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Department Of Environment and Natural Resources XII Automated Reporting System: Its Implementation and Performance in The New Normal Mechanism in Monitoring and Evaluation

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ABSTRACT

This study assessed the implementation and performance of the Department of Environment and Natural Resources XII Automated Reporting System (DARS) as a new-normal mechanism for monitoring and evaluation. It examined the system's acceptability in terms of efficiency, reliability, flexibility, maintainability, and machine independence; its technology implementation in terms of language, database, and interface; and its performance in monitoring and evaluation functions. The study used a quantitative descriptive-correlational design with complete enumeration of 200 respondents composed of 80 DENR-XII officials and 120 DARS focal persons from the Regional Office and field offices. Data were gathered using a validated survey questionnaire with excellent content validity and highly acceptable reliability (Cronbach's alpha = 0.87), and were analyzed using mean, standard deviation, Pearson r, t-test, ANOVA, z-test, percentage, and ranking. Results showed that DARS was rated very high in acceptability (M = 4.63, SD = 0.10), fully implemented in technology implementation (M = 4.52, SD = 0.18), and outstanding in monitoring and evaluation performance (M = 4.65, SD = 0.05). Acceptability had a strong positive relationship with implementation (r = 0.81, t = 19.44), while technology implementation had a strong positive relationship with DENR performance (r = 0.84, t = 21.78). Significant differences were also found among implementation indicators (F = 30.48, Fcrit = 3.01). The findings indicate that DARS improved transparency, timeliness, paperless reporting, data accessibility, and performance monitoring in DENR Region XII, although sustained internet support, system upgrading, training, and IT staffing remain necessary for long-term implementation.

Keywords: *automated reporting system, DENR Region XII, e-governance, monitoring and evaluation, system acceptability, technology implementation*

INTRODUCTION

Automation has become an important mechanism for improving transparency, speed, and productivity in public organizations. In the Philippines, government agencies continue to adopt e-governance systems to improve service delivery, reduce manual procedures, and make public transactions more efficient. Earlier e-government models, including those of Layne and Lee (2001) and Gartner Research (2003), provide a development road map for moving public administration from traditional processes toward integrated and technology-supported governance.

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In the Department of Environment and Natural Resources (DENR) Region XII, the Plans and Program Section and Monitoring and Evaluation Section under the Planning and Management Division perform critical functions in monitoring work and financial plans, consolidating monthly and quarterly accomplishment reports, and reviewing the required Means of Verification (MOVs) from field offices. Monitoring involves the systematic collection and analysis of information, while evaluation examines whether intended results have been achieved and identifies recommendations for improvement (Muyuka, 2015; Rossi et al., 2018).

Before the adoption of the DENR-XII Automated Reporting System (DARS), report submission and consolidation were largely manual. This created concerns in timeliness, quality, quantity, and verification of reports. Reports that failed to meet criteria were returned for correction, causing delays and increasing the workload of both regional and field offices. These difficulties became more pronounced during the COVID-19 pandemic, when travel restrictions and boundary controls limited the usual movement of documents and personnel. The need for a faster and more transparent reporting mechanism therefore became urgent.

In response, DENR-XII initiated the development of DARS as an online reporting system that could be accessed anytime and anywhere with an Internet connection. The system was designed to replace manual transactions, support paperless reporting, monitor performance per programs, activities, and projects (PAPs), and improve the timeliness and quality of accomplishment reports. Its pilot testing began in late 2020, and full implementation started in Calendar Year 2021 under DENR-XII Memorandum No. 2021-003 dated January 5, 2021. The adoption of DARS was associated with a notable organizational improvement, as DENR-XII rose from rank thirteen to rank five in the 2021 nationwide accomplishment assessment conducted by the DENR Central Office.

Despite this reported improvement, the implementation of DARS required empirical assessment. The system needed to be examined not only in terms of whether users accepted it, but also in terms of whether its technology components supported actual implementation and whether it contributed to monitoring and evaluation performance. This study therefore assessed the acceptability, technology implementation, and performance of DARS as a new-normal mechanism for monitoring and evaluation in DENR Region XII.

Literature Review

Automation, e-governance, and public sector reporting

Automation reduces repetitive manual tasks and improves the production, processing, and retrieval of information. Wickens and McCarley (2017) and Parasuraman et al. (2015) emphasized that the level and stage of automation influence system execution and user performance. While automation can increase speed and consistency, overreliance on automated systems may create problems when software, hardware, or functional failures occur. This means that system design must consider both technological capacity and human oversight.

In government settings, automation becomes part of e-governance because it applies information and communication technology to public sector operations. Layne and Lee (2001) and Gartner Research (2003) describe e-government development as a gradual process that moves from simple information access to integrated and responsive digital services. In the context of DENR-XII, DARS represents an e-governance infrastructure because it enables transparency, paperless transactions, report tracking, and faster decision-making across regional and field offices.

Human involvement remains essential in automated processes. Bainbridge (1983) argued that people are still needed to supervise, maintain, and improve automated systems. Butler and Sellbom (2002) likewise emphasized the need for updated technical knowledge and decision-making skills when adopting new technologies. Thus, even if DARS automates reporting, the role of officials, focal persons, administrators, and system developers remains central to ensuring accurate encoding, verification, and system maintenance.

Automated reporting systems and organizational performance

Automated reporting systems are management tools that allow agencies and organizations to prepare, update, and submit reports within specific time frames without repeatedly reconstructing data manually. Calzon

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(2021) explained that automated reporting can save time and cost, improve access to information, promote transparency, and support real-time decision-making. Roa (2020) also noted that automated reporting reduces routine tasks, improves reporting quality, minimizes human error, and supports organizational growth.

In DENR-XII, automated reporting is closely linked with project monitoring and evaluation because the agency must track budget allocation, workload distribution, financial management, physical accomplishments, expenditures, and MOVs. Automated systems help align physical and financial data, provide traceable report status, and allow users to view, download, and print submitted files. These functions are important for organizations that must consolidate reports from multiple field offices and submit them to a central authority within strict deadlines.

Automated reporting also supports decision-making. Wilcox and Bourne (2002) emphasized that performance prediction depends on the accuracy and veracity of data, while DeLone and McLean (1992) highlighted the importance of system quality and information quality in information systems success. Applying these concepts to DARS, system quality is reflected in efficiency, reliability, flexibility, maintainability, and machine independence, while information quality is reflected in the ability to provide accurate, accessible, and verifiable reports.

Technology implementation, usability, and system maintenance

Successful system implementation depends on the interaction of software language, database functionality, and user interface. Benton (2020) emphasized that developers must analyze organizational requirements, programming limitations, usability, and backend processes before designing a system. Maes et al. (2017) similarly noted that system development requires logical thinking, planning, endurance, and cooperation between programmers and end-users. These ideas support the present study's emphasis on language, database, and interface as indicators of DARS technology implementation.

Database security and accessibility are also critical to an automated reporting system. Janssen (2019) explained that automation adoption involves data acquisition, analysis, decision-making, and implementation. In DARS, the database stores encoded work and financial plans, submitted reports, user credentials, and attached MOVs. A centralized and secure database is therefore necessary to prevent unauthorized access while allowing appropriate users to retrieve files based on their office and role.

User interface quality directly affects user engagement and satisfaction. A system may be technically functional but difficult to implement if users cannot navigate it efficiently. For DARS, a responsive and user-friendly interface is essential because officials and focal persons from both regional and field offices use the system for encoding, submission, review, downloading, and report confirmation. Therefore, the literature indicates that automation succeeds when technical design, database security, usability, maintenance, and management support are aligned.

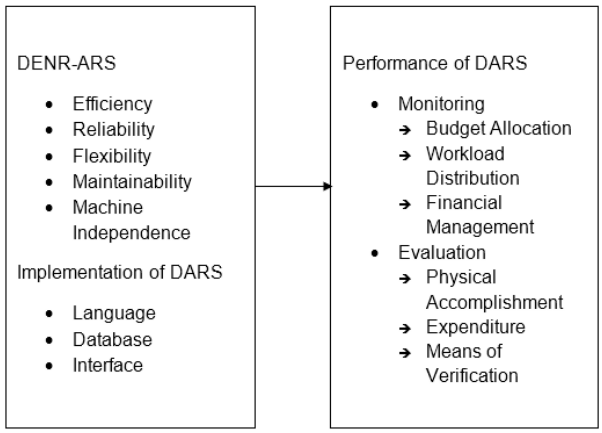

Figure 1. *Conceptual Framework of the Study*

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METHODS

Research Design

The study used a quantitative descriptive-correlational research design. The descriptive component was used to determine the extent of acceptability of DARS, the level of technology implementation, and the level of DARS performance. The correlational component was used to determine whether acceptability was associated with implementation and whether technology implementation was related to DENR performance. The design was appropriate because the study used survey data and statistical procedures to describe and test relationships among variables.

Research Locale

The study was conducted in DENR Region XII, also known as SOCCSKSARGEN. It covered the Regional Office and field offices, including PENROs and CENROs in Cotabato, South Cotabato, Sultan Kudarat, Sarangani, General Santos, Banga, Tacurong, Kalamansig, Glan, Kiamba, Midsayap, and Matalam. The locale was appropriate because these offices were active users of the implemented DARS in the preparation, submission, monitoring, and evaluation of reports.

Participants and Sampling Technique

The respondents were 200 DENR-XII personnel composed of 80 officials and 120 regular employees designated as DARS focal persons, particularly Planning Officers and Budget Officers. Complete enumeration was employed because the study included all relevant officials and focal persons from 13 offices who actively participated in and interacted with the adopted system.

Research Instrument

The primary instrument was a researcher-made survey questionnaire. It measured the acceptability of DARS in terms of efficiency, reliability, flexibility, maintainability, and machine independence using a five-point scale from Very Low to Very High. It also measured the level of technology implementation in terms of language, database, and interface using a scale from Not Implemented to Fully Implemented, and the level of DARS performance in terms of monitoring and evaluation using a scale from Poor to Outstanding.

The instrument was validated by experts and knowledgeable personnel from DENR Region XII. The content validity index obtained an average proportion of 0.91, interpreted as excellent. A pilot test was also conducted, and the tool obtained a Cronbach's alpha of 0.87, indicating highly acceptable internal consistency reliability.

Data Gathering Procedure

The researcher secured the required certification from the Dean of the Graduate School and permission from the Office of the DENR-XII Regional Executive Director before conducting the study. Data were gathered through face-to-face distribution of questionnaires and through a digital Google Forms survey link sent by email and posted in appropriate communication groups. Responses submitted through the online form were automatically stored in a spreadsheet accessible only to the researcher.

Data Analysis

The study used mean and standard deviation to describe the acceptability, technology implementation, and performance of DARS. Pearson Product-Moment Correlation and t-test were used to determine the relationships between acceptability and implementation, and between technology implementation and DENR performance. ANOVA and z-test were used to determine differences between and among implementation indicators. Percentage and ranking were used to summarize issues and concerns about DARS. All inferential tests were evaluated at the 0.05 level of significance.

Ethical Consideration

The study observed proper permission-seeking procedures before data collection. Participation was limited to authorized officials and focal persons who used the system. Responses were gathered only for research

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purposes and were treated with confidentiality. The online survey responses were accessible only to the researcher, and the findings were reported in aggregate form to avoid identifying individual respondents.

Table 1. *Respondents of the Study*

Respondent Group	Number of Respondents	Coverage
Officials	80	RED, Assistant Regional Directors, PENR Officers, CENR Officers, Division Chiefs, Section Chiefs, and Unit Chiefs
DARS focal persons	120	Planning Officers and Budget Officers from DENR-XII Regional Office and field offices
Total	200	Complete enumeration of target users across 13 offices

RESULTS AND DISCUSSION

Acceptability of the DARS

The respondents rated the acceptability of DARS as very high across all five indicators. Efficiency obtained the highest mean (M = 4.77), showing that the system strongly promoted timely submission of reports, paperless transactions, WFP distribution, simultaneous multi-user handling, calculation of physical and financial accomplishments, and access to uploaded files. Machine independence followed (M = 4.64), indicating that the system could run across computers and smartphones and could be accessed through a static URL. Reliability (M = 4.63), maintainability (M = 4.58), and flexibility (M = 4.50) were also rated very high.

The overall acceptability mean was 4.63 (SD = 0.10), interpreted as Very High. This indicates that officials and DARS focal persons strongly accepted the system as a mechanism for reducing manual reporting, improving report timeliness, and promoting transparency. This finding aligns with Calzon (2021) and Roa (2020), who emphasized that automated reporting systems support timely retrieval, data quality, and reduced manual effort.

Table 2. *Summary of the Extent of Acceptability of DARS*

Element	Mean	SD	Verbal Description
Efficiency	4.77	0.30	Very High
Machine Independence	4.64	0.40	Very High
Reliability	4.63	0.30	Very High
Maintainability	4.58	0.40	Very High
Flexibility	4.50	0.46	Very High
Overall Mean	4.63	0.10	Very High

Level of Technology Implementation

The technology implementation of DARS was rated as Fully Implemented. Interface obtained the highest mean (M = 4.71), suggesting that users were highly satisfied with the responsive design, user-friendly interface, consistency of buttons and icons, and ability of the system to handle multiple users. Database followed with a mean of 4.49, showing that the system provided restriction of unauthorized access, multiple views of data, easy accessibility, backup and recovery facilities, centralized files, and consistent transaction processing. Language obtained a mean of 4.35, indicating that the programming language and software used supported the system's complex structure, readability, ease of use, and consistency.

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The overall mean for technology implementation was 4.52 (SD = 0.18), interpreted as Fully Implemented. This demonstrates that the implemented system satisfied user expectations in terms of frontend and backend processes. It also reflects the importance of system design, database security, and user interface in achieving effective technology adoption, as discussed by Benton (2020), Janssen (2019), and Clemens (2020).

Table 3. *Summary of the Level of Technology Implementation*

Element	Mean	SD	Verbal Description
Interface	4.71	0.47	Fully Implemented
Database	4.49	0.42	Fully Implemented
Language	4.35	0.49	Fully Implemented
Overall Mean	4.52	0.18	Fully Implemented

Performance of DARS in Monitoring and Evaluation

The performance of DARS in monitoring and evaluation was rated Outstanding. Workload distribution obtained the highest mean (M = 4.72), indicating that the system effectively segregated targets per office, identified major target PAPs, cascaded indicators, categorized running and fixed targets, and distributed targets per PAP. Expenditure followed (M = 4.68), showing that the system supported budget officers through individual user accounts, identification of expense classes, and downloadable financial reports.

Means of Verification (M = 4.67), budget allocation (M = 4.64), physical accomplishment (M = 4.64), and financial management (M = 4.56) were also rated Outstanding. The overall performance mean was 4.65 (SD = 0.05), suggesting that DARS improved the agency's ability to monitor financial and physical accomplishments, track report status, and organize MOVs. These results support the view that automated reporting systems improve decision-making and reduce human error in data processing (Mellisa, 2021; Roa, 2020).

Table 4. *Summary of the Level of Performance of DARS*

Element	Mean	SD	Verbal Description
Workload Distribution	4.72	0.39	Outstanding
Expenditure	4.68	0.42	Outstanding
Means of Verification	4.67	0.39	Outstanding
Budget Allocation	4.64	0.41	Outstanding
Physical Accomplishment	4.64	0.38	Outstanding
Financial Management	4.56	0.48	Outstanding
Overall Mean	4.65	0.05	Outstanding

Relationships Among Acceptability, Implementation, and Performance

The relationship between DARS acceptability and the level of implementation was strong and positive (r = 0.81). The computed t-value of 19.44 exceeded the tabular value of 1.97 at the 0.05 level of significance, indicating that the relationship was statistically significant. Thus, the null hypothesis of no significant association between acceptability and implementation was rejected. This means that when users perceived the system as efficient, reliable, flexible, maintainable, and machine independent, they also perceived its implementation as stronger.

The relationship between technology implementation and DENR performance was likewise strong and positive (r = 0.84). The computed t-value of 21.78 exceeded the tabular value of 1.97, indicating a statistically significant relationship. This result means that stronger implementation of language, database, and interface

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components was associated with higher monitoring and evaluation performance. The results indicate that technology implementation contributed to better performance in workload distribution, budget allocation, physical accomplishment tracking, expenditure monitoring, and MOV management.

Table 5. *Test of Significant Relationships*

Pair of Variables	n	r	t-computed	t-tabular	Decision
Acceptability of DARS and Level of Implementation	200	0.81	19.44	1.97	Significant; reject H0
Technology Implementation and DENR Performance	200	0.84	21.78	1.97	Significant; reject H0

Differences Among Implementation Indicators and Issues Encountered

The ANOVA result showed a statistically significant difference among implementation indicators. The computed F-value of 30.48 was greater than the critical value of 3.01, leading to the rejection of the null hypothesis. The post-hoc test further showed significant differences among language, database, and interface indicators. Interface obtained the highest mean and was therefore the strongest implementation component, while language obtained the lowest summary mean although it remained fully implemented.

The respondents also identified issues and concerns related to DARS implementation. The top concern was the need for continuous Internet allowance for all focal persons (34.09%), followed by increased Internet bandwidth per office (18.18%), support from top management (13.64%), allocation of Internet allowance to section/unit chiefs (11.36%), continued upgrading of the system interface (9.09%), refresher training every year (6.82%), hiring of IT staff for Regional Office and PENRO Planning Sections (4.55%), and purchasing a domain for a static URL (2.27%). These concerns show that although DARS was rated highly, sustained infrastructure, training, and management support remain necessary.

Table 6. *ANOVA Result and Major Issues About DARS*

Analysis/Issue	Value/Percentage	Interpretation/Rank
ANOVA F-computed	30.48	Significant difference among implementation indicators
F-critical	3.01	F-computed is greater than F-critical
Continuous Internet allowance to all focal persons	34.09%	Rank 1
Increase Internet bandwidth per office	18.18%	Rank 2
Support of top management	13.64%	Rank 3
Internet allowance for section/unit chiefs	11.36%	Rank 4
Continue upgrading system interface	9.09%	Rank 5
Provide refresher training yearly	6.82%	Rank 6
Hire IT staff for Regional Office and PENRO Planning Sections	4.55%	Rank 7
Purchase domain for static URL	2.27%	Rank 8

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CONCLUSION

The study concludes that the DENR-XII Automated Reporting System was strongly accepted by its target users. Its efficiency, reliability, flexibility, maintainability, and machine independence were all rated very high, indicating that the system effectively supported timely submission of reports, paperless transactions, report retrieval, file uploads, and remote access. The findings show that DARS addressed major limitations of manual reporting and contributed to a faster and more transparent reporting process.

The technology implementation of DARS also fully satisfied user expectations. The interface, database, and programming language components supported the conversion of manual transactions into a digitized and user-friendly reporting system. Among these, the interface was the strongest component because it allowed users to interact with the system effectively across offices and devices. The system's database also strengthened data security, access control, and report storage.

The performance of DENR Region XII in monitoring and evaluation was rated Outstanding during the implementation of DARS. The system enhanced workload distribution, budget allocation, financial management, physical accomplishment tracking, expenditure monitoring, and MOV verification. Strong positive and significant relationships were found between acceptability and implementation, and between technology implementation and DENR performance. These results indicate that the success of DARS depended not only on its technical features but also on user acceptance, system usability, and management support.

Although the system was highly accepted and fully implemented, respondents identified important sustainability concerns. Continued Internet allowance, increased bandwidth, top management support, system upgrading, refresher training, and IT staffing remain necessary to maintain and further improve DARS. Overall, the study demonstrates that a well-designed automated reporting system can improve transparency, reliability, timeliness, and performance in public sector monitoring and evaluation.

Recommendation

DENR-XII officials and DARS focal persons should maintain their commitment to accurate and timely encoding, submission, and verification of reports. Since efficiency obtained the highest acceptability rating, users should continue observing deadlines and quality standards to sustain the benefits of the system.

The system developer and database administrator should continue upgrading the graphical user interface and system functionality to maintain user-friendliness, strengthen security, and support future conversion into a responsive Android platform. Licensed software for the frontend and backend processes should be updated periodically to prevent system shutdown and protect long-term operations.

Top management should sustain support for the system by allocating funds for faster Internet connections, Internet allowances for focal persons and relevant section/unit chiefs, updated computer units, static URL or domain maintenance, and system hosting requirements. These investments are necessary because the major issues raised by respondents were related to Internet access and system continuity.

The agency should establish a workforce mechanism by hiring or designating IT-related personnel who can maintain DARS and other developed systems at the Regional Office and field office levels. Technical support should be available to address database backup, system debugging, user account management, server connectivity, and report-related concerns.

Regular refresher training and yearly system assessments should be conducted for officials and focal persons. These activities should focus on system navigation, proper attachment of MOVs, accurate encoding of physical and financial accomplishments, cybersecurity awareness, and troubleshooting procedures. Future researchers may evaluate the long-term impact of DARS on organizational ranking, staff workload, data accuracy, and decision-making quality in other DENR regions or government agencies.

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