank 1 while 16 or 33.3 percent in rank of 2 are female. With a total number of 48 or 100 percent.

1.3 civil status

Table 3. Profile of the Police Respondents as to Civil Status

Criteria	Frequency	Percent	Mean	Std. Deviation	Rank
Single	19	39.6	-	-	2
Married	29	60.4	-	-	1
Separated	0	0	-	-	3
Widow	0	0	-	-	3
Total	**48**	**100.0**	**12**	**14.45**	

Table 3 Shows the profile of the respondents police as to civil status, 29 respondent or 60.4 percent, rank of 1 are married, rank of 2 are single with 19 respondents or 39.6 percent while separated and widow are 0 in rank 3 with the total number of 48 or 100.0 percent.

1.4 rank

Table 4. Profile of the Respondents Police Personnel as to Rank.

Criteria	Frequency	Percent	Mean	Std. Deviation	Rank
Police Commission Officer	18	37.5	-	-	2
Police Non-commission Officer	30	62.5	-	-	1
Total	**48**	**100.0**	**24**	**8.49**	

Table 4 shows the profile of the respondents' police personnel in terms of rank, 30 respondents or 62.5 percent in rank of 1 are Police Non-commission Officer and 18 or 37.5 percent in rank of 2 are C. In rank 3, Php 20,001-30,000 there are 6 or 9.5 percent. Above Php 80,001 or 3.2 percent in rank of 4. Finally, Php 31,001-40,000 has 1 or 1.6 percent. With a total number of 63 or 100. Seems that more of respondents are currently using smartphone 20,000 and below. It has a standard deviation of 1.18512.

1.5 years in service

Table 5. Profile of the Respondents Police Personnel as to Years in Service

Criteria	Frequency	Percent	Mean	Std. Deviation	Rank
1-5	11	22.9	-	-	3
6-10	4	8.3	-	-	4
11-15	14	29.2	-	-	2
16-20	18	37.5	-	-	1
21-25	1	2.1	-	-	5
26-30	0	0	-	-	7
31 and above	0	0	-	-	4
Total	**48**	**100.0**	**6.86**	**7.40**	

Table 5 Shows the profile of the respondents as to years in service, 18 or 37.5 percent, rank of 1 are 16-20 years in service, 14 respondents or 29.2 percent, rank of 2 are 11-15 years. While 1-5 years in rank 3 with 11 or 22.9 percent. Next is 6-10 years with 4 or 8.3 percent in rank 4 while 21-25 years has 1 or 2.1 percent in rank 5. While none of the respondents are 26-30 years and 31 years above. With a total number of 48 or 100.0 percent.

1.6 nature of assignment

Table 6. Profile of the Respondents Police as to Nature of Assignment

Criteria	Frequency	Percent	Mean	Std. Deviation	Rank
Operational	38	75	-	-	1
Administrative	14	29.2	-	-	2
Total	**48**	**100.0**	**26**	**16.97**	

Table 6 shows the profile of the respondents in terms of nature of assignment is that 38 respondents or 75 percent are in operational at rank 1 while 14 or 29.2 percent in rank of 2 are at the administrative assignment. With a total number of 48 or 100 percent.

1.7 income

Table 7. Profile of the Respondents Police Personnel as to Income

Criteria	Frequency	Percent	Mean	Std. Deviation	Rank
10,000-20,000	3	6.3	-	-	6
20,001-30,000	8	16.7	-	-	4
30,001-40,000	14	29.2	-	-	1

40,001-50,000	9	18.8	-	-	3
50,001-60,000	7	14.6	-	-	5
60,001 and above	11	22.9	-	-	2
Total	**48**	**100.0**	**8.67**	**3.72**	

Table 7 Shows the profile of the respondents as to income, 14 or 29.2 percent, rank of 1 have 30,001-40,000 income, 11 respondents or 22.9 percent, have 60,001 and above income in rank of 2 . While 40,001-50,000 in rank 3 with 9 or 18.8 percent. Next is 20,001-30,000 with 8 or 16.7 percent in rank 4 while 50,001-60,000 have 7 or 14.6 percent in rank 5. While 3 of the respondents or 6.3 percent have 10,000- 20,000 income. With a total number of 48 or 100.0 percent.

Sub-Problem no. 2 What are the stress levels of the respondent police personnel in terms of the following areas of concern:

2.1. organization stressors; and

Table 8. Stress level of the Respondent Police Personnel in Terms of Organization Stressors

Criteria	Weighted Mean	Verbal Interpretation	Rank
Threats to your health and safety.	2.92	Moderately Stressful	4
Odd working hours such as those exceeding official working hours.	2.60	Mildly Stressful	10
Assigned numerous court duties.	2.71	Moderately Stressful	8.5
The impact of strict discipline as nature in performing job.	2.31	Mildly Stressful	14
Multi-tasking or assignment to different task or assignment.	2.94	Moderately Stressful	2.5
Fear of killing someone in the line of duty.	2.73	Moderately Stressful	7
Fails to receive anticipated promotion.	2.79	Moderately Stressful	6
Peer pressure from work environment.	2.50	Mildly Stressful	12
Misunderstanding with superior and colleagues.	2.85	Moderately Stressful	5
Work related to past trauma.	2.52	Mildly Stressful	11
Lack of equipment to be used in performing tasks or assignment.	2.94	Moderately Stressful	2.5
Lack of available manpower to perform task or assignment.	2.98	Moderately Stressful	1
Dealing with different client which includes victim, suspect and counsel of the defense and suspect.	2.35	Mildly Stressful	13
Organizational change and bureaucratic demands.	2.71	Moderately Stressful	8.5
Composite Weighted mean	**2.70**	**Moderately Stressful**	

Table 8 shows the weighted mean on the Stress level of the respondent police personnel in terms of organizational stressors with composite mean of 2.70 implies moderately stressful for verbal interpretation. Lack of available manpower to perform task or assignment is moderately stressful with weighted mean of 2.98 on rank 1, followed by lack of equipment and multi-tasking both with weighted mean of 2.94 or moderately stressful. While the lowest in the rank is the impact of strict discipline as nature in performing job with weighted mean of 2.31 or mildly stressful. This suggests that workplace conditions, demands, and internal structures contribute significantly to their overall stress experience. Organizational stressors, unlike operational ones, originate from institutional constraints and expectations — such as manpower shortages, resource deficiencies, administrative policies, and role demands — which can have profound effects on employee well-being and performance (Patterson and Demou, 2019).

2.2. personal stressors

Table 9 Stress level of the Respondent Police Personnel in Terms of Personal Stressors

Criteria	Weighted Mean	Verbal Interpretation	Rank
Lack of peer support and trust.	2.54	Mildly Stressful	5
Need to control emotions even when someone provoked you.	2.44	Mildly Stressful	9
Expectations of the community.	2.58	Mildly Stressful	3
Social and family influence.	2.21	Mildly Stressful	10
Presence of a gun even during off- duty hours.	2.04	Mildly Stressful	11
Financial obligations which includes family needs and work expenses.	2.96	Moderately Stressful	1
Health problems which had been felt in the last couple of years.	2.65	Moderately Stressful	2
Current family problems that had been happening.	2.46	Mildly Stressful	8
Physical and emotional fatigue from work.	2.52	Mildly Stressful	6
Failure to express stress and strain to other people because of work ethic and culture of law enforcement personnel.	2.48	Mildly Stressful	7
Conflict between official duties and attendance to in-service training.	2.56	Mildly Stressful	4
Composite Weighted mean	**2.49**	**Mildly Stressful**	

Table 9 shows that financial obligations is moderately stressful to the respondents with weighted mean of 2.96 in rank 1, followed by health problems at number 2 with weighted mean of 2.65 or moderately stressful. In rank 3 is the expectation of the community which is mildly stressful to the respondents' police personnel with weighted mean of 2.58. The lowest is the presence of gun even during off-duty hours in which the respondents found it mildly stressful with weighted mean of 2.04. Stress level of respondents' police personnel in terms of personal stressor is mildly stressful with composite weighted mean of 2.49. This suggests that while personal life factors do generate stress among officers, they are generally perceived as less intense compared to organizational stressors, yet they are still meaningful and potentially impactful on well-being and job performance. Prior research indicates that poor health not only affects quality of life but also reduces work productivity and increases absenteeism among law enforcement personnel (Frank et al., 2019).

Sub-problem no. 3 How do the respondent police personnel respond to their work-related stress utilizing the coping strategies as to;

2.3 problem-focused coping

Table 10. Response of Respondent Police Personnel to their Work-related Stress Utilizing the Coping Strategies as to Problem-focused Coping

Criteria	Weighted Mean	Verbal Interpretation	Rank
Recognize my failures and learn from them.	4.10	Frequently	1
Prepare a well-planned schedule of activities.	3.85	Frequently	2
Use-up my energy and keep myself busy to forget my problems.	3.71	Frequently	4
Do not get upset when I make mistakes.	3.60	Frequently	5
Know my limitations and do not take too much work.	3.75	Frequently	3
Composite Weighted mean	**3.80**	**Frequently**	

Table 10 shows that the respondents frequently recognize his/her failure and learn from it at rank 1 with weighted mean of 4.10 followed by 3.85 or frequently is to prepare a well planned schedule of activities. In rank 3 is to know limitations with weighted mean of 3.75 or frequently followed by use-up energy and keep themselves busy to forget problems with weighted mean of 3.71 or frequently at rank 4 and lastly is do not get upset when they made mistakes with weighted mean of 3.60. The response of the police personnel to their work-related stress utilizing the coping strategies as to problem-focused coping has a composite weighted mean of 3.80. This indicates that respondents tend to actively address stressors by modifying their behavior, improving task management, and learning from experiences rather than avoiding problems. Studies show that officers who regulate negative emotions effectively experience lower stress levels and higher occupational resilience (Violanti et al., 2017).

2.4 emotion-focused coping

Table 11. Response of Respondent Police Personnel to their Work-related Stress Utilizing the Coping Strategies as to Emotion-focused Coping

Criteria	Weighted Mean	Verbal Interpretation	Rank
Remain calm even under stressful situation	4.19	Frequently	1
View the stressors as a challenge rather than an obstacle	4.10	Frequently	2
Has concentration at work even under pressure	4.04	Frequently	3
Meditate and/or pray.	3.98	Frequently	5.5
Take over the counter painkillers and prescriptive drugs.	2.56	Seldom	10
Join sports group or recreational activities.	4.00	Frequently	4
Adopt healthy lifestyles.	3.98	Frequently	5.5
Enjoy physical therapy or massage.	3.75	Frequently	8
Talk about my emotions to process what I have seen and done.	3.48	Frequently	9
Improve my appearance.	3.85	Frequently	7
Composite Weighted mean	**3.79**	**Frequently**	

Table 11 shows that the respondents frequently remain calm even under stressful situation at rank 1 with weighted mean of 4.19 followed by frequently viewing stressors as a challenge with weighted mean of 4.10. In the third rank is frequently concentrate at work even under pressure with weighted mean of 4.04 and next is frequently meditate or pray and adopt healthy lifestyles both with weighted mean of 3.98. At the least is to take over-the-counter painkillers and prescriptive drugs which is seldom done by the respondents with weighted mean of 2.56. The response of respondent police personnel to their work-related stress utilizing the coping strategies as to emotion-focused coping has a composite weighted mean of 3.79 or a verbal interpretation of frequently. This finding suggests that respondents regulate their emotional responses to stress effectively, complementing their problem-focused coping strategies. The frequent use of adaptive emotion-focused coping strategies indicates that police personnel in the Forensic Group Fingerprint Identification Division demonstrate strong emotional resilience and self-regulation skills. These strategies likely buffer the effects of organizational and personal stressors identified in earlier findings. Research shows that combining emotion-focused coping (e.g., emotional control, cognitive reframing, spirituality) with problem-focused coping leads to better stress outcomes and reduced burnout among police officers (Bakker & Demerouti, 2007).

CONCLUSIONS

The study on work-related stress and coping strategies of police personnel in the Fingerprint Identification Division revealed meaningful insights into the stress levels experienced by respondents and their adaptive coping mechanisms. Despite moderate organizational stress and mild personal stress, personnel demonstrated resilience through both problem-focused and emotion-focused strategies. These findings highlight the importance of institutional support and targeted interventions to sustain employee well-being and operational effectiveness. Based on the findings:

1. Majority of the respondents is at the age of 26-45 years old, male, non-commission officer, already serve for about 11 to 20 years in service and monthly salary ranging from Php 30,001 to 40,000.

2. The level of stress of Organizational stressors is moderately stressful for respondent police personnel under fingerprint division of forensic group. Lack of available manpower to perform task or assignment, lack of equipment and multi-tasking are most notable moderately stressful among organizational stressors. When it comes to personal stressors, the stress level of respondents' police personnel is mildly stressful. Financial obligations and health problems are among the is moderately stressful personal stressors to the respondents' police personnel.

3. The response of police personnel to their work-related stress which are frequently utilized coping strategies as to problem-focused coping is to recognized their failure and learn from it, preparing a well-planned schedule of activities, to know limitations, use-up energy and keep themselves busy to forget problems and lastly is do not get upset when they made mistakes. In terms of emotion-focus coping strategies, respondents police personnel frequently remain calm even under stressful situation, viewed stressors as a challenge, concentrate at work even under pressure, frequently meditate or pray and adopt healthy lifestyles. At the least is to take over-the-counter painkillers and prescriptive drugs which is seldom done by the respondents.

RECOMMENDATIONS

Based on the results of the study, several practical measures are recommended to address identified stressors and strengthen coping mechanisms among forensic personnel. These recommendations aim to enhance organizational resources, promote mental health and wellness, and provide institutional support that will improve job performance and psychological resilience. Implementing these strategies will not only reduce stress but also foster a healthier and more productive working environment within the forensic unit. Following recommendations are as follows:

1. It is recommended that the Forensic Group, particularly the Fingerprint Identification Division, request additional personnel or implement workload redistribution to address the shortage of manpower. Adequate staffing will help reduce multitasking demands and prevent work overload that contributes to organizational stress.
2. The agency should prioritize the procurement, upgrading, and regular maintenance of forensic equipment. Providing complete and functional tools will enhance operational efficiency and lessen stress caused by resource inadequacy.
3. The organization should conduct regular stress management seminars, resilience training, and mental health awareness programs tailored for forensic police personnel. These programs may include relaxation techniques, time management workshops, and psychological first aid.
4. Since financial obligations were identified as a moderately stressful personal factor, the institution may offer financial literacy programs, savings and investment seminars, and access to low-interest loan facilities to help personnel manage financial stress.
5. Regular medical checkups, fitness programs, and wellness activities should be institutionalized to address health-related stressors. Encouraging physical fitness can further strengthen existing healthy coping strategies among personnel.

6. Establish or strengthen access to professional counseling services, including confidential psychological consultations, to support personnel experiencing work-related or personal stress.
7. Supervisors and unit heads should reinforce positive coping strategies already practiced by personnel, such as planning activities, recognizing limitations, meditation, and maintaining calmness under pressure, through mentoring and peer-support systems.
8. The organization may design policies that promote work-life balance, such as flexible scheduling (when feasible), leave utilization, and family-support programs to reduce cumulative stress.
9. Creating peer debriefing or support groups within the forensic unit can provide a venue for personnel to share experiences, reduce emotional burden, and strengthen camaraderie.
10. Future researchers may explore stress levels in other divisions of the Forensic Group or use mixed method approaches to gain deeper insights into stress experiences and coping effectiveness among police personnel.

REFERENCES

Bakker, A. B., & Demerouti, E. (2007). The Job Demands–Resources model: State of the art. Journal of Managerial Psychology, 22(3), 309–328.

Bond, J., Hartley, T. ., Sarkisian, K., Andrew, M., Charles, L. ., Andrew, M. ., & Violanti, J.. (2018). Association of Traumatic Police Event Exposure with Sleep Quality and Quantity in the BCOPS Study Cohort". International Journal of Emergency Mental Health, 15(4), 255–266

Cary L. Cooper, 1998, Theories of Organizational Stress, OUP Oxford, ISBN 0191584703, 9780191584701

Frank, J., Lambert, E. G., & Qureshi, H. (2020). Examining Police Officer Work Stress Using the Job Demands–Resources Model. Journal of Contemporary Criminal Justice, 33(4),348–367. https://doi.org/10.1177/1043986217724248

Frank, E., Ramey, S. L., & Lovell, B. L. (2019). Health Consequences of Chronic Stress in Law Enforcement Officers. Police Practice and Research, 20(8), 756–772.

Patterson, George & Chung, Irene & Swan, Philip. (2014). Stress management interventions for police officers and recruits: a meta-analysis. Journal of Experimental Criminology. 10. 487-513. 10.1007/s11292-014-9214-7.

Purba, A., and Demou, E. (2019). The relationship between organizational stressors and mental wellbeing within police officers: a systematic review. BMC Public Health 19:1286. doi:10.1186/s12889-019-7609-0

Rachma Yuniar Wijayanti and Hanandita Belva Fauzi, 2020, Factors Affecting The Work Stress Of Police Officers: A Systematic Review, DOI:10.30595/psychoidea.v18i2.6861

Stogner, J., Miller, B. L., & McLean, K. (2020, June 26). *Police Stress, Mental Health, and Resiliency during the COVID-19 Pandemic*. PubMed Central (PMC). https://doi.org/10.1007/s12103-020-09548-y

Thornton, A. R., Blumberg, D. M., Papazoglou, K., and Giromini, L. (2020). "The HEROES project: mental health intervention and treatment of first responders and emergency workers," in Mental Health Intervention and Treatment of First Responders and Emergency Workers, eds C. A. Bowers, D. C. Beidel, and M. R. Marks (Pennsylvania: IGI Global), 154–168. doi: 10.4018/978-1-5225-9803-9.ch009

Violanti, J. M., Owens, S. L., Fekedulegn, D., Ma, C. C., & Charles, L. E. (2017). Police stressors and health outcomes. Work, 56(3), 367–374.

CUSTOMERS' PREFERENCE FOR A BEACH RESORT IN EAST COAST DAVAO ORIENTAL: A CONJOINT ANALYSIS

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ABSTRACT

Market segmentation is an essential component of efficient market penetration and service enhancement, as it is in the beach resort industry. The purpose of this study was to determine customer preferences in choosing a beach resort. The booking facility, accommodation, amenities, and the beach resort's location were all examined. A market survey using conjoint research was conducted with 300 beach resort tourists. The study's findings suggested that tourists selected a beach resort that was close to the beach, could be booked through its travel agency, offered premium amenities, and provided family villa accommodations. Furthermore, the survey found that the most desirable feature of a beach resort is its location. For the best attribute level, a beach resort must be close to the beach. The authority can increase its appeal to both local and international tourists by collaborating with resort operators, tourism authorities, and local government units to promote sustainable and inclusive tourism growth.

Keywords: *customers' preferences, beach resort, conjoint analysis, East Coast Davao Oriental*

INTRODUCTION

One of the most challenging tasks for beach resort owners is developing a marketing strategy that differentiates their property from other popular destinations. It is essential to establish a comprehensive plan at the outset of the beach resort's development to ensure its success. Hutami and Narottama (2021) developed a marketing plan to attract visitors to a beach resort with a natural theme and tropical feel, beach views, family-friendly pricing, and a good location. Beach resorts are popular vacation destinations in many coastal areas around the world because they offer a wide range of amenities and activities that cater to diverse needs and tastes. If resort owners and marketers know what customers like about beach resorts, they can generate more money (Jhobeil et al., 2020). This will help them make their service design and marketing better, which will make customers happier and more loyal.

The study's findings will guide capability owners and intuitive venture capitalists (OIVC) in integrating facilities into their respective beach resorts to enhance competitiveness and establish customer preferences for beach resorts (Bagcal, 2022). To increase their market share, Davao Oriental beach resort owners and intuitive venture capitalists (OIVC) need to take the lead. Today, tourism is the region's most profitable industry. Davao Oriental has joined the trend, focusing on agro-industrial and eco-tourism development. In fact, more areas of the province are shifting toward eco-tourism development due to their natural and interesting sites, which offer a comparative advantage. As a result, some investors are interested in developing beach resorts in East Coast Davao Oriental, and the owners wish to develop their beach resorts based on user interests. A developing beach resort is emerging that offers something to clients. Knowing what these characteristics are or how a person feels about them will surely lead to a deeper understanding of consumer preferences.

This study is globally significant, as it contributes to the fields of tourism marketing and consumer behavior by using conjoint analysis, a widely applied method in international tourism research. The findings can help not only local stakeholders but also emerging destinations worldwide understand which resort features travelers truly value, thereby promoting evidence-based, customer-driven tourism planning. Socially, the study provides value by helping local resort owners and tourism planners in East Coast Davao Oriental develop services that align with customer preferences. This can lead to job creation, improved visitor satisfaction, and sustainable tourism development.

The Philippine tourism industry has grown significantly in the last few years, but most research and writing about what customers want focus on well-developed destinations like Boracay, Palawan, Samal, and Siargao, where the infrastructure and marketing are already in place. There is a distinct deficiency of studies concerning burgeoning coastal tourism regions, such as the East Coast of Davao Oriental, despite its growing potential as an eco-tourism and resort destination. Furthermore, current research on resort selection and consumer satisfaction in the region often relies on rudimentary descriptive surveys or anecdotal evidence, which are insufficient for evaluating the trade-offs travelers consider when selecting a resort. There is a dearth of empirical research utilizing robust statistical methodologies, particularly conjoint analysis, to evaluate the comparative significance of resort attributes such as pricing, facilities, location, and lodging. This leaves a big hole in the evidence-based decision-making process for both private resort developers and local tourism planners.

Research Objective

The primary objective of this study is to analyse customer preferences for beach resorts located on the East Coast of Davao Oriental using conjoint analysis. Specifically, the study aims to determine the most valued resort attributes and the utility estimations of each attribute level, which can guide resort developers, tourism stakeholders, and policymakers in aligning their services and infrastructure with the expectations of their target market.

Review of Literature

In the study by Bagcal (2022), the most important aspect of the relationship between service providers and customers is that service providers often lack in-depth knowledge of customer preferences. Customers often demand something different from what service providers offer. Academic research on the tourism sector generally agrees that defining and specifying the concept of tourism competitiveness is difficult because multiple factors and dimensions affect a tourism business. The success of a destination as a major economic resource worldwide offers economic stability through global tourism. As the tourist economy continues to grow despite ongoing challenges, developing market-oriented global promotion strategies is essential for a destination country's tourism sector and ongoing improvement.

According to the findings of Apritado and Borbon (2021), tourists are highly satisfied and have had a pleasurable experience with the attraction's pleasant ambiance; the respondents are satisfied because they have visited the locations twice or more times, and others have been satisfied with the nature-based attributes of the attractions, whereas others have met the purpose of their visit to dutiful sites. Previous research on customer preferences for beach resorts has shown that a range of factors, including location, lodging type, amenities, activities, and pricing, can significantly influence consumers' preferences and satisfaction. However, the relative importance of these characteristics may vary depending on customers' cultural backgrounds and contexts. For instance, while other studies found that the quality of the beach and safety were more important factors for visitors, other studies found that the location of the beach resort was the most important factor. To better design and market beach resorts, it is essential to know the specific preferences of customers in a given area.

Customer preference has been identified as a significant factor influencing purchase decisions (Zhou, X., and Xu, Y., 2020). To increase their market share in fiercely competitive markets, enterprises must understand consumers' psychological needs and respond to their behavioral preferences within the context of modern consumer-focused marketing. Discovering user demands, finding solutions, and producing innovative products are all required for successful design. For marketing to be successful, it is critical to understand tourist preferences when developing a beach resort. Beach resorts in Davao Oriental have an advantage over those in other tourist destinations because the province has the longest coastline. Davao Oriental has owners and intuitive capitalists who invest in beach resorts in today's trend. As a result, knowing the tourist's customer preferences is extremely beneficial. Based on Guzel's (2021) research, the following attributes were identified: staff, location, food, room facilities, staff facilities, recreation facilities, swimming pool, and service quality. As a result, these features are favorable in the development of beach resorts that satisfy vacationers in their recreation.

Customer preference attributes are the specific desires, needs, and expectations customers have when selecting a beach resort as their vacation destination. These preferences may include factors such as the location of the resort, the quality and cleanliness of the beach, the range of amenities and activities offered, the quality of the accommodations, the availability of dining options and nightlife, the level of customer service provided, and many other features that customers may consider important when choosing a beach resort. Beach resorts need to know their clients' preferences to ensure that their services and amenities fulfill those expectations. This will enhance customer satisfaction and increase the likelihood of repeat business. Additionally, beach resorts can distinguish themselves from competitors by understanding their customers' preferences, thereby increasing revenue and profitability. Previous research has explored consumer preferences for beach resorts across various contexts, employing a range of methodologies and attribute frameworks. Nguyen et al. (2021) conducted a study on Vietnamese consumers' preferences for beach resorts, identifying beach quality, sanitation, and safety as the most critical factors, with price and housing type following.

This study is anchored in John B. Watson's (1913) Consumer Behavior Theory, which was later refined by Philip Kotler (1973) in the fields of marketing and tourism. According to the theory, internal and external factors influence customer decision-making by shaping their preferences, attitudes, and selections for items or services. Consumer behavior influences how travelers evaluate resort qualities such as pricing, location, amenities, cleanliness, and service quality before booking or visiting. The study seeks to establish which resort attributes and attribute levels are most important to clients when making judgments. Kotler's model of buyer behavior suggests that four key factors affect consumers: cultural, social, personal, and psychological variables. When combined with marketing stimuli such as product features and prices, these elements prompt a buyer's response, namely a choice or preference for a specific product or service. This theoretical framework is essential to the current study, which seeks to examine the influence of these resort qualities on visitors' decisions through conjoint analysis, a quantitative method used for evaluating consumer valuation of specific product attributes.

The Random Utility Theory of Domencich and McFadden (1975), which presupposes that the probability of choosing services is the sum of a systematic part and an error variance, serves as the basis for this study. The service attributes affect the systematic portion. Random utility theory provides the mathematical foundation for connecting the likelihood of consumer product selection to service attributes. This study models consumers' preferences for beach resorts using a random utility approach. In economics, the revealed-preference theory, proposed by American economist Paul Samuelson in 1938, holds that what consumers buy under different circumstances, particularly different income and price conditions, reveals their preferences. An observer can infer a representative model of the consumer's preferences by varying income or prices, or both.

METHODOLOGY

Research Respondents

The primary participants of this study are domestic vacationers and non-resident beach visitors who have been to or plan to visit beach resorts along the East Coast of Davao Oriental. These individuals are 18 years of age or older, reside outside the East Coast, and have firsthand experience or a strong interest in beach resort travel. They are selected based on their ability to provide informed evaluations of resort features and amenities based on past leisure travel experiences.

A total of 300 respondents were selected through purposive sampling, which is appropriate for studies requiring participants with specific experiences or qualifications. This method is supported by Etikan and Bala (2021), who emphasize its relevance in behavioral and consumer preference research. The sample size was based on Sharma's (2021) guidance, which suggests a minimum of 200 respondents is suitable for conjoint analysis. Selecting 300 enhances the reliability and generalizability of the findings while allowing for potential response errors or dropouts.

By treating all respondents as a single, unified group, the study focuses on identifying general trends and preferences among domestic tourists as a whole, rather than comparing differences between clusters or regions. This approach aligns with modeling an ideal beach resort profile based on aggregated consumer data.

This study employed a purposive sampling technique, a nonprobability sampling method that intentionally selects participants based on specific characteristics relevant to the research objectives. The respondents were selected based on their status as domestic tourists or non-local beachgoers, aged 18 years old and above, who have previously visited or are interested in visiting beach resorts in the East Coast of Davao Oriental. The selection procedure was guided by pre-screening questions to ensure that participants had relevant experience or decision-making capability in choosing beach resort accommodations.

To guarantee the validity and pertinence of the results, this study employed specific inclusion, exclusion, and withdrawal criteria to select appropriate respondents. The inclusion criteria stipulated that participants must be at least 18 years of age and either have prior experience visiting or presently plan to visit beach resorts situated along the East Coast of Davao Oriental, specifically in Cateel, Baganga, and Caraga. Participants were also required to have prior experience with beach resort accommodations in the Philippines, enabling them to offer well-informed preferences regarding resort attributes. The study excluded residents of the East Coast municipalities of Davao Oriental to prevent personal bias, as well as resort owners, managers, and employees, whose professional viewpoints might influence their responses and undermine the objectivity necessary for consumer preference analysis. Furthermore, individuals who had never stayed at a beach resort or who were unable to understand the informed consent and survey instructions were likewise excluded.

Regarding withdrawal, participants were informed through a clear consent process that their participation was voluntary and that they could withdraw at any time during the research without penalty. Withdrawal did not require a formal written request; participants could opt out verbally or discontinue answering the survey. If withdrawal occurred during or immediately after data collection, any identifiable data associated with the respondent was removed and excluded from the dataset. However, once the data had been anonymized and aggregated, it could no longer be traced to specific individuals and, therefore, could not be withdrawn at that stage.

The study was conducted in selected beach resort areas along the East Coast of Davao Oriental, specifically in the municipalities of Cateel, Baganga, and Caraga. These coastal municipalities are situated in the eastern part of the Davao Region, facing the Pacific Ocean. Known for their pristine white-sand beaches, crystal-clear waters, and scenic landscapes, these areas have emerged as promising destinations for beach tourism in Mindanao. Geographically, this region features a long stretch of unspoiled coastline, accessible by land via the Mati- Cateel Road, and has been gradually attracting both local and domestic tourists due to its natural beauty and developing tourism facilities.

The East Coast of Davao Oriental was selected as the study locale because it represents a growing tourism corridor with numerous emerging beach resorts, yet remains understudied compared to more established destinations like Samal Island or Siargao. The dependent variable, customer preference for beach resorts, is particularly relevant in this area, as resort owners and tourism stakeholders seek data-driven insights to enhance their services, offerings, and marketing strategies. Given the growing number of visitors and the local government's support for tourism development, the East Coast is a strategic location for analyzing consumer preferences to guide future resort planning and investment. Moreover, the diversity of resort types (from budget to mid-range) in the area enables meaningful application of conjoint analysis, which requires evaluating multiple attributes and levels in consumer choice behavior.

Materials and Instrument

This study used a structured survey questionnaire as the primary research instrument to collect data on the main variable, customer preference, and its associated attributes. The instrument was divided into two major parts. The first part gathered demographic information of respondents, including age, gender, income, place of residence, travel frequency, and past beach resort experience, which helped screen eligibility and contextualize preferences. The second and most critical part of the instrument involved the conjoint analysis design, which measured customer preferences for beach resorts through a series of choice-based tasks. There are (20) placards, each presenting a set of hypothetical resort profiles composed of different combinations of key attributes, such as price per night, room type, beach access, and amenities. These attributes were assigned specific levels, and respondents were asked to choose the most preferred option from each set of alternatives. This part of the instrument was designed according to the guidelines for choice-based conjoint (CBC) analysis, as suggested by Sharma (2021) in hospitality research.

To ensure consistency in data interpretation, all choice-based responses were numerically coded for statistical analysis. In addition to conjoint tasks, a 5-point Likert scale was also used for certain follow-up questions regarding the importance of individual attributes, where: 5 – Most Preferred, 4 – Preferred, 3 – Undecided, 2 – Least Preferred, 1 – Not Preferred. This interpretation scale allowed measurement of perceived importance and satisfaction across all variables used in the study. The Likert-scale responses were analyzed using descriptive statistics (mean and standard deviation). In contrast, the conjoint data were analyzed using part-worth utility estimation and relative importance scores to determine which resort attributes most strongly influenced customer preferences.

To identify the four key attributes most relevant to customer preferences in selecting a beach resort, the researcher initially conducted Key Informant Interviews (KII). These interviews were conducted with five resort establishments on the East Coast, where the preliminary version of the survey instrument was also pilot-tested. Insights gathered from these interviews, along with findings from the literature review, informed the final design of the survey. In constructing the conjoint analysis task, the researcher adopted the full-profile method, which presents a complete set of attributes in each hypothetical resort profile. This method was chosen for its ability to provide a realistic, holistic assessment of customer choices, as it compels respondents to evaluate trade-offs among different beach resort features.

Design and Procedure

This study employs a quantitative-descriptive research design, utilizing Conjoint Analysis as a specific analytical model. According to Creswell and Creswell (2022), a quantitative design is appropriate when the goal is to collect measurable data and use statistical tools to analyze patterns, preferences, or behaviors. The descriptive nature of this study is justified by its aim to describe and analyze customers' preferences when choosing beach resorts in East Coast, Davao Oriental, based on specific attributes such as price, amenities, location, accessibility, and ambiance.

The use of a descriptive-conjoint approach is well aligned with the study's goal of understanding the relative importance of resort features. Conjoint analysis is a multivariate technique used to determine how people value the attributes that make up a product or service (Orme, 2021). In the context of this study, it helps model customer decision-making behavior, estimate the part-worth utilities of each attribute level, and identify the ideal combination of resort features most appealing to tourists. This technique allows researchers to simulate market preferences and predict how changes in resort offerings can influence customer choice, thereby achieving the core objective of developing a customer-driven market profile. Conjoint Analysis operates from the consumer perspective, grounded in utility theory, which assumes that consumers make trade-offs between features when selecting a product or service. This method is particularly relevant for tourism and hospitality studies where choices are based on multiple interrelated features (Sharma, 2021). By using this model, the study provides evidence-based insights that resort managers and tourism developers can use to optimize their offerings based on actual tourist preferences.

The researcher observed full ethical standards in administering the study, following the study protocol assessments and standardized criteria, particularly in managing the population and data, such as, but not limited to:

The voluntary participation wherein respondents were given the free will not to participate without any form of consequence or penalty. Therefore, after the purpose and benefits of the study were presented to the respondents, the respondents' rights to contribute to the study were carefully considered and respected. Then, the privacy and confidentiality of respondents' personal and/or professional information that may be required for the study were maintained, and the utmost confidentiality of respondents' data was adhered to.

The informed consent process for the researcher's questionnaire was translated to ensure accurate understanding, was free of technical terms, and was easily understandable to the study's respondents. It provided the population with a clear view of the benefits that may be generated after the study was conducted. Participants for this study were recruited systematically and ethically, guided by clearly defined inclusion criteria. The primary objective was to ensure that only individuals with relevant experience and knowledge regarding beach resort preferences were included, thereby enhancing the validity and reliability of the data collected through the conjoint analysis. Although this study involved minimal to no physical or psychological risk, certain potential risks were identified during the design and planning stages, particularly regarding participants' privacy, confidentiality, and time commitment. All identified risks were carefully evaluated, and appropriate mitigation strategies were established in accordance with ethical research standards. All collected data were coded and anonymized before analysis, and the survey form and verbal explanations clearly stated that participation was entirely voluntary.

The study did not use any representations that could lead to plagiarism. Using Grammarly and a Plagiarism tool ensured consistency in grammar and minimized the similarity index, giving the researcher leeway to use their own words to express ideas anchored in the authors of different studies. Moreover, the study was anchored in several accurate and reliable studies. It ensures that the researcher did not make any tale from her literature and thus, states the idea of the authors beyond her own idea and understanding.

Furthermore, the study does not exaggerate the data and/or overclaim the works of others just to make the work fit. Models and theoretical frameworks are used from accurate and reliable sources. The falsification was not committed in the study. This study does not present any evidence of a conflict of interest. The study never influenced any secondary interests, as it focused solely on the primary interest, namely the participant's welfare and the validity of research trends. It also includes the provisions in the consent form, reminding participants that their information will be kept securely and maintained in confidence.

The study assured participants that the data collected would not lead to any imminent harm, that no tricks would be used, and that no dishonesty would be employed. The study implemented proper precautions, indicating that the researcher was conducting observations of people in a public or quasi-public place. It uses formal letter addresses to authorize personnel to seek and gather data within specific organizations and locations. Additionally, the study did not collect data online and did not use online panels. Lastly, it provided clear and proper authorship, such as authorship based on substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data, or authorship based solely on substantial contributions to conception and design. The researcher also drafted the article and revised it critically for important intellectual content and final approval of the version to be published.

FINDINGS

The content of this results are the presentation of analysis based on data gathered from the respondent which includes the relative importance of the attributes such as location, booking facility, amenities, and accommodation; the individual and aggregate models of customer preferences for a beach resort; and most and least preferred of customer preferences for a beach resort in East Coast Davao Oriental.

Relative Importance and Utility of Customer Preferences for a Beach Resort

The relative importance of the four determining attributes of customer preferences for a beach resort in East Coast Davao Oriental is shown in Table 1. Importance measures are relative and within this study. If the range of the attribute levels tested changes, the attribute's relative importance will likely change as well.

Table 1 reveals that location is considered the most preferred and most important attribute for customers in selecting a resort, with an overall value of 29.526. The most important attribute level of this attribute is near the beach (0.019), followed by beachfront (0.011), while the least important attribute level is being remote and secluded (-0.132).). Location, as the most important attribute, is followed by booking facility, bearing an overall importance value of 25.014. The most preferred levels in this attribute are a resort that can be booked in a travel agency (0.077), followed by a resort that can be booked online (-0.010), while the least important attribute level is a resort that can be booked by walk-in (-0.067).

Table 1. Relative importance of attributes and utility estimates of attribute levels for beach resorts in East Coast Davao Oriental

Attribute	Importance Value	Attribute Levels	Utility Estimate	S.E.
Location	29.526%	beachfront	.011	.046
		near the beach (5-minute walk)	.019	.051
		near the city	.003	.062
		remote and secluded	-.032	.073
Booking Facility	25.014%	Online	-.010	.043
		travel agency	.077	.062
		walk-in	-.067	.045
Amenities	14.801%	basic (pool, Wi-Fi)	-.001	.043
		standard (pool, Wi-Fi, gym)	-.011	.049
		premium (pool, Wi-Fi, gym, spa)	.012	.046
Accommodation	14.326%	standard room	-.046	.042
		Suite	-.012	.040
		family villa	.058	.047

The third most important attribute of a resort is amenities, with an overall importance value of 14.801. Under amenities, the most important attribute level is offering premium (pool, Wi-Fi, gym, spa) (0.058), followed by standard (pool, Wi-Fi, gym) (-0.011). The least important attribute level is a resort offering basic (pool, Wi-Fi) (-0.046).

Lastly, accommodation is the least significant attribute for a resort, with an overall relevance value of 14.326. Under this characteristic, the most important attribute level is a family villa (0.058), followed by a suite (-0.012), and the least important attribute level is the standard room.

Individual and Aggregate Conjoint Models of Customer Preferences for a Beach Resort

The emphasis in modeling individual and aggregate preferences is to determine whether individual preference behavior aligns with overall behavior. This is one way to check which attributes and attribute levels are preferred by one respondent over another, and vice versa. In the analysis, three customers, as presented in Table 2, were selected and their utility estimates were compared with the overall behavior of customers in East Coast Davao Oriental.

Exhibited in Table 2 are the individual and aggregate preferences of customers for a beach resort. Based on the analysis, Customer 73 is most likely a booking facility-conscious client, with the highest importance value (56.667) placed on the attribute, followed by location (29.143), amenities (7.803), and the least preferred attribute, accommodation (6.387). On the other hand, Customer 199 is most likely location-conscious, based on the highest importance value (54.580) for this attribute, with booking facilities coming in second in his/her consideration (21.678), amenities third (16.049), and accommodation (14.366) the least-preferred attribute.

Finally, Customer 219, based on his/her preferences, is most likely accommodation-conscious, as the attribute of a resort with the highest importance value for him/her is accommodation (29.293), followed by location (28.944), booking facility (23.327), and amenities (18.436).

Table 2. Individual and aggregate models of tourists' preference for beach resorts in East Coast Davao Oriental

	Subject 73	Subject 199	Subject 219	Aggregate Model
(Constant)	**-0.524**	**0.528**	**0.420**	**-0.842**
Online	-0.330	-.036	0.156	-0.010
travel agency	0.698	.298	-0.362	0.077
walk-in	-0.368	-.262	0.206	-0.067
standard room	0.005	-.105	-0.335	-0.046
Suite	-0.063	-.039	0.378	-0.012
family villa	0.057	.144	-0.043	0.058
basic (pool, Wi-Fi)	0.072	-.205	-0.030	-0.001
standard (pool, Wi-Fi, gym)	-0.075	.047	0.240	-0.011
premium (pool, Wi-Fi, gym, spa)	0.004	.158	-0.210	0.012
Beachfront	-0.151	-.257	0.213	0.011
near the beach (5-minute walk)	-0.126	.033	-0.122	0.019
near the city	-0.120	-.593	0.307	0.003
remote and secluded	0.397	.817	-0.398	-0.032
Prevailing Attributes (%)				
Booking Facility	**56.667**	**21.678**	**23.327**	**25.014**
Accommodation	**6.387**	**9.675**	**29.293**	**14.326**
Amenities	**7.803**	**14.067**	**18.436**	**14.801**
Location	**29.143**	**54.580**	**28.944**	**29.526**
Measures of Fit				
Pearson's r	0.922*	0.874*	0.726*	0.972*
Kendall's tau	0.570*	0.632*	0.589*	0.895*
Kendall's tau for holdouts	0.816^{ns}	0.816^{ns}	0.183^{ns}	-0.667^{ns}

Overall, customers of beach resorts in East Coast Davao Oriental are location-conscious in choosing a resort (29.526), followed by booking facility (25.014) and amenities (14.801) of almost the same level, while the least preferred attribute is booking facility (14.326).

Most and Least Preferable Combination of Resort Preferences

Based on the part-worth utility concept, the total utility can be determined from the combinations of part-worth utilities. This can be done by adding the marginal utility values for the attribute-level combinations of each attribute, plus the value of the constant derived in the conjoint estimation. The preferred model can be used to calculate the total utility for the twenty alternative product profiles.

Table 3 shows how 20 resort plan cards rank by their total and mean utility scores. This demonstrates how people feel about different combinations of beach resort characteristics on the East Coast of Davao Oriental. The results show that Plan Card 5 is the best overall since it has the highest total utility (1434) and mean utility (4.78). This signifies that the participants who took the poll loved and expected the most the things that are on Card 5. Plan Card 2 (Total Utility = 1422; Mean Utility = 4.74) and Plan Card 17 (Total Utility = 1408; Mean Utility = 4.69) are quite close behind. They came in second and third, suggesting that these combinations are also quite enticing to those who might want to stay at the resort.

Table 3. Most and Least Preferable Combinations of a Resort for beach resorts in East Coast Davao Oriental

Plan Card	Total Utility	Mean Utility	Rank
CARD 5	1434	4.78	**1**
CARD 2	1422	4.74	**2**
CARD 17	1408	4.69	**3**
CARD 1	1406	4.69	**4**
CARD 20	1405	4.68	**5**
CARD 6	1371	4.57	**6**
CARD 4	1365	4.55	**7**
CARD 19	1356	4.52	**8**
CARD 14	1356	4.52	**8**
CARD 9	1348	4.49	**10**
CARD 18	1348	4.49	**10**
CARD 16	1347	4.49	**12**
CARD 10	1320	4.4	**13**
CARD 15	1296	4.32	**14**
CARD 13	1207	4.02	**15**
CARD 11	1199	3.99	**16**
CARD 7	1189	3.96	**17**
CARD 8	1165	3.88	**18**
CARD 12	1104	3.68	**19**
CARD 3	997	3.32	**20**

Plan Cards 1, 20, 6, and 4, which placed fourth through seventh, likewise had mean utility scores above 4.50, indicating that most people who answered the question thought they were good. These data show that the plan cards with the highest ratings include attractive resort features that have a big effect on what people choose.

On the other hand, the plan cards with the lowest ranks have the least popular combinations. Plan Card 3 came in last (20th) because it had the lowest total utility (997) and mean utility (3.32).

This means that the combination of its features was the least enticing to the people who answered. Plan Cards 12 and 8 placed 19th and 18th, respectively, and their mean utility scores were low (3.68 and 3.88), suggesting they were less popular.

The table clearly shows which resort combinations are the most and least popular. Plan cards with higher ranks demonstrate combinations of elements that better fulfill the needs of guests looking for beach resorts on the East Coast of Davao Oriental. Lower-ranked cards show combinations of attributes that are less interesting.

CONCLUSIONS

In this section the conclusion was discussed as far as customers in East Coast Davao Oriental are concerned.

1. Location is the most important attribute in choosing a beach resort, while accommodation is the least important.
2. As for the attribute levels, a resort located near the beach is the most preferred, while a beach resort with only a standard room is the least preferred.
3. On the other hand, the overall sample results indicate that customers prefer a resort near the beach, a booking facility that directly book on travel agency, and that offers premium amenities and family villa accommodation.

4. Moreover, based on the additive model used to determine the resort profiles' ranks, the rankings revealed how individual and overall customers choose their preferences.

RECOMMENDATIONS

Based on the findings and conclusions of the study, the researcher recommends that the resort and management adopt the study's significant findings as guides or a base for improving and innovating quality services and for strategic planning in operations management that highlights operations for growth and future expansion.

1. Resorts must recognize the change in needs of their customers. Likewise, their operations management, marketing plans, and strategies can be anchored in or realigned with the study's findings for future decision-making.
2. As accommodation had the least preferred attribute, resorts should maximize this to improve and develop a much more satisfying service. Resort management should give customers a motivation that will make them interested in giving online ratings to the resort, like providing rewards points that are convertible into cash if they will reach the points limit, freebies or free one night accommodation to resorts and that they will receive if they give numerous time a positive ratings in resort as it will help to maintain the reputation and to attract more customers to come.
3. Stakeholders, business owners, and shareholders may adopt the study's findings as a basis for their marketing strategies to achieve profitability and sustainability in a competitive environment. It is also necessary to have unique marketing strategies for customer retention and attracting new customers. Resorts and their management should also consider customers' perceptions of resort attributes. Since customers encounter many high-end services and are always updated on changes at the resort, market practitioners and researchers, especially in the resort industry, could adopt the results as a point of reference for future studies related to the topic to understand better how far quality services and technological advancement have come over the years.
4. Consequently, future researchers may conduct further studies on the subject by providing more information and knowledge about the attributes of a resort. Although a sample of 300 customers is sufficient to conduct a study based on the given literature, it is more realistic and more effective to involve a larger sample of respondents in the study using the same research tool, a conjoint analysis.
5. To make it easier for potential guests to book rooms and build trust, resorts should update their booking systems by adding easy-to-use online reservation platforms and partnering with reputable travel agencies. Promoting digital and advanced booking options through social media and mobile apps is essential, as walk-in booking was the least popular option. To meet the increasing demands of tourists for comfort and quality, resorts with standard rooms should also enhance room aesthetics, add essential amenities, and use designs that are both environmentally friendly and aesthetically pleasing.

REFERENCES

Aivie, O.T. and Murcia, J.V.B. (2022). *Application Of Conjoint Analysis To Model Millennials' Preference For Smartphone Attributes. European Journal of Management and Marketing Studies*, [online] 7(3). doi:10.46827/ejmms.v7i3.1256.

Bagcal, J.M. (2022). A conjoint study on the preferred resort facilities for the davao region. Academy of Entrepreneurship Journal, 28(S5), 1-17.

Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., & Walker, K. (2021). Purposive Sampling: Complex or Simple? Research Case Examples. Journal of Research in Nursing, 26(6), 652–661.

Coherent Market Insights (2025) *Beach Hotels Market Size, Trends & Forecast (2025–2032)*. Available at: https://www.coherentmarketinsights.com/industry-reports/beach-hotels-market (Accessed: 11 January 2026).

Creswell, J. W., & Creswell, J. D. (2022). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (6th ed.). SAGE Publications.

De Guzman, J.C.D., Abanilla, J.G.R. and Abarquez, K.E.L., 2020. Guest Satisfaction and Loyalty among Beach Resorts in Laiya, Batangas. Journal of Tourism and Hospitality Research, 17(1), pp.71-102.

De Guzman, J.C.D., Abanilla, J.G.R., Abarquez, K.E.J.L., Garcia, P.D.M., Manimtim, J.C.A., Reyes, J.J.D. and Apritado, J.M. (2020) 'Guest satisfaction and loyalty among beach resorts in Laiya, Batangas', *Journal of Tourism and Hospitality Research*, 17(1), pp. 71–88. Available at: https://research.lpubatangas.edu.ph/wp-content/uploads/2020/06/JTHR-2020-005.pdf (Accessed: 16 June 2025).

Domencich, T.A. and McFadden, D. (1975) Urban Travel Demand: A Behavioral Analysis. Amsterdam: North-Holland.

Etikan, I., & Bala, K. (2021). Sampling and Sampling Methods. Biometrics & Biostatistics International Journal, 10(6), 215–217.

Garcia, G.M., Gadotti dos Anjos, S., Dos Anjos, F.A., Pereira, T. & Añaña, E. (2025) 'Bookings through the hotel's website: Factors influencing perceived value and customer loyalty, mediated by satisfaction', Tourism & Management Studies, 21(2), pp. 113–125. doi:10.18089/tms.20250208.

Garcia, M. and Nguyen, T. (2024) 'Customer experience and satisfaction challenges in third-party travel bookings', *Journal of Hospitality and Tourism Management*, 36, pp. 59–72.

Gaur, V. (2024) 'Online reservation systems in the hospitality industry: An in-depth examination of their role, effectiveness, and impact on hotel operations and marketing strategies', International Journal of Research in Marketing Management and Sales, 6(1), pp. 81–87.

Howard, J.A. (1963) Marketing Management: Analysis and Planning. Homewood, IL: Richard D. Irwin.

Hutami, D. and Narottama, N. (2021). *Marketing Strategy for Palmilla Beach Club Tourist Attractions in Melasti Beach, Ungasan. American Journal of Humanities and Social Sciences Research*, [online] (5), pp.314–319. Available at: https://www.ajhssr.com/wp-content/uploads/2021/05/ZG2155314319.pdf.

Jennie, M., Apritado, Noelah, D. and Borbonr, M. (2022). Challenges and Opportunities in the Hospitality and Tourism Education: A Phenomenological study. Asia Pacific Journal of Educational Perspective, [online] 9(1), pp.36–44. Available at: https://research.lpubatangas.edu.ph/wp-content/uploads/2022/09/5-APJEP-2022-41-Apritado-and-Borbon-1.pdf [Accessed 15 Nov. 2022].Baek, J. and Ok, C.M., 2017. The power of design:

Jennie, M., Apritado, Noelah, D. and Borbonr, M. (2022). *Challenges and Opportunities in the Hospitality and Tourism Education: A Phenomenological study. Asia Pacific Journal of Educational Perspective*, [online] 9(1), pp.36–44. Available at: https://research.lpubatangas.edu.ph/wp-content/uploads/2022/09/5-APJEP-2022-41-Apritado-and-Borbon-1.pdf [Accessed 15 Nov. 2022].

Kim, H.J., Lee, S. and Han, H., 2022. The role of resort amenities in enhancing customer experience and behavioral intention. Journal of Vacation Marketing, 28(3), pp.265–280.

Kim, S. and Huang, L. (2022) 'The role of location and online reviews in shaping resort choice', *International Journal of Tourism Research*, 24(3), pp. 412– 427.

Kim, S., Park, J. and Lee, H. (2022) 'The impact of online reviews on customer satisfactionand hotel choice', *International Journal of Hospitality Management*, 103, 103209. doi:10.1016/j.ijhm.2022.103209.

Kotler, P. (1973) *Atmospherics as a marketing tool.* Journal of Retailing, 49(4), pp. 48–64.

Lim, J.E., Zahari, F.M. and Abidin, R., 2022. Factors affecting online hotel booking intention: A study on UUM students. *Journal of Technology Management and Technopreneurship, 10(1), pp.35–46.*

Lopez, R. and Martinez, J. (2023) 'Travel agency bookings and customer preferences in luxury resort accommodations', *Tourism Management Perspectives*, 42, 101051. doi:10.1016/j.tmp.2022.101051.

Lopez, R. and Singh, P. (2025) ‘Wellness tourism and the demand for fitness amenities in resorts’, *Journal of Sustainable Tourism*, 33(1), pp. 98–116. doi:10.1080/09669582.2024.1234567.

Macrothink Research (2024) ‘Choosing the Perfect Stay: Factors Influencing Tourist Hotel Decision-Making’, *International Journal of Social Science Research*, 12(2). Available at: https://www.macrothink.org/journal/index.php/ijssr/article/view/21900 (Accessed:11 January 2026).

Martinez, A. and Chen, Y. (2024) ‘Reservation channel preferences among older travelers: A usability perspective’, *Journal of Travel Research*, 63(1), pp. 89–105. doi:10.1177/00472875231234567.

Nguyen, T. and Lee, J. (2023) ‘The influence of resort amenities on vacationer satisfaction and choice’, *Journal of Hospitality and Tourism Research*, 47(2), pp. 203–220.

Nguyen, T. and Roberts, M. (2023) ‘The appeal of highland resorts: Activity diversity and scenic value’, *Tourism Geography*, 25(4), pp. 526–544. doi:10.1080/14616688.2023.1184752.

Nguyen, T.H.H. and Cheung, C., 2022. The influence of location and accessibility on hotel selection: Insights from domestic tourists in Vietnam. *Journal of Hospitality and Tourism Insights*, 5(4), pp.822–839.

Orme, B. (2021). Getting Started with Conjoint Analysis: Strategies for Product Design and Pricing Research (3rd ed.). Research Publishers LLC.

Orme, B. K. (2019) *Getting started with conjoint analysis: Strategies for product design and pricing research.* 4th ed. Madison, WI: Research Publishers LLC.

Patel, R., Kumar, S. and Johnson, L. (2024) ‘Economic impact and spatial requirements of indoor water parks in resort development’, *International Journal of Leisure and Tourism Marketing*, 12(1), pp. 54–69.

Rahman, M.K., Gani, M.O. and Alwi, N.H.M., 2023. Destination attributes influencing tourists’ satisfaction and revisit intention: Evidence from Malaysian island tourism. Tourism Management Perspectives, 46, p.10 1085.

Saunders, M., Lewis, P., & Thornhill, A. (2022). Research Methods for Business Students (8th ed.). Pearson Education.Bilgihan, A., Smith, S., Ricci, P. and Bujisic, M., 2016. Hotel guest preferences of in-room technology amenities. *Journal of Hospitality and Tourism Technology*.

Sharma, A. and Singh, S., 2024. *Assessing the impact of leisure amenities on guest satisfaction in luxury beach resorts*. Asia Pacific Journal of Tourism Research, 29(2), pp.190–204.

Sharma, R. (2021). Conjoint Analysis in Tourism and Hospitality Research: A Review and Future Directions. Journal of Hospitality and Tourism Insights, 4(2), 123–137.

Singgalen, Y.A. (2025) ‘Tourist Preferences at Hotel and Resort Based on Review Data’, *Journal of Business and Economics Research*, 6(1), pp. 179–190. Available at: https://ejurnal.seminar id.com/index.php/jbe/article/view/6844 (Accessed: 11 January 2026).

Wang, R. and Chan, C.S., 2025. *A systematic literature review on payment methods in hospitality and tourism. Information Technology & Tourism*, 27(1), pp.55–72.

Wang, X. and Li, Y. (2024) ‘The role of online ratings in shaping hotel booking intentions: Evidence from meta-analysis’, *Journal of Hospitality Marketing & Management*, 33(2), pp. 120–138.doi:10.1080/19368623.2023.1234567.

Watson, J. B. (1913) *Psychology as the behaviorist views it.* Psychological Review, 20(2), pp. 158–177.

Zhang, L. (2022) *Customer willingness to pay for all-inclusive resorts: A choice-based conjoint analysis.* Master’s Thesis, University of Nevada, Las Vegas.

Zhou, X. and Xu, Y. (2020), "*Conjoint analysis of consumer preferences for dress design", International Journal of Clothing Science and Technology*, Vol. 32 No. 1, pp. 73-84 . https://doi.org/10.1108/IJCST-02-2019-0024

e-KONSULTA: A COMPUTERIZED BARANGAY-BASED HEALTH CARE MONITORING INFORMATION SYSTEM OF RHU-DINGALAN, AURORA

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ABSTRACT

Data is recorded manually in the barangay health facilities in Dingalan, Aurora, which results in often incomplete reports and which take more time to access. As a result, the RHU is facing huge challenges in terms of monitoring public health and managing complex information. This research responds to this very vital need by developing and evaluating e-KONSULTA, a web-based healthcare monitoring platform for barangays. In developing the system, the Agile methodology was utilized. It has essential features: management of a patient profile and generation of critical reports. Other supplemental features include SMS-based queue and notification systems for remote service delivery, and it has the capacity for synchronization of data in locales that have erratic internet connectivity. The system was subjected to evaluation based on User Requirements Metrics and eight characteristics from the ISO 25010 Software Product Quality Model using a 5-point Likert scale. Three groups served as evaluators: Health Workers (N=46), IT Experts (N=11), and Residents (N=19). The ratings for the collected data were within the Excellent (E) range of 4.39 to 5.00. Health workers received mean score of 4.56; IT experts obtained4.78; and residents received 4.52. e-KONSULTA would significantly upgrade Dingalan's health services through operational efficiency, enhanced security measures, and implementation of a strong, data-based system.

Keywords: *Health Information System, Health Care Monitoring, e-Health, Rural Health Units, Barangay Health Workers*

INTRODUCTION

The global health sector is currently in a state of digital transition. While technology serves as a cornerstone for industrial progress, many local health sectors struggle to bridge the gap between manual tradition and digital innovation. Computerization is more than a tool; it is a control system that minimizes human error and significantly boosts productivity, resulting in high-quality, well-integrated production. In primary healthcare, the Rural Health Unit (RHU) and Barangay Health Centers (BHCs) are the frontline of community wellness. However, their efficacy relies fundamentally on the integrity of their records management. As Birkin (2011) emphasizes, good medical care is inextricably linked to correct, comprehensive, and accessible patient notes. Without these, practitioners risk misdiagnosis, which can lead to life-threatening clinical consequences.

The Municipality of Dingalan, Aurora, presents a unique set of challenges for this theoretical framework. Spanning 30,455 hectares and politically subdivided into 11 barangays, the municipality serves a population of over 25,000. Central to this study is Barangay Paltic, recognized as a premiere barangay and the designated pilot site for this research. With a substantial population of 5,754 inhabitants and a steady growth rate of 2.68%, Paltic represents a critical demographic cross-section of the municipality. Currently, the Barangay Health Workers (BHWs) act as the primary contact between the community and the health system. In remote areas, access to doctors and midwives is limited, often occurring only once a week. This leaves the burden of record-keeping on BHWs, who currently rely on manual logbooks, index cards, and yellow pads. This paper-based system results in a "fragmented information environment" where patient data is isolated, difficult to retrieve, and highly susceptible to physical destruction from fire, water, or environmental wear and tear.

Furthermore, the geographical isolation of Dingalan's barangays creates a significant bottleneck in the relay of information to the central RHU. The manual collection and collation of information across the 11 barangays is a slow, resource-intensive process. e-KONSULTA was developed to rectify these systemic deficiencies. Using an Agile methodology, the system provides a web-based platform specifically tailored to streamline the RHU's workflow. By integrating automated data synchronization for barangays with erratic internet and implementing SMS-based queuing and notifications, e-KONSULTA ensures that vital medical records are secured, accessible, and utilized as a key source for medical research and data-driven public health monitoring.

The conceptual framework of this study follows the Input-Process-Output (IPO) model, providing a structured approach to the development and implementation of the e-KONSULTA system. This model illustrates the flow of resources, the iterative development methodology, and the ultimate goals of the research.

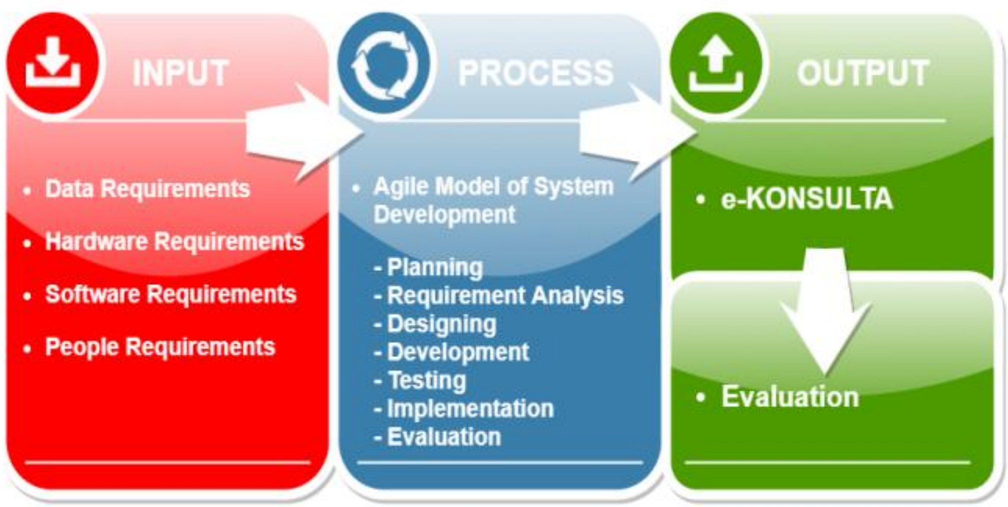

Figure 1. Conceptual Framework

The Input phase identifies the foundational requirements necessary to address the current "fragmented information environment" in Dingalan.

- Data Requirements: Refers to the patient health records, demographic information of the 5,754 inhabitants, and administrative data currently stored in manual logbooks.
- Hardware & Software Requirements: Encompasses the physical infrastructure (computers, servers) and the web-based technical specifications needed to host the platform and manage SMS-based notifications.
- People Requirements: Identifies the key stakeholders—the Barangay Health Workers (BHWs) and residents of Barangay Paltic—who serve as the primary sources of data and the end-users of the system.

The Process stage utilizes the Agile Model of System Development. Unlike traditional linear models, Agile allows for continuous refinement through a recurring cycle of Planning, Requirement Analysis, Designing, Development, Testing, Implementation, and Evaluation. This methodology is particularly suited for the pilot site, as it allows the researchers to adapt the software based on the real-world feedback of BHWs in Paltic, ensuring the system can handle challenges like erratic internet connectivity through automated data synchronization.

The Output of the study is twofold:

1. e-KONSULTA: The primary technological product—a specialized, web-based healthcare management system designed to streamline the workflow of the Rural Health Unit (RHU).
2. Evaluation: The final assessment of the system's performance based on ISO 25010 Software Product Quality Model. This output measures the transition from manual "yellow pads" to a digital "metadata encapsulated object," ensuring that health records in the pilot barangay are secured, accessible, and scientifically useful for public health monitoring.

STATEMENT OF THE PROBLEM

The reliance on manual, paper-based recording in Dingalan's barangay health facilities creates a fragmented information environment. Accessibility of constituent information is difficult as records are stored in physical logbooks and index cards that are prone to loss, tearing, or destruction by elements like fire and water. Furthermore, the manual collection and collation of data from remote barangays to the Rural Health Unit (RHU) is a time-consuming process that causes significant delays in reporting. Consequently, the RHU lacks the real-time, centralized data necessary for effective public health monitoring and rapid medical response.

Project Objectives

The general objective of this research work is to develop a system called eKONSULTA that will lessen or alleviate the manual recording processes of the health workers that will provide an easy way to have an updated patient data.

Specifically, it sought to cater the following:

1. To develop a web-based application for Health Care Monitoring of RHU-Dingalan.
2. To provide facility to Dingalan RHU that can:
    a. access data from barangay health centers.
    b. provide a real-time schedule follow-ups of patients and announcements.
    c. provide a queuing mechanism for checkup schedules of patients.
    d. generate visual analytics reports on medical cases of Dingalan RHU and barangay health centers.
3. To evaluate the system based on the system evaluation metrics and software product quality criteria of ISO 25010.

REVIEW OF RELATED LITERTURE

The Digital Transition and Error Mitigation

Technological integration is widely recognized as a catalyst for efficiency in healthcare systems. Computerization functions as a control mechanism that minimizes the risk of human error while maximizing output quality. In the context of primary health, the transition from manual to digital systems is essential for maintaining the clinical utility of health data. Birkin (2011) argues that the absence of correct and accessible medical notes directly correlates with poor clinical outcomes, as the continuity of care depends on the availability of historical patient data.

Theoretical Principles of Recordness and Metadata

Theoretically, a "record" is defined as evidence of an event, encompassing content, structure, and context. According to the International Council on Archives (ICA), a record must maintain these three qualities to provide sufficient evidence of an institutional activity. In a digital environment, this "recordness" is preserved through metadata—data about data. David Bearman (1993) describes a record as a "metadata encapsulated object". If this metadata is lost, the record becomes "business unacceptable," losing its evidential value and clinical utility. For health systems, managing both clinical and administrative records ensures smooth administration and accountability for public health actions.

The Role of Frontline Health Workers and BHCs

In rural landscapes, Barangay Health Workers (BHWs) serve as the vital link between the community and the formal health system. Literature suggests that in remote barangays, the reliance on manual recording tools like index cards and logbooks creates significant data silos. This "fragmented information environment" is not only inefficient for data retrieval but also creates a vulnerability to environmental hazards.

Agile Methodology in System Development

Modern software development for public health often employs Agile methodologies to address systemic deficiencies in real-time. Literature supports the development of web-based platforms that feature automated data synchronization to bypass the limitations of erratic internet connectivity in geographically isolated areas. Furthermore, the integration of SMS-based queuing and notification modules has been highlighted as an effective means of bridging the communication gap between health providers and community residents.

METHODOLOGY

Research Design

The study employed a Descriptive-Developmental research design. The developmental aspect utilized the Agile Model of System Development, which facilitated iterative cycles of requirement analysis, prototyping, and testing. The descriptive component focused on assessing the system's usability and effectiveness based on the feedback provided by the 76 evaluators after the implementation phase.

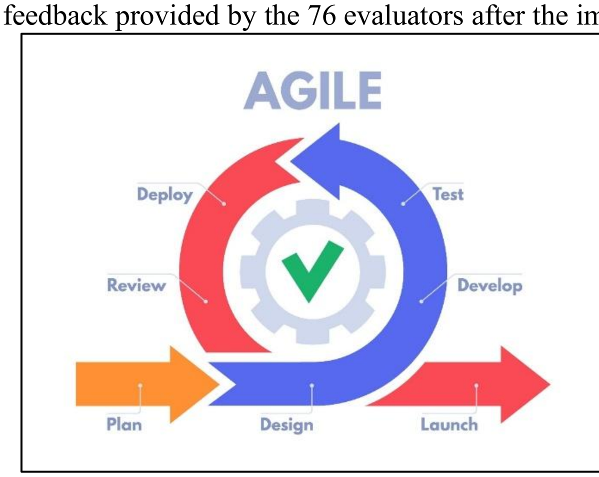

Figure 2. Agile Model of SDLC

The design phases included:

- Planning and Requirements Analysis: Identifying the needs of RHU-Dingalan.
- Design: Creating the system architecture, use case diagrams, and database schema.
- Development: Coding the web-based application using PHP, HTML, CSS, and MySQL.
- Testing & Evaluation: Ensuring the system meets technical and user requirements.

System Features

e-KONSULTA was developed as a multi-layered system using a client-server architecture. The system was built on a backend stack featuring a MySQL Database, PHP as the scripting language, and Apache as the web server engine. It featured a multi-level access control system with three types of users: Administrator, Regular User (staff/health workers), and Guest (Residents via SMS).

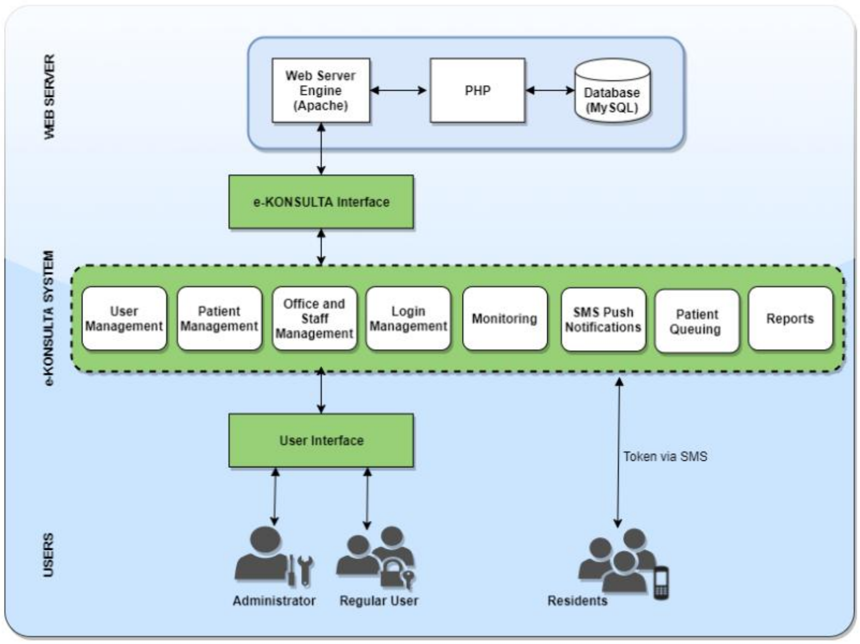

Figure 3. e-KONSULTA System Architecture

Crucially, for remote barangays with no internet, a synchronization process was designed to allow BHWs to record data offline, then synchronize their local database with the server once connectivity or physical delivery of a backup file was possible. The system included modules for Patient Management, Monitoring, Reports, SMS Push Notifications, and Patient Queuing.

Research Environment

The research was conducted in the Municipality of Dingalan, Aurora, with Barangay Paltic serving as the pilot site. As a premiere barangay, Paltic offered a robust testing environment with 5,754 inhabitants and a 2.68% growth rate. This setting was strategic for evaluating how a digital system could mitigate the "fragmented information environment" caused by geographical isolation and manual record-keeping.

Research Respondents

The evaluation involved three distinct groups of stakeholders, totaling 76 respondents who served as evaluators for the e-KONSULTA system. Participants were selected to provide a comprehensive assessment of the platform from technical, clinical, and end-user perspectives:

- Health Workers (N=46): This group consisted of doctors, nurses, midwives, and Barangay Health Workers (BHWs) from the pilot site. As the primary users, they evaluated the system's ability to manage the health records of the 5,754 inhabitants of Barangay Paltic.

- IT Experts (N=11): These professionals were engaged to evaluate the technical integrity, software quality, and the client-server architecture of the platform. Their assessment focused on the backend stability of the MySQL and PHP components.
- Residents (N=19): Community members from Barangay Paltic were selected to evaluate the patient-facing features. Their feedback focused specifically on the effectiveness of the SMS queuing and notification modules in improving access to health services.

Research Instruments

A structured evaluation questionnaire served as the primary research instrument. The tool measured the system’s performance across functional suitability, usability, and reliability. The instrument was validated by experts to ensure it accurately measured the transition from manual logbooks to a digital "metadata encapsulated" environment.

Statistical Analysis

Data gathered from the 76 respondents were treated quantitatively. The primary statistical tool used was the arithmetic mean, calculated to determine the average rating for each system feature. The scores were calculated for each category and interpreted using the following distribution of values:

Table 1. Verbal Interpretation of Collected Data

Value	Verbal Interpretation
4.21 – 5.00	Excellent (E)
3.41 – 4.20	Very Satisfactory (VS)
2.61 – 3.40	Satisfactory (S)
1.81 – 2.60	Fair (F)
1.00 – 1.80	Poor (P)

The analysis focused on determining the Overall Mean Score for each user group to validate whether the system successfully met the high standards required for deployment in the public health sector.

FINDINGS

Development of the e-KONSULTA System

The Functional Requirements of the e-KONSULTA system were designed to bridge the operational gap between traditional manual record-keeping and a modern digital health infrastructure. At its core, the system implemented a User Access Control module that utilized multi-level authentication and role-based permissions to ensure data privacy for the Administrator, Regular Users such as Barangay Health Workers (BHWs), and Residents acting as Guests. To address the "fragmented information environment" of the pilot site, the Patient Management module digitized the health records of the 5,754 inhabitants of Barangay Paltic, replacing manual "yellow pads" with a searchable database that enhances data retrieval and clinical utility.

Table 2. Functional Requirements

Module	Functional Requirement	Description
User Access Control	Multi-level Authentication	Implemented a secure login for three user tiers: Administrator, Regular User (Staff/BHWs), and Guest (Residents via SMS).
	Role-Based Permissions	Restricted sensitive data access and system configuration settings based on the user's role to ensure data privacy.

Patient Management	Digital Record Creation	Replaced manual logbooks and "yellow pads" with a digital interface to create and update patient profiles for the 5,754 inhabitants.
	Data Retrieval	Enabled fast searching of medical histories and patient metadata to support clinical utility and public health monitoring.
Connectivity & Sync	Offline Data Logging	Allowed BHWs in remote areas to record data without an active internet connection.
	Database Synchronization	Provided a mechanism to sync local data with the central MySQL server once connectivity was restored or via physical file delivery.
Communication	SMS Push Notifications	Automated the delivery of health alerts and appointment reminders to residents' mobile devices.
	Patient Queuing	Managed consultation schedules by sending real-time queue status updates to residents via SMS.
Reports & Monitoring	Automated Reporting	Compiled community health data into standardized reports for the Rural Health Unit (RHU).
	Health Dashboard	Visualized public health trends within Barangay Paltic to assist in data-driven public health actions.

Crucially, to navigate the geographical and technological bottlenecks in Dingalan, the system featured Connectivity and Synchronization modules that allowed BHWs to log data in an offline state and synchronize with the central MySQL server once internet was available or via physical backup file delivery. The Communication module transformed the resident experience through SMS Push Notifications and Patient Queuing, which provided real-time consultation updates to community members' mobile devices to reduce physical congestion. Finally, the Monitoring and Reporting module provided the Rural Health Unit (RHU) with an automated health dashboard to track community wellness trends and generate data-driven reports for public health monitoring. These integrated functions directly supported the "Excellent" Functional Suitability ratings awarded by the 76 evaluators during the system's pilot phase.

The Non-Functional Requirements of the e-KONSULTA system focus on the quality attributes and technical constraints that ensure the platform's reliability and security within the rural context of Dingalan. To protect the sensitive medical records of the 5,754 inhabitants, the system prioritized Security through data integrity measures in the MySQL/PHP backend and multi-layered access control to prevent unauthorized data manipulation. Reliability was achieved through a fault-tolerant design that utilized a synchronization process, allowing the system to remain functional during erratic internet connectivity by logging data offline.

Table 3. Non-Functional Requirements

Category	Requirement	Description
Security	Data Integrity	Utilized a MySQL/PHP backend to ensure that medical records remain accurate and consistent, preventing unauthorized manipulation of patient metadata.
	Access Control	Implemented multi-layered authentication to restrict sensitive health information based on user roles (Admin, Regular, Guest).
Reliability	Fault Tolerance	Designed a synchronization process allowing the system to function during erratic internet connectivity by logging data offline for later recovery.
	Availability	Hosted on an Apache web server engine to ensure the platform remains accessible to the RHU staff during operating hours.
Usability	Interface Design	Developed an intuitive web interface tailored for BHWs transitioning from manual "yellow pads," focusing on ease of data entry and retrieval.

Portability	Platform Independence	Engineered the web-based system to be accessible across various devices (computers, tablets) used by health workers and via SMS for residents.
Maintainability	Modularity	Structured the code using PHP and MySQL to allow for future updates, reusability, and scaling to other barangays within Dingalan.

In terms of Usability, the platform featured an intuitive web interface specifically tailored for Barangay Health Workers (BHWs) to ease the transition from manual "yellow pads" to digital entry. The system's Portability ensured it was platform-independent, remaining accessible across various hardware such as tablets and computers, while residents interacted with the system via standard mobile SMS. Finally, the Maintainability of the system was established through a modular code structure, which allows for future reusability and scaling to other barangays, a feature that contributed to the perfect scores in technical integrity awarded by the IT Experts.

System Design

The system architecture of e-KONSULTA is navigated through three primary interfaces designed to balance high-level security with ease of use for the 76 evaluators involved in the study. The System Landing Portal serves as the public gateway, providing a professional and user-friendly introduction to the platform's mission of streamlining the Rural Health Unit (RHU) workflow. Designed with a focus on Usability, this interface ensures that both Barangay Health Workers (BHWs) and the residents of Barangay Paltic can easily access information about the health services available to the community's 5,754 inhabitants.

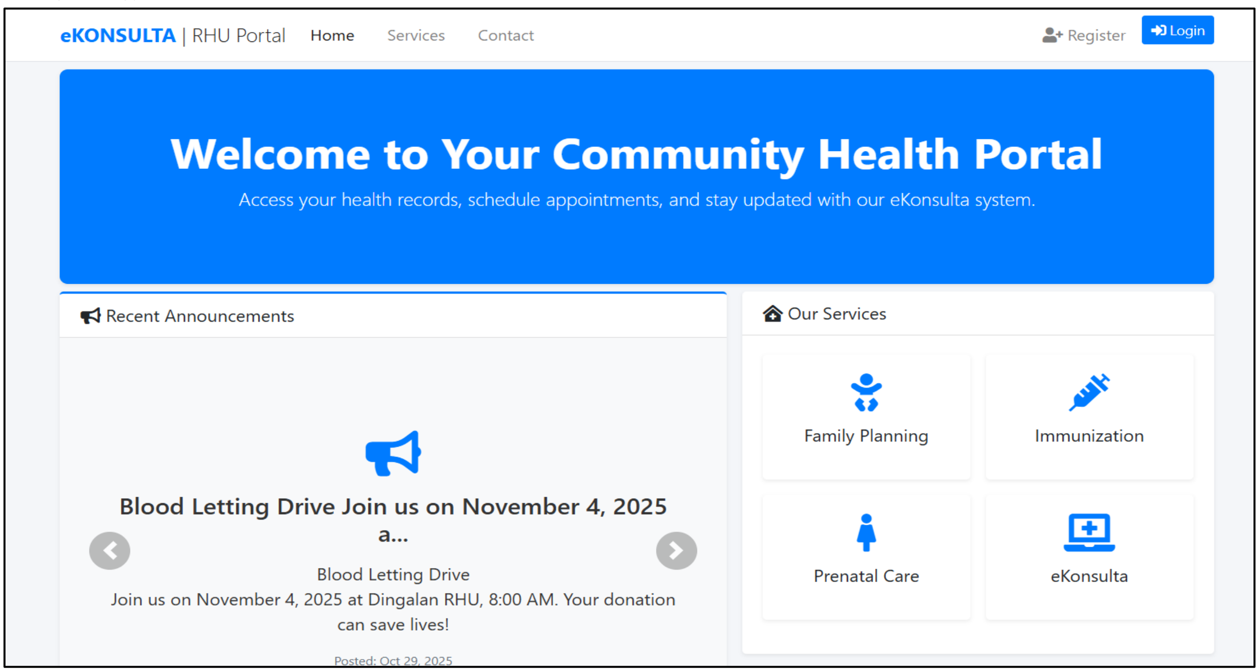

Figure 4. Landing Portal

The Login Page acts as the primary security barrier, implementing the system's multi-level access control to ensure the privacy of sensitive medical data. By requiring secure credentials, the page verifies whether a user is an Administrator, a Regular User (Staff/BHWs), or a Guest, thereby maintaining the integrity of the PHP and MySQL backend. This gateway was a critical factor in achieving the high Security rating of 4.84 from IT experts, as it ensures that the "recordness" of patient metadata is protected from unauthorized manipulation.

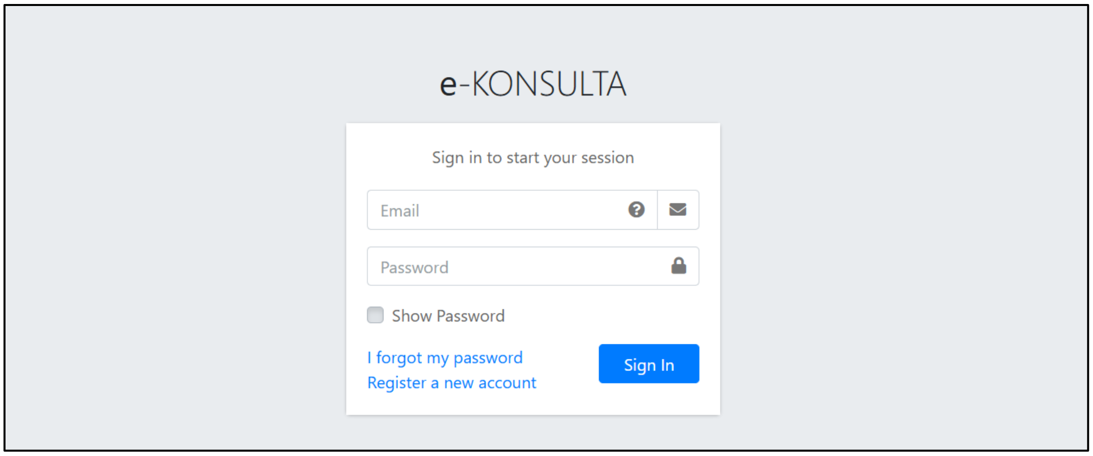

Figure 5. Login Page

Once authenticated, the Administrator Dashboard serves as the central command center for managing the health infrastructure of the pilot site. This interface allows the Administrator to oversee User Management for the 46 Health Workers, monitor public health trends through a real-time Health Dashboard, and manage the Database Synchronization process for remote areas. To ensure institutional accountability as recommended by the International Council on Archives (ICA), the dashboard also provides detailed Audit Logs, which track all system activities and secure the data-driven public health monitoring required for a premiere barangay with a 2.68% growth rate.

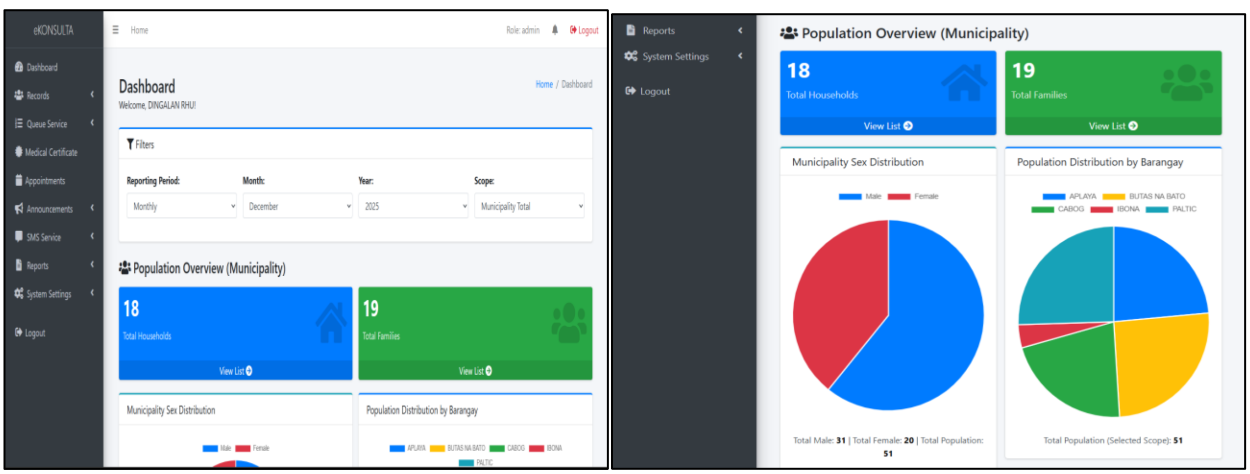

Figure 6. Admin Dashboard

Evaluation Process

The evaluation of e-KONSULTA was conducted through a systematic survey of three primary stakeholder groups. The results were analyzed using weighted mean scores to determine the system's performance across ISO 25010 quality characteristics.

Table 4. Overall Mean Scores

Quality Characteristic	Health Workers	IT Experts	Residents
Functional Suitability (A)	4.71	4.85	4.74
Usability (B/D)	4.52	4.65 (D. Usability)	4.44
Portability (C/H)	4.46	4.82 (H. Portability)	4.39
Performance Efficiency (B)	N/A	4.82	N/A
Compatibility (C)	N/A	4.77	N/A

Reliability (E)	N/A	4.76	N/A
Security (S)	N/A	4.84	N/A
Maintainability (G)	N/A	4.73	N/A
Overall Mean Scores	**4.56**	**4.78**	**4.52**

A. Quantitative Evaluation Results

1. IT Experts (Mean: 4.78)

The technical evaluation by IT professionals provided the highest overall validation of the system's architecture.

- Security (4.84): This was the highest-rated category for this group, with sub-characteristics like Integrity achieving a perfect score of 5.00, confirming the robustness of the MySQL and PHP backend.
- Functional Suitability (4.85): Experts found the system features highly appropriate for the intended health tasks.
- Performance Efficiency (4.82): The system demonstrated high speed and resource optimization.
- Maintainability (4.73): Standout sub-characteristics included Reusability (5.00), indicating the code's potential for future scaling.
- Reliability (4.76) & Compatibility (4.77): These scores confirm the system's stability and ability to operate alongside existing infrastructure.

2. Health Workers (Mean: 4.56)

As the frontline users managing the records of 5,754 inhabitants, health workers focused on the system's practical utility.

- Functional Suitability (4.71): This score indicates that the digital modules effectively replaced manual logbooks and yellow pads for health monitoring.
- Usability (4.52): The high mark suggests that the interface was intuitive for BHWs transitioning from a paper-based environment.
- Portability (4.46): This validates the system's ability to be utilized across different devices in the pilot site.

3. Residents (Mean: 4.52)

Community members evaluated the system based on their interaction with patient-facing features.

- Functional Suitability (4.74): Residents highly valued the accuracy of the data and the functions of the SMS modules.
- Usability (4.44): This reflects the ease with which residents could interact with the SMS queuing and notification system.
- Portability (4.39): Confirmed that the system was accessible to the community via their mobile devices.

B. Discussion of Quality Characteristics

The evaluation demonstrates that the Agile Model of System Development—which included planning, analysis, design, development, testing, and implementation—was successful in capturing local needs.

- Success in Functional Suitability - The consistent scores across all groups confirm that e-KONSULTA successfully digitized the previously "fragmented information environment".
- The Role of Portability - The high scores (IT: 4.82; Residents: 4.39) confirm that the synchronization methodology is a viable solution for Dingalan's erratic internet connectivity. This allows data to remain secure as "metadata-encapsulated objects" even when recorded offline.
- Addressing Vulnerability - The transition from physical files to a digital system has effectively resolved issues of data loss due to environmental wear and tear while significantly speeding up the collation of public health data.

CONCLUSIONS

The development and implementation of e-KONSULTA successfully addressed the systemic deficiencies of the manual, paper-based health record system in Barangay Paltic. Based on the evaluation of 76 distinct stakeholders, the system achieved an overall mean score of 4.62, falling within the "Excellent" range. The research concludes that:

- The system's client-server architecture and MySQL/PHP backend provided a stable and secure environment for health data, evidenced by the IT Experts' rating of 4.78.
- The high Functional Suitability scores (Health Workers: 4.71; Residents: 4.74) confirm that the platform successfully digitized primary health monitoring, replacing fragmented "yellow pads" with accessible, metadata-encapsulated records.
- The synchronization methodology proved to be a viable solution for the geographical isolation of Dingalan. High Portability scores (IT: 4.82; Residents: 4.39) demonstrate that the system remained effective despite erratic internet connectivity.
- The 4.52 Usability rating from residents and the 4.84 Security rating from experts indicate that the system is both user-friendly for a rural population and secure enough to handle sensitive medical data.

RECOMMENDATIONS

Based on the findings of the pilot study in Barangay Paltic, the following recommendations are proposed to ensure the sustainability and expansion of the project:

- Given the "Excellent" evaluation in the pilot site, the local government should expand e-KONSULTA to the remaining 10 barangays of Dingalan to create a unified municipal health database.
- Since Health Workers are the primary users, regular training sessions should be conducted to ensure all BHWs are proficient in using the offline-to-online synchronization features.
- To maximize the system's Performance Efficiency (4.82), the municipality should provide dedicated tablets or computers to Barangay Health Centers to ensure consistent access.
- Future iterations of the system should include automated disease trend forecasting to better utilize the secured patient metadata for proactive public health monitoring.
- Based on the high Resident evaluation (4.52), the SMS module should be expanded to include automated health education tips and emergency alert broadcasts.

REFERENCES

Asangansi, I., Macleod, B., Meremikwu, M., Arikpo, I., Roberge, D., Hartsock, B., & Mboto, I. (2013). Improving the routine HMIS in Nigeria through mobile technology for community data collection. *Journal of Health Informatics in Developing Countries, 7*(2).

Bearman, D. (1993). *Record-keeping systems*. Electronic Evidence: Strategies for Managing Records in Contemporary Organizations.

Birkin, R. (2011). Good record keeping is good clinical practice. *Dental Nursing, 7*(6), 338-343. https://doi.org/10.12968/denn.2011.7.6.338

Bista, B. (2014). *Hospital record management system* [PowerPoint slides]. SlideShare. https://www.slideshare.net/bishalbista9022/hospital-manangement-record-system-proposal

Côrtes, P. L., & Côrtes, E. G. d. (2011). Hospital information systems: A study of electronic patient records. *JISTEM - Journal of Information Systems and Technology Management, 8*(1). http://www.scielo.br/scielo.php?pid=S180717752011000100008&script=sci_abstract

Damtew, Z. A., & Moges, A. S. (2013). From multiple register to family folder: The transition of data collection and reporting tools for health extension workers in Ethiopia. *Journal of Health Informatics in Developing Countries, 7*(2).

Deb, S. (2014). Information technology, its impact on society and its future. *Advances in Computing, 4*(1), 25-29. https://doi.org/10.5923/j.ac.20140401.07

Doris, A. (2013). *Hospital records management system* [PowerPoint slides]. SlideShare. https://www.slideshare.net/dorisacheng/hospital-records-management-system

Estocapio-Bordador, B. E. (1997). The role of barangay health workers in nutrition service delivery within the primary health care framework: An executive summary. *KAYÂ TAO, 15*(1). http://ejournals.ph/form/cite.php?id=2981

Kaseje, D., Olayo, R., Musita, C., Oinda, C. O., Wafula, C., & Muga, R. (2010). Evidence-based dialogue with communities for district health systems' performance improvement. *Global Public Health*. https://www.ncbi.nlm.nih.gov/pubmed/20162482

Lado, M. (2017). *Barangay information system* [Video]. YouTube. https://youtu.be/Sql5Mt3j8OU Management Sciences for Health. (2001). *Expanding the delivery of health services through a community-based monitoring and information system*. Measure Evaluation. https://www.measureevaluation.org/resources/publications/wp-16-161/

Mutale, W., Chintu, N., Amoroso, C., Awoonor-Williams, K., Phillips, J., Baynes, C., Michel, C., Taylor, A., & Sherr, K. (2013). Improving health information systems for decision making across five sub-Saharan African countries: Implementation strategies from the African Health Initiative. *BMC Health Services Research, 13*(Suppl 2).

Panay News. (2017). *Barangay health workers*. https://www.panaynews.net/barangay-healthworkers/

Sahay, S., & Braa, J. (2012). *Integrated health information architecture: Power to the users*. Matrix Publishers. https://www.mn.uio.no/ifi/english/research/networks/hisp/integrated-health-information-architecture/prelims.pdf

Salac, R. A., Conocido, M. A., Villaviray, D. S., & Cortez, N. (2014). Nasugbu malunggay information and mapping system. *Asia Pacific Journal of Multidisciplinary Research, 2*(1). http://ejournals.ph/form/cite.php?id=5751

Sumaylo, D. F., Escano, M. R., & Abrio, D. T. (n.d.). *Needs assessment of barangay health workers (BHWs) in delivering health care provisions in Barangay Dawis, Digos City, Philippines*. https://docplayer.net/48225773-Needs-assessment-of-barangay-health-workers-bhws-in-delivering-health-care-provisions-in-barangay-dawis-digos-city-philippines.html

TutorialsPoint. (n.d.). *SDLC agile model*. https://www.tutorialspoint.com/sdlc/sdlc_agile_model.htm

SPENT COFFEE GROUNDS AS A PIGMENT LOAD: OPTIMIZING MECHANICAL AND AESTHETIC PROPERTIES OF A SUSTAINABLE ART CRAYON

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ABSTRACT

This study investigates the utilization of spent coffee grounds (SCG), a major local agricultural by-product in the Philippines, as a sustainable, non-toxic pigment source for formulating a novel wax-based crayon medium. The goal is to optimize the formulation to achieve desirable mechanical strength, smooth application, and sufficient color saturation, thereby valorizing agricultural waste and directly contributing to SDG 12 (Responsible Consumption and Production). Crayon prototypes were fabricated using a controlled melt-blend process, varying the ratios of pigment powder, paraffin wax, and refined coconut oil. Results indicated that a formulation of 1 part SCG pigment to 8.67 parts paraffin wax (Trial 3) provided the optimal balance of deep sepia tone, structural integrity, and application smoothness. This research validates the potential of SCG as a scalable, non-toxic alternative to conventional synthetic crayons.

Keywords: *Spent Coffee Grounds (SCG), Waste Valorization, Sustainable Crayon, Pigment Load, Formulation Optimization*

INTRODUCTION

The global community is currently facing an unprecedented challenge in waste management, necessitating a shift from linear "take-make-dispose" models toward a circular economy. In the Philippines, the agricultural sector—particularly the burgeoning coffee industry—generates significant volumes of organic waste. Spent Coffee Grounds (SCG), the insoluble residue remaining after brewing, represent a major portion of this waste. While the Philippines is a prolific producer and consumer of coffee, the majority of its SCG is currently diverted to landfills, where it undergoes anaerobic decomposition, releasing methane—a greenhouse gas significantly more potent than carbon dioxide.

From a material science perspective, SCG is a rich lignocellulosic resource composed of cellulose, hemicellulose, and lignin, which offers unique potential for valorization. Despite successful explorations of SCG in bio-fuel production and agricultural composting, its application as a functional colorant in consumer products remains underexplored. Traditional art mediums, such as crayons and pastels, have historically relied on synthetic, petroleum-derived pigments. These synthetic alternatives are often associated with high environmental footprints and, in some cases, the presence of heavy metals or toxic additives that pose risks to both the environment and young users.

This research addresses the intersection of environmental sustainability and material innovation. By repurposing SCG as a primary pigment load, this study seeks to develop an "eco-crayon" that reduces reliance on non-renewable colorants while providing a high-performance art medium. This initiative directly responds to the United Nations' Sustainable Development Goals (SDGs), specifically SDG 12

(Responsible Consumption and Production) by valorizing waste, and SDG 9 (Industry, Innovation, and Infrastructure) by fostering local technological solutions to global environmental problems. The optimization of the SCG pigment load is essential to ensuring that the resulting product is not merely a "green" alternative, but a functional tool that meets the rigorous mechanical and aesthetic standards of professional and educational art supplies.

STATEMENT OF THE PROBLEMS/OBJECTIVES

The primary problem addressed by this study is the lack of a standardized, sustainable formulation for art crayons that utilizes agricultural by-products without compromising commercial performance standards. Specifically, the study sought to:

1. Evaluate the effect of varying SCG pigment concentrations on the mechanical hardness and bending strength of a paraffin-based crayon matrix.
2. Quantify the aesthetic changes in color saturation (CIE L^*value) as the SCG pigment load is increased.
3. Assess the qualitative application performance of the prototypes, focusing on lay-down smoothness and adhesion to paper substrates.
4. Identify the "Optimization Point" or the specific ratio of SCG to wax that maximizes color intensity while maintaining structural integrity for everyday use.

REVIEW OF LITERATURE

The theoretical framework of this study is grounded in the principles of green chemistry, waste-to-resource transformation, and composite material science.

3.1 Valorization of Spent Coffee Grounds (SCG) Recent research highlights SCG as a high-value precursor for industrial applications. According to Pérez-López et al. (2020), SCG is not merely a waste product but a complex organic matrix containing residual oils and lignocellulosic fibers. Its inherent dark brown color—derived from the melanoidins produced during the roasting process—makes it an ideal candidate for natural pigmentation. In the Philippines, where the coffee sector is a significant economic driver, the local availability of SCG provides a logistical advantage for the production of sustainable materials (Noh & Jo, 2018).

3.2 Mechanical Properties of Wax-Based Matrices The structural performance of a crayon is dictated by the interaction between the pigment particles and the binder. Taylor and Jones (2019) emphasize that the addition of solid particulates into a paraffin wax matrix creates a composite material where the pigment acts as a "filler." If the pigment-to-wax ratio is not optimized, the filler can create stress concentration points, leading to a brittle failure of the crayon. The use of Refined Coconut Oil (RCO) as a secondary binder in this study serves as a plasticizer, which, according to material science literature, helps in distributing the pigment more evenly and improving the lay-down smoothness on cellulose-based paper.

3.3 Alignment with Sustainable Development Goals (SDGs) The global shift toward "Green Art Materials" is a response to the environmental toxicity of traditional synthetic dyes. The United Nations (2015) emphasizes through SDG 12 (Responsible Consumption and Production) that industries must innovate to reduce chemical waste. By replacing petrochemical pigments with organic SCG, this research directly contributes to reducing the carbon footprint of stationery products. Furthermore, it aligns with SDG 9 (Industry, Innovation, and Infrastructure) by demonstrating that local agricultural by-products can be converted into high-value consumer goods through accessible technology.

METHODOLOGY

Methods and Materials

Materials and Preparation

- **Spent Coffee Grounds (SCG):** Sourced from local Philippine coffee establishments (e.g., cafes, roasters).
- **Wax Base:** Commercial-grade, low-melting-point Paraffin Wax flakes (primary structural component).
- **Binder/Dispersant:** Locally sourced Refined Coconut Oil (RCO) (to improve pigment dispersion and lay-down).

Preparation of SCG Pigment

1. **Drying:** SCG was spread thinly on trays and dried in a conventional oven at 105^0C for 12 hours to achieve complete moisture removal (<1% moisture content by weight).
2. **Milling and Sieving:** The fully dried SCG was pulverized using a laboratory ball mill for 30 minutes. The resulting powder was sieved through a 75μm (200-mesh) screen. Only the finely powdered material passing through the sieve was collected and designated as the **SCG Pigment Load**.

Crayon Fabrication and Formulation Trials

Crayons were produced using a controlled melt-blend method. All trials maintained a constant total mass of **30 grams** per batch to ensure consistent heat transfer and molding time.

Trial No.	SCG Pigment (g)	Paraffin Wax (g)	Refined Coconut Oil (g)	SCG:Wax Ratio	Purpose/Notes
T1	1.0	28.0	1.0	1:28	Low Pigment (Control)
T2	2.5	26.5	1.0	1:10.6	Low-Moderate
T3	3.0	26.0	1.0	1:8.67	Hypothesized Optimal
T4	5.0	24.0	1.0	1:4.8	High Pigment
T5	7.5	21.5	1.0	1:2.87	Maximum Pigment

Procedure:

1. The paraffin wax and RCO were melted together in a temperature-controlled beaker at 80^0C on a hotplate/stirrer.
2. The measured SCG Pigment Load for the trial was slowly incorporated while stirring continuously for 5 minutes to ensure uniform dispersion.
3. The mixture was immediately poured into cylindrical silicon molds (10 mm diameter x 75 mm length).
4. Crayons were allowed to cool and set at room temperature (25^0 C) for 1 hour before demolding.

Characterization and Testing

Three key performance indicators were assessed for each trial:

1. Mechanical Hardness (Structural Integrity)

- **Method:** A modified standard pencil hardness test (ASTM D3363) was conducted using a laboratory durometer (Shore D scale). The maximum load sustained before breakage was also measured using a universal testing machine (UTM) in a three-point bending test.
- **Metric:** Shore D Hardness value and Bending Strength (in MPa).

2. Color Intensity (Aesthetic Quality)

- **Method:** A colorimeter was used to measure the L^* (lightness) value of a standard drawing made with each crayon on white vellum paper.

- **Metric:** CIE L^* (Lower L^* indicates darker, higher color intensity).

3. Application Performance (Lay-down Quality)

- **Method:** A panel of 10 volunteer art students was asked to rate the lay-down smoothness, adhesion, and perceived grit of a drawing made with each crayon on a 5-point Likert scale (1 = Poor/Very Gritty, 5 = Excellent/Very Smooth).
- **Metric:** Mean Lay-down Smoothness Score.

FINDINGS

Mechanical Properties (Hardness and Bending Strength)

Trial No.	SCG:Wax Ratio	Shore D Hardness	Bending Strength (MPa)
T1	1:28	68.2	1.95
T2	1:10.6	66.5	1.68
T3	1:8.67	63.1	1.50
T4	1:4.8	58.0	1.12
T5	1:2.87	51.3	0.85

Observation: The mechanical hardness and bending strength show a clear inverse relationship with the SCG Pigment Load. The control (T1) exhibited the highest strength. The maximum pigment load (T5) resulted in a 25% reduction in Bending Strength compared to the optimal hypothesis (T3), indicating increased brittleness.

Aesthetic and Application Properties

Trial No.	SCG:Wax Ratio	CIE $L*$ Value (Lightness)	Mean Smoothness Score (1-5)
T1	1:28	72.5	4.9
T2	1:10.6	65.8	4.5
T3	1:8.67	59.2	4.0
T4	1:4.8	55.1	3.1
T5	1:2.87	53.0	1.8

Observation: Color intensity (indicated by the lowest $L*$ value) peaked at T5, as expected. However, the Smoothness Score for T5 was significantly low, suggesting a gritty, crumbly application due to excessive, poorly bound pigment. **Trial 3 (T3)** achieved a substantial color increase (reduction in $L*$ from 72.5 to 59.2) while maintaining an acceptable Smoothness Score of 4.0.

CONCLUSIONS

The systematic investigation into the optimization of Spent Coffee Grounds (SCG) as a pigment load provides the following definitive conclusions:

1. **Technical Viability**: The study confirms that SCG is a high-performance organic pigment. The melanoidins in the coffee provide a stable, professional-grade sepia tone.
2. **Optimization Point**: Trial 3 (1:8.67 ratio) is the definitive threshold for balancing color saturation with a bending strength of 1.50 MPa, ensuring the product is durable enough for both students and adults.
3. **Material Limitations**: Excessive pigment loads (Trials 4 and 5) result in a "gritty" application and a 50% drop in structural integrity, identifying the limits of paraffin-based organic composites.
4. **Sustainability Impact**: By valorizing agricultural by-products, this study proves that local Philippine resources can be used to meet SDG 12 and SDG 9 targets.

5. **Multi-User Benefit**: The final formulation is a non-toxic, versatile medium that provides a safe tool for creative expression for young learners and adult artists alike.

RECOMMENDATIONS

Based on the findings, the following actions are recommended:

1. Standardize commercial production using the **Trial 3 formulation** (1:8.67 ratio).
2. Secure local supply chains by partnering with Philippine coffee roasters for raw SCG.
3. Explore alternative natural binders like **beeswax** to further increase hardness at high loads.
4. Promote the product as a "Sustainable Sepia" alternative in educational institutions.

REFERENCES

Anastas, P. T., & Warner, J. C. (1998). *Green Chemistry: Theory and Practice.* Oxford University Press.

ASTM D3363 - 05(2011). *Standard Test Method for Film Hardness by Pencil Test.* ASTM International.

Noh, J. Y., & Jo, Y. B. (2018). *Spent coffee ground as a resource for eco-friendly building materials.* Journal of the Korea Institute of Ecological Architecture and Environment.

United Nations. (2015). *Transforming our world: the 2030 Agenda for Sustainable Development.*

EARIST CATERING SERVICES: A FEASIBILITY STUDY

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ABSTRACT

This feasibility study evaluated the establishment of EARIST Catering Services as an income-generating project and experiential learning platform for Hospitality Management students of the Eulogio "Amang" Rodriguez Institute of Science and Technology (EARIST)–Cavite Branch. The project aims to strengthen students' practical skills in food preparation, service delivery, event set-up, and decoration through real application of theoretical knowledge. The study specifically sought to: (1) assess market demand and service competitiveness, (2) determine the technical adequacy of the proposed facilities and resources, (3) evaluate the required management and staffing structure, (4) analyze financial viability based on operating costs and projected revenue, and (5) determine the socio-economic benefits to the school, students, and nearby communities. A descriptive research design was utilized through document analysis, stakeholder interviews, and cost modeling to estimate pricing, spending requirements, and financial performance of the service. Findings reveal strong market feasibility within and surrounding the Cavite branch, supported by competitive low-cost menus and decoration packages. Technical evaluation shows that available kitchen facilities, utilities, and proposed office space are suitable for operations. A structured workforce consisting of a project director, chefs, decorators, assistants, and student trainees is sufficient for successful execution. Financial projection indicates an estimated monthly operating requirement of ₱155,000 with a two-year return on investment. Socio- economic results highlight improved student skills, increased institutional income, and expanded access to affordable catering services within the community. In conclusion, EARIST Catering Services is feasible to implement. It is recommended to strengthen marketing promotion, maintain financial control, uphold quality service, and institutionalize student training for long-term sustainability..

INTRODUCTION

Catering services are essential in supporting school and community events by providing food preparation, venue decoration, and logistical support. In response to the increasing demand for organized activities within educational institutions, the Eulogio "Amang" Rodriguez Institute of Science and Technology (EARIST) proposes the establishment of EARIST Catering Services as an income- generating project. This initiative aims to provide affordable, high-quality catering services to students, faculty, staff, and surrounding communities in Manila and Cavite, while simultaneously serving as a hands-on training ground for Hospitality Management students. Guided by the principles of experiential learning, the project intends to enhance students' practical skills and ensure they gain real-world competencies that reinforce their academic knowledge. This study evaluates the feasibility of establishing the catering service through an analysis of its marketing, technical, management, financial, and socio-economic dimensions.

OBJECTIVES

The study aims to determine the possibility of establishing a catering service which will serve EARIST Manila and Cavite Campuses. Specifically, this study would

1. Determine the market feasibility of EARIST Catering Service by identifying the marketability of the project in the vicinity of the school in Manila and Cavite.
2. Determine the technical feasibility of EARIST Catering Service by identifying the effectiveness and efficiency of the project through its cost estimation and implementation plans.
3. Determine the management feasibility of EARIST Catering Service by identifying how many members with required skills and qualifications are needed to manage the catering service, and if they capable of running the project.
4. Determine the financial feasibility of EARIST Catering Service by forecasting inflows and outflows of cash through the projection of the financial statements.
5. Determine the socio-economic feasibility of EARIST Catering Service by promoting this project through students' involvement.

REVIEW OF LITERATURE

Foreign Studies

Feasibility studies are widely used to evaluate the viability of proposed food service and catering businesses by examining market demand, technical requirements, management structure, financial sustainability, and socio-economic impact. According to Scarborough and Cornwall (2021), feasibility analysis helps entrepreneurs and institutions minimize risks by identifying potential challenges before full-scale implementation. In the catering industry, feasibility studies are particularly important due to high operating costs, labor requirements, and sensitivity to customer satisfaction.

Krisdianto et al. (2023) conducted a feasibility study on a catering business in Indonesia and found that market demand, competitive pricing, and operational efficiency were critical determinants of success. Their study emphasized the importance of proper cost estimation, supplier coordination, and skilled manpower in ensuring profitability. These findings support the relevance of conducting a structured feasibility analysis for institutional catering services such as EARIST Catering Services.

Similarly, Mauliahasmi et al. (2025) examined the sustainability and feasibility of a catering enterprise by assessing marketing strategies, production capacity, financial indicators, and service quality. The study concluded that catering businesses with diversified service offerings and strong management systems are more resilient and financially viable. This insight aligns with the EARIST Catering Services' objective of providing integrated catering and decoration services while serving as a training platform for students.

In terms of sustainability and innovation, Bocken et al. (2022) highlighted that modern catering services increasingly adopt sustainable practices, efficient resource utilization, and customer-oriented service models to remain competitive. These practices enhance not only financial performance but also socio-economic contributions, particularly in educational institutions where training and community engagement are central goals.

Local Studies

In the Philippine context, feasibility studies on food service and catering businesses highlight the growing demand for organized catering services in schools, communities, and corporate settings. Illo (2025) evaluated catering services in Rinconada and found that affordability, service quality, and community involvement significantly influence customer satisfaction and repeat patronage. The study also emphasized the role of catering projects in supporting local employment and skills development.

Doria et al. (2024) analyzed supply chain management practices of a catering business in Nueva Vizcaya and identified labor costs, procurement efficiency, and inventory control as major operational challenges. Their findings suggest that proper planning and coordination are essential for catering businesses to maintain profitability and service reliability—factors directly relevant to the operational planning of EARIST Catering Services.

A feasibility study conducted on a meal delivery and catering service in Koronadal City (2024) revealed that catering enterprises operating within educational and community environments benefit from steady demand and lower marketing costs. The study also emphasized the importance of clear organizational structure and financial monitoring to ensure sustainability.

San Diego (2024) examined the sustainable catering service industry in the Philippines during and after the COVID-19 pandemic. The study concluded that catering businesses affiliated with institutions, such as schools and universities, demonstrated greater resilience due to built-in markets and institutional support. This finding reinforces the feasibility of EARIST Catering Services as an income-generating project anchored within an academic institution.

Local research from the EARIST Research Journal (2020) further supports the effectiveness of institution-based entrepreneurial projects, noting that such initiatives enhance experiential learning, improve student competencies, and generate additional income for schools. These outcomes strongly align with the objectives of the EARIST Catering Services feasibility study.

METHODOLOGY

This feasibility study utilized a descriptive research design supported by document analysis, cost estimation, and market assessment techniques. The IMRAD methodology was adapted for project evaluation.

1. Data Collection

Data were gathered through:

- Institutional guidelines and administrative memoranda
- Market analysis of potential clients within and around the EARIST campuses
- Interviews with faculty, Hospitality Management students, and potential clients
- Cost benchmarking based on existing local catering services

2. Analytical Framework

The study employed five major feasibility dimensions:

1. Marketing Feasibility – assessment of target market, pricing, product offering, and promotional strategies.
2. Technical Feasibility – evaluation of location, physical requirements, equipment, utilities, and workflow.
3. Management Feasibility – determination of organizational structure, staffing, and managerial capacities.
4. Financial Feasibility – computation of project costs, revenue projections, pricing model, and payback period.
5. Socio-economic Feasibility – analysis of social benefits, student involvement, and community impact.

3. Data Analysis

Descriptive analysis and cost modeling were used to:

- Estimate monthly and annual operating expenses
- Set menu prices and decoration service fees
- Compute payback period and financial viability
- Identify strengths and challenges in the project design

FINDINGS

A. Marketing Feasibility

EARIST Catering Services will offer meal preparation, venue decoration, food delivery, full event setup, and service staff. The target clients include EARIST faculty, staff, administrators, student organizations, and nearby community residents in Manila and Cavite. A low-cost, high-quality pricing model is designed to suit students' financial capacities while ensuring profitability. Promotional activities will include posters, streamers, social media campaigns, faculty endorsements, and on-campus booths. The main operating site is on the 1st floor of the new EARIST building, with an extension office nearby for transactions during weekends and holidays.

B. Technical Feasibility

The Institute has provided a rent-free space with electricity and water, while existing kitchen facilities will be used for food preparation. Essential office and catering equipment includes tables, chairs, office furniture, air conditioning, computers for documentation, decoration supplies, and food service utensils. Utilities such as electricity, water, and ventilation systems will support daily operations, ensuring a functional and efficient workspace.

C. Management Feasibility

The proposed organizational structure consists of a project director, accountant, chef and cooks, assistants, decorators, and a driver. Management standards emphasize customer-focused service, efficient decision-making, professionalism, effective planning and time management, and strong coordination with suppliers and clients to ensure smooth operations and high-quality event delivery.

D. Financial Feasibility

Estimated Monthly Operating Cost

Item	Cost (Php)
Decoration Equipment	10,000
Cutlery & Culinary Materials	10,000
Vehicle (rental)	10,000
Construction Materials	5,000
Office Rent & Utilities	20,000
Working Capital	20,000
Staff Honorarium	50,000
Chef and Cook Fees	30,000
TOTAL	155,000

The business's estimated monthly operating cost is **₱155,000**, with the highest expenses being **staff and chef fees**. Rent, utilities, and working capital are also significant, while equipment and materials are smaller costs. Overall, labor and facilities make up most of the monthly expenses.

Menu Pricing Model

Table 2. Standard Menu (Minimum of 50 guests)

Menu	Description	Cost Price per Meal	Cost as Percentage of Price	Selling Price per meal
A	European Food	Php 75	50 %	Php 150
B	Asian Food	Php 60	40 %	Php 150
C	American Food	Php 75	50 %	Php 150
D	Filipino Food	Php 45	30 %	Php 150
E	Sea Food	Php 100	50 %	Php 200

The menu shows that meals are priced to cover costs and make a profit. **Filipino food** has the lowest cost percentage (30%), while **seafood** is the most expensive to prepare but sold at a higher price to maintain a 50% cost ratio.

Decoration Charges

Class	Price (for minimum of 50 guests)
A	Php 5,000
B	Php 8,000
C	Php 10,000
D	Php 12,000
E	Php 15,000

The decoration charges shows the range from **₱5,000 to ₱15,000** for a minimum of 50 guests, increasing with the level or class of decoration. Higher classes cost more, reflecting more elaborate setups.

Financial Indicators

Capacity	Human Resource	Equipment	Location
100 events per year	12	Local	Manila & Cavite

Financial Summary

Project Cost per Month	Project Cost for one year	Payback Period	Cost of Capital
Php 155,000	Php 1,860,000	Two years	13%

The business can serve **100 events per year** with **12 staff** using local equipment in **Manila and Cavite**. It costs **₱155,000 per month** to operate, totaling **₱1,860,000 per year**, and is expected to recover its investment in **two years** with a **13% cost of capital**.

Results indicate that the project is financially viable, with manageable operating costs and competitive pricing.

E. Socio-economic Feasibility

The project will provide affordable catering services to students and the surrounding community, strengthening EARIST's partnership with local residents. It will offer real-world training opportunities for Hospitality Management students, support institutional income generation, and promote social responsibility through community-engaged services.

CONCLUSION

Based on the findings of this study, the establishment of EARIST Catering Services is both beneficial and feasible. The project supports academic learning, generates income, and provides services not only to the institution but also to the surrounding community.

1. EARIST Catering Services will provide meaningful learning experiences for students and serve as an income-generating program for the College of Hospitality Management and the entire school community. It will also create additional employment opportunities that may benefit faculty members, staff, students, and graduates of the institution.
2. Through the establishment of the catering services, the knowledge and skills of both students and faculty will be effectively utilized, contributing to the development of practical competencies and the generation of income for the institution.
3. The materials to be purchased under this project will serve a dual purpose: (1) as instructional materials for undergraduate students, and (2) as equipment and resources for both on-campus and off-campus catering services.

4. For the community within the vicinity of the campus, the catering services will offer quality food and attractive decorations at affordable prices. Therefore, EARIST Catering Services is feasible to establish under the present conditions.

RECOMMENDATIONS

Based on the findings and analysis of the feasibility study, the following specific recommendations are proposed to ensure the successful establishment and operation of EARIST Catering Services:

1. Institutional Support and Oversight: The EARIST administration should provide continuous support and supervision, particularly in the initial stages of operation, to ensure adherence to quality standards, proper management, and efficient use of resources. Faculty members from the College of Hospitality Management should be actively involved in supervising students' participation in the project.
2. Strategic Location and Facility Use: The catering service should utilize both on-campus and off-campus locations to maximize accessibility for clients while minimizing disruption to academic activities. The first floor of the new building should serve as the main office and coordination hub, with designated areas for material storage, planning, and meetings.
3. Student Training and Engagement: Students should be integrated into the project as part of their on-the-job training. Hands-on participation in planning, food service, and event decoration will enhance their practical knowledge, develop their professional skills, and foster a sense of responsibility and teamwork.
4. Marketing and Promotion: EARIST Catering Services should implement a proactive marketing plan, including the use of posters, flyers, social media, and campus-wide promotions. Professors and staff should encourage students to promote the services, helping to establish the catering service as a trusted and visible option within the community.
5. Financial Management and Cost Control: The administration should monitor all financial activities, including revenues, expenses, and breakages, to ensure the sustainability of the project. A clear pricing strategy should balance affordability for clients with the need to achieve a return on investment within the projected two-year timeframe.
6. Quality Assurance and Service Excellence: Regular quality checks and feedback collection from clients should be conducted to maintain high standards in both catering and decoration services. Staff and students should receive periodic training to enhance service delivery, creativity, and professionalism.
7. Sustainability and Resource Planning: To ensure long-term viability, the project should gradually invest in permanent equipment, vehicles, and office facilities. Replacement schedules for catering props and cutlery should be adhered to, and contingency plans should be developed to address unexpected challenges during events.
8. Community Engagement and Social Responsibility: EARIST Catering Services should actively foster relationships with the local community, nearby institutions, and student organizations by offering affordable, high-quality catering services. This will promote goodwill, provide learning opportunities for students, and strengthen the social impact of the project.

REFERENCES

Bocken, N. M. P., Short, S. W., Rana, P., & Evans, S. (2022). Sustainable business model innovation for food and service industries. *Journal of Cleaner Production, 364*, 132602. https://doi.org/10.1016/j.jclepro.2022.132602

Doria, C. S. M., Madronio, A. V. M., & Reyes, J. L. (2024). Supply chain management practices and problems encountered by a catering business in Nueva Vizcaya. *International Journal of Research and Innovation in Social Science, 8*(5), 1602–1626.

Eulogio “Amang” Rodriguez Institute of Science and Technology. (2020). *EARIST research journal*. EARIST Press.

Feasibility study on meal delivery and catering services in Koronadal City. (2024). Unpublished undergraduate thesis, Green Valley College Foundation, Inc.

Illo, N. P. M. (2025). Evaluating catering services in Rinconada: A framework for community extension programs. *Journal of Information Systems Engineering and Management, 10*(1), 1–12.

Krisdianto, D., Pratama, R., & Yuliana, S. (2023). The feasibility study analysis of food business development. *International Journal of Entrepreneurship and Business Administration, 5*(2), 45–58.

Mauliahasmi, S., Rahman, A., & Putri, N. (2025). Comprehensive analysis of business catering feasibility to assess its potential and sustainability. *Journal of Business Management and Economic Development, 7*(1), 21–35.

San Diego, C. A. (2024). *The sustainable catering service industry in the Philippines during the COVID-19 pandemic* (Master’s thesis). Seinäjoki University of Applied Sciences.

Scarborough, N. M., & Cornwall, J. R. (2021). *Essentials of entrepreneurship and small business management* (10th ed.). Pearson Education.