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Article

The Role of Levers of Control on Sustainable Performance with Risk Management Implementation as a Mediating Variable: An Empirical Study on Public Service Agency Universities

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Abstract: This study analyzes the effect of Levers of Control on sustainable performance and the mediating function of risk management implementation in public service agency universities. The study adopted a quantitative approach using explanatory survey design. The sample was determined by purposive sampling and resulted in 202 valid responses. Data were obtained by a questionnaire with a 5-point Likert scale and were analyzed through Partial Least Squares–Structural Equation Modeling (PLS-SEM) using SmartPLS 4. The results reveal that Levers of Control have a favorable and significant effect on sustainable performance ($\beta = 0.635$, $p < 0.001$) and on the application of risk management ($\beta = 0.818$, $p < 0.001$***). Implementing risk management has a beneficial influence on sustainable performance ($\beta = 0.275$, $p < 0.001$***). The indirect effect of Levers of Control on sustainable performance through risk management adoption is considerable ($\beta = 0.225$, $p < 0.001$***) demonstrating complementary partial mediation. The results demonstrate that the simultaneous employment of belief systems, boundary systems, diagnostic control systems and interactive control systems can improve economic, social and environmental performance, both directly and through improved risk management implementation.
Keywords: Levers of Control; risk management; sustainable performance; Public Service Agency college

1. Introduction

Universities are challenged not merely to produce high-quality graduates, undertake research and give community service, but also to demonstrate sustainable success. Sustainable performance highlights the organization's ability to meet long-term objectives through a balance among economic, social and environmental factors. Sustainability in a university cannot be achieved by simply embedding it in vision and purpose statements or institutional reports, but rather needs to be integrated into strategy, decision-making, resource management and organizational control mechanisms. According to Gond et al. (2012), the integration of sustainability into strategy necessitates linking sustainability control systems with the fundamental management control systems of a business.

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In the case of the two systems being separate, sustainability practices run the risk of becoming symbolic without actually impacting decision-making processes.

The standards are much more complex for public universities with the Public Service Agency financial management structure. The Public Service Agency status gives you more flexibility to manage cash, resources and services. This flexibility nevertheless comes with higher expectations of openness, responsibility, efficiency, compliance and performance target attainment. Public Service Agency universities need to manage resources efficiently and ethically to be able to fulfill both their academic mission and public service responsibility.

But changes in status and more managerial flexibility also introduce different types of uncertainty and risk. These risks can relate to budget management, quality of education, research, human resources, information technology, regulatory compliance, procurement, institutional reputation, data security, and social and environmental implications. Therefore, the performance of Public Service Agency universities is determined by not only the quantity of resources they have but also their capacity to govern activities, manage uncertainty and respond to hazards systematically. Management control systems are an important tool by which firms may align member behaviour, strategy and performance goals. These systems are not simply for monitoring. They also give information for planning, evaluation, decision-making, organizational learning, and strategic modification. Levers of Control established by Simons (1995) is one of the most extensively used management control frameworks.

The Levers of Control framework includes four complementary control mechanisms: belief systems, boundary systems, diagnostic control systems and interactive control systems. Belief systems are about communicating the essential values, purposes and strategic direction of the firm. Boundary systems establish what is and what is not acceptable in terms of behaviours and activities. Diagnostic control systems are used to monitor performance attainment, evaluate actual outcomes against standards, and fix any differences. Interactive control systems permit managerial involvement, two-way communication, learning and discussion of strategic uncertainty.

The power of the Levers of Control does not reside in the employment of any one system in isolation but in the balanced use of all four. Positive impetus is given in the form of inspiration, involvement, opportunity seeking and learning in belief systems and interactive control systems. Boundary systems and diagnostic control systems, in contrast, provide limitations, discipline, compliance and assurance of achievement of targets. The dynamic tension between empowerment and control produces a balance that allows organisations to be efficient and respond to environmental change (Mundy, 2010).

Widener (2007) demonstrates that the four control systems are interrelated and mutually reinforcing. Strategic risk and uncertainty lead to the adoption of belief, boundary, diagnostic and interactive systems by organizations which affect organizational learning, managerial attention and performance. While the implementation of control systems demands resources and managerial attention, their overall benefits positively influence organizational performance. Similarly, Henri (2006) argues that the interactive use of control systems promotes organizational learning, creativity, entrepreneurship and strategic orientation, while the diagnostic use of control systems ensures that the activities of the organization are consistent with established objectives. The wise usage of both systems can produce a dynamic tension that helps increase capability and improve performance.

Although the Levers of Control concept is often applied, previous empirical results are mixed. Tessier and Otley (2012) contend that conceptual ambiguity and variations in the definition and operationalization of each control system may result in diverse empirical findings. Hence research on Levers of Control should examine the four systems as components of an integrated control configuration and should illuminate the organizational mechanisms linking control systems and performance. A meta-analysis by Bellora-Bienengräber et al. (2023) on 58 independent samples and 10,374 observations supports the idea that the four Levers of Control are employed more often together than separately. Their results suggest that organizational capacities somewhat mediate the association between Levers of Control and performance. This implies that standardized control systems do not necessarily improve performance directly, but may work through mediating mechanisms that transform control into the organization's capacity to respond to challenges and achieve its objectives.

There has also been rising focus to the relationship between management control systems and sustainability performance. Budiwati et al. (2025) find that four Levers of Control positively impact sustainability performance in the Indonesian batik sector. Control systems assist firms transform sustainability goals into values, boundaries of behaviour, performance measurements, and managerial discussion processes. The batik business is not the same as higher education; yet, the findings imply that the Levers of Control can be utilized as a mechanism to guide economic, social and environmental performance. The use of control systems in the academic setting is faced with different characteristics than in business enterprises. Universities are professional organizations that value academic independence, autonomy, a collegial culture, and decision-making that is somewhat decentralized. Therefore, the control mechanisms that are effective in the commercial sector cannot be immediately imported into higher education.

Heinicke and Guenther (2020) conclude that the deployment of control systems and their effects on teaching and research performance can be perceived differently by administrative and academic actors. Diagnostic and interactive controls might have diverse outcomes based on actors' position, types of autonomy and institutional factors. The findings show the significance of developing control systems in a way that ensures responsibility without damaging the professional character of universities. Empirical research from Indonesian universities also shows that control systems relate to academic conduct and performance . Rosalina and Jusoh (2024) stated that boundary systems and interactive control systems can prevent unproductive work behavior and indirectly improve academic achievement. Boundary systems make clear the standards of ethics and undesirable behaviours, but interactive systems foster communication, involvement, autonomy and academic engagement. These results imply that the effect of control systems on performance could be mediated by some behavioural and organizational processes.

An organizational mechanism that could explain the relationship between Levers of Control and sustainable performance is the application of risk management. Risk management is an integrated process of detecting, analysing, evaluating, treating, monitoring and communicating risks that may affect the achievement of objectives. This is different from traditional risk management, which is usually carried out independently within each unit. Integrated risk management links uncertainty management to strategy, decision-making, accountability and organizational performance. Gordon et al. (2009) propose that enterprise risk management can boost organizational performance if the system is compatible with the organizational features and environmental conditions. Environmental uncertainty, competition intensity, size, organizational complexity and governance oversight affect the link between risk management and performance. Therefore, it is not enough to have risk management procedures; risk management must be adapted and linked with the control systems and decision-making processes of the company.

The work of Arena et al. (2010) demonstrates that the implementation of risk management is influenced by organizational actors, professional experience, technology and existing control mechanisms. In practice, risk management can be integrated in the fabric of strategic and operational processes but it can also become an administrative compliance job if it is not embedded in day-to-day decision-making. The quality of the execution of risk management depends on the extent of the system accepted, used and integrated into the activities of the company. The necessity for risk management is particularly acute in Public Service Agency universities. Sutoyo et al. (2024) indicate that risk management has been practically adopted at one Public Service Agency university, but not yet thoroughly and consistently. Implementation does not include all units and all activities. The study advises the creation of a defined risk management structure and the implementation of activities that incorporate context setting, risk identification, analysis, evaluation, treatment, monitoring, communication and consultation.

The Levers of Control can increase the application of risk management in theory through complementing methods. Belief systems influence risk aware values and culture. Boundary systems specify the acceptable level of risk, the scope of authority, and the activities that are not allowed. Diagnostic control systems are used to track risk indicators, target attainment and mitigation efficacy. Interactive control systems promote discussion on new risks, changes in regulation, technical developments and strategic uncertainty. Then risk management implementation can contribute to promote sustainable performance by protecting resources, preventing service disruption, boosting the quality of decisions, protecting reputation and protecting stakeholder interest. In terms of economics, risk management helps to avoid losses, inefficiencies and bad budget management. On the social side it protects students, staff and

society from quality failures, safety issues, data breaches and integrity challenges. The environmental dimension helps the management of energy use, waste management, infrastructural impacts and compliance with environmental duties,

Conceptual relationships exist between Levers of Control, risk management and performance but some research gaps still exist. First, most studies on Levers of Control focus on corporate organizations and mostly analyze financial, operational, innovation or individual performance results. Little research exists yet that links Levers of Control to sustainable success in universities. Second, the literature on control systems in higher education focuses mostly on research and teaching performance, academic conduct and organizational autonomy, and rarely on institutional performance in the economic, social and environmental dimensions. Thirdly, risk management research is frequently focused on risk management as an independent variable impacting performance. There are very few studies investigating the application of risk management as a mediating mechanism between control systems and sustainable performance. Fourth, descriptive and case study methodologies are still predominant in risk management research in Public Service Agency universities.

Therefore, empirical testing is necessary to understand the causal linkages between control systems, risk management adoption, and sustainable performance in Public Service Agency institutions. These deficiencies also become the motivation for the research recommended by Sriyono. The objective of this study is to analyze the effect of Levers of Control on sustainable performance and explore the mediating function of risk management adoption in Public Service Agency institutions. The levers of control are belief systems, boundary systems, diagnostic control systems and interactive control systems. Sustainable performance has economic, social and environmental elements.

This research makes three contributions. First, it adds to the Levers of Control literature by proposing that the application of risk management is a mechanism that connects control systems and sustainable performance. Secondly, it offers actual insights from Public Service Agency universities, that are hybrid organizations, with their management flexibility, public accountability, professional autonomy and sustainability pressures. Third, the results are supposed to provide recommendations to university leaders concerning the design of control systems and risk management practices that foster resource efficiency, quality of public service, social responsibility, responsibility for the environment, and institutional sustainability.

2. Literature review

2.1. Theoretical basis

The resource-based view and contingency theory are used in this study to explain the relationship between Levers of Control, risk management implementation and sustainable performance. The resource-based view suggests that an organization's ability to manage its resources and build internal skills is the source of superior and sustained success. Contingency theory, by contrast, stresses that the efficacy of control systems and risk management is contingent on their fit with the organization's features and environmental setting.

2.1.1. Resource Based View

The Resource-Based View (RBV) is one of the key perspectives in strategic management. It explains performance disparities between companies as a consequence of the variability of internal resources and capabilities that each company owns and manages. RBV is based on the internal conditions of an organization as the basis for value creation, competitive advantage and long-term performance, unlike alternatives that are based on industry structure and market position.

Historically, the philosophical roots of RBV may be linked to Edith T. Penrose's book The Theory of the Growth of the Firm, originally published in 1959. Penrose viewed the corporation not simply as an administrative unit but as a bundle of productive resources. He argues that the economic worth of resources is contingent on the knowledge, experience and managerial ability that are brought to bear to deploy the resources. Same resources, different benefits. Thus, organizational growth does not depend only on resources owned but also on managerial competence of providing productive services from the resources.

The term resource based perspective of the firm was specifically proposed by Birger Wernerfelt in 1984 in his article 'A resource based view of the firm', however the fundamental ideas were established by Penrose. Wernerfelt (1984) suggested that companies should be studied not just in terms of products and market positions, but also in terms of the resources they manage. This view gave rise to the concept of resource position barriers: those resource-based barriers that can protect a firm's position against competitors. Consequently, Wernerfelt is often cited as the academic that formally introduced the RBV designation while Penrose laid the intellectual foundation.

2.1.2. Contingency Theory

The contingency hypothesis holds that there is no unique control system that is good for all organizations. The success of a system depends on the fit between the system and the environment, structure, strategy, size, complexity and the level of uncertainty faced by the organization. Gordon et al. (2009) find that the adoption of enterprise risk management does not inevitably boost performance. The influence of risk management on performance depends on the alignment of the risk management system and environmental unpredictability, competitive intensity, organizational size, complexity and governance systems. This means that risk management has to be created in line with company peculiarities and not as a general approach.

Public Service Agency universities operate in a difficult climate where they have to reconcile financial management flexibility with public accountability, government laws, accrediting standards, academic autonomy, technological changes and stakeholder expectations. The conditions prescribe that the control and risk management systems are adjusted to the nature of universities as public, professional and knowledge-based organizations. In this study the Levers of Control are seen as mechanisms that create organizational conditions for the implementation of risk management. In turn, the application of risk management becomes a tool that allows universities to deal with uncertainty and achieve sustainable economic, social and environmental performance.

2.1.3. Levers Of Control

Simons (1995) presented the Levers of Control paradigm as a way to explain how managers use formal control systems to implement strategy while responding to strategic risks and uncertainties. The framework consists of four components: belief systems, boundary systems, diagnostic control systems, and interactive control systems.

The strength of the Levers of Control resides in their complementary application, and these four components are not meant to be employed in isolation. Belief systems and interactive control systems offer positive impetus through values, engagement, learning and opportunity seeking. In contrast, boundary systems and diagnostic control systems provide limitations, discipline, compliance, and assurance of target achievement. Balanced use produces a conflict between freedom and restraint, empowerment and accountability, creativity and efficiency. Tessier and Otley (2012) observe that belief systems transmit essential values and organizational direction, and boundary systems establish acceptable realms of action. Diagnostic control systems are used for monitoring outcomes and correcting deviations from norms. Interactive control systems promote managerial involvement in dealing with strategic uncertainty and generating organizational learning.

2.1.4. Risk Management Implementation

Risk management is a systematic approach to the identification, analysis, evaluation, treatment, monitoring and communication of risks which may have an impact on the achievement of the organization's objectives. Risk management is not only an instrument for avoiding losses but also for companies to find opportunities, improve the quality of decisions and preserve the continuity of operations.

Public Service Agency colleges are particularly sensitive to risk management because the ability to exercise flexibility in the administration of finances and the organization creates greater obligations and higher degrees of risk. Risks may be in the area of financial management, academic activities, research, human resources, procurement, information technology, reputation, compliance, social issues and environmental repercussions. According to Sutoyo et al. (2024), there are three primary reasons why BLU universities need to implement risk management. First, there

is a need to meet regulatory requirements. Second, risk management can help the fulfillment of organizational goals. Third, there are new risks that arise due to changes in management status.

Having policy documents or risk registers does not mean that effective risk management has been implemented. It should have defined duties structure, systematic risk assessment methods, risk owners designation, treatment strategies, communication, monitoring and periodic review. Sutoyo et al. (2024) have shown that risk management at UPN "Veteran" Yogyakarta has been operationally adopted but not yet thoroughly and systematically. They suggest a system that encompasses the audit committee, university administration, the internal audit unit and the quality assurance unit and includes all organizational aspects, functions and procedures.

In this study, the implementation of risk management refers to the university's ability to: (1) establish the context and objectives of risk management; (2) identify risk; (3) analyse and evaluate risk; (4) determine treatment actions; (5) communicate risk; and (6) monitor and review control effectiveness. Risk management is treated as a mediating variable according to the COSO ERM and ISO 31000 standards. Thus the execution of the risk management is seen as a process which makes the organisational control systems tangible by expressing it in action to deal with uncertainty.

2.1.5. Sustainable Performance

Sustainable performance refers to an organization's ability to achieve its long-term objectives while maintaining a balance among economic, social, and environmental performance. This approach is aligned with the triple bottom line concept, which extends performance assessment beyond financial outcomes to the creation of economic, social, and environmental value. In this study, the sustainable performance of Public Service Agency universities comprises three key dimensions: economic performance, social performance, and environmental performance. This structure is consistent with the conceptual model formulated in the research proposal.

3. Hypothesis development

3.1. Relationship between Levers of Control and sustainable performance

The Levers of Control paradigm assists firms to translate strategic objectives into values, behavioural boundaries, performance measures and communication methods. The four levers, although they have different purposes, complement each other in promoting sustainable performance. Belief systems incorporate commitments to sustainability, public service, and social responsibility as basic principles of universities. Boundary systems are supposed to keep out activities against legal, ethical or environmental interests. The diagnostic control systems transform the sustainability goals into indicators that can be monitored, whilst the interactive control systems provide a platform to debate environmental change and the expectations of stakeholders.

According to Budiwati et al. (2025), the four Levers of Control help organizations to handle uncertainty and achieve sustainability goals and become more significant when the organizational environment is unpredictable and difficult to forecast. Their study also indicates that a model which includes belief systems, boundary systems, diagnostic control systems and interactive control systems has a good explanatory potential for differences in sustainability performance. The combined use of these four systems at Public Service Agency universities can assist institutions balance flexibility, accountability, innovation, compliance, and efficiency. Accordingly, the following hypothesis is proposed:

H1: The Levers of Control have a positive effect on the sustainable performance of Public Service Agency universities.

3.2. Relationship between Levers of Control and Implementation of Risk Management

Implementing risk management involves a culture of risk awareness, clear lines of authority, methods for monitoring and effective communication of uncertainty. The four Levers of Control set the conditions to create such processes. Beliefs systems develop knowledge that the management of risk is the duty of all the members of the organization. Boundary systems set the risk tolerance, limits of power and prohibited behaviours. Diagnostic control

systems help manage risk through indicators, reports and assessments of actions taken to reduce risk. Interactive control systems allow discussions about new risks and changes in organizational circumstances.

These linkages suggest that the Levers of Control do not simply monitor performance, but also affect the way in which businesses detect, assess and respond to risk. Furthermore, the research proposal highlights that the effectiveness of implementation of risk management could be affected by diagnostic and interactive systems. The integrated use of control systems will incorporate risk management into planning, budgeting, program implementation and decision making. Accordingly, the following hypothesis is proposed:

H2: The Levers of Control have a positive effect on risk management implementation in Public Service Agency universities.

3.3. Relationship between Risk Management Implementation on Sustainable Performance

The application of risk management assists businesses to minimize the likelihood and impact of occurrences that may impede the attainment of objectives. The risk management approach also offers the necessary knowledge to prioritize and allocate assets effectively. In the economic dimension, risk management can avoid losses, budget inefficiencies, operational disruptions, and procurement errors. In the social dimension, it helps protect students, staff and the wider community against hazards connected to educational quality, safety, integrity and data protection. In the environmental dimension, it facilitates the identification of impacts from energy usage, waste management, infrastructure and operational operations.

Sutoyo et al. (2024) state that the application of risk management can avert undesirable events and raise the knowledge of the leaders regarding risks in decision making, both strategically and operationally. The objectives of Public Service Agency universities are helped by the processes of risk identification, risk assessment, risk prioritization, risk treatment, and risk monitoring. Universities that adopt a holistic strategy to risk management are therefore expected to be better positioned to maintain economic, social and environmental success. Thus, the following hypothesis is proposed:

H3: Risk management implementation has a positive effect on the sustainable performance of Public Service Agency universities.

3.4. Mediating Risk Management Implementation

The Levers of Control can influence sustainable performance directly by alignment of organizational strategy, behaviour and activities. However, this influence might also be indirect through the adoption of risk management. Belief systems shape values and a risk-sensitive culture. Boundary systems define acceptable actions and risk tolerance. Diagnostic control systems provide information on goal achievement and risk exposure. Interactive control systems stimulate discussions on environmental change and strategic uncertainty.

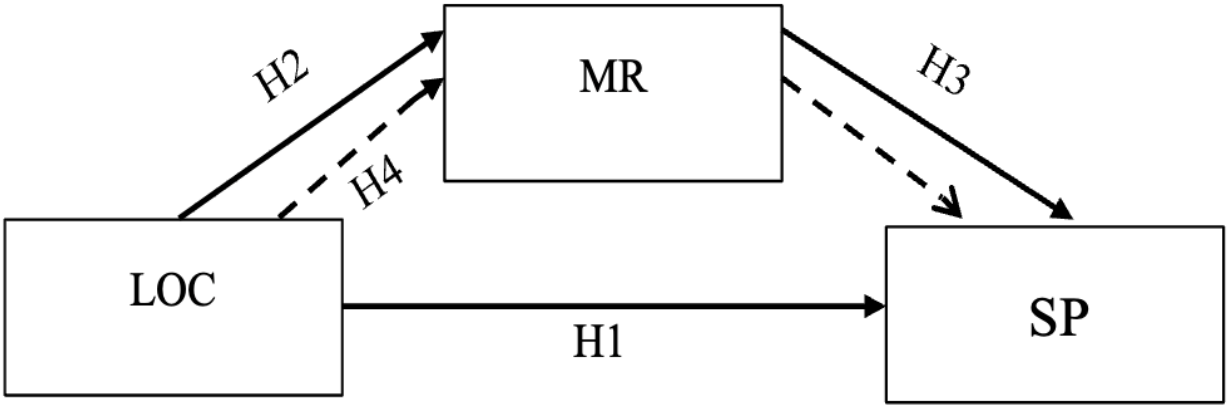
Together these systems provide conditions for the implementation of effective risk management. Risk management, in turn, assists institutions to safeguard resources, maintain service quality, protect reputation and meet their economic, social and environmental duties. This mediation approach is premised on the concept that control systems do not directly generate performance, but rather first change organizational processes and capabilities, which then increase performance. The research proposal clearly explains that the implementation of risk management is the mechanism through which Levers of Control impact sustainable performance. The originality of the model is to integrate the Levers of Control, risk management and sustainable performance in one empirical framework and to assess risk management as a mediating variable in Indonesian Public Service Agency universities. Accordingly, the following hypothesis is proposed:

H4: Risk management implementation mediates the positive effect of the Levers of Control on the sustainable performance of Public Service Agency universities.

3.5. Conceptual Framework

The research model is built on the theoretical foundation and hypothesis development and consists of three major features. The Levers of Control, the independent variable, are: belief systems, boundary systems, diagnostic control systems, and interactive control systems. The independent variable is the implementation of risk management and the mediating variable is the sustainable performance, which consists of economic, social and environmental performance.

Therefore, it can be said that the relationships in the research model are: Levers of Control have a direct effect on sustainable performance and an indirect effect through the adoption of risk management as a mediating variable.



4. Research methodology

4.1. Research Design

This research uses a quantitative approach using explanatory survey design. The quantitative technique is utilized to investigate the causal links between Levers of Control, implementation of risk management and sustainable performance in institutions with Public Service Agency status. An explanatory design is selected because the research model specifies direct and indirect impacts, and the study details the application of these three aspects.

The research data are collected in a cross-sectional fashion, i.e. at a single point of data collection. In this design, respondents' perceptions on control systems, implemention of risk management and sustainable performance are measured at about the same time. The research approach is congruent with the proposal's aims, which are to investigate the direct relationship between the Levers of Control and sustainable performance, and the indirect association through risk management implementation as a mediating variable.

4.2. Population and Research Sample

The study population are the leaders and unit managers of the university who oversee the Public Service Agency plan. The unit of analysis is Public Service Agency university. The unit of observation is the person who has the expertise and is involved in institutional planning, budgeting, control, performance evaluation, internal auditing and risk management.

The sample technique was done purposive sampling since not all university employees have appropriate information about control systems, risk management, and institutional performance. The respondents were picked based on their experience, authority and direct participation in the operation of the university. The criteria for the respondents are: (1) working in a university that applies the Public Service Agency pattern of financial management; (2) holding a leadership, structural, supervisory, coordinative or unit management position; (3) involved in planning, budgeting, internal control, supervision, quality assurance, asset management, or risk management; (4) understands the institutional policies, procedures and performance indicators; and (5) willing to fill the research questionnaire.

The respondents include rectors or vice rectors, deans or vice deans, directors of study programs, heads of bureaus, financial managers, state asset managers, internal audit units, quality assurance units, research and community service units and other relevant unit managers The criteria are aligned with the plan, which is intended for leaders and unit managers at the rectorate, faculties, finance bureau, internal audit unit and quality assurance unit. After collecting and screening, 202 eligible questionnaires were collected from 35 universities or allied institutions that manage Public Service Agency universities. All questions were screened for completeness before analysis by PLS-SEM.

4.3. Data collection technique

Primary data acquired by structured questionnaire has been used for the present investigation. The questionnaire was distributed online, and in person where necessary, to respondents that matched the selection criteria. The objective of the online distribution was to contact respondents from various Public Service Agency universities. The purpose of the direct communication was to explain the purpose of the study and to guarantee the questionnaire was received by appropriate respondents.

Before completing the questionnaire, the respondents were briefed about the purpose of the study, the confidentiality of their names and the use of data for academic purposes. It was voluntary to provide names and contact numbers. This aimed to make the respondents feel safe and lessen the inclination to give responses they saw as most desirable to the institution.

The data collection procedure involved the following steps: (1) developing indicators based on relevant theories and previous research instruments; (2) adapting the wording of items to the context of the Public Service Agency university; (3) distributing the questionnaire to eligible respondents; (4) checking the completeness of responses; (5) coding and tabulating the data; and (6) processing the data using SmartPLS 4.

4.4. Data Analysis Techniques

Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with the SmartPLS 4 software. PLS-SEM was chosen because it allows estimation of models with several latent dimensions, complicated indicators, mediation relationships and prediction aims and it does not require strict multivariate normality assumptions. The analysis was performed in two steps; measurement model evaluation and structural model evaluation.

The measurement model assessment is an assessment of the validity and reliability of indicators and constructs. First, convergent validity is assessed by using outer loadings and average variance extracted (AVE). Indicators with Outer Loadings ≥ 0.708 indicate that the construct explains more than 50% of the indicator's variance, while loadings between 0.40 and 0.70 can be retained if their removal does not significantly improve the construct's reliability and validity; AVE values should be > 0.50. Second, internal reliability is tested by Cronbach's alpha, rho_A and the composite reliability, with values between 0.70 and 0.95 showing the sufficient internal consistency. Third, the heterotrait–monotrait ratio (HTMT) is used to verify discriminant validity; HTMT values less than 0.90 (or 0.85 for a more cautious threshold) suggest significant empirical separation between constructs. Fourth, the indicator collinearity is assessed by the variance inflation factor (VIF) where VIF values below 5 indicate no major multicollinearity problems and below 3 VIF values are deemed the optimal ones.

5. Research Results and Discussion

5.1 Respondent Characteristics

This study analyzed 202 fully filled questionnaires collected from 35 institutions or organizations listed in the research database. The respondents were selected using purposive sampling because they held jobs and had experience in planning, financial management, internal auditing, asset management, quality assurance, and risk management in universities.

Table 1: Characteristics of Respondents by Position

Job group	Frequency (n=202)	Percentage (%)
Finance, Asset, and General Affairs Coordinator	117	57,9%
Internal Oversight	36	17,8%
Dean/Vice Dean	15	7,4%
Head of Department/Study Program	8	4,0%
Research and community service	4	2,0%
Rector/Vice-Rector	2	1,0%
Quality assurance	2	1,0%
Other positions	18	8,9%
Total	**202**	**100,0%**

Source: Processed primary data, 2026.

The group of respondents that had the largest number was the finance, asset and general affairs coordinators with 117 respondents, 57.9% . Thirty-six or 17.8% of the respondents were from internal audit functions or Internal Audit Unit. The makeup shows that most respondents are directly involved in control activities, resource management, reporting and institutional oversight.

Table 2: Institutional Characteristics and Respondent Experience

Characteristics	Category	Frequency (n=202)	Percentage (%)
Institutional accreditation	Superior	121	59,9%
	Very Good	59	29,2%
	Good	21	10,4%
	Not accredited	1	0,5%
Tenure [in year]	>_ 3	164	81,2%
	1–3	35	17,3%
	>_1	3	1,5%
Alignment of the work program with the Strategic Plan	Fully refers to the Strategic Plan	116	57,4%
	Some refer to the Strategic Plan	86	42,6%
Involvement of the study program/faculty	Prepared entirely by the university	146	72,3%
	Study programs/faculties are partially involved.	28	13,9%
	Full autonomy for study programs/faculties	28	13,9%

Source: Processed primary data, 2026.

The respondents who were from the Excellent accredited colleges were 59.9% and the respondents who were from the Very Good accredited institutions were 29.2%. In addition, 81.2% of the respondents spent more than three years in their professions. This composition suggests that the majority of respondents had enough expertise to evaluate the control systems of the institutions, the implementation of risk management and sustainable performance.

Also, 57.4% of the respondents indicated that work-program development was totally consistent with the universities' strategic plans. But 72.3% said that programs and budgets were still being set exclusively at the university level. The data show that institutional management tends to be centralized yet some institutions have allowed study programs and faculties the opportunity to participate and have more autonomy.

5.2. Descriptive Statistics of Research Variables

Descriptive statistics were employed to offer an overview of the respondents' response tendencies for each of the research constructs. The closer the mean value is to 5 , the more respondents agree with the statement

Table 3: Descriptive Statistics for Research Constructs and Dimensions

Construct/dimension	Average	Standard deviation
Belief systems	4,332	0,516
Boundary systems	4,296	0,535
Diagnostic control systems	4,348	0,589
Interactive control systems	4,157	0,608
Levers of Control	4,283	0,494
Risk management implementation	3,997	0,746
Economic performance	4,218	0,625
Social performance	4,368	0,578
Environmental performance	4,175	0,643
Sustainable performance	4,255	0,554

Source: Processed primary data, 2026.

The mean score for the Levers of Control construct was 4.283 suggesting that the control mechanisms had been adequately implemented according to the respondents. The dimension with the greatest mean score was diagnostic control systems (4.348) and the lowest was interactive control systems (4.157). This score was still high but the results show that we need to improve strategic dialog, employe involvement and inter-unit communication. The mean score of risk management implementation was 3.997. This score was lower than the mean scores of both Levers of Control and sustainable performance. These results imply that risk management is in place, but its execution is not as strong as that of formal control systems.

The highest mean score was for social performance with 4.368. In contrast, environmental performance received the lowest mean score of 4.175. This research indicates that universities appear to be relatively more successful in managing resources and implementing environmental sustainability practices than in providing services to their stakeholders, social interactions and the well-being of their employes and contributing to society.

5.3. Measurement Model Evaluation

The measuring model was examined for convergent validity, construct reliability, and discriminant validity. The research model included reflective constructs with 16 indicators for Levers of Control, 7 indicators for risk management implementation and 15 indicators for sustainable performance .

5.3.1. Convergent Validity

Convergent validity is evaluated based on the outer loading and average variance extracted or AVE values.

Table 4: Summary of Outer Loadings

Construction	Number of indicators	Lowest loading	Highest loading	Information
Levers of Control	16	0,601	0,862	Adequate
Risk management implementation	7	0,812	0,924	Adequate
Sustainable performance	15	0,729	0,858	Adequate

Source: SmartPLS 4 processing results, 2026.

All indicators for the application of risk management and sustainable performance had an outside loading value greater than 0.708. Hence, constructs might explain more than 50% of the variance in each metric. The Levers of Control construct was measured with six indicators, with outer loading values ranging from 0.601 to 0.694. These indicators were kept since the values of their outer loadings were higher than 0.40 and statistically significant at 1%, and their elimination was not necessary to satisfy the criteria of the AVE and construct reliability values. Despite this, these markers should be given greater consideration in the refinement of the study instrument in future investigations.

5.3.2. Construct Reliability and Average Variance Extracted

Table 5: Reliability and Convergent Validity

Construction	Cronbach's alpha	rho_A	Composite reliability	AVE
Sustainable performance	0,958	0,959	0,962	0,629
Levers of Control	0,937	0,941	0,945	0,520
Risk management implementation	0,953	0,956	0,961	0,781

Source: SmartPLS 4 processing results, 2026..

Cronbach's alpha values, rho_A and composite reliability values were more than 0.70 for all constructs. Thus, the three constructs showed remarkable internal consistency. All AVE values of the constructs were also over 0.50. The AVE score was 0.629, for Levers of Control was 0.520, and for risk management implementation was 0.781 for sustainable performance. The findings of these analyzes reveal that each construct could explain more than 50% of the variance of its indicators. Therefore, convergent validity and construct dependability were largely confirmed. Implementation reliability levels of sustainable performance and risk management reaching or exceeding 0.95 denote very high internal consistency. However, caution should be exercised in the interpretation of these values as they may be indicative of numerous items having comparable content to each other.

5.4. Structural Model Collinearity Evaluation

Collinearity between predictor constructs was evaluated using the variance inflation factor value.

Table 6: Inner Variance Inflation Factor

Relationship	VIF	Information
LOC → Sustainable performance	3,027	There is no critical collinearity.

LOC → Risk management	1,000	There is no collinearity.
Risk management → Sustainable performance	3,027	There is no critical collinearity.

Source: SmartPLS 4 processing results, 2026.

All VIF values in the structural model were less than 5. Thus, no critical concerns of multicollinearity were found among the predictor constructs. The VIF value of 3.027 in the sustainable performance model was within the permissible limits, but suggested reasonably strong link between Levers of Control and risk management implementation.

5.5. Coefficient of Determination

The coefficient of determination was used to assess the ability of exogenous constructs to explain the variance in endogenous constructs.

Table 7: R-squared value

Endogenous construct	R^2	Adjusted R^2	Interpretation
Risk management implementation	0,670	0,668	Moderate to strong
Sustainable performance	0,765	0,762	Strong

Source: SmartPLS 4 processing results, 2026.

The *R*2 value for risk management implementation was 0.670, indicating that Levers of Control explained 67.0% of the variance in risk management implementation. The remaining 33.0% of the variance was explained by other factors that were not included in the research model. The *R*2 value for sustainable performance was 0.765, indicating that Levers of Control and risk management implementation jointly explained 76.5% of the variance in sustainable performance. The remaining 23.5% was explained by other factors outside the research model. These findings indicate that the model has strong explanatory power for sustainable performance.

5.6 Effect Size

The f^2 effect size is used to assess the magnitude of the contribution of each exogenous construct to the endogenous construct.

Table 8: Effect Size Value

Relationship	f^2	Interpretation
LOC → Sustainable performance	0,566	Large
LOC → Risk management implementation	2,027	Very large
Risk management → Sustainable performance	0,106	Small

Source: SmartPLS 4 processing results, 2026.

The Levers of Control had a substantial effect size on sustainable performance and a very large effect size on risk management implementation. In contrast, the effect size of risk management implementation on sustainable performance was quite minor after controlling the direct effect of Levers of Control. The results suggest that the control system is the most important predictor in the research model. However, the effect of risk management

implementation on sustainable performance was relatively smaller, the association is essential since it was statistically significant and functioned as a conduit explaining the mediation mechanism.

5.7. Hypothesis Testing

Hypothesis testing was performed using the bootstrapping approach. The hypothesis was considered supported if the t-statistic was greater than 1.96 and the p-value was less than 0.05.

Table 9: Results of Direct Effect Testing

Relationship	Path coefficient	t-statistic	p-value	Confidence interval 95%	Decision
H1_LOC → Sustainable performance	0,635	8,986	<0,001	0,490–0,767	Supported
H2_LOC → Risk management implementation	0,818	43,846	<0,001	0,783–0,857	Supported
H3_Risk management → Sustainable performance	0,275	3,610	<0,001	0,128–0,427	Supported

Source: SmartPLS 4 processing results, 2026.

The H1 test findings suggest that Levers of Control has a positive and significant effect on sustained performance with a path coefficient of 0.635, t-statistic of 8.986 and p-value of less than 0.001. The confidence interval was 0.490 to 0.767 and it did not cross zero. Thus, H1 was supported. The better the application of belief systems, boundary systems, diagnostic control systems and interactive control systems the higher the university's economic, social and environmental performance.

The findings of H2 test showed that Levers of Control had a positive and substantial effect on risk management implementation with a path coefficient of 0.818, t-statistic of 43.846 and p-value < 0.001. The path coefficient of 0.818 revealed very strong association. As such, H2 was supported. Belief systems, boundary systems, diagnostic control systems and interactive control systems are vital for risk policy formulation, risk identification, risk assessment, risk mitigation, risk monitoring and for the integration of risk into institutional planning.

H3 test findings revealed that risk management implementation has positive and substantial impact on sustainable performance with path coefficient 0.275, t-statistic 3.610 and p-value less than 0.001. The confidence interval was from 0.128 to 0.427 and did not contain zero. Hence, H3 was supported. The better an organization is able to recognize, assess, address and monitor risks, the better its sustainable performance will be.

5.8. Testing the Mediation Effect

H4 tests the indirect effect of Levers of Control on sustainable performance through the implementation of risk management.

Table 10: Results of Indirect Effect Testing

Indirect route	Coefficient	t-statistic	p-value	Confidence interval 95%	Decision
H4_LOC → MR → SP	0,225	3,506	<0,001	0,104–0,358	Supported

Source: SmartPLS 4 processing results, 2026.

The indirect effect of Levers of Control on sustainable performance thru risk management adoption was 0.225 with t-statistic of 3.506 and p-value less than 0.001. The 95% confidence interval was 0.104-0.358 and did not include zero. Therefore, mediation effect was statistically significant and H4 was supported. The inclusion of the risk management implementation in the model did not change the considerable direct effect of Levers of Control on sustainable performance. Moreover, the direct and indirect impacts were in the same favorable direction. Thus, the installation of risk management was an additional partial mediator.

The total effect of Levers of Control on sustainable performance was 0.860; the direct effect was 0.635; the indirect effect was 0.225. The proportion of indirect effect to the total effect or variance accounted for (VAF) was computed as:

$$VAF = (\frac{0.225}{0.860})X\ 100\% = 26.2\%$$

Therefore, these data suggest that the application of risk management mediated approximately 26.2% of the influence of Levers of Control on sustainable performance. Meanwhile, the majority of the remaining effect took place directly or thru additional pathways that are not included in the research model.

5.9 Model Fit Evaluation

Table 11: Model Fit Summary

Indicator	Saturated model	Estimated model	Information
SRMR	0,077	0,077	Meets the <0.08 limit
NFI	0,566	0,566	Relatively low

Source: SmartPLS 4 processing results, 2026.

The SRMR value of 0.077 was below the cut-off point of 0.08, meaning that the average residual covariance of the model was still within an acceptable range. However, the NFI value of 0.566 was comparatively low, indicating the restricted fit of the model based on this index.

5.10. Predictive Capability of the Model

Predictive ability was evaluated using the PLSpredict procedure and cross-validated predictive ability test.

Table 12: PLS predict Latent Variable Summary

Endogenous construct	Q^2 predict	RMSE	MAE	Information
Risk management implementation	0,664	0,587	0,476	Has predictive relevance
Sustainable performance	0,734	0,521	0,391	Has predictive relevance

Source: SmartPLS 4 processing results, 2026

The $Q2$ predict value for risk management implementation was 0.664, while the $Q2$ value for sustainable performance was 0.734. Both were positive. So, the model revealed predictive value for both endogenous constructs. Results of the cross-validated predictive ability test (CVPAT) indicated that the prediction errors of the PLS-SEM model were far below the benchmark of average-indicator. However, the prediction errors of the PLS-SEM model were higher than the linear model and this difference was statistically significant.

5.11. Summary of Hypothesis Testing Results

Table 13: Summary of Hypothesis Decisions

Statement	Results
H1_ Levers of Control has a positive effect on sustainable performance	Supported
H2_ Levers of Control has a positive effect on the implementation of risk management	Supported
H3_ Implementation of risk management has a positive effect on sustainable performance	Supported
H4_ Implementation of risk management mediates the influence of Levers of Control on sustainable performance	Supported; complementary partial mediation

Source: SmartPLS 4 processing results, 2026.

The results generally confirmed all the ideas given. Levers of Control had a powerful and immediate effect on the implementation of sustainable performance and risk management. In addition, the adoption of risk management had a favorable impact on the sustainable performance and was a significant mediator in the relationship between Levers of Control and sustainable performance. These data demonstrate that risk management implementation operates as a complementary partial mediator because the direct and indirect effects are both significant and operate in the same direction.

6. Discussion

The results show that all the offered hypotheses gained empirical support. The Levers of Control (LOC) positively influenced sustainable performance and the application of risk management. Moreover, risk management implementation positively affected sustainable performance and somewhat mediated the association between LOC and sustainable performance. The findings indicate that the sustainability of higher education institutions as Public Service Agencies is not only dependent on the existence of formal control mechanisms but also on their ability to translate these mechanisms into integrated risk management processes embedded in institutional planning and decision-making.

The mean score for LOC was 4.283 and this was greater than the mean score for risk management implementation which was 3.997. This disparity suggests that the control system was relatively well built, but the institutionalization of risk management still has to be enhanced. The diagnostic control systems dimension had the greatest mean while the interactive control systems dimension scored the lowest mean. This pattern shows that Public Service Agency higher education institutions are better at target setting, measurement of results and handling of deviations than they are at stimulating strategic conversation across organizational levels. This situation accords with the features of higher education institutions that are grappling with the pressures of administrative accountability and the desire to sustain professional autonomy (Heinicke & Guenther, 2020; Rosalina & Jusoh, 2024).

In terms of sustainable performance, the social dimension obtained the greatest average score and the environmental dimension obtained the lowest. This result might be attributed to the traditionally strong social focus of higher education institutions in terms of instruction, research, community engagement and services to stakeholders. In comparison, greater efforts should be made to mainstream environmental issues in budgeting, use of resources, procurement, infrastructure development and performance measures. The findings confirm that sustainability achievement cannot be based on the strengthening of the social mission only, but also requires control systems that explicitly integrate environmental objectives into core management operations (Gond et al., 2012).

6.1. The Influence of Levers of Control on Sustainable Performance

The H1-test generated a route coefficient of 0.635 and a p-value of less than 0.001. The effect size of 0.566 suggests that LOC was a major contributor to sustainable performance. Thus, more use of belief systems, boundary systems, diagnostic control systems and interactive control systems was connected with better economic, social and environmental performance in Public Service Agency higher education institutions.

This conclusion confirms Simons' (1995) approach, which treats the four levers of control as complimentary systems. Belief systems focus the organizational members' attention on values, missions, and long-term goals. Boundary systems delineate prohibited behavior and safeguard the institution from behaviors that can impede the attainment of its objectives. Diagnostic control systems connect objectives with targets and monitorable indicators, whereas interactive control systems foster dialog, organizational learning, and adaptability to change. The four systems combined generate a tension between discipline and flexibility that is necessary to sustain efficiency while adapting to unpredictability (Mundy, 2010).

The results are also in line with Henri (2006) and Widener (2007) who showed that control systems adoption can improve organizational capabilities and performance. Bellora-Bienengräber et al.'s (2023) meta-analysis offers more evidence that the four levers of control are often utilized in conjunction and that their combined use is related with positive performance outcomes. These findings are in line with Budiwati et al. (2025) when considering sustainability in Indonesia, where they discovered that the four LOC mechanisms together increased sustainability performance in the batik business.

This significant effect can be explained by the hybrid nature of Public Service Agency higher education schools. Public Service Agency higher education institutions have flexibility in managing resources but must also satisfy the needs of public accountability, regulatory compliance, academic quality, and different stakeholder interests. LOC offers a way to balance flexibility with accountability. Belief systems strengthen dedication to public service and sustainability; boundary systems protect compliance and integrity; diagnostic systems track performance; and interactive systems allow for strategic adjustment as conditions change.

From a resource-based view, the strategic value of LOC is not just in the presence of control procedures or instruments, but in an organization's ability to combine and use them contextually. Other institutions can copy formal systems but communication patterns, managerial experience, trust, organizational culture and the capacity to balance the use of diagnostic and interactive systems are developed over time and are not readily copied (Barney, 1991; Henri, 2006). Therefore, the integrated use of LOC can be considered as an organizational competency that helps higher education institutions translate academic, financial, technical and reputational resources into sustained performance.

6.2. The Influence of Levers of Control on Risk Management Implementation

The H2 test was 0.818 with a p-value < 0.001***. The effect value of 2.027 implies a very robust prediction of risk management implementation by LOC. The R2 value was 0.670 which suggests that LOC explains 67.0% of the variance in risk management implementation. These findings identify the control system as a key infrastructure that enables risk management to be conducted in a methodical manner.

The important parts of risk management are provided by each lever of control. Belief systems embed the ideals of integrity, responsibility and caution, and in so doing help to create a risk-aware culture. Boundary systems delineate limitations on power, risk-taking, and forbidden activities. Diagnostic control systems supply targets, risk indicators, reports and follow-up mechanisms. At the same time, interactive control systems open opportunities for discussing new risks, reviewing planning assumptions, and aligning responses across organizational units. Hence, LOC turns risk management from a stand-alone activity to an essential part of managerial routines.

The findings extend earlier studies. Widener (2007) showed that control systems are used because of strategic risks and uncertainties. Gordon et al. (2009) have seen enterprise risk management (ERM) as a component of management control system, the effectiveness of which hinges on its fit with company context. Meanwhile, Arena et

al. (2010) demonstrated how risk management evolves thru the interaction with existing control logics, actors and technologies. The present study contributes to this body of research by indicating that strong usage of LOC can encourage a more structured and integrated approach to risk management.

These findings also have crucial consequences for higher education institution of Public Service Agency in Indonesia. Sutoyo et al. (2024) discovered that risk management in Public Service Agency higher education institutions has been done operationally but has not always been conducted completely and methodologically in all organizational units. The very high effect coefficient found in this study indicates that increasing the risk management should not only involve the addition of forms, risk registers, or organizational structures. Such efforts, instead, should begin with consistent ideals, clear boundaries, monitoring mechanisms and dialog forums which represent the heart of LOC. In the absence of such support risk management may be restricted to administrative compliance or to compliance with rules, with no impact on day-to-day decision-making (Arena et al., 2010).

6.3. The Effect of Risk Management Implementation on Sustainable Performance

The H3 test indicated that the introduction of risk management positively affected sustainable performance with a path coefficient of 0.275 and a p-value of < 0.001***. Thus, higher education institutions that systematically identify, assess, address, communicate and monitor risks tend to have superior economic, social and environmental performance.

Risk management in the economic dimension allows institutions to anticipate budget disruptions, errors in procurement, inefficiencies, loss of assets and volatile sources of income. In the social dimension, risk management ensures the quality of educational services, safety, academic integrity, personal data, employe well-being and community connections. In the environmental dimension, risk management techniques can be used to detect the implications of energy, water and paper consumption, waste management, hazardous materials and campus infrastructure development. So risk management is not simply defensive, it allows institutions to protect assets and continue to serve.

These results are consistent with Gordon et al. (2009) who found that risk management can improve performance when it is congruent with the characteristics of the organization and the environment. The results also support the argument of Sutoyo et al. (2024) that risk management helps Public Service Agency higher education institutions to achieve their goals and increase risk awareness in strategic and operational decisions. The ability to manage risk is an adaptive institutional capability (Teece et al., 1997) in a changing regulatory environment, technology developments, public expectations and accreditation criteria.

The effect size of risk management implementation on sustainable performance was 0.106. Although the effect is statistically significant, it is considered tiny. It demonstrates that risk management is an important mechanism of institutional sustainability but not the sole one. Leadership, organizational culture, organizational learning, human resource capabilities, technical support, stakeholder demands and the availability of resources can all affect success in higher education. Furthermore, the benefits of risk management typically do not show up immediately in the form of higher outputs, but rather in the form of avoided losses, better quality of decisions, and enhanced institutional resilience in the event of disruptions. Its impact should not thus be judged merely on the basis of short-term gains in performance.

6.4. The Mediating Role in Risk Management Implementation

The H4 test yielded an indirect impact of 0.225 with a p-value of <0.001***. The direct influence of LOC on sustainable performance was significant and the direct and indirect impacts were positive. Therefore, risk management implementation partially mediated the relation. The total effect of LOC on sustainable performance was 0.860 and the ratio of the indirect effect to the total effect was 26.2%. This demonstrates that over 25% of the influence of LOC on sustainable performance was mediated by risk management adoption.

This mediation outcome explains the process thru which control systems are related to performance. LOC influences performance directly thru value alignment, target discipline and strategic conversation but also creates conditions that enable institutions to manage risks more efficiently. This capacity to manage risk thus helps to protect resources, increase the quality of decision-making and continue the delivery of institutional objectives. This means that risk management is one of the steps of transforming the control architecture into sustainable performance.

These results corroborate the meta-analysis of Bellora-Bienengräber et al. (2023) that revealed that the impact of LOC on performance is partially mediated by organizational capacities. The study by Rosalina and Jusoh (2024) similarly found that the impact of the levers of control on academic achievement could function thru behavioral processes but they explored a different mediator. Control systems are also a tool that connects management methods to organizational resilience (Baird et al. 2023). Overall these research suggest that control systems influence performance thru intermediary processes that shape organizational behavior, learning and capacities.

The mediation results are consistent with the resource-based view (RBV) that resources only lead to performance when they are structured thru relevant capabilities. LOC is an orchestration mechanism that directs and organizes resources, and risk management implementation is a capability to protect and reconfigure the usage of resources in conditions of uncertainty (Grant, 1991; Teece et al., 1997). As the direct influence of LOC still existed significantly, risk management is not the only process that LOC affects sustainable performance. Other potential mediators that may explain the residual effect of LOC include organizational learning, creativity, managerial attention, dedication, organizational culture, and work behavior (Henri, 2006; Widener, 2007; Bellora-Bienengräber et al., 2023).

6.5. Explanatory Power and Predictive Capability of the Model

The research model demonstrated strong explanatory power. LOC explained 67.0% of the variance in risk management implementation, whereas LOC and risk management implementation jointly explained 76.5% of the variance in sustainable performance. These values indicate that the model explained a substantial proportion of the variance in the endogenous constructs and provided strong empirical support for the conceptual framework of the study. The Q2 predict values of 0.664 for risk management implementation and 0.734 for sustainable performance indicate predictive relevance because both values were greater than zero. However, the CVPAT results showed that the PLS-SEM model produced higher prediction errors than the linear model. Therefore, the model was more effective in explaining theoretical relationships within the sample than in generating consistently superior predictions outside the sample. This finding is important because the interpretation should not focus solely on the high R2 values but should also consider the model's predictive generalizability.

The SRMR value of 0.077 indicates that the model residuals remained within an acceptable range. However, the HTMT value between LOC and sustainable performance was 0.902, which was slightly above the threshold of 0.90. This condition indicates a degree of empirical proximity between the two constructs. One possible explanation is that some performance indicators substantively capture the benefits of LOC or risk management rather than solely representing economic, social, and environmental outcomes. Therefore, re-estimation using 12 performance indicators that specifically represent the three dimensions of sustainability should be considered to ensure discriminant validity and assess the robustness of the findings.

6.6. Theoretical Implications

First, This paper extends the Levers of Control (LOC) research by considering sustainable performance as an organizational outcome. Previous studies have primarily focused on financial performance, operational performance, innovation, learning or individual performance. The results indicate that the joint application of the four levers of control is also relevant to explain the economic, social and environmental performance in higher education organizations.

Second, this study brings risk management implementation as a mediation technique. In this contribution, it is clarified that control systems create performance not only thru direct monitoring but also thru the development of

capacities that allow companies to deal with uncertainty. The findings add to the resource-based view (RBV) literature (Penrose, 1959; Wernerfelt, 1984; Barney, 1991) by demonstrating that risk management capability is a key mechanism that transforms resources and internal systems to sustainable performance.

Third, The paper presents empirical findings from the setting of higher education institutions as Public Service Agencies, a type of hybrid public organization. The findings show that control techniques created mostly in the corporate sector are still applicable to higher education institutions. But its use needs to be sensitive to academic autonomy, collegial culture, public responsibility and the diversity of stakeholders. This study therefore supports the contingency perspective that the efficiency of control systems and risk management is dependent on fit with company characteristics (Gordon et al., 2009).

6.7. Practical Implications

The leaders of higher education institutions that operate as Public Service Agencies must keep the strength of the diagnostic control system without viewing it as the exclusive control method. The comparatively low mean score for interactive control systems points to a need for more regular and substantial dialog forums. Performance review meetings should not only look at whether targets have been met but also at legislative changes, emerging hazards, planning assumptions, student demands, technological advances and social and environmental implications.

Risk management should be integrated into strategic planning, budgeting, performance-contract formulation, procurement, asset management, accreditation, quality assurance, and program evaluation cycles. Each organizational unit should have a defined risk owner, key risk indicators, risk treatment strategies, and reporting and escalation mechanisms. This combination would make risk management a decision support instrument, and not just a paper prepared to meet regulatory criteria.

Higher education institutions should also link the four levers of control with their risk management methodology. Institutional principles and goals should be consistent with commitments to integrity, public service and sustainability. Clearly identify the bounds of authority and risk appetite. Performance indicators should be linked to risk indicators, and interactive forums should be used to debate uncertainties that cannot be dealt with by routine reporting alone.

Special attention is required on the comparatively low environmental performance. Public Service Agency higher education institutions may include indicators of energy and water efficiency, paper consumption, waste management, environmentally responsible procurement, emissions and green infrastructure in their diagnostic control systems. Environmental issues should be considered interactively, so that they do not become additional programs isolated from institutional strategy, budgeting, learning, research and community engagement.

Lastly, control systems need to be strengthened to maintain professionalism in higher education. Overly coercive controls can lead to increased pressure, encourage indicator-focused behavior and reduce quality. Therefore, communication, participation, feedback and opportunity for professional judgment should go hand in hand with boundaries and targets. This equilibrium allows higher education institutions to promote accountability while protecting innovation, academic freedom and organizational learning.

7. Conclusion

The study concludes that Levers of Control (LOC) is important to improve the sustainable performance of Public Service Agency universities directly and indirectly through the use of risk management. LOC has a positive effect on sustainable performance and risk management implementation, and risk management implementation has a positive effect on sustainable performance. The partial mediation effect points out the importance of formal control mechanisms in translating the impact into integrated risk management systems inherent in planning and decision-making. On the descriptive side, institutionalization of risk management is less developed than control systems. Diagnostic control systems predominate while interactive control systems are rather poor. This pattern underscores the contradiction between calls for administrative responsibility and professional autonomy in institutions. In terms

of sustainable performance, the social dimension is more emphasized than the environmental one, such that it emphasizes the necessity of strengthening control systems that explicitly integrate environmental objectives into the fundamental processes of management.

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