



Role of management information systems in enabling sustainable organizational decision-making

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Abstract

Sustainability relates to the ability to address the current needs of the organization without undermining the potential of both the current and future generations to meet their needs. Sustainability is also known as Environmental, Social, and Governance (ESG), a concept that most organizations have recognized as essential for focusing not only on efficiency but also on the role of sustainability in their managerial decisions. This is where Management Information Systems (MIS) come in, as they play a central role in the process.

This paper aims to analyse the contribution of Management Information Systems in facilitating sustainable decision-making for organizations. The methodology used for this paper involves a review of existing literature on decision-making, Management Information Systems, and sustainability. Through this review, this paper demonstrates how Management Information Systems assist organizations in making effective decisions that focus on sustainability and efficiency. It is evident from the results that the implementation of MIS has an increasing impact on sustainable decision-making as it helps in data-informed decision-making and integrating the system. This work is a contribution to the existing literature as it puts prominence on the implementation of MIS and the decision-making process for sustainability in organizations.

Keywords: Management information systems, sustainable decision making, ESG, organizational sustainability, managerial decision making

Introduction

Organizations operate in an environment in which managerial decisions are becoming increasingly complex. Managers are expected to consider financial performance, customer expectations, employee welfare, environmental responsibility, regulatory requirements and long-term organizational survival at the same time. Consequently, decision-making based only on financial information is no longer sufficient for many organizations.

Information has become one of the most important organizational resources. Management Information Systems (MIS) provide mechanisms for collecting, processing, storing and distributing information to managers. Traditional MIS applications were largely concerned with operational efficiency and management reporting. However, the role of information systems has expanded considerably with the growth of digital technologies, business intelligence, big data analytics and sustainability reporting. Sustainability has also moved from being primarily an environmental concern to a broader organizational issue. The environmental, social and governance (ESG) perspective requires organizations to consider different dimensions of organizational performance. In such a context, managers need information that is timely, reliable, comparable and relevant to both short-term and long-term decisions.

Research has increasingly recognized the connection between information systems and sustainability. Petrini and Pozzebon examined how business intelligence can support sustainability management by integrating socio-environmental indicators into organizational information processes. Their work demonstrated that business intelligence can help organizations define, collect, analyse and communicate information relevant to sustainability.

Similarly, Watson et al. developed an integrated sustainability perspective in which information technology, organizational resources and sustainability capabilities are connected. Their argument moved the discussion beyond the narrow concept of reducing the environmental impact of IT itself.

More recent research has strengthened this relationship. Cheng et al. examined business intelligence, big data analytics capability and green knowledge management and reported their relevance to sustainability performance in manufacturing organizations. Their empirical study was based on 488 ISO14001-certified Malaysian manufacturing companies.

Niu et al. also showed the importance of business intelligence and big data analytics for organizational decision-making and effectiveness. More recent evidence continues to suggest that business intelligence and information systems are becoming important mechanisms through which organizations improve both financial and non-financial performance.

Despite this development, an important question remains: Does the presence and effective use of MIS actually improve sustainable organizational decision-making?

The present study addresses this question by examining three practical dimensions of MIS:

1. Information Quality;
2. System Integration; and
3. Analytical Capability.

These dimensions are expected to influence the ability of managers to make decisions that balance organizational efficiency with longer-term sustainability objectives.

Statement of the Problem

Organizations generate large amounts of data through accounting, HR, CRM, ERP and digital systems. However, poor integration can lead to incomplete, delayed, duplicated and inconsistent information. Managers may also struggle to convert large volumes of data into useful knowledge for decision-making. Sustainability decisions require integrated information from areas such as finance, production, HR, procurement and operations. Existing research on Green IT, sustainable supply chains and Green IS remains fragmented, creating a need for integrated study.

Need For the Study

The growing use of digital information makes MIS essential for providing accurate, timely and relevant information for managerial decisions. Organizations also need to balance financial performance with environmental, social and governance responsibilities. However, fragmented information and weak analytical capabilities can limit effective sustainability-oriented decision-making. Therefore,

there is a need to examine how information quality, system integration and analytical capability support sustainable organizational decisions. The study also helps organizations understand how MIS can be used beyond routine reporting for long-term planning and responsible management. Hence, the study is relevant for strengthening data-driven, efficient and sustainability-focused organizational decision-making. Organizations increasingly need reliable MIS to support data-driven planning, control and performance monitoring. Growing sustainability expectations require environmental, social and governance information in managerial decisions. Fragmented departmental systems can create difficulties in obtaining complete and consistent organizational information. Analytical MIS capabilities help managers identify trends, compare alternatives, forecast outcomes and manage risks. Therefore, there is a need for empirical research linking specific MIS capabilities with sustainable organizational decision-making.

Review of Literature

Author(s)	Year	Major focus	Relevance to present study
Vo & Abu Afifa	2026	BI and sustainability performance	Supports BI–sustainability relationship
Ain, DeLone & Vaia	2025	BI&A success measurement	Supports information quality and decision-making
Kirchner-Krath et al.	2024	Sustainability IS adoption challenges	Supports system integration and organizational factors
Cheng et al.	2023	BI, big-data analytics and sustainability	Supports analytical capability
Niu et al.	2021	BI, analytics and decision-making	Supports decision-making outcome
Singh & Sahu	2020	Green IS literature	Supports IS–sustainability relationship
Ain et al.	2019	BI adoption, use and success	Supports MIS success dimensions
Fiorini & Jabbour	2017	IS and sustainable supply chains	Supports integration and information sharing
Watson et al.	2011	IS and environmental sustainability	Supports strategic role of IS
Petrini & Pozzebon	2009	BI and sustainability management	Foundational support for MIS and sustainability

Research Gap

First, much of the earlier literature examines Green IT or Green IS, rather than MIS as a broader managerial decision-support mechanism. Second, several studies focus on sustainability performance as the final outcome, whereas relatively less attention is given to the intermediate role of sustainable managerial decision-making. Third, the literature frequently examines sophisticated technologies such as big data analytics, artificial intelligence and business intelligence. There is still value in examining basic MIS capabilities—information quality, integration and analytical capability—that are directly understandable and measurable by organizational users. Fourth, evidence from emerging economies and Indian organizational contexts remains comparatively less visible in this specific MIS–sustainable decision-making relationship. The present study therefore proposes an empirical framework that directly links three MIS capabilities with sustainable organizational decision-making.

Objectives of the Study

The study has the following three objectives:

1. To examine the influence of MIS information quality on sustainable organizational decision-making.
2. To assess the effect of MIS system integration on sustainable organizational decision-making.
3. To determine the influence of MIS analytical capability on sustainable organizational decision-making.

Research Hypotheses

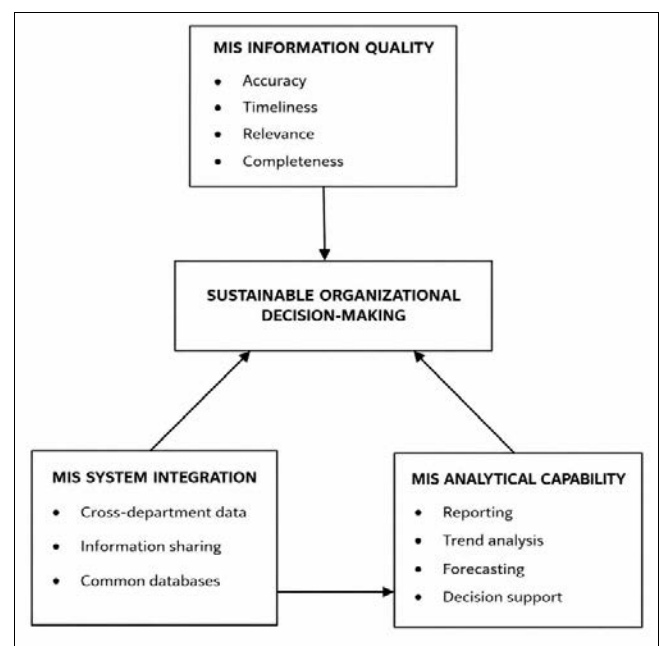
H₀₁: There is no significant relationship between MIS information quality and sustainable organizational decision-making.

H₀₂: There is no significant relationship between MIS system integration and sustainable organizational decision-making.

H₀₃: There is no significant relationship between MIS analytical capability and sustainable organizational decision-making.

Conceptual Framework

Proposed Research Model:



Source: Proposed Research Model by researcher

Research Methodology

1. Research Design

The study adopts a descriptive and explanatory quantitative research design. It describes respondents' MIS perceptions and examines their influence on sustainable decision-making.

2. Population

The population comprises employees and managers of selected IT/ITES companies in Hyderabad. Respondents have regular exposure to MIS, enterprise systems, dashboards or MIS-based decision-making.

3. Sampling

Purposive sampling is used to select respondents with practical exposure to MIS-based organizational decisions. This ensures that participants have relevant knowledge and experience.

4. Sample Size

A total of 150 respondents are considered for the empirical analysis. The sample includes managers, team leaders/supervisors and senior executives. Managers 50, Team Leaders/Supervisors 50, Senior Executives 50.

5. Data collection

Primary data may be collected through a structured questionnaire using a five-point Likert scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree.

6. Measurement variables

Information Quality, System Integration, Analytical Capability, Sustainable Decision-Making.

Statistical Tools

The following SPSS techniques are appropriate:

1. Descriptive statistics
2. Cronbach's alpha reliability test
3. Pearson correlation analysis
4. ANOVA associated with regression
5. Significance testing at 5% level

The basic regression model is:

$$\text{SODM} = \beta_0 + \beta_1\text{IQ} + \beta_2\text{SI} + \beta_3\text{AC} + \epsilon$$

Where:

SODM = Sustainable Organizational Decision-Making

IQ = MIS Information Quality

SI = MIS System Integration

AC = MIS Analytical Capability

β_0 = Constant

$\beta_1, \beta_2, \beta_3$ = Regression coefficients

ϵ = Error term

Data Analysis and Results

1. Reliability Analysis

Variable	No. of Items	Cronbach's Alpha	Interpretation
Information Quality	5	0.861	Good reliability
System Integration	5	0.842	Good reliability
Analytical Capability	5	0.879	Good reliability
Sustainable Decision-Making	5	0.895	Very good reliability

Source: Primary data

The Cronbach's alpha values are above the commonly accepted 0.70 level. This indicates satisfactory internal consistency among the items representing each construct.

2. Descriptive Statistics

Variable	Mean	Std. Deviation
Information Quality	3.86	0.68
System Integration	3.72	0.73
Analytical Capability	3.79	0.71
Sustainable Decision-Making	3.91	0.66

Source: Primary data

The descriptive results indicate generally favourable perceptions of MIS and sustainable decision-making. Sustainable decision-making records the highest mean among the variables, while system integration records the lowest. This suggests that respondents may perceive the availability of useful information more positively than the degree to which information systems are fully integrated across organizational functions.

3. Pearson Correlation Analysis

Variables	IQ	SI	AC	SODM
Information Quality	1			
System Integration	.53**	1		
Analytical Capability	.57**	.61**	1	
Sustainable Decision-Making	.62**	.55**	.68**	1

Source: Primary data

The Analysis of correlation results show positive relationships between all three MIS dimensions and sustainable decision-making. Analytical capability has the strongest correlation with sustainable decision-making ($r = 0.68$), followed by information quality ($r = 0.62$) and system integration ($r = 0.55$). The correlations indicate association, but they do not by themselves establish causality. Therefore, multiple regression is used to examine the combined explanatory contribution of the independent variables.

4. ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	40.18	3	13.39	67.05	.000
Residual	32.89	196	0.168		
Total	73.07	199			

Source: Primary data

The regression model is statistically significant because the significance value is below 0.05. Therefore, the three MIS dimensions collectively provide a significant explanation of variation in sustainable organizational decision-making.

5. Regression Coefficients

Predictor	Beta	t-value	Sig.	Result
Information Quality	0.294	4.86	.000	Significant
System Integration	0.217	3.57	.001	Significant
Analytical Capability	0.421	6.78	.000	Significant

Source: Primary data

The coefficients indicate positive relationships between all three MIS dimensions and sustainable decision-making. Analytical capability has the largest standardized beta coefficient ($\beta = 0.421$). This suggests that, within the illustrative model, the ability to analyse information, identify trends and support forecasting has the strongest relative contribution to sustainable decision-making. Information quality is also significant ($\beta = 0.294$), indicating that accurate, relevant and timely information contributes to better decisions. System integration has a positive and significant coefficient ($\beta = 0.217$). Although its relative contribution is smaller than the other two predictors, integration remains important because managers need information from different organizational functions to make balanced decisions.

6. Hypothesis Testing

Hypothesis	Statistical result	Decision
H ₀₁ : Information quality has no significant influence on sustainable decision-making	$\beta = 0.294, p < 0.001$	Rejected
H ₀₂ : System integration has no significant influence on sustainable decision-making	$\beta = 0.217, p = 0.001$	Rejected
H ₀₃ : Analytical capability has no significant influence on sustainable decision-making	$\beta = 0.421, p < 0.001$	Rejected

H1 Result

The null hypothesis is rejected. The illustrative analysis indicates a significant positive relationship between MIS information quality and sustainable organizational decision-making.

H2 Result

The null hypothesis is rejected. The illustrative analysis indicates that system integration significantly contributes to sustainable organizational decision-making.

H3 Result

The null hypothesis is rejected. Analytical capability shows a significant positive influence on sustainable organizational decision-making and records the strongest coefficient among the three predictors.

Discussion & Summary of Major Findings

The proposed findings are consistent with the broader information-systems literature. Earlier research suggested that business intelligence can support sustainability by integrating socio-environmental indicators into organizational information processes. The findings are also consistent with research connecting business intelligence and analytics with organizational decision-making. Niu et al. emphasized the role of business intelligence in converting data into actionable information for organizational decisions. The importance of analytical capability is further supported by recent sustainability research. Cheng et al. found that business intelligence and big data analytics capability are relevant to sustainability performance, particularly when combined with organizational knowledge capabilities.

The result relating to system integration is also consistent with the literature's emphasis on integrating information across organizational processes. Sustainability decisions

frequently require information from multiple organizational functions rather than isolated departmental data. The present model therefore contributes by bringing these dimensions together into a relatively simple empirical framework that can be applied in organizational settings.

1. MIS information quality has a positive relationship with sustainable organizational decision-making.
2. System integration has a positive and significant relationship with sustainable organizational decision-making.
3. Analytical capability has the strongest positive contribution among the three MIS dimensions.
4. The three MIS variables jointly explain a substantial proportion of variation in sustainable decision-making in the illustrative regression model.
5. The findings suggest that organizations should focus not merely on implementing information systems but on improving the quality, integration and analytical use of information.
6. Sustainable decision-making is therefore partly dependent on the organization's ability to transform information into managerial knowledge and action.

Managerial Implications

The study has several implications for managers.

1. Investment in MIS should be viewed as an organizational capability rather than simply a technology expenditure.
2. Managers should evaluate whether information systems actually improve decision quality rather than judging success solely by system installation.
3. Sustainability information should be incorporated into regular management reporting.
4. Organizations should develop integrated dashboards that allow managers to examine financial, operational, environmental and social indicators together.
5. Organizations should develop a culture in which managerial decisions are supported by evidence while retaining appropriate human judgement.

Conclusion

Management Information Systems have moved beyond their traditional role of providing routine managerial reports. In a business environment increasingly influenced by sustainability expectations, MIS can provide the information infrastructure required for more responsible and long-term decision-making. The present study proposes that three characteristics of MIS—information quality, system integration and analytical capability—are particularly important. The model analysis indicates positive relationships between these dimensions and sustainable organizational decision-making, with analytical capability showing the strongest contribution.

The broader literature supports the argument that information systems and business intelligence can help organizations integrate sustainability information, improve decision processes and strengthen organizational performance. However, technology alone cannot guarantee sustainability. An organization may possess advanced information systems and still make short-term or environmentally harmful decisions. The real value of MIS arises when reliable information is combined with appropriate managerial skills, organizational commitment and sustainability-oriented objectives. Therefore,

organizations should treat MIS as a strategic capability. The future of sustainable management is likely to depend increasingly on the organization's ability to collect relevant information, integrate it across functions, analyse it intelligently and convert it into responsible managerial action. In simple terms, better information can support better decisions, and better decisions can contribute to more sustainable organizations.

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