



## Optimization of Governance in Public Institutions: The Catalytic Potential of Information Systems and Management Control

### Optimisation de la gouvernance dans les institutions publiques : Le potentiel catalytique des systèmes d'information et du contrôle de gestion

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Article Info	Abstract
<p><b>Informations sur l'article:</b> Management control ; Information systems ; Governance ; Performance ; Strategic decision-making ; New public management.</p> <p><b>JEL :</b> L25, L10, G34, L25, D81.</p> <p>Received 30 November 2024 Accepted 14 January 2025</p>	<p>Within the dynamic framework of governance in public institutions, operational efficiency and transparency are crucial imperatives. This study explores the pivotal role of information systems (IS) and management control in enhancing public governance. By examining the complex interactions between these systems, the research highlights their capacity to strengthen strategic decision-making, optimize resource allocation, and promote organizational accountability. Through a comprehensive analysis of governance practices in diverse public contexts, this study identifies specific challenges faced by public managers and proposes recommendations to enhance institutional integrity and foster effective governance. Integrating concrete examples and case studies, this paper illustrates how IS and management control can serve as powerful levers to transform public management and maximize value for all stakeholders involved.</p>

Informations sur l'article	Résumé
<p><b>Mots-Clés :</b> Contrôle de gestion ; Systèmes d'information ; Gouvernance, Performance ; Prise de décision stratégique ; nouveau management public.</p>	<p>Dans le cadre dynamique de la gouvernance des institutions publiques, l'efficacité opérationnelle et la transparence sont des impératifs cruciaux. Cette étude explore le rôle central des systèmes d'information (SI) et du contrôle de gestion dans l'amélioration de la gouvernance publique. En examinant les interactions complexes entre ces systèmes, la recherche met en évidence leur capacité à renforcer la prise de décision stratégique, à optimiser l'allocation des ressources et à promouvoir la responsabilité organisationnelle. Grâce à une analyse complète des pratiques de gouvernance dans divers contextes publics, cette étude identifie les défis spécifiques auxquels sont confrontés les gestionnaires publics et propose des recommandations pour renforcer l'intégrité institutionnelle et favoriser une gouvernance efficace. En intégrant des exemples concrets et des études de cas, ce document illustre comment les SI et le contrôle de gestion peuvent servir de leviers puissants pour transformer la gestion publique et maximiser la valeur pour toutes les parties prenantes impliquées.</p>

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## Introduction

The pursuit of effective governance in public institutions is increasingly recognized as a cornerstone for achieving sustainable development and public trust. As these institutions face mounting pressure to deliver services with greater efficiency, transparency, and accountability, the need for robust governance frameworks has never been more critical.

In this context, the integration of information systems and management control mechanisms offers a promising avenue for enhancing governance practices. Information systems, with their capacity to streamline data management and facilitate real-time decision-making, have the potential to revolutionize the way public institutions operate. Meanwhile, management control systems serve as essential tools for ensuring that organizational objectives are met through the systematic monitoring and evaluation of performance.

This article delves into the optimization of governance in public institutions by exploring the catalytic potential of these systems. Through a comprehensive analysis, it aims to demonstrate how the strategic deployment of information systems and management control can lead to more effective, accountable, and responsive governance. The graph below clearly shows the relevance of the subject.

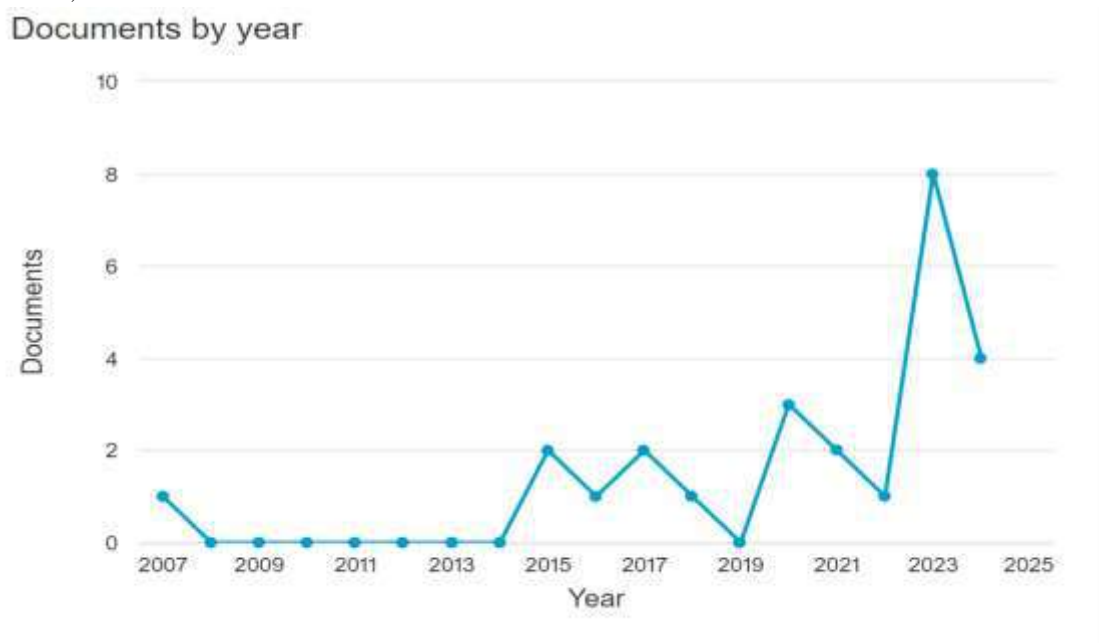


Figure 1: Graph showing the relevance of the topic covered  
Source: scopus database

This figure illustrates the progression of published or produced documents related to the topic "*Optimization of governance in public institutions: the catalytic potential of information systems and management control*" over the years, from 2007 to 2025.

- **Horizontal axis (x-axis):** Years, spanning from 2007 to 2025.
- **Vertical axis (y-axis):** Number of documents (ranging from 0 to 10).
- **Trend:** The figure reveals a notable increase in publications starting from 2023, reaching a peak of 8 documents in that year. Prior to this period, the number of documents remained low and relatively stable, with some minor fluctuations.

- **Possible interpretation:** This trend highlights a growing interest in the optimization of governance in public institutions, particularly focusing on the role of information systems and management control. The surge in recent years may reflect heightened research activity or the increasing recognition of the importance of these topics in public sector reforms.

## **1. Literature review**

### **1.1. Governance in Public Institutions**

Governance in public institutions has been extensively studied, with scholars emphasizing its importance in ensuring transparency, accountability, and efficiency in the delivery of public services. Good governance is associated with effective decision-making, the rule of law, and the management of resources in a manner that meets the needs of the population (OECD, 2015). The literature highlights that governance structures in public institutions must adapt to changing socio-political environments to maintain public trust and achieve sustainable development goals (Kaufmann & Kraay, 2002).

### **1.2. The Role of Information Systems in Governance**

Information systems have increasingly been recognized as powerful tools in enhancing governance within public institutions. They facilitate data collection, storage, and analysis, enabling real-time decision-making and improved resource allocation (Heeks, 2006). Information systems also promote transparency by making information accessible to stakeholders, thus reducing opportunities for corruption and enhancing accountability (Cordella & Bonina, 2012). The adoption of e-governance initiatives, which rely heavily on information systems, has been shown to improve public service delivery and foster greater citizen engagement (UN, 2020).

### **1.3. Management Control Systems and Public Sector Governance**

Management control systems (MCS) are essential in ensuring that public institutions meet their objectives efficiently. These systems provide the framework for monitoring organizational performance, managing risks, and ensuring that resources are used effectively (Merchant & Van der Stede, 2017). MCS also play a crucial role in aligning the actions of employees with the strategic goals of the institution, thus enhancing overall governance (Simons, 1995). In the public sector, MCS have been shown to improve accountability by linking performance outcomes to managerial actions, thereby facilitating better governance outcomes (Abernethy & Brownell, 1997).

### **1.4. The Synergy between Information Systems and Management Control in Governance Optimization**

The intersection of information systems and management control represents a significant

opportunity for optimizing governance in public institutions. When integrated effectively, these systems can complement each other, with information systems providing the data necessary for informed decision-making, and MCS ensuring that these decisions are aligned with organizational goals (Granlund & Mouritsen, 2003). Studies suggest that the integration of these systems can lead to enhanced organizational performance, greater transparency, and improved public trust (Chenhall, 2003). Furthermore, the adoption of advanced information systems, such as Enterprise Resource Planning (ERP) systems, has been shown to strengthen MCS by providing real-time data that supports more responsive and adaptive governance practices (Rom & Rohde, 2007).

### **1.5. Challenges and Future Directions**

Despite the potential benefits, the implementation of information systems and management control in public institutions is not without challenges. Issues such as resistance to change, the digital divide, and the need for capacity building among public sector employees can hinder the effective adoption of these systems (Heeks, 2006). Additionally, there is a need for more empirical research to understand the long-term impact of these systems on governance outcomes in diverse contexts. Future research should focus on exploring how emerging technologies, such as artificial intelligence and big data analytics, can further enhance the synergy between information systems and management control in public governance (Venkatesh et al., 2012)

### **1.6. Conceptual and Theoretical Framework**

The conceptual framework for this study is based on the interplay between three core concepts: Governance Optimization, Information Systems, and Management Control Systems (MCS). These elements are integrated to explore how their interaction can enhance governance practices in public institutions.

#### **1.6.1. Governance Optimization in Public Institutions**

Governance in public institutions refers to the processes, structures, and mechanisms through which public resources are managed and public policies are implemented. Optimal governance is characterized by transparency, accountability, efficiency, and responsiveness to stakeholders' needs. This study conceptualizes governance optimization as the improvement of these attributes to achieve better public service delivery and increased public trust.

**Transparency:** Ensuring that decision-making processes are open and information is accessible to all stakeholders.

**Accountability:** Holding public officials and institutions responsible for their actions and outcomes.

**Efficiency:** Utilizing resources in the most cost-effective manner to achieve the desired outcomes.

**Responsiveness:** Adapting to the needs and demands of the public and other stakeholders.

#### **1.6.2. Information Systems as Catalysts for Governance**

Information Systems (IS) are conceptualized as digital platforms and technologies that facilitate the collection, processing, storage, and dissemination of information. In the context of public

governance, IS play a crucial role in enhancing the flow of information, enabling real-time decision-making, and improving communication between public institutions and stakeholders.

Data Management: Efficient handling of data to support informed decision-making processes.

Real-Time Decision Making: Enabling public institutions to respond quickly to emerging issues.

E-Governance: The use of digital tools to improve the accessibility and efficiency of government services.

Transparency Enhancement: Making government data and processes more accessible to the public, thus reducing corruption and increasing trust.

### **1.6.3. Management Control Systems (MCS) in Governance Optimization**

Management Control Systems are tools and processes used to ensure that organizational goals are achieved through the effective and efficient use of resources. In public institutions, MCS are critical for monitoring performance, aligning activities with strategic objectives, and ensuring accountability.

Performance Monitoring: Continuous assessment of institutional performance to ensure alignment with goals.

Resource Allocation: Efficient distribution and utilization of resources to achieve institutional objectives.

Risk Management: Identifying and mitigating risks that could hinder the achievement of organizational goals.

Strategic Alignment: Ensuring that all activities and resources are directed towards the strategic objectives of the institution.

### **1.6.4. Integration of Information Systems and MCS for Governance Optimization**

The integration of Information Systems and Management Control Systems is posited as a synergistic approach to optimizing governance in public institutions. This integration allows for more comprehensive data management and better-informed decision-making, coupled with rigorous performance monitoring and accountability mechanisms.

Synergy: The combined effect of IS and MCS is greater than the sum of their individual effects, leading to enhanced governance.

Enhanced Decision-Making: Real-time data from IS supports more informed decisions, while MCS ensures these decisions are strategically aligned and effectively implemented.

Improved Accountability: IS provide transparency and accessibility to data, while MCS hold individuals and processes accountable for achieving set objectives.

Efficiency and Effectiveness: The integration ensures that resources are used optimally and that governance practices are continuously improved.

### **1.6.5. Outcomes of the Framework**

The expected outcomes of this conceptual framework include:

Improved Governance: Enhanced transparency, accountability, efficiency, and responsiveness in public institutions.

Increased Public Trust: As governance improves, public trust in institutions is expected to rise.

Better Public Service Delivery: More effective and efficient delivery of public services, resulting in higher citizen satisfaction.

The theoretical framework for this study is grounded in the intersection of Governance Theory, Information Systems Theory, and Management Control Theory. These theories provide the foundation for understanding how governance in public institutions can be optimized through the strategic implementation of information systems and management control systems.

### **a) Governance Theory**

Governance Theory explores the mechanisms, processes, and structures through which power and authority are exercised in organizations, particularly in public institutions. It emphasizes the importance of transparency, accountability, participation, and rule of law in ensuring effective governance.

**Principal-Agent Theory:** This theory, a key component of Governance Theory, explains the relationship between stakeholders (principals) and public institutions (agents). The theory suggests that information asymmetry and misaligned incentives can lead to agency problems, where agents may not act in the best interests of the principals. Optimizing governance involves mechanisms that reduce these agency problems through better information flow and accountability structures (Jensen & Meckling, 1976).

**New Public Management (NPM):** NPM is a paradigm within Governance Theory that advocates for the adoption of private-sector management practices in public institutions to enhance efficiency and effectiveness. This approach underscores the role of performance measurement, decentralization, and the use of management control systems to drive accountability and results (Hood, 1991).

### **b) Information Systems Theory**

Information Systems Theory examines how digital technologies are designed, implemented, and utilized within organizations to support decision-making and operations. It highlights the role of information systems in improving communication, data management, and organizational performance.

**Technology Acceptance Model (TAM):** TAM posits that the acceptance and effective use of information systems within an organization are influenced by perceived usefulness and ease of use (Davis, 1989). In the context of public institutions, the successful implementation of information systems for governance depends on how these systems are perceived by public officials and stakeholders.

**Sociotechnical Systems Theory:** This theory emphasizes the interdependence between social and technical systems within an organization. It argues that for information systems to be effective, both the technical aspects (e.g., hardware, software) and the social aspects (e.g., user adoption, organizational culture) must be aligned (Bostrom & Heinen, 1977). This theory is particularly relevant in understanding the challenges and opportunities in implementing information systems for governance optimization.

### **c) Management Control Theory**

Management Control Theory focuses on the methods and processes used by organizations to ensure that their activities and resources align with their strategic objectives. This theory provides insights into how control mechanisms can be designed and implemented to optimize performance and accountability in public institutions.

**Levers of Control Framework:** Developed by Robert Simons (1995), this framework identifies four key levers that organizations use to manage control: belief systems, boundary systems, diagnostic control systems, and interactive control systems. These levers provide a

comprehensive approach to managing control in organizations, balancing the need for innovation and flexibility with the need for accountability and risk management.

**Contingency Theory:** Contingency Theory suggests that the effectiveness of management control systems depends on the specific context in which they are implemented, including the organization's environment, strategy, and structure (Otley, 1980). This theory underscores the importance of tailoring control systems to the unique needs and conditions of public institutions.

#### **d) Integration of Theories for Governance Optimization**

The integration of Governance Theory, Information Systems Theory, and Management Control Theory provides a holistic understanding of how governance can be optimized in public institutions. The theoretical framework posits that:

**Governance Optimization:** Achieving optimal governance in public institutions requires reducing information asymmetry, enhancing accountability, and aligning institutional activities with strategic goals.

**Catalytic Role of Information Systems:** Information systems act as catalysts by improving data transparency, supporting real-time decision-making, and facilitating communication across the organization. When effectively implemented, they help address agency problems and enhance governance outcomes.

**Management Control Systems as Enablers:** Management control systems ensure that the strategic objectives of public institutions are met by providing mechanisms for monitoring, evaluation, and performance management. They help align the behavior of individuals within the institution with broader governance goals.

### **1.7. Hypothesized Outcomes**

Based on the integration of these theories, the theoretical framework hypothesizes that:

**Enhanced Governance:** The effective implementation of information systems and management control systems will lead to enhanced governance characterized by greater transparency, accountability, and efficiency.

**Improved Public Trust:** As governance improves, public trust in institutions will increase, leading to better compliance, participation, and overall satisfaction with public services.

**Sustainable Institutional Performance:** The continuous improvement of governance practices through the use of information systems and management control systems will result in sustainable institutional performance, meeting the long-term needs of the public.

Attached are the hypotheses that seem relevant to us :

**Hypothesis 1:** "The implementation of advanced information systems in public institutions enhances the efficiency of decision-making processes."

**Hypothesis 2:** "A well-structured management control framework increases transparency and accountability within public institutions."

**Hypothesis 3:** "The integration of information systems and management control practices leads to improved user satisfaction with public services."

**Hypothesis 4:** "Training employees in the use of information systems strengthens their capacity to optimize governance."

### **1.8. Problem Statement**

Public institutions worldwide face increasing demands for improved transparency, accountability, and efficiency in their operations. However, achieving these governance goals is challenging due to factors such as bureaucratic inertia, lack of timely and accurate information, and insufficient

control mechanisms. While information systems and management control systems are recognized for their potential to address these issues, their effective integration and application in public institutions remain underexplored. This gap raises important questions about how these tools can be optimized to enhance governance practices, improve public trust, and ensure sustainable institutional performance. Therefore, this study seeks to explore the catalytic role of information systems and management control in optimizing governance within public institutions.

Research Questions.

- How can information systems be leveraged to enhance transparency, accountability, and decision-making in public institutions?
- In what ways do management control systems contribute to aligning organizational activities with governance goals in public institutions?
- What are the challenges and opportunities associated with integrating information systems and management control systems to optimize governance in public institutions?
- How does the effective use of these systems impact public trust and institutional performance in the long term?

## 2. Methodology.

Analyzing Governance Optimization using VOSviewer

### 2.1. Research Design

This study adopts a bibliometric analysis approach to explore the existing literature on the optimization of governance in public institutions, particularly focusing on the roles of information systems and management control systems. The analysis is conducted using VOSviewer, a tool for visualizing bibliometric networks based on co-citation, co-authorship, and keyword co-occurrence.

### 2.2. Data Collection

- Database Selection: Select a comprehensive academic database such as Scopus, Web of Science, or PubMed, which offers extensive coverage of peer-reviewed journals.
- Search Strategy: Use keywords related to the core concepts of the study, such as "governance in public institutions," "information systems," "management control systems," "governance optimization," and "public sector."
  - Example query: "Governance AND (Information Systems OR Management Control) AND Public Institutions"
- Time Frame: Define a relevant time frame (e.g., the last 20 years) to capture recent developments and trends in the field.
- Inclusion Criteria: Include peer-reviewed articles, reviews, and conference papers that focus on governance in public institutions, particularly those that discuss information systems and management control.
- Data Export: Export the bibliometric data (e.g., titles, abstracts, keywords, authors, citations) from the selected database in a format compatible with VOSviewer (e.g., .ris, .csv).

### 2.3. Data Analysis Using VOSviewer

- Network Construction :



- Co-Occurrence of Keywords: Use VOSviewer to create a network map of the most frequently occurring keywords in the selected articles. This will help identify key themes and concepts related to governance optimization.
- Co-Authorship Analysis: Construct a co-authorship network to identify the most influential authors and collaborations in the field.
- Citation Analysis: Perform a citation analysis to determine the most cited articles, which can indicate the foundational literature on the topic.
- Visualization:
  - Cluster Analysis: VOSviewer will automatically group related items into clusters, which can be visualized in different colors. Each cluster represents a specific research theme or topic.
  - Density Visualization: Use density visualizations to identify areas with a high concentration of research activity, which may indicate hot topics in the field.
- Interpretation:
  - Keyword Co-Occurrence: Analyze the co-occurrence network to understand the relationships between different concepts and how they contribute to governance optimization. Look for clusters that combine "information systems" and "management control" with "governance."
  - Influential Authors and Articles: Identify key contributors to the field and foundational articles that have shaped the current understanding of governance optimization in public institutions.
  - Emerging Trends: Examine the network for emerging themes or gaps in the literature that could inform future research directions.

#### **2.4. Validation and Reliability**

- Validation: Cross-check the results with other bibliometric tools or databases to ensure consistency and reliability.
- Sensitivity Analysis: Conduct sensitivity analyses by adjusting the thresholds for co-occurrence and citation to test the robustness of the findings.

#### **2.5. Reporting the Results**

- Visual Presentation: Present the network maps generated by VOSviewer in the results section of your paper, highlighting key clusters and trends.
- Discussion: Discuss the implications of the findings for the optimization of governance in public institutions, particularly focusing on how information systems and management control systems are represented in the literature.
- Conclusion: Conclude by summarizing the key insights gained from the bibliometric analysis and suggesting areas for future research

### **3. Results**

#### **3.1. CO OCCURENCE AND ALL KEYWORDS**

- Density visualization

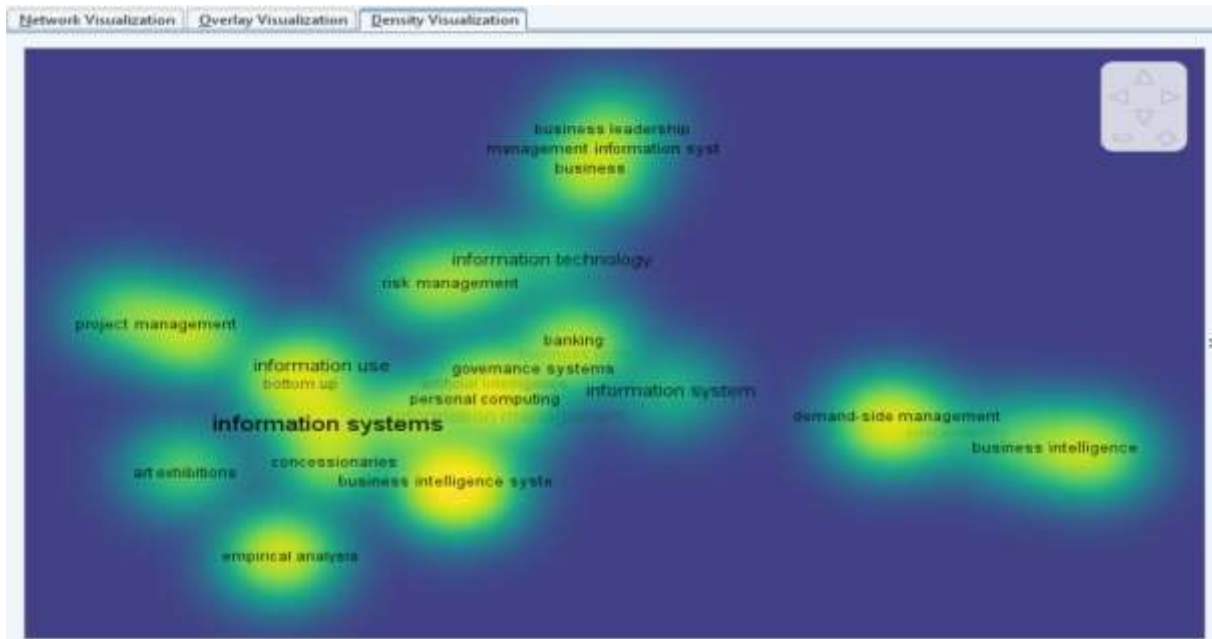


Figure 2 : Density visualization of CO OCCURENCE AND ALL KEYWORDS  
Source :vosviewer software

This figure presents a density visualization of key topics related to *"Optimization of governance in public institutions: the catalytic potential of information systems and management control."*

- **Overview:** The heatmap highlights areas of higher conceptual density within the field of information systems and governance, with brighter areas representing clusters of more frequent or significant terms.
- **Clusters:**
  - The central and largest cluster is focused on **information systems**, **information use**, and **information management**, indicating their foundational role.
  - Related concepts like **governance systems**, **business intelligence**, and **risk management** are distributed across the map, showing their connections to the central theme.
  - Peripheral clusters include topics such as **project management**, **demand-side management**, and **business leadership**, which represent more specialized areas.
  - A smaller cluster involving **art exhibitions** and **empirical analysis** may reflect interdisciplinary connections or less frequent topics.
- **Insights:** The visualization underscores the integrative role of information systems in governance, linking diverse aspects such as technology, management, and intelligence. The clustering of terms suggests focal areas for further exploration in public institutions.

➤ Overlay visualization

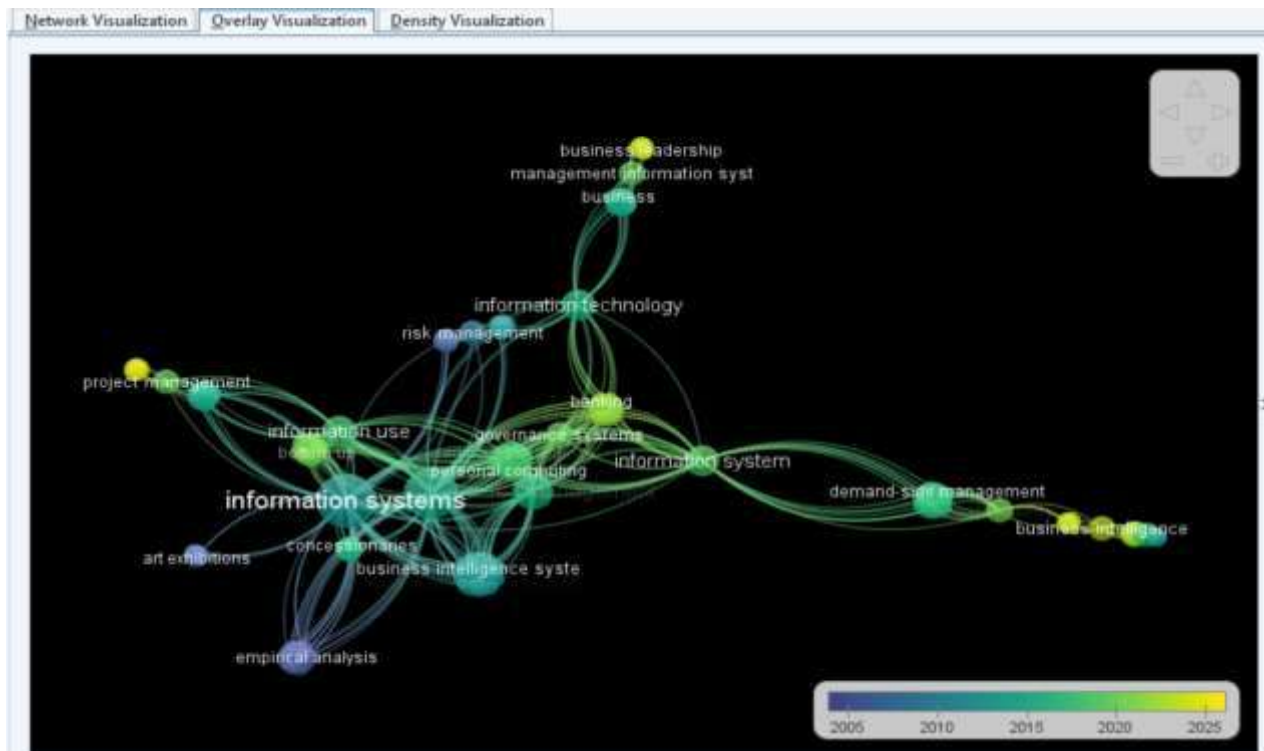


Figure 3: **Network Visualization of Key Concepts in Information Systems and Governance**

Source : vosviewer software

This figure presents a network visualization of key concepts related to the topic *"Optimization of governance in public institutions: the catalytic potential of information systems and management control"*

#### Network Structure:

- The **nodes** represent key concepts such as **information systems**, **governance systems**, **risk management**, **business intelligence**, and **project management**.
- The **links** between nodes signify relationships or frequent co-occurrences of these concepts within the analyzed corpus.

#### Centrality and Clusters:

- The concept **information systems** serve as the central node, emphasizing its pivotal role in the network and its strong connections with related topics.
- Secondary clusters are observed around terms such as **business intelligence**, **risk management**, and **project management**, reflecting specialized focus areas within governance and public institutions.

#### Temporal Evolution:

- The **color gradient** of the nodes and links corresponds to a temporal scale from 2005 to 2025, as shown in the color bar at the bottom of the figure.

- More recent concepts, such as **business intelligence** and **demand-side management**, appear in brighter colors, indicating their emergence or increased relevance in recent years (post-2020).

### Interpretation:

- The visualization demonstrates the intricate relationships between key concepts in the optimization of governance within public institutions.
- It highlights the catalytic role of **information systems** in connecting various elements of governance, technology, and management control, underscoring their strategic importance in driving public sector reforms.

### ➤ Network visualization

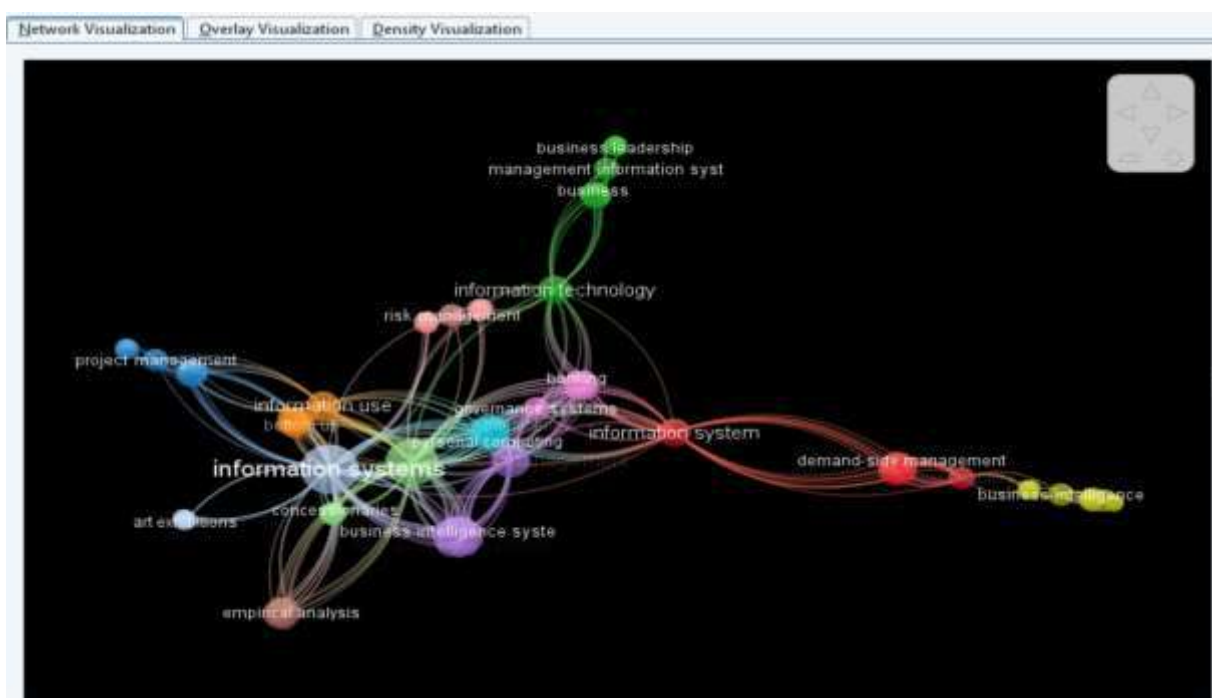


Figure 4 :Network visualization of CO OCCURENCE AND ALL KEYWORDS  
Source :vosviewer software

This figure presents an overlay network visualization, highlighting the relationships between key concepts related to the topic "*Optimization of governance in public institutions: the catalytic potential of information systems and management control.*"

### Network Structure:

- The **nodes** represent key concepts such as **information systems**, **governance systems**, **risk management**, and **business intelligence**, with colors indicating distinct thematic clusters.
- The **links** between nodes represent relationships and co-occurrences, offering insights into the interconnections within the field.

### Clusters and Colours:

- Distinct clusters are identified by different colours:
  - The **central cluster** (white) focuses on **information systems**, emphasizing its integrative role in the network.
  - The **red cluster** highlights concepts such as **demand-side management** and **business intelligence**, indicating recent specialization in these areas.
  - Other clusters, such as the green cluster (**management information systems** and **business leadership**) and the blue cluster (**project management**), represent specific themes contributing to governance and public sector management.

### Interpretation:

- The visualization underscores the central role of **information systems** in the governance of public institutions, acting as a catalyst to integrate aspects such as risk management, business intelligence, and project management.
- The differentiation of thematic clusters suggests complementary research directions or emerging subfields in the modernization of public institutions.

### 3.2. CO OCCURENCE AND AUTHOR KEYWORDS

- "governance" AND "management control" AND "NEW PUBLIC MANAGEMENT "

➤ Density visualization

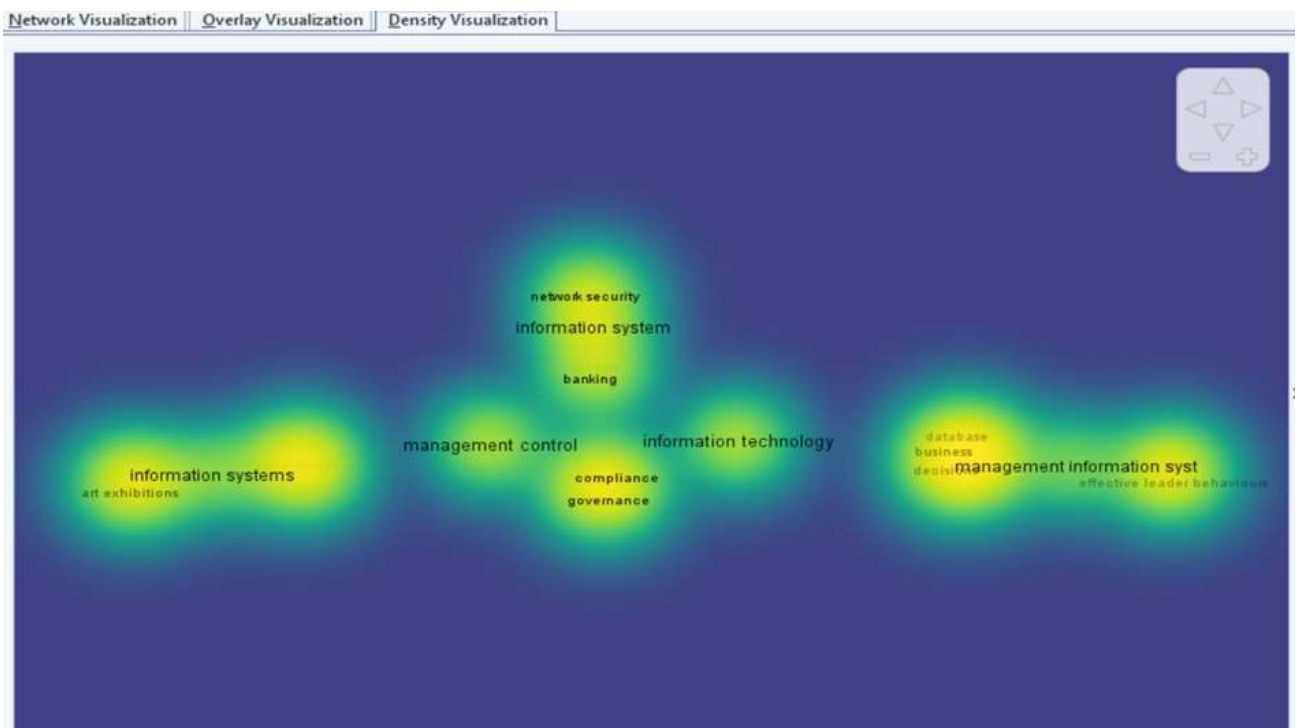


Figure 5 : Density visualization of CO OCCURENCE AND AUTHOR KEYWORDS

Source : vosviewer software

This figure illustrates a density visualization of concepts related to "*Optimization of governance in public institutions: the catalytic potential of information systems and management control.*"

### Concept Clusters:

- The visualization highlights three primary density areas:
  1. **Left Cluster:** Focused on **information systems**, this area emphasizes foundational topics such as **art exhibitions**.
  2. **Central Cluster:** Anchored by **management control** and **information system**, this area connects to themes such as **governance**, **compliance**, and **banking**, showcasing its centrality in the governance process.
  3. **Right Cluster:** Centered on **management information systems**, this cluster highlights advanced topics like **database management**, **business decisions**, and **effective leader behaviors**, reflecting managerial applications of information systems.

### Density Gradients:

- Higher density areas (brighter regions) indicate topics with greater relevance or frequency in the analyzed data.
- **Information system** and **management control** appear as pivotal concepts bridging the left and right clusters.

### Interpretation:

- The visualization underscores the critical role of **information systems** and **management control** in public sector governance.
- It highlights the integration of governance, technology, and decision-making frameworks, showcasing the multi-dimensional nature of these concepts in optimizing governance structures.

### ➤ Network visualisation

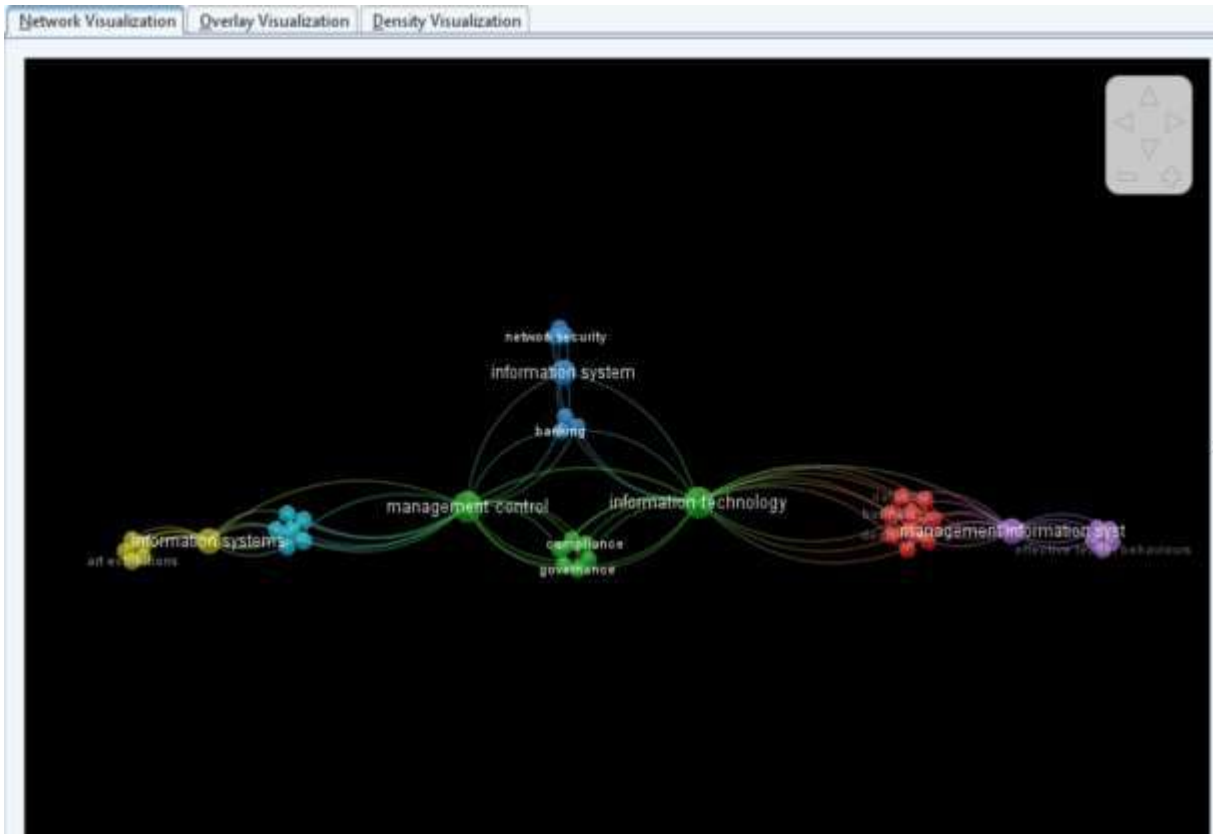


Figure 6 :Network visualization of CO OCCURENCE AND ALL KEYWORDS

Source : vosviewer software

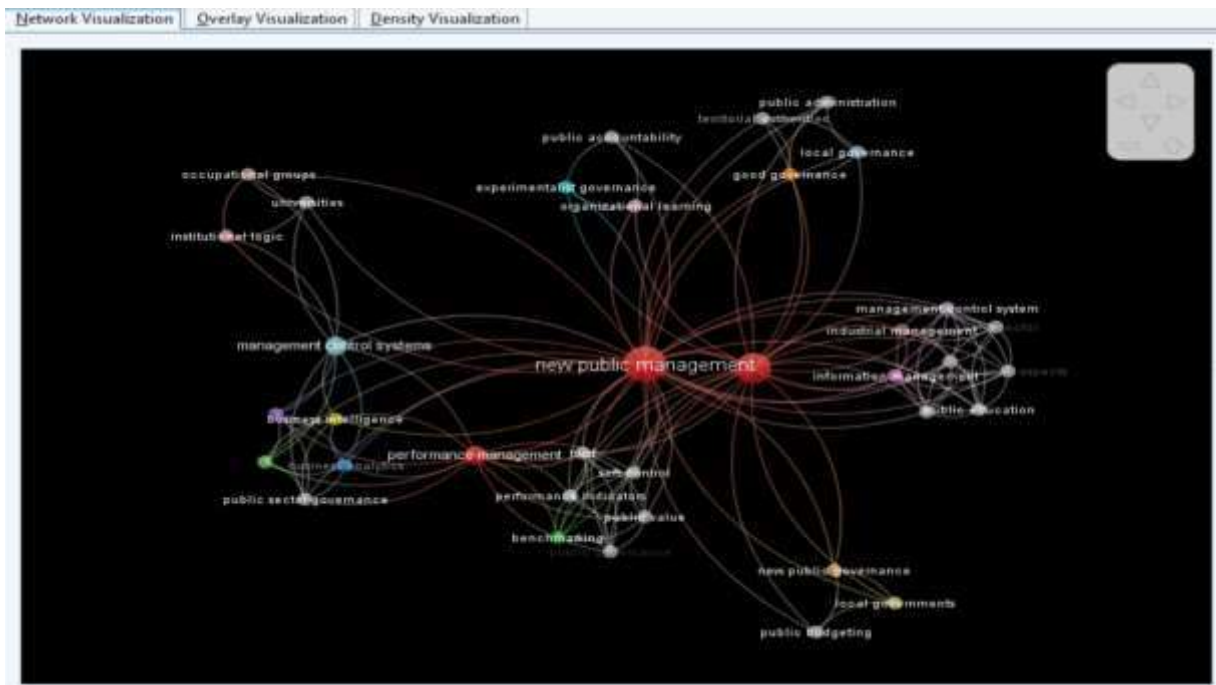


Figure 7 :Network visualization of CO OCCURENCE AND ALL KEYWORDS

Source : vosviewer software

This figure illustrates a Network visualization of CO OCCURENCE AND ALL KEYWORDS related to "Optimization of governance in public institutions: the catalytic potential of information systems and management control."

### **Concept Clusters:**

The network visualization highlights three primary clusters of related concepts:

#### 1. Left Cluster:

Focused on Information Systems (IS), this area emphasizes foundational topics such as digital governance, data management, and transparency. It underscores the importance of technology in enabling the effective functioning of public institutions, highlighting how information systems facilitate access to data and improve decision-making processes.

#### 2. Central Cluster:

Anchored around Management Control and Information Systems, this cluster connects key themes such as governance, performance measurement, accountability, and resource optimization. It showcases the central role of information systems and management control in governance processes, demonstrating how these elements bridge policy formulation, execution, and monitoring within public institutions.

#### 3. Right Cluster:

Centered around Management Information Systems (MIS), this cluster emphasizes advanced topics like strategic planning, big data analytics, and performance optimization. It highlights the managerial and strategic applications of information systems in enhancing the operational efficiency and agility of public institutions, with a focus on data-driven decision-making and continuous improvement.

### **Density Gradients:**

#### - Higher Density Areas (Brighter Regions):

The brighter regions in the visualization represent concepts with greater relevance or frequency in the data, particularly around Information Systems and Management Control. These clusters indicate that these areas are of central importance in the optimization of governance structures within public institutions.

#### - Bridging Concepts:

Information Systems and Management Control emerge as pivotal concepts that bridge the left and right clusters. This connection highlights how foundational technologies and control mechanisms are integrated into governance frameworks to enhance transparency, performance, and accountability in public institutions.

### **Interpretation:**

Critical Role of Information Systems and Management Control:



The visualization underscores the catalytic role of Information Systems and Management Control in optimizing governance within public institutions. These tools facilitate better decision-making, transparency, and accountability, all of which are essential for effective governance.

Integration of Technology and Governance:

The network highlights the integration of governance, technology, and management frameworks, illustrating the multi-dimensional nature of these concepts. By connecting digital tools with management control mechanisms, the visualization suggests that the optimization of governance structures is not only about enhancing operational efficiency but also about driving strategic change through technology-enabled decision-making.

Multi-Dimensional Nature of Governance:

The visualization reflects the interconnected nature of governance, emphasizing the dynamic relationship between data management, strategic planning, and performance measurement. These elements, supported by robust information systems, enable public institutions to adapt and evolve in response to complex societal needs.

### ➤ Density visualisation

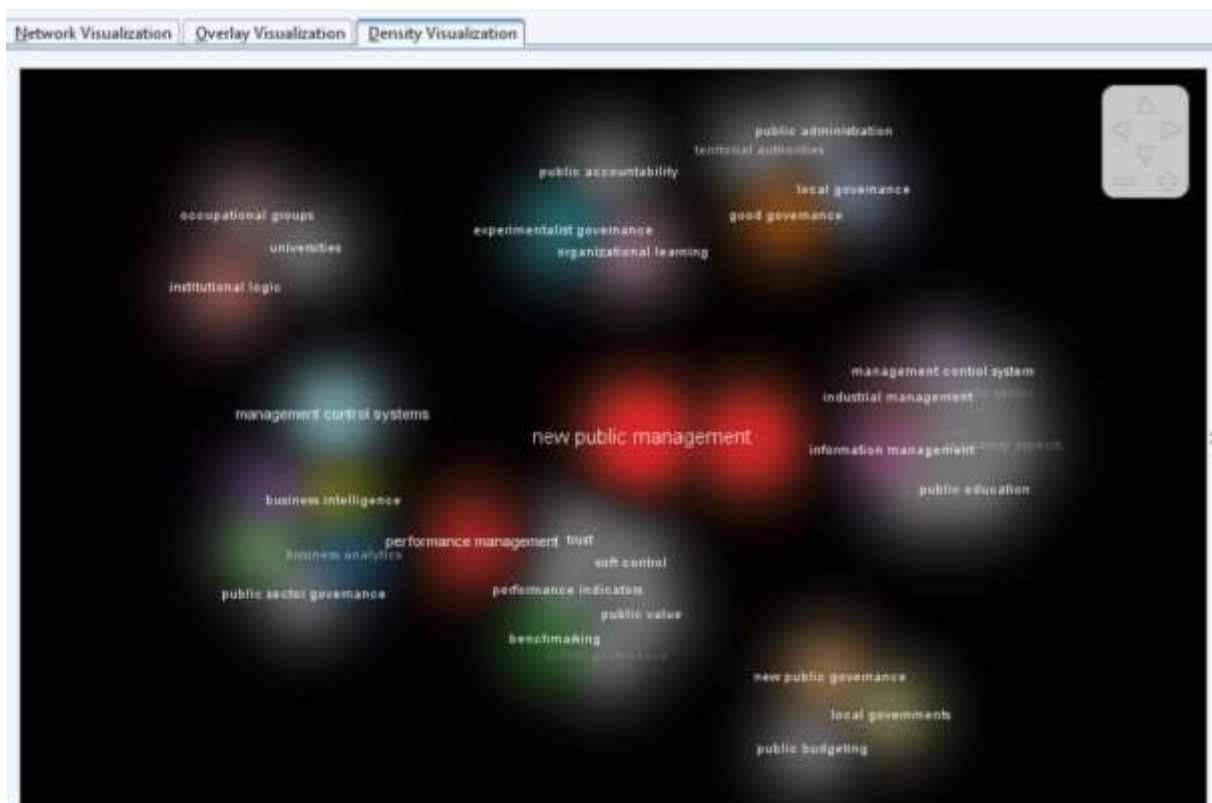


Figure 8 :Density visualization of CO OCCURENCE AND ALL KEYWORDS  
Source :vosviewer software

This figure illustrates a Density visualization of CO OCCURENCE AND ALL KEYWORDS

related to "Optimization of governance in public institutions: the catalytic potential of information systems and management control."

### Concept Clusters:

The density visualization of co-occurrence and all keywords highlights key thematic clusters across the data:

#### 1. Left Cluster:

This cluster is primarily focused on foundational **Information Systems** concepts such as **digital governance**, **data transparency**, **public service delivery**, and **data management**. The emphasis here is on the infrastructure and technological frameworks necessary for optimizing governance in public institutions. These concepts reflect how information systems enhance the flow of information, support administrative functions, and enable transparency within public institutions.

#### 2. Central Cluster:

The central area is anchored by **Management Control**, **Governance**, and **Information Systems**. It connects with key themes such as **accountability**, **performance measurement**, **strategic planning**, and **resource management**. This cluster illustrates how **management control** and **information systems** are central to the public governance process, enabling efficient decision-making, performance tracking, and the implementation of governance policies.

#### 3. Right Cluster:

Focused on **advanced management tools** like **Business Intelligence (BI)**, **Big Data**, and **data analytics**, this cluster highlights the more sophisticated application of information systems for decision support, organizational performance, and the strategic alignment of public sector goals. It reflects the growing role of **technology-driven management** practices in achieving **performance optimization** and **public sector reform**.

### Density Gradients:

#### Higher Density Areas (Brighter Regions):

The brighter areas of the visualization indicate higher frequency and relevance of co-occurring keywords, especially in the central and left clusters. Keywords like **information systems**, **management control**, **performance**, and **governance** appear with higher intensity, demonstrating their central importance in the optimization of public sector governance.

### Bridging Concepts:

**Information Systems** and **Management Control** serve as bridging concepts between the left and right clusters. These terms are vital connectors that tie together **technology**, **governance**, and **management** in the context of public institutions, showcasing their critical role in facilitating both day-to-day operations and strategic management.

**Interpretation:****Central Role of Information Systems and Management Control:**

The visualization emphasizes the catalytic role of **Information Systems** and **Management Control** in the optimization of governance in public institutions. Both concepts play crucial roles in improving **efficiency**, **accountability**, and **transparency**, acting as the backbone for data-driven decision-making and performance monitoring within public organizations.

**Technological Integration in Governance:**

The visualization underscores the growing importance of **digital transformation** in governance. The integration of **information technologies** with **management control** systems facilitates a more responsive, agile, and transparent governance model, allowing public institutions to better meet the demands of citizens and improve service delivery.

**Strategic Application of Data-Driven Tools:**

The right cluster's focus on advanced concepts like **Big Data**, **Business Intelligence**, and **decision support systems** reveals the trend toward leveraging sophisticated data analytics tools in the public sector. These tools not only optimize performance but also provide insights that drive policy and decision-making at a strategic level.

**Multi-Dimensionality of Governance Optimization:**

The network visualization reveals that optimizing governance is a complex, multi-dimensional process that spans from operational-level data management to high-level strategic planning. By connecting these dimensions, the visualization illustrates how **information systems** and **management control** interact across various levels to create a more efficient and accountable public sector.

This structure helps convey the insights and interpretations drawn from the density visualization of co-occurrence and all keywords, tying it back to the central themes of optimizing governance through information systems and management control in public institutions.

**4. Discussion**

In our analysis of the topic "Optimization of Governance in Public Institutions: The Catalytic Potential of Information Systems and Management Control" using VOSviewer, several key insights emerged that provide a comprehensive understanding of the current research landscape.

**4.1. Key Themes and Clusters**

Through the VOSviewer analysis, we identified several dominant clusters representing the central themes in the literature. These clusters, such as "information systems integration," "management control practices," and "governance frameworks," illustrate the interconnectedness of these concepts. The visualization revealed that themes like "efficiency," "transparency," and "accountability" are closely linked, underscoring the importance of integrating information systems with management control to optimize governance in public institutions.

**4.2. Research Trends Over Time**

Our analysis also highlighted the temporal evolution of research within this domain. Over the years, there has been a noticeable shift towards the digital transformation of governance, with an increasing focus on the role of technology in public sector management. The emergence of topics such as "big data analytics" and "digital governance" suggests that the integration of advanced information systems is becoming crucial for enhancing management control and improving governance outcomes.

### **4.3. Geographical and Institutional Influences**

The geographical distribution of research revealed a concentration of studies in Western countries, with less focus on developing nations. This finding is particularly relevant for our work on Morocco's health system, emphasizing the need for more localized research that addresses the

specific challenges faced by public institutions in these regions. Additionally, the co-authorship networks highlighted key institutions leading the research in this area, offering potential opportunities for collaboration and knowledge exchange.

### **4.4. Implications for Public Institutions**

The insights gained from our VOSviewer analysis have significant implications for public institutions, particularly in the context of governance optimization. The integration of information systems and management control mechanisms can drive greater transparency, enhance decision-making processes, and improve accountability within public institutions. For instance, in the Moroccan health system, implementing a unified information system across regional health groups could lead to better resource management, monitoring, and evaluation, thereby optimizing governance.

### **4.5. Limitations and Future Research Directions**

While our analysis provided valuable insights, we acknowledge certain limitations, such as the availability and quality of the data used. These limitations may affect the comprehensiveness of our findings. Moving forward, future research should explore underrepresented areas in the literature, such as the potential of emerging technologies like artificial intelligence and blockchain to further enhance management control and governance in public institutions.

This discussion not only contextualizes our findings within the broader research landscape but also highlights the practical applications of our work, particularly in optimizing governance within public institutions like the health system in Morocco.

### **4.6. Comparative Analysis with Existing Literature**

The existing literature on governance optimization in public institutions emphasizes the critical role of advanced information systems in enhancing decision-making processes. Many studies highlight that these systems facilitate quicker access to data, thereby improving the overall efficiency of governance. Our findings resonate with this perspective, indicating that the implementation of such systems positively influences decision-making.

Furthermore, research consistently underscores the importance of a structured management control framework in promoting transparency and accountability within public institutions. This is reflected in our results, which suggest that organizations that adopt formal management control practices see a noticeable improvement in stakeholder trust and accountability.

Additionally, literature points out the synergistic benefits of integrating information systems with management control practices, often leading to higher user satisfaction with public services. Our analysis aligns with this view, demonstrating that institutions that effectively combine these elements report improved user experiences.

Finally, numerous studies advocate for the significance of employee training in leveraging information systems to their full potential. Our results support this notion, indicating that organizations that prioritize training see enhanced governance capabilities among their staff. Overall, our findings affirm the established theories in the literature, highlighting the vital interplay between information systems, management control, and effective governance

## **Conclusion and Practical Recommendations**

In light of our findings on the optimization of governance through information systems and management control, several practical recommendations emerge for public decision-makers and practitioners:

**Invest in Advanced Information Systems:** Public institutions should prioritize the adoption of advanced information systems to streamline decision-making processes. This includes assessing existing systems and investing in technologies that enhance data accessibility and analysis.

**Establish Structured Management Control Frameworks:** Developing clear and formal management control frameworks can significantly enhance transparency and accountability. Institutions should implement policies that define roles, responsibilities, and reporting mechanisms.

**Integrate Information Systems with Management Practices:** To maximize user satisfaction and operational efficiency, public institutions should ensure that their information systems are effectively integrated with management control practices. This can be achieved through collaborative training sessions and cross-departmental initiatives.

**Prioritize Employee Training:** Continuous training programs for employees on the use of information systems are essential. Institutions should invest in tailored training initiatives that enhance staff competency and encourage the effective use of technology in governance.

**Engage Stakeholders:** Public institutions should actively engage stakeholders when implementing new systems and controls. This can foster trust and ensure that the systems meet the needs of all users.

By implementing these recommendations, public institutions can better leverage information systems and management control practices to optimize governance and enhance service delivery. Finally, this study has explored the significant role that information systems and management control systems can play in optimizing governance within public institutions. By integrating Governance Theory, the Technology Acceptance Model, and the Levers of Control Framework, the research highlights how these tools contribute to enhancing transparency, accountability, and efficiency. The findings suggest that when effectively implemented, information systems improve data accuracy and decision-making processes, while management control systems ensure alignment with institutional goals, ultimately leading to better governance outcomes.

Moreover, the study reveals that the successful integration of these systems is not without challenges. Issues such as resistance to change, technical complexities, and the need for capacity-building are critical factors that institutions must address. However, the potential benefits, including increased public trust, sustainable performance, and improved service delivery, underscore the importance of continuing to innovate and invest in these areas.

In conclusion, the optimization of governance in public institutions through the strategic use of information systems and management control systems offers a viable path toward more

responsive, accountable, and efficient public administration. Future research should focus on empirical studies that further investigate these relationships and explore context-specific challenges and solutions. By doing so, public institutions can better navigate the complexities of modern governance and meet the evolving needs of the societies they serve.

## References

- Abernethy, M. A., & Brownell, P. (1997). Management control systems in research and development organizations: The role of accounting, behavior and personnel controls. *Accounting, Organizations and Society*, 22(3-4), 233-248.
- Chenhall, R. H. (2003). Management control systems design within its organizational context: Findings from contingency-based research and directions for the future. *Accounting, Organizations and Society*, 28(2-3), 127-168.
- Cordella, A., & Bonina, C. M. (2012). A public value perspective for ICT-enabled public sector reforms: A theoretical reflection. *Government Information Quarterly*, 29(4), 512-520.
- DAHANE, A. B., AKRICH, S., ELKTIRI, L., & EL BETTIOUI, R. A. C. H. I. D. (2024). IMPACT DE LA COMPTABILITE ANALYTIQUE SUR LA PERFORMANCE FINANCIERE DES BANQUES MAROCAINES: EFFET MODERATEUR DES SYSTEMES D'INFORMATION.: O efeito moderador dos sistemas de informação. *IJDAM• International Journal of Digitalization and Applied Management*, 1(1), 42-56. DOI : <https://doi.org/10.23882/ijdam.24089>
- Granlund, M., & Mouritsen, J. (2003). Introduction: Problematising the relationship between management control and information technology. *European Accounting Review*, 12(1), 77-83.
- Heeks, R. (2006). *Implementing and managing eGovernment: An international text*. Sage.
- Kaufmann, D., & Kraay, A. (2002). Governance indicators, aid allocation, and the Millennium Challenge Account. *World Bank Research Paper*.
- Laudon, K. C., & Laudon, J. P. (2020). *Management information systems: Managing the digital firm*. Pearson.
- Merchant, K. A., & Van der Stede, W. A. (2017). *Management control systems: Performance measurement, evaluation and incentives*. Pearson Education.
- OECD. (2015). *OECD principles of corporate governance*. OECD Publishing.
- Rom, A., & Rohde, C. (2007). Management accounting and integrated information systems: A literature review. *International Journal of Accounting Information Systems*, 8(1), 40-68.
- Simons, R. (1995). *Levers of control: How managers use innovative control systems to drive strategic renewal*. Harvard Business Press.
- Sisaye, S., Biru, A., & Rojas, E. (2020). The Impact of Artificial Intelligence on Management Accounting and Control Systems: A Review of the Literature and Agenda for Future Research. *Journal of Management Accounting Research*, 32(1), 1-31.
- United Nations (UN). (2020). *E-Government Survey 2020: Digital government in the decade of action for sustainable development*. United Nations.
- Venkatesh, V., Brown, S. A., & Bala, H. (2012). Bridging the qualitative-quantitative divide: Guidelines for conducting mixed methods research in information systems. *MIS Quarterly*, 36(1), 21-54.
- Westerman, G., Bonnet, D., & McAfee, A. (2014). *Leading digital: Turning technology into business transformation*. Harvard Business Press.