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Mitigating Managerial Behavioral Biases Through Smart Technologies: Implications for Organizational Sustainability and Green Growth

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ABSTRACT

The inability of the organization to achieve its sustainability and green growth objectives is attributed to the fact that managers make decisions based on behavioral biases. The process is caused by the biases that contain overconfidence, anchoring and herd behavior, and loss aversion, leading to resource allocation problems and sustainable innovation challenges and short-term orientation problems. Smart technologies that comprise artificial intelligence (AI) and big data analytics and digital decision-support systems offer organizations with a new approach to improve the decision-making process by offering more rationality and transparency. The research question is examined in terms of the way smart technologies operate to decrease managerial behavioral biases that subsequently lead to the benefits of organizational sustainability and green growth. The research team gathered survey data of managers in manufacturing and service industries in an emerging economy in order to test their connections using the structural equation modeling (SEM). With smart technologies, organizations can reduce the amount of managerial behavioral biases that will lead to better organizational sustainability and green growth. The research paper adds to the literature on administrative sciences and behavioral management by combining both behavioral bias theory and the use of smart technologies that provide practical recommendations to managers and policymakers.

Keywords: Behavioral biases, Smart technologies, Managerial decision-making, Organizational sustainability, and green growth.

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Introduction

The contemporary organizations are operating within a framework that incorporates both environmental limitations, legal specifications and increasing stakeholder expectations of sustainable development alongside the environmentally friendly economic development. Sustainable development process requires technological innovation as the driving force but leaders of the organization in their decision making introduce primary hindrances that lead to failure in implementing the technology. The behavioral decision-making theory describes the decisions made by managers due to their rational thinking, but the biases caused by the mental state and emotional state lead to ineffective sustainability decision-making.

Overconfidence, anchoring, herd behavior and loss aversion are some of the behavioral biases that cause managers to underestimate risks that may affect the environment and spend excessive sums on old means and managers reject new environmentally friendly technologies (Kahneman and Tversky, 1979; Barberis and Thaler, 2003). The current biases generate strategic analysis mistakes that impinge sustainability pertinent investments since the investments require evaluations of future states, and you will incur inexhaustible costs that will not be recuperated (Bansal and Hoffman, 2012). Organizations have decided to concentrate on the short-term financial outcomes rather than

develop environmental and social value over the whole period of operation.

Managerial behavioral biases are a challenge that emerging economies are grappling with since their institutional systems focusing on sustainability and rules of enforcement and stakeholder activism are yet to be developed (Khanna and Palepu, 2010). These environments have biased management decisions that cause delays on the organizations adoption of green technologies and sustainable business models that restricts their ability to facilitate sustainable development and green economic growth.

The integration of intelligent technologies that embraces artificial intelligence (AI) and big data analytics and the Internet of Things (IoT) and algorithmic decision-making systems will provide new professional jobs in various industries.

The amalgamation of artificial intelligence (AI) and big data analytics and Internet of things (IoT) systems and algorithmic decision-support systems works as an effective solution that organizations employ to enhance their operational efficiency and establish trust by its stakeholders and enhance their strategic planning capabilities. The study demonstrates that these technologies that are present in the analyzed setting could generate more successful decision-making outcomes since they eradicate information gaps and make correct predictions and reduce the necessity of individuals to rely on their intuitional decision-making skills as stated by Davenport and Harris 2007 and Brynjolfsson

and McAfee 2017. Smart technologies allow organizations to decrease biases in decision-making since they develop systematic decision-making processes that incorporate instant judgment and evidence-driven judgment.

Digital and smart technologies play a crucial role in the sphere of sustainability since they can help organizations to evaluate their performance in the environmental arena, optimize their use of resources, and make greener decisions based on the findings of Bai et al. 2020 and Gupta et al. 2021. The way in which smart technologies influence the outcomes of sustainability has yet to be researched despite the growing interest in digital transformation and sustainability studies. There is little research on the topic, yet people have discussed how smart technologies can assist organizations to reduce biases in their managerial behavior, resulting in the improvement of organizational sustainability and environmental development.

The knowledge gap that is currently present will be resolved by way of conducting this research study that will integrate the information provided by the behavioral decision theory with the technologies-enabled governance and sustainability management to explore the influence of smart technologies on the managerial business decision-making process and their consequences on the sustainability outcomes. The research study shows the attainment of sustainability objectives in organizations since it indicates that mitigation of

managerial bias is the primary factor that interprets environmental sustainability research findings.

The present study aims to address the gaps in the literature by applying the behavioral decision theory and technology-enabled governance along with the sustainability management solutions to examine the impact of smart technologies on the interactions between managerial behavioral biases and sustainability outcomes. Managerial bias mitigation is used to explain the sustainability research study that is beyond the prevailing technological and institutional sustainability frameworks. The study examines the ways in which smart technologies can assist the organizations to minimize managerial behavioral biases and the impact of that minimization on its environmentally sustainable operations and green growth. The research questions the study will answer are as follows:

1. Are smart technologies able to minimize the biases in managerial behavior in the organizational decision making?
2. What is the relationship between managerial behavioral biases and organizational sustainability and green growth?
3. How can smart technologies be used to increase the sustainability results due to bias reduction?

The study answers these questions to come up with both theories and application that can be applied to show the effects of smart technologies on sustainable decision-making at the organizational level.

2. Literature Review and Hypotheses Development

2.1 Biases in the way managers behave

Simon (1955) provided the grounds to behavioral decision-making with the concept of bounded rationality that refutes the notion of economic agents being fully rational. According to this view, Kahneman and Tversky (1979) developed the prospect theory that showed that decision-makers are systematically inefficient in following their rationality by cognitive biases, especially in risk and uncertainty situations. Their work has made loss aversion, anchoring and framing effect a long-term aspect of human judgment.

In the 1990s, the concept of behavioral insights started being utilized more in a managerial and organizational context. March and Shapira (1992) demonstrated that executives are usually mistaken about risk overconfidence and selective attention that make them make optimal strategic decisions. Empirically, Busenitz and Barney (1997) showed that managers have been using heuristics and biases in appraising opportunities particularly in unfamiliar and complicated situations.

The explicit connection between strategic and investment decisions and managerial biases started to be studied in the early 2000s. According to Malmendier and Tate (2005) overconfident CEOs tend to overinvest and make value-destroying mergers. On the same note, Barberis and Thaler (2003) pointed out that herd

behavior and anchoring play an important role in the managerial financial and strategic decisions. These results imply that prejudicial managerial cognition may pervert long term planning and resource distribution.

More current research has emphasized how behavioral biases may be applied to the issue of sustainability and innovation choices. Bansal and Hoffman (2012) have argued that cognitive frames determine the perception of environmental problems by managers and they tend to oppose any attempts towards sustainability efforts. Schneider et al. (2017) also demonstrated that firms perceive loss aversion such that they are not willing to implement green innovations because they perceive costs in the short term but benefits in the long term both environmental and economic. On the whole, the literature suggests that the managerial behavioural biases are an important obstacle to organizational sustainability and green development.

2.2 Debiasing Technologies under Smartness

The value of technology in enhancing decision-making in management has been talked of since the advent of the decision-support systems. Sprague and Carlson (1982) emphasized the role of computerized systems in improving managerial effectiveness through organisation of information and lightening cognitive load. On the same note, Davenport (1998) asserted that decision-making processes founded on analytics enhances uniformity and objectivity in organizational processes.

As big data and analytics continued to grow in ease, researchers began to understand technology as a tool to cut bias. Davenport and Harris (2007) revealed that data-driven organizations are more successful than intuition-driven firms because they act on evidence instead of depending on the judgment of the managers. Their work was a move towards considering analytics as a strategic resource that has the potential to reduce the impact of heuristic-based decisions.

Artificial intelligence and machine learning contributed to the enhancement of this argument. Brynjolfsson and McAfee (2017) have posited that the use of AI-based systems can help to more accurately make decisions because they can see patterns that cannot be perceived by humans due to cognitive constraints. Kahneman et al. (2021) specifically suggested the idea of algorithmic decision-making as a tool to reduce bias because algorithm can be safer than a human in terms of noise and bias reduction in a well-designed algorithm.

Smart technologies (IoT and real-time analytics) can be used in the context of sustainability to monitor the environmental performance and resources use as the monitoring process may be continued. Bai et al. (2020) discovered how digital technologies enhance environmental transparency and accountability, thus helping in making sustainable operation choices. Gupta et al. (2021) also proved that AI-based analytics are used to enable green innovation as it offers objective measurements of risks and returns related to sustainability. Administrative sciences

view will consider such technologies as enhancing the administration systems and the information asymmetry, which will ultimately limit the biased managerial actions.

2.3 Green Growth and Organizational Sustainability

Organizational sustainability was conceived when Elkington (1997) introduced the triple bottom line model which focused on the incorporation of social, environmental, and economic goals. The initial research was narrowed down to studying corporate environmental responsibility as an activity based on compliance. Porter and van der Linde (1995) however objected this by asserting that environmental sustainability is able to improve competitiveness by improving innovation and efficiency.

During the 2000s, sustainability studies more or less associated managerial strategy with environmental performance. Hart and Milstein (2003) also suggested that strategic leadership and long term managerial orientation are essential to creation of sustainable values. Shrivastava (2010) added that the commitment of the managers and the framing of cognition is essential to integrating sustainability into organizational strategy.

The concept of green growth also continued to develop in the 2010s both in policy and in the literature. Green growth was described by OECD (2011) as one that promotes economic growth and at the same time environmental

sustainability. Empirical evidence by De Marchi (2012) and Fernando et al. (2018) revealed that companies utilizing green technologies have a high environmental and financial performance, which is assigned by the managerial decision-making in favor of such changes.

The most recent studies point to the facilitating nature of digital and smart technology in attaining sustainability and green growth. George et al. (2014) and Bocken et al. (2019) stated that the technological innovation in the context of sustainable business models improves the resilience of organizations in the long term. Nevertheless, researchers like Zollo et al. (2018) warn that technological potential cannot be effective unless the problem of managerial biases and cognitive constraints is also restored. The latter is a reminder of the significance of studying smart technologies as not only means of operations, but also means of enhancing managerial cognition and decision-making that is sustainability-oriented.

2.4 Hypotheses Development

According to the literature, the hypotheses are as follows:

H1: There are negative effects of managerial behavioral bias on organizational sustainability and green growth.

H 2: The adoption of smart technologies has a negative effect on managerial behavioral biases.

H3: Use of smart technology has a positive impact on organizational sustainability and green growth.

H4: Managerial behavioral biases mediate the relationship between smart technology adoption and organizational sustainability and green growth.

Research Methodology

3.1 Research Design

The research design used is quantitative explanatory research based on the behavioral decision theory and administrative sciences. The type of model that will be used is Partial Least Squares-Structural Equation Modeling (PLS-SEM) which is specifically applied to predictive research studies, complex models and studies, which involve behavioral constructs and use of technology adoption.

3.2 Sample and Data Collection

The main data was gathered among managerial staff of organizations involved in manufacturing and service sectors in the environment of an emerging economy. The purposive sampling methodology was applied so that the respondents were well-exposed to strategic decision making and smart technologies. Of the 350 questionnaires distributed, 287 valid responses were received and this is equivalent to 82 percent response rate. The respondents covered middle and senior level managers in sustainability, technology and administrative decision processes.

3.3 Measurement of Constructs

Measurement of all constructs was undertaken with the existing scales based on the previous literature that were adjusted and redesigned to fit the organizational sustainability environment.

Smart Technology Adoption (STA): This measure is measured on the basis of the items connected with the use of AI-based analytics, digital dashboards, predictive and real-time data platform.

Managerial Behavioral Biases (MBB): Measured as an overconfidence higher order construct that reflects overconfidence, anchoring bias, herd behavior and loss aversion.

Organizational Sustainability and Green Growth (OSGG): Indicated with the help of the indicators of the environmental performance, green innovation, efficient use of resources and long-term economic results.

Everything was rated on the five-point Likert scale, where 1 (strongly disagree) to 5 (strongly agree).

3.4 Method of Data Analysis: PLS-SEM

SmartPLS 4 was used in data analysis. The selection of PLS-SEM was based on its strength in the ability to manage non-normal data, mediation analysis, and ability of higher-order constructs. The analysis was based on two steps:

Measurement Model Assessment: The assessment was done based on factor loadings, Cronbachs alpha, composite reliability (CR), average variance extracted (AVE) and heterotrait-monotrait ratio (HTMT).

Structural Model Assessment: The hypotheses were tested using path coefficients, coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and variance inflation factor (VIF) and bootstrapping (5000 subsamples).

4. Results

The evaluation of the measurement model will be conducted in parts 4.1 to 4.3, which will be discussed later in this paper.

4.1 Measurement Model Assessment

All indicator loadings exceeded the recommended threshold of 0.70. Cronbach's alpha and composite reliability values ranged between 0.78 and 0.91, confirming internal consistency reliability. All constructs had AVE values of more than 0.50, which was a high degree of convergent validity. The HTMT criterion was selected to validate discriminant validity, and all the values were below the threshold of 0.85.

4.2 Structural Model Assessment

The diagnostics of collinearity showed that there were no problems with multicollinearity since VIF did not exceed 3.3. The results of the structural model indicate that the managerial behavioral biases have a strong negative impact on the environment of the organization and green growth ($\beta = -0.36$, $p < 0.001$), supporting H1. Smart technology adoption significantly reduces managerial behavioral biases ($\beta = -0.52$, $p < 0.001$), supporting H2. Additionally, smart technology adoption positively influences

organizational sustainability and green growth ($\beta = 0.47, p < 0.001$), supporting H3.

The model demonstrates significant levels of variance of the organizational sustainability and green growth ($R^2 = 0.58$), indicating strong explanatory power.

4.3 Mediation Analysis

The results of bootstrapping prove the hypothesis that managerial behavioral biases to some extent mediate the relationship between smart technology adoption with the organizational sustainability and green growth. The indirect effect is significant ($\beta = 0.19, p < 0.01$), supporting H4.

5. Discussion

The empirical findings support the claim that smart technologies are effective debiasing mechanisms in the managerial decision-making process, which positively impacts managerial sustainability and green development. The effect of managerial behavioral biases on the sustainability outcomes is negative and this fact shows the significance of combating the cognitive constraints in the administrative procedures. Being smart technologies, the technologies minimize the use of heuristics, allowing transparent and objective decision environments to be created using data.

Conceptual Framework (Figure 1)

Smart Technology Adoption



(-) Managerial Behavioral Biases



Organizational Sustainability & Green Growth

In Figure 1, the study conceptual framework illustrates the direct impact of the smart technology adoption on the sustainability and green growth in organizations as well as the indirect impact of the smart technology adoption on the mitigation of biases in the managerial behavioral pattern. The framework ranks the behavioral biases in the form of the mediating mechanism, consequently combining the behavioral decision theory with smart technology-driven sustainability.

This paradigm promotes the literature of administrative sciences by showing how both technological and behavioral aspects influence sustainable organizational performance.

The results indicate that intelligent technologies can have a dual impact on the sustainability of the organization: on the one hand, it is a direct contribution to the sustainability performance, and on the other hand, indirectly, it is a way to eliminate the negative impact of the managerial

behavioral bias. The paper is a continuation of the behavioral decision theory that empirically proves the use of smart technologies as an effective debiasing process in organizations.

Data-driven decision-support systems can help minimize intuitive biases that prevent sustainable investment and innovation (with the help of a managerial approach). On the managerial level, the smart technologies must be integrated in the organizational structure of governance and performance review to institutionalize rational and sustainable decision-making.

Figure 2. SDG Alignment Framework



SDG Mapping and Policy Relevance

This research is close to the United Nations Sustainable Development Goals (SDGs) showing how the application of smart technologies may reduce any managerial bias of behavior and contribute to sustainable and green organizational performance. The conceptual mapping of SDG linkages is below and can be displayed in the form of a table or schematic figure.

Mapping of Study Constructs with SDGs

SDG	SDG Focus	Linkage with Study Variables
SDG 9	Industry, Innovation, and Infrastructure	Adoption of smart technologies (AI, analytics, digital platforms) enhances decision quality and innovation-driven infrastructure, reducing bias-driven inefficiencies.
SDG 12	Responsible Consumption and Production	Bias-aware managerial decisions improve resource allocation, waste reduction, and sustainable operational practices.
SDG 13	Climate Action	Technology-enabled unbiased decisions support proactive environmental strategies and green growth initiatives.
SDG 8	Decent Work and Economic Growth	Reduction of overconfidence and herding biases leads to stable growth, productivity, and long-term organizational resilience.
SDG 16	Peace, Justice, and	Transparent, data-driven managerial

SDG	SDG Focus	Linkage with Study Variables
	Strong Institutions	decisions strengthen governance and institutional accountability.

Conceptual SDG Integration

Smart technologies serve as a mediating process that counters the negative consequences of managerial behavioral biases (including overconfidence, anchoring and herd behavior), which in turn facilitates sustainable performance and sustainable growth in a responsible manner to the environment. This directly anchors the SDG framework since it will be a combination of digital innovation and sustainability-oriented managerial governance.

6. Implications

6.1 Theoretical Implications

The study has added value to the literature of the administrative sciences in that it has combined the behavioral bias theory with smart technology adoption and sustainability research. It offers empirical data on the mediating position of behavioral prejudices in technology-sustainability relational connections.

6.2 Practical Implications

Smart technologies should be embraced by managers as measures to enhance the efficiency of operation and decision quality. Training programs must be aimed at integration of technological skills and behaviour awareness.

6.3 Policy Implications

It is possible to facilitate green growth through digital transformation initiatives that facilitate evidence-based managerial decision-making and minimize behavioral inefficiencies, which can be encouraged by policymakers.

7. Conclusion

The present study has shown that smart technologies are crucial to improving the sustainability and green growth of organizations as they reduce the managerial behavioral biases. The results prove that overconfidence, anchoring, herd behavior and loss aversion are biases that adversely affect sustainability-based decisions, but the adoption of AI-based analytics and digital decision-support systems considerably minimizes such distortions and positively affect long-term environmental and economic results. The findings point to the fact that the digital transformation not only adds value to operational efficacy but also reorganizes the managerial cognition by making it more evidence-based and transparent in decision-making. The paper combines the behavioral decision theory with technology adoption and sustainability research, which gives the study a

refined explanation of how technological capabilities are converted into sustainable performance. In general, companies that integrate the use of smart technologies into the governance and strategic processes are in a better position to attain resilience, innovation-based, and responsible growth.

8. Limitation and Future Research

This study is limited in a number of ways despite its contributions. The cross-sectional nature limits the causal interpretation and the use of self-reported managerial data can be prone to perceptual bias. The wide sectoral approach also restricts a more industry-specific perspective and the synthesis of behavioral biases into a higher-order measure fails to reflect the complicated impact of single-cognitive amplifications. The longitudinal designs, the experimental research, and the objective sustainability measures are to be used in future studies in order to enhance the causal validity. Further contextual effects could be explained by comparative cross-country research and industry-specific analysis, whereas the ethical and governance issues in relation to algorithmic decision systems may be investigated in the future as well. The further development of this line of research will help to better comprehend the way in which technology-enabled debiasing can provide a systematic contribution to sustainable and green organizational change.

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