

# Integrating Data for Economic Analysis Management Systems (IDEAMS)

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## Abstract

The rapid growth of digital technologies has transformed economic decision-making, demanding more advanced data integration for accurate analysis and strategic planning. This study explores the development and implementation of an Integrated Data for Economic Analysis Management System (IDEAMS) to enhance data-driven decision-making in economic analysis, particularly within Guimaras province's tourism sector. By integrating real-time and historical data, IDEAMS aims to serve stakeholders, including the provincial government, the Local Government Unit (LGU), and tourism businesses in Guimaras. This system features a centralised platform for efficient data processing, predictive analytics, and informed decision-making. The research employs a mixed-methods approach, combining qualitative assessments of economic data needs with quantitative evaluations of system functionality — including suitability, performance, efficiency, compatibility, usability, reliability, security, portability, and maintainability. Respondents rated the study highly, with a mean score of 4.4, indicating that the project meets standards for functionality, usability, efficiency, portability, and maintainability. The findings underscore IDEAMS's potential to enhance economic forecasting, optimise resource allocation, and support evidence-based policymaking. It is expected to improve economic monitoring, forecasting, and policy support by integrating multiple economic data sources into real-time market indicators, creating a unified, standardised platform.

**Key Words:** Data integration for accurate analysis and strategic planning, Data-driven decision-making in the tourism industry.

## 1. Introduction

Economic analysis is essential in shaping policies, guiding investment decisions, and ensuring efficient resource allocation in a world increasingly dependent on data. However, a common challenge in financial analysis is data fragmentation across various sources, which makes it difficult to generate accurate, timely, and actionable insights (Chen et al., 2021). Many organisations rely on separate datasets, manual processes, and outdated analytical

techniques, hindering effective decision-making and causing inefficiencies in economic planning and policy formation (Kitchin, 2014). Without a unified system, financial analysts, policymakers, businesses, and investors struggle to consolidate and interpret large volumes of data, leading to less effective strategies and missed opportunities for economic growth.

Economic analysis and decision-making often depend on integrating various data sources. Effective integration of internal and external data can improve the quality and accuracy of management decisions. (Wulandari & Ali, 2023) The Integrating Data for Economic Analysis Management System provides a comprehensive approach to integrating data for economic analysis. In the tourism industry, gathering diverse data sources is essential for financial analysis and decision-making. However, the sector faces a significant challenge due to the numerous data sources, including local establishments, tourism offices, shops, tourist attractions, and others. These sources often vary in format, structure, and quality, and sometimes the data they provide is incomplete, hindering integration and potentially affecting the accuracy of the data used for analysis and decision-making. To address these issues, it is necessary to implement standardised data formats, establish robust data governance practices, and utilise advanced data integration tools to ensure seamless, reliable data consolidation.

To address these challenges, the Integrating Data for Economic Analysis Management System (IDEAMS) has been developed to offer a comprehensive solution for economic data related to the tourism industry. IDEAMS provides real-time economic forecasting and trend analysis to support evidence-based decisions. The software aims to assist government agencies, particularly those in tourism, in automating and streamlining data collection and reporting, thereby improving accuracy and facilitating easier data retrieval for decision-making.

IDEAMS enhances analytical skills and promotes transparency and accountability in economic decision-making by integrating diverse economic datasets into a single unified system. This study examines the design, deployment, and impact of IDEAMS in transforming economic analysis and providing stakeholders with a powerful tool for informed policymaking and strategic planning.

IDEAMS enables seamless data integration from various sources to support economic analysis and decision-making (Brynjolfsson et al., 2011). It offers a centralised platform for collecting, harmonising, and analysing data from tourism sector establishments. The system employs data integration and analytics functions to transform raw data into actionable insights, allowing tourism officers, local government units, and provincial officials to make better, data-driven decisions. A key feature of IDEAMS is its ability to enhance decision-making through data-driven analysis (Brynjolfsson et al., 2011; Noller et al., 2012; Guo et al., 2018). Data analytics within IDEAMS plays a crucial role in identifying patterns and trends in tourism activities. The system provides advanced analytics techniques, including descriptive, predictive, and prescriptive analytics, to evaluate key performance indicators (KPIs) such as visitor numbers, revenue, customer satisfaction, and economic impact. IDEAMS offers a comprehensive overview of the tourism economy by integrating data from local establishments.

## **2. Purpose of the study**

Specifically, the study aims to

1. Assess whether IDEAMS meets economic analysis requirements by providing comprehensive, accurate, and relevant data integration.
2. Assess system response times, resource consumption, and scalability for handling large economic datasets. Review how IDEAMS integrates with existing economic data platforms and external systems.
3. Assess user experience, ease of learning, and accessibility to ensure successful stakeholder adoption.
4. Test the system's fault tolerance, data recovery mechanisms, and availability to ensure continuous economic analysis.
5. Evaluate data confidentiality, integrity, and access controls to protect sensitive economic information.
6. Assess the modularity, testability, and ease of modification for continuous system enhancements.
7. Assess IDEAMS' flexibility across different infrastructures and deployment environments.

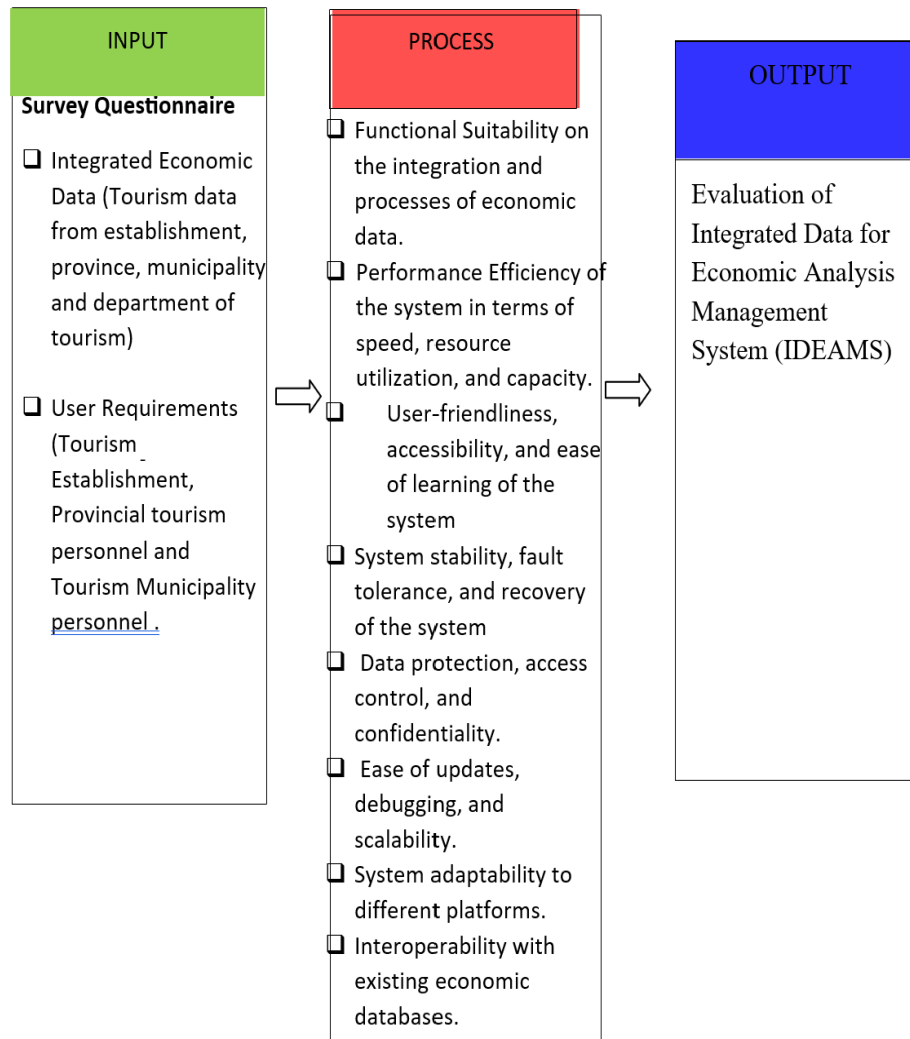
## **3. Framework**

Figure 1 illustrates the study's conceptual framework. In the context of the Integrating Data for Economic Analysis Management System (IDEAMS), the input is a survey questionnaire based on ISO 25010 that evaluates software quality attributes, including functionality, reliability, usability, compatibility, security, efficiency, maintainability, and portability. This questionnaire gathers responses from tourism businesses and stakeholders within the tourism sector. Its purpose is to assess the system's performance and adherence to international quality standards. The process involves collecting, validating, and analysing data using statistical methods to identify strengths, weaknesses, and potential areas for improvement in the IDEAMS software. This stage includes organising responses, interpreting results, and applying appropriate analytical techniques to generate meaningful insights. Finally, the output is a detailed evaluation report that describes the software's quality, identifies areas for enhancement, and provides recommendations to optimise IDEAMS for better economic data management. This

structured approach ensures the system meets high-quality standards and effectively supports economic analysis and decision-making.

**Figure 1**

Conceptual Framework of the Study



The system's approach.

## 4. Methodology

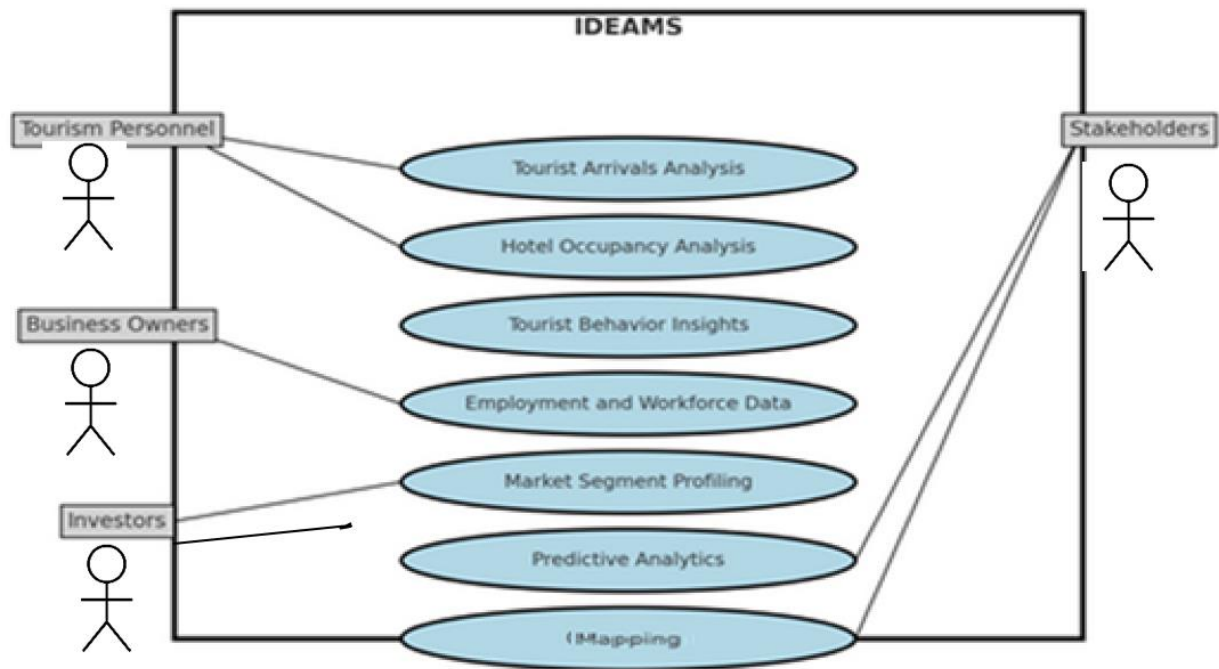
### 4.1 Research Design

IDEAMS was created to offer a platform for data-driven decision-making in the tourism industry. Figure 2 shows the use case diagram for IDEAMS, illustrating the software's users, including stakeholders such as investors, business owners, and tourism staff. The IDEAMS was developed to include use cases such as tourism arrival analysis, hotel occupancy analysis, tourism behaviour insights, employment and workforce data, market segment profiling, predictive analytics, and mapping.

The IDEAMS was created to allow users to view hotel occupancy rates, average visitor stay durations, and tourism market segments and profiles on interactive maps. These systems enable users to obtain a broad overview of this data through geographically contextualised insights.

**Figure 2**

Use the case diagram of IDEAMS.



The IDEAMS employ a descriptive-evaluative research design to assess the system’s software quality against the ISO 25010 standard. To accomplish this, a black-box analysis is used to evaluate the system in accordance with ISO 25010. This method examines the system’s performance and functionality without inspecting its internal structure or code. Black-box analysis involves analysing inputs and their corresponding outputs to determine whether the system functions as expected (Myers, Sandler, & Badgett, 2011), rather than examining the system's code and internal design.

Through black-box analysis, IDEAMS is assessed to ensure it accurately processes data across various tourism sectors and generates reliable economic insights and reports. This method is essential for verifying whether IDEAMS consistently provides dependable results. The system end-user tested the software using black-box testing, confirming that IDEAMS satisfies the practical requirements for data-driven decision-making in the tourism industry.

This study also used a quantitative approach by employing a structured survey questionnaire aligned with ISO 25010 quality attributes, including functionality, reliability, usability, efficiency, maintainability, portability, security, and compatibility (ISO/IEC 25010:2011). The evaluation involves gathering feedback from tourism establishments, tourism personnel, developers, IT professionals, and economic analysts who have used IDEAMS to ensure a comprehensive assessment. Performance metrics such as system response time, uptime, and error rates will also be analysed to validate the system’s efficiency and reliability.

According to Boehm et al. (2016), software quality models like ISO 25010 provide a structured framework for evaluating system performance and user satisfaction, making them widely recognised standards for software assessment. Similarly, Kitchenham and Pfleeger (2008) observe that software quality assessment should include both quantitative measurements and user perceptions to gauge the system's effectiveness accurately. The study by Al-Qutaish (2010) emphasises the importance of maintainability and usability in software systems, especially in economic data management, where ease of access and system stability are vital.

Data were analysed using descriptive statistics (mean, frequency, and percentage) to summarise user responses. A purposive sampling method was employed to ensure respondents had relevant experience with IDEAMS, aligning with Creswell’s (2014) best practices for conducting software evaluations. Ethical considerations will be strictly

observed, including obtaining informed consent, maintaining data confidentiality, and complying with data privacy regulations.

The expected outcome of this research is a thorough evaluation report that highlights IDEAMS' strengths, weaknesses, and areas for improvement. The findings improved the system's efficiency and usability while ensuring compliance with ISO 25010 standards, ultimately supporting more effective economic data management.

#### **4.2 Respondents and Sampling Plan**

The respondents and sampling plan for Integrating Data for Economic Analysis Management System (IDEAMS) using ISO 25010 employ a purposive sampling strategy to ensure participants have relevant experience with the system. The 46 respondents in the study include owners of tourism establishments and tourism staff from five municipalities in the Province of Guimaras, as well as tourism personnel, software developers, IT professionals, and economic analysts who actively engage with IDEAMS in their roles. According to Palinkas, Horwitz, Green, Wisdom, Duan, & Hoagwood (2015), Purposive sampling is a non-probability sampling technique in which the researcher selects respondents based on their relevance to the research objectives. Purposive sampling relies on the researcher's judgment to identify respondents who best fit the criteria or possess characteristics considered essential for the study. Furthermore, according to Etikan, Musa, and Alkassim (2016), purposive sampling effectively selects respondents who can provide insightful and experience-based feedback, especially in software evaluations where domain expertise is crucial.

The selection criteria for respondents were based on how often they use the system, their role in system development or maintenance, and their level of interaction with economic data analysis processes. This approach aligns with the recommendations of Creswell & Creswell (2018), who emphasise that choosing knowledgeable respondents improves the accuracy and depth of research findings. The study ensures representation from various stakeholders to gather diverse perspectives on system functionality, usability, reliability, and other ISO 25010 quality attributes.

Data were collected using structured survey questionnaires developed in accordance with ISO 25010 software quality standards. These questionnaires use Likert-scale measurements to evaluate user satisfaction and perceived system performance. According to DeLone & McLean (2003), using validated survey tools in information system evaluations offers a systematic way to assess software effectiveness, thereby enhancing the reliability of the results. In addition to surveys, focus group discussions (FGDs) were conducted with selected respondents to gain deeper insights into software usability and potential areas for improvement.

To ensure ethical integrity, the study follows principles of ethical research, including informed consent, confidentiality, and voluntary participation, as Bryman (2016) advised. The expected outcome of this sampling plan is a strong dataset that accurately reflects user experiences, offering a thorough evaluation of IDEAMS in line with ISO 25010 standards. The insights obtained have improved the system's design and functionality, ultimately boosting its effectiveness in economic data management.

#### **4.3 Instrument and Data Gathering Procedure**

The instrument and data-gathering method for the Integrating Data for Economic Analysis Management System (IDEAMS) using ISO 25010 relied on a structured survey questionnaire as the primary data-collection tool. The survey was designed based on the ISO 25010 software quality model, which assesses key quality attributes such as functionality, reliability, usability, efficiency, maintainability, portability, security, and compatibility (ISO/IEC 25010:2011). The questionnaire includes Likert-scale items, enabling respondents to rate their experiences and perceptions of the system's performance. According to DeLone and McLean (2003), standardised survey instruments in information system evaluations enhance measurement accuracy and provide reliable insights into software effectiveness.

The survey questionnaire was tested with a small group of tourism establishment owners in the Province of Guimaras to ensure its clarity, relevance, and reliability. Following Taherdoost's recommendations (2016), the questionnaire should undergo content validity assessment with input from IT professionals and economic analysts familiar with IDEAMS.

The data collection process involved distributing survey questionnaires to selected respondents, including owners and staff of tourism establishments, software developers, IT professionals, and economic analysts who interact with IDEAMS. Surveys will be sent via online forms and direct email invitations to maximise reach and convenience. According to Creswell and Creswell (2018), electronic survey distribution enhances response rates and makes data collection more efficient. To supplement the survey data, focus group discussions (FGDs) and key informant interviews (KIIs) will be conducted with selected respondents to gain deeper qualitative insights into the system's strengths and weaknesses. These discussions will follow a semi-structured format, allowing participants to elaborate on their experiences with IDEAMS and suggest improvements.

#### 4.4 Data Analysis

The data analysis for the Integrating Data for Economic Analysis Management System (IDEAMS) was conducted in Microsoft Excel. It employed descriptive statistical techniques to evaluate users' feedback based on ISO 25010 software quality attributes. The study utilised a Likert-scale survey, and respondents' ratings are presented in Figure 3.

Figure 3

Likert's Scale Rating

RANGE	Description
4.21-5.0	Excellent
3.41-4.20	Very Good
2.61-3.40	Good
1.81-2.60	Fair
1.0 – 1.8	Poor

This approach enabled a systematic evaluation of the system's functionality, reliability, usability, efficiency, maintainability, portability, security, and compatibility.

To begin the analysis, survey responses were entered into Excel, with each row representing a respondent and each column a specific survey question. The weighted mean was used to determine the mean score for each quality attribute, providing an overall assessment of user satisfaction.

#### 4.5 Ethical Considerations

Ethical considerations, including informed consent, voluntary participation, and data confidentiality, are strictly adhered to in accordance with research ethics guidelines outlined by Bryman (2016). The results from this data collection process provide a comprehensive assessment of IDEAMS, offering evidence-based recommendations for system improvement while ensuring compliance with ISO 25010 quality standards.

### 5. Results and Discussion

#### 5.1 Participants' Demographics

Table 1

Participant's Demographic Profile

Participant's Information		Total (N=46)	Percentage (100)
<b>Sex</b>	Male	13	28 %
	Female	33	72 %
<b>Age</b>	20-30	10	22 %
	30-40	18	39 %
	40-50	14	30 %
	50 over	4	9 %
<b>Educational Background</b>			
	Business Program	4	9 %
	Tourism Management Program	21	46 %
	Hospitality Management Program	10	22 %
	Economics Program	3	6 %
	Statistic Programs	5	11 %
	Other related programs	3	6 %
<b>Years of Service</b>			
	1-10 years	21	60%
	11- 20 years	11	30 %

21-30 years	3	10%
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Table 2 displays the respondents' demographic profile. Regarding gender distribution, most participants are female, accounting for 72% of the total, while males make up about 28%. In terms of age, the largest group is 30-40 years old (39%), followed by 40-50 years old (30%), indicating *that* a significant portion of the workforce is in their mid-career stage. Younger participants (22%) suggest a pipeline of emerging professionals, while a smaller percentage (9%) are over 50, likely representing senior-level employees or long-standing industry professionals. Concerning educational background, most participants (46%) have studied tourism management, followed by hospitality management (22%), indicating that the study population primarily consists of tourism and hospitality experts. The presence of participants from business (9%), statistics (11%), and economics (6%) points to some interdisciplinary involvement within the industry. In terms of years of service, most participants (60%) have relatively short-term experience (1-10 years), reflecting a workforce with a high influx of new professionals. A notable portion (30%) has moderate experience (11-20 years), while only 10% have over 20 years of experience. This distribution may suggest either a high turnover rate or limited career longevity.

The participant demographics indicate that the study predominantly reflects a female-led workforce with a strong presence in the tourism and hospitality sectors. Most participants are mid-career, with a significant number having 1-10 years of experience. Knowing these demographics helps tailor policies, training programmes, and career development opportunities within the industry.

## 5. 2 Results of Evaluation

The researchers assessed the performance and compliance of the IDEAMS software with the specified user requirements. The evaluation results are presented in **Table 2**.

**Table 2**

Overall results of the respondents.

Parameters	Obtained Mean	Interpretation
<b>1. Functional Stability</b>	4.4	Excellent
<b>2. Performance Efficiency</b>	4.3	Excellent
<b>3. Compatibility</b>	4.3	Excellent
<b>4. Usability</b>	4.5	Excellent
<b>5. Reliability</b>	4.4	Excellent
<b>6. Security</b>	4.4	Excellent
<b>7. Maintainability</b>	4.4	Excellent
<b>8. Portability</b>	4.4	Excellent
<b>Average</b>	<b>4.4</b>	<b>Excellent</b>

The respondents rated the software's functionality as excellent, with an average score of 4.4. According to Ramnath (2012), software functionality involves a set of attributes that define its properties and meet users' stated or implied needs. The system's functionality includes both user requirements and objectives. For the system to operate effectively, IDEAMS software must produce correct or agreed-upon results and interact smoothly with the specified system components. The study aligns with what Stefani, Vamvatsikou, and Vassiliadis (2023) stated: for software to be functional, it must satisfy all user requirements.

The respondents rated the software's performance efficiency as excellent, with an average score of 4.3. According to the International Organisation for Standardisation (ISO 25010), performance efficiency refers to the system's ability to perform adequately relative to the resources used under specific conditions. Evaluating the software's performance ensures it operates effectively, with response times, resource utilisation, and throughput meeting user expectations. This finding is supported by Hamilton, Thomas (2024), who stated that the efficiency of a software product indicates the system's performance and the effectiveness with which it uses resources. The IDEAMS software for the project aims to achieve high performance by leveraging respondents' perceptions, including quick responses to user inputs, minimal delays in data processing, and efficient resource use.

The respondents rated the software's compatibility efficiency as excellent, with an average score of 4.3. This score reflects the software's ability to perform its functions in a shared environment, in line with ISO/IEC 25010:2023. Compatibility efficiency covers aspects such as interoperability, ensuring the system works with other programmes while meeting user expectations. The IDEAMS, according to the respondents, can integrate with various platforms, such as the mapping system, and maintain interoperability with existing applications and devices. As a result, the respondents found the software to perform its functions effectively without unexpected disruptions.

The respondents rated the project's usability as excellent, with an average score of 4.5. According to Sruthy (2024), project usability refers to the device's ability to help users determine whether the software is suitable for their needs and how it can be used for specific tasks and conditions; the project enables users to learn its applications and operate and control the software. Overall, the results suggest that the project functions well and is designed to be easily understood by different users. The findings agree with Falco and Robiolo (2020), who stated that project developers must consider the importance of usability to create a user-friendly interface that is easy to learn and operate. These quality characteristics have attracted the most interest because they are more responsive to end users.

The respondents rated the software's reliability as excellent, with an average score of 4.4. The ISO/IEC 25010:2023 standard describes reliability as a product's capacity to perform specific tasks under certain conditions over a given period without errors or interruptions. The software's reliability encompasses features such as fault tolerance, availability, and recoverability. These qualities are assessed to ensure the system can recover data or return to its normal state in the event of a disruption. The IDEAMS software was engineered to operate continuously and smoothly, executing intended tasks without errors or interruptions.

With an average score of 4.4, respondents rated the software's security as excellent. According to ISO/IEC 25010:2023, security refers to the extent to which software protects data and information and allows only authorised users to access, read, or modify it. Security includes attributes such as confidentiality, integrity, non-repudiation, accountability, authenticity, and resistance of the software product. The IDEAMS software was assessed to ensure that its data remains accessible only to authorised users, thereby safeguarding its integrity as a software application. Consequently, as perceived by respondents, the software meets these requirements by implementing robust security measures that prevent unauthorised access and ensure data integrity.

The respondents rated the software's maintainability as excellent, with an average score of 4.4. According to Bhanushali and Amit (2023), maintainability of the system means that it can accommodate the effort required to implement specified modifications, which may include corrections, improvements, or adaptations to environmental changes. The project identified deficiencies or failures in all its parts and components that required modification. The software is also adaptable, allowing the system to be customised for efficient implementation. Furthermore, the software can minimise unexpected effects from modifications. The results also suggest that end users can easily modify and test the system.

The respondents rated the project's portability as excellent, with an average score of 4.4. According to Darwin Mena and Marco Santórum G. (2021), software portability pertains to the system's ability to be moved from one platform to another, including the organisation, hardware, or software environment in which the application is installed. Furthermore, the result indicates that the software can be adapted for different specified environments without requiring actions or measures beyond those intended for this purpose for the hardware involved.

The respondents rated the study as excellent, with an average score of 4.4. This suggests that the software application meets standards in functionality, reliability, efficiency, usability, portability, and maintainability.

### **Summary Of Findings**

The evaluation of IDEAMS using the ISO/IEC 25010 software product quality model revealed a well-structured and functionally capable system with notable strengths and key areas for improvement. The system has excellent functional suitability, demonstrating its effectiveness in integrating diverse economic data sources, supporting analytics and forecasting, and enabling real-time and historical economic assessments. Regarding performance efficiency, IDEAMS performed well under standard conditions but showed reduced responsiveness when handling large datasets or high user concurrency, indicating the need for optimisation in data processing and query execution.

Reliability was another strength, with the system demonstrating consistent stability, precise error management, and effective recovery methods. Security was rated excellent, featuring robust foundational elements such as dedicated end-user access levels; however, improvements are recommended for advanced threat detection, audit customisation, and full compliance with data protection regulations.

The system's usability was rated highly, with technical users manoeuvring the interface effectively. However, non-technical users faced difficulties due to limited knowledge and information about ICT devices. Enhancing accessibility and user support would expand the system's usability across different stakeholder groups.

Compatibility with standard data formats was adequate, although integration with specific external databases and APIs requires improvement to enhance data ecosystem interoperability. In terms of maintainability, the system benefits from a modular design and proper version control, although some legacy code modules need refactoring to improve long-term sustainability. Lastly, portability was excellent; the system can operate across cloud and on-premise environments.

IDEAMS demonstrates strong core capabilities; addressing these identified gaps will further improve its quality, scalability, and value as a strategic economic data management and analysis tool.

## **6. Conclusions and Recommendations**

Based on the assessment of the Integrating Data for Economic Analysis Management System (IDEAMS) using the ISO 25010 standard, the following conclusions can be made:

IDEAMS addresses the needs of economic research by offering comprehensive, accurate, and relevant data integration, particularly within the tourism sector. The system ensures reliability, showcasing strong functionality and stability.

The IDEAMS software performs exceptionally well in terms of performance efficiency. The results demonstrate that IDEAMS can effectively manage economic datasets while optimising time and resources.

The respondents considered IDEAMS compatible with its environment and other key platforms. This shows that the software is highly compatible with external systems and existing economic data platforms.

The software was found to provide better usability. The results show that the system was designed to be intuitive, user-friendly, and easy to comprehend.

The software's reliability shows that the system's fault tolerance and data recovery methods are excellent. This indicates that IDEAMS continues regular economic analysis despite any interruptions.

The software's security demonstrates its ability to safeguard confidential data and maintain data integrity by limiting unauthorised access. However, the system still requires improvement.

The respondents regarded IDEAMS's maintainability as excellent. They also considered the software's modularity and ease of updating or modifying to be functional and straightforward to deploy, ensuring its effective implementation.

The respondents regard IDEAMS' portability as flexible, scalable, and maintainable, as it can be deployed across different infrastructures.

To enhance the overall effectiveness of the Integrating Data for Economic Analysis Management System (IDEAMS), it is advisable to prioritise improvements in system performance and usability, especially for handling large datasets and supporting non-technical users. Optimising data processing workflows and designing intuitive user interfaces will improve accessibility and efficiency across a broader user base. Enhancing interoperability with external data systems through standardised APIs will also streamline data exchange and integration, fostering a more connected, responsive analytical environment. Strengthening security controls and expanding audit capabilities are vital to ensure compliance with evolving regulatory requirements and to safeguard sensitive economic data. Finally, modernising the system's maintainability and portability by adopting updated development practices—such as modular coding, containerisation, and platform-agnostic deployment—will support long-term scalability, easier updates, and increased deployment flexibility.

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### **Disclaimer (Artificial Intelligence)**

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### **Author's Contribution**

Remia L. DOCTORA: She led the project from conception to implementation, supervised the entire team, delegated personnel tasks, oversaw analytical operations, and communicated insights.

Yvette G. GONZALES: She developed advanced analytical models to generate new datasets and extract fresh insights from data.

Tracy N. Tacuban: She manages data stored in the software and handles all matters related to data processing, policies, and guidelines.

Loreto G. GABAWA, JR.: Supervise programmers and oversee code updates.

Juniffer B. BADOLES: Develops and oversees data workflows, pipelines, ETL processes, and platforms.

Rayjand T. GELLAMUCHO: Accountable for the technical assessment of the system.

### **Conflict of Interest**

There are no conflicts of interest associated with this study.

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