

Linking Management Control Systems to Performance Evaluation in Public Sector Enterprises: A Configurational Approach Based on Effectiveness, Efficiency, and Quality

1st Kaoutar Moudden

MOUDDEN Kaoutar
*Laboratoire Panafricain de Recherche
 en Economie, Management et
 Innovation, ENCG – Université Moulay
 Ismail, Meknes.*
 kaoutar.moudden@gmail.com

2nd Mohammed Kaicer

Laboratory of Analysis, Geometry and
 Applications
 Faculty of Sciences, University of Ibn
 Tofail
 mohammed.kaicer@uit.ac.ma

3rd Youssef Samihi

Research Laboratory in Management
 Sciences of Organizations
 ENCG, Ibn Tofail University
 youssef.samih@uit.ac.ma

4th Soukaina Ait Ouaores

Faculty of Sciences, University of Ibn
 Tofail
 aitouaores.soukaina@gmail.com

Abstract -In the context of ongoing reforms in the public sector, the evaluation and management of performance have become critical challenges. This article investigates the contribution of management control systems (MCS) to the improvement of organizational performance, considering its multidimensional nature, efficiency, effectiveness, and quality. Using a configurational approach (fsQCA) complemented by a weighted mathematical modeling, the study reveals multiple contextual and organizational configurations that explain overall performance. Findings highlight the central role of organizational culture, budgetary simplification, and information system modernization, while demonstrating an equifinality logic. The confrontation between fsQCA results and quantitative simulation illustrates the complementarity of both approaches, offering a richer understanding of the complex interplay between managerial practices and performance outcomes. Theoretically, this research advances the literature by combining configurational and weighted approaches. From a managerial perspective, it provides a framework for performance evaluation and steering, tailored to the specificities of public enterprises in Morocco.

Keywords: *Public sector; Performance Evaluation; Management Control Systems Configurational Approach; Weighted Modeling.*

I. INTRODUCTION

In recent decades, public enterprises have been at the center of profound structural and managerial transformations, largely driven by reforms inspired by New Public Management (NPM). These transformations aim to enhance public sector performance by strengthening managerial accountability, introducing results-oriented approaches, and promoting efficiency in resource management. Within this context, the management control system (MCS) has progressively become an essential tool for steering performance.

However, while the adoption of management instruments borrowed from the private sector has modernized certain processes, it has also raised significant concerns. The specificities of the public sector, multiplicity of objectives, institutional constraints, political pressure, and the need for legitimacy vis-à-vis diverse stakeholders, render a simple transposition of private management models inadequate (Anthony, 1965; Ferreira & Otley, 2009). In the public sector, the MCS goes beyond its traditional role of budgetary oversight to act as a mechanism of mediation, regulation, and legitimation between often contradictory demands: regulatory compliance, performance expectations, social equity, and economic efficiency.

Accordingly, public performance cannot be understood in a one-dimensional way. It requires an integrated perspective encompassing three fundamental dimensions:

Effectiveness, referring to the ability to achieve the objectives set, in line with the mission of public service (Pollitt & Bouckaert, 2011; Boyne, 2002).

Efficiency, emphasizing the rational use of resources in relation to the outcomes achieved (OECD, 2005; Dunleavy et al., 2006).

Quality, which encompasses users' perceived quality, service standards, and continuous improvement mechanisms (Behn, 2003; Osborne & Gaebler, 1992).

Nevertheless, several studies stress that the influence of MCS on these performance dimensions is neither linear nor isolated. Its effects result from complex interactions among multiple contextual factors, including organizational culture, leadership style, accountability structures, and the level of digitalization of information systems (Malmi & Brown, 2008; Gerdin, 2005). In this regard, conventional analytical approaches struggle to fully capture such complexity.

To address this, the present study employs a configurational approach, and more specifically the fuzzy-set Qualitative Comparative Analysis (fsQCA) method. This approach enables the identification of multiple causal configurations, that is, combinations of conditions that jointly lead to high performance. It also recognizes the principle of equifinality: multiple, distinct pathways may result in the same favorable outcome, depending on the specific interplay of factors.

Drawing on empirical research conducted with a sample of Moroccan state-owned enterprises with a commercial orientation, this study pursues three main objectives:

To empirically assess the impact of MCS on public performance across its effectiveness, efficiency, and quality dimensions.

To identify the combinations of organizational and institutional factors that, in interaction with MCS, lead to high performance.

To discuss the theoretical and practical implications for the design and adaptation of control systems in public sector contexts.

By adopting both an analytical and contextual perspective, this study complements previous findings centered on global performance configurations. It provides a more refined understanding of the specific levers of performance across its different dimensions, thereby offering concrete insights for public decision-makers while enriching the academic debate on contemporary public management.

II. LITERATURE REVIEWS

1. From State Modernization to Public Enterprise Reform: A Global Dynamic

Since the 1980s, the movement of state reform, largely driven by the doctrines of New Public Management (NPM), has profoundly transformed the functioning of public administrations and organizations on a global scale (Hood, 1991; Dunleavy & Hood, 1994). This managerial paradigm, initially developed in Anglo-Saxon countries, was built on the desire to break away from the bureaucratic rigidities of the traditional Weberian model, in favor of management approaches focused on results, process efficiency, and a culture of performance. The introduction of private-sector-inspired mechanisms, such as contractualization, management by objectives, managerial accountability, and performance evaluation, represents one of the major hallmarks of this evolution.

Within this context, public enterprises, long regarded as state-owned entities dedicated primarily to public service missions, have been directly affected by these transformations. They are now expected to adopt more efficient managerial practices while preserving their commitment to the public interest (Christensen & Lægred, 2011; Pollitt & Bouckaert, 2017). This hybridization of public and private logics raises significant challenges in terms of

steering, regulation, and performance, particularly in institutional environments characterized by political, cultural, and administrative constraints.

In Morocco, this dynamic has been reflected in a series of ambitious reforms, embedded within a broader vision of modernizing the public sector. The reform of state-owned firms has been placed at the core of government priorities, with the aim of rationalizing resources, strengthening transparency, and improving both the economic and social performance of these entities. Initiatives such as the introduction of performance contracts, the redesign of evaluation mechanisms, the enhancement of governance frameworks, and the implementation of performance indicators illustrate this progressive transformation of the commercial public sector. These reforms are also aligned with a wider framework of public managerial accountability, consistent with international recommendations regarding good governance and fiscal discipline.

Thus, the reform of public firms in Morocco is fully embedded within the global trajectory of state modernization, while seeking to adapt the principles of NPM to the country's specific structural, institutional, and socio-economic realities.

2. The Management Control System in Public Organizations: Between Adaptation and Hybridization

The management control system (MCS) has become an essential tool for steering performance within public organizations. Borrowed from private-sector practices, it relies on a combination of tools and mechanisms such as dashboards, reporting, internal audits, budgetary control, and performance evaluation (Otley, 1999; Simons, 1995). These mechanisms enable public managers to plan, coordinate, monitor, and adjust actions in a way that aligns strategically with the objectives set by political authorities or stakeholders.

However, the application of standard management control models in public organizations is not straightforward. Their effectiveness largely depends on the degree to which they are adapted to the institutional, cultural, and political specificities of each context (Ferreira & Otley, 2009). In environments characterized by strong administrative traditions, such as in many Global South countries, the MCS often operates within a logic of hybridization. This results in the coexistence of private-sector-inspired instruments, bureaucratic practices inherited from classical administration, and symbolic uses aimed at ensuring compliance or legitimacy (Hassenteufel, 2020).

In Morocco, this hybridization is manifested in the tension between modernization demands, driven by recent reforms seeking to enhance accountability and performance, and constraints related to administrative culture, centralized decision-making, and limited managerial autonomy. MCS tools are sometimes implemented superficially, without genuine appropriation by actors, limiting their transformative potential. In this context, the MCS cannot be reduced to a set of neutral technical instruments: it becomes a socially constructed system, shaped by multiple logics, political,

organizational, and cultural, that must be analyzed contextually.

3. Public Performance: A Plural, Multidimensional, and Politically Constructed Concept

The notion of performance in the public sector fundamentally differs from that in the private sector, where financial profitability is a central criterion. In public organizations, performance is multidimensional and cannot easily be reduced to standardized quantitative indicators. It encompasses complementary dimensions such as effectiveness (the ability to achieve set objectives), efficiency (the relationship between resources mobilized and results achieved), service quality, equity in access to public services, user satisfaction, and the sustainability of outcomes produced (Van Dooren et al., 2015; Talbot, 2010).

This plurality makes the evaluation of public performance particularly challenging. It requires measurement tools capable of capturing not only immediate results but also delayed, qualitative, and sometimes subjective effects. Moreover, the very definition of performance criteria is the subject of negotiation among various actors, political decision-makers, managers, citizens, and social partners, who may pursue divergent interests. From this perspective, public performance emerges as a political and social construct rather than a simple objective measure (Moynihan, 2008).

Consequently, public performance evaluation systems are often criticized for their excessive technicality or normative approach, which tends to standardize realities that are inherently diverse. To address these limitations, several authors advocate for a more integrated evaluation, based on a weighted approach that accounts for the institutional context, strategic priorities, and the relative importance assigned to each performance dimension (Bouckaert & Halligan, 2008). Such an approach would not only enhance the relevance of evaluation mechanisms but also strengthen their legitimacy among internal and external stakeholders.

4. Towards a Configurational Logic: Moving Beyond Linear and Contingency Approaches

Research on management control systems (MCS) has long been dominated by contingency approaches, which assume an «optimal» fit between certain contextual characteristics, such as organizational size, strategy, or environment, and the control mechanisms adopted (Chenhall, 2003; Donaldson, 2001). While these approaches have provided useful insights, they rely on a linear and isolated view of causal relationships, where each variable exerts a direct and unambiguous effect on performance. In public sector environments, characterized by high institutional complexity and sometimes conflicting objectives, this perspective proves insufficient for understanding the realities of performance management.

In response to the limitations of these deterministic models, configurational approaches offer a richer theoretical and methodological alternative. Rather than seeking a single solution or « best practice », they aim to identify specific combinations of contextual, structural, and managerial conditions that collectively explain performance (Fiss, 2011).

This perspective is based on three fundamental principles: the complementarity of factors, equifinality (i.e., the existence of multiple pathways leading to the same outcome), and causal asymmetry, meaning that a condition present in one pathway to performance may be absent in another.

Within this framework, the fuzzy-set Qualitative Comparative Analysis (fsQCA) method emerges as particularly well-suited. By combining logical rigor with contextual sensitivity, it allows for the modeling of complex causal configurations in the form of recipe leading to a given outcome, in this case the performance of public organizations (Ragin, 2008; Misangyi et al., 2017). It also enables the identification of combinations of factors that are sufficient or necessary for achieving a result, considering interdependence, substitution, or mutual reinforcement among conditions.

In the institutional contexts of emerging countries such as Morocco, where reform dynamics are often characterized by hybridization, uncertainty, and the coexistence of multiple logics (administrative, managerial, political), this approach allows researchers to move beyond classical explanatory frameworks. It provides a more nuanced and realistic understanding of the factors that interactively contribute to enhancing performance in public enterprises.

5. Complementarity between Configurational Logic and Weighted Performance Modeling: An Original Methodological Contribution

An underexplored area in the scientific literature concerns the integration of configurational approaches, such as fsQCA, with weighted performance modeling tools. Although often applied separately, these two analytical frameworks offer a fruitful methodological complementarity. On the one hand, configurational analysis allows for the identification of causal profiles, or recipes, linking various combinations of contextual and managerial conditions to organizational performance. On the other hand, weighted modeling, typically based on multi-criteria techniques, provides a synthetic and integrated quantification of overall performance, considering its multiple dimensions (effectiveness, efficiency, quality, satisfaction, etc.).

Few studies combine these two approaches, even though they can significantly reinforce each other (Greckhamer et al., 2018; Bell et al., 2020). fsQCA provides a detailed, qualitative, and conditional understanding of explanatory factors, capturing interaction effects and equifinality. In turn, weighting performance criteria allows for the construction of an aggregated score, facilitating comparisons across cases and providing a robust measure useful for public decision-makers. This mixed approach thus overcomes the methodological compartmentalization still present in research by integrating qualitative and quantitative dimensions within a cross-validation logic.

Practically, this complementarity enables:

The identification of causal configurations leading to performance via the fsQCA method.

The estimation of a weighted performance score based on multidimensional criteria, reflecting the priorities of the studied context.

The comparison of profiles of high-performing and low-performing organizations, enhancing the robustness of results through triangulation.

This analytical coupling constitutes an original methodological contribution, particularly suited to complex contexts such as Moroccan public enterprises, where performance challenges are multidimensional and highly contextualized. It also provides public decision-makers with tools that are both explanatory and operational.

III. THEORETICAL AND CONCEPTUAL FRAMEWORK

1. *Rethinking Public Sector Performance: Towards a Multidimensional Approach*

In a context of public administration transformation, marked by the spread of New Public Management (NPM) principles, the notion of performance has gradually become a structuring reference for public organizations (Bouckaert & Halligan, 2008; Pollitt & Bouckaert, 2011). Unlike in the private sector, public performance cannot be reduced to financial or profitability indicators. It follows a multidimensional logic, aiming to reconcile sometimes conflicting objectives: meeting social expectations, optimizing resources, and ensuring sustainable service quality for citizens.

From this perspective, three essential dimensions emerge for the evaluation of public performance: effectiveness, efficiency, and quality.

Effectiveness refers to the capacity of a public organization to achieve the strategic and societal objectives assigned to it (Boyne, 2002). It measures the alignment between pursued goals (mission, public mandate) and achieved results, often within a framework characterized by multiple imperatives.

Efficiency concerns the relationship between resources mobilized and results produced. Within a logic of budgetary accountability, it becomes a central criterion for legitimizing public policies, particularly through productivity indicators, unit costs, or timelines (Dunleavy et al., 2006; OECD, 2005).

Quality constitutes a transversal and subjective dimension, encompassing not only compliance with public service standards but also user satisfaction, service responsiveness, accessibility, and personalization. It is often assessed using frameworks such as the Common Assessment Framework (CAF) or the EFQM model (Osborne & Gaebler, 1992; Behn, 2003).

These dimensions are interdependent and should be integrated within a logic of overall performance, where management becomes an exercise in balancing institutional constraints, societal expectations, and available resources.

2. *Management Control Systems: Steering Tools and Performance Levers*

The management control system (MCS) constitutes a strategic device for decision-making and performance management, structuring processes of evaluation, planning, measurement, and organizational learning (Simons, 1995; Otley, 1999). In public organizations, the MCS serves a triple function: ensuring internal regulation, reporting to external stakeholders, and supporting the continuous improvement of services (Van Dooren, Bouckaert & Halligan, 2010).

Historically inspired by private-sector practices, the MCS in the public sector has evolved into a hybrid model, considering the institutional, political, and cultural specificities of public organizations (Anthony, 1965; Ferreira & Otley, 2009). Unlike normative models, the public MCS is not a standardized or universally applicable tool. Rather, it becomes an instrument of mediation between bureaucratic requirements (compliance, legality, administrative control) and emerging performance expectations (results, public value, operational efficiency).

In this sense, the MCS also acts as a lever of legitimation, enabling public managers to justify their decisions, demonstrate responsiveness, and produce a « trace » of performance in environments often characterized by high political or social pressure.

3. *The MCS in the Public Sector: Between Contextual Constraints and Organizational Configurations*

Recent studies emphasize that the MCS does not exert a direct and isolated effect on performance (Malmi & Brown, 2008; Gerdin, 2005). On the contrary, its impact depends heavily on interactions with other contextual factors, such as:

- Organizational structure and the degree of centralization.
- Organizational culture and dominant values.
- Leadership style and team mobilization capacity.
- Adopted strategy and political orientations.
- Institutional, legal, and regulatory environment.

These complex interactions suggest the need for a paradigm shift: moving from a linear logic to a configurational logic. In other words, the goal is no longer to identify a « best practice » or an « optimal » MCS model, but rather to understand which combinations of conditions produce performance effects in each context.

This perspective aligns with both contingency and configurational approaches, which posit that there is no single path to performance, but multiple « performance pathways » (Miller, 1981; Meyer et al., 1993; Fiss, 2007). Each configuration represents a specific arrangement of factors that, taken together, can lead to equivalent outcomes, reflecting the principle of equifinality.

4. *The fsQCA Approach: Modeling Complex Causal Relationships in the Public Sector*

To account for this complexity, the fuzzy-set Qualitative Comparative Analysis (fsQCA) method, developed by Ragin (2000, 2008), offers an appropriate methodological response. This approach enables the identification of causal configurations explaining high (or low) performance levels while simultaneously incorporating multiple conditions.

The strength of fsQCA lies in its ability to:
 Account for multiple pathways to the same outcome (equifinality).
 Model non-linear and asymmetric interactions between variables.
 Reflect the complex and contextual realities of the public sector.
 Integrate subjectivity (through fuzzy membership scores) while maintaining comparative rigor.
 Within the scope of this article, the use of the configurational approach through fsQCA thus aims to better understand how management control systems, in interaction with other contextual factors, can contribute to the overall performance of public enterprises, measured across the dimensions of effectiveness, efficiency, and quality.

IV. METHODOLOGY

1. Epistemological Positioning and Methodological Choice

This research adopts an interpretivist stance, viewing management control and performance evaluation practices as socially situated constructs shaped by institutional, cultural, and organizational dynamics. It employs an abductive logic, facilitating iterative exchanges between empirical observations and theoretical frameworks to uncover explanatory configurations grounded in field realities (Dubois & Gadde, 2002).

The choice of the fsQCA (fuzzy-set Qualitative Comparative Analysis) method, developed by Ragin (2000, 2008), is justified by the aim to explore complex, non-linear causal relationships between organizational practices and overall performance. Unlike traditional statistical approaches, fsQCA enables the identification of combinations of conditions (or causal configurations) that may lead to the same performance level according to the principle of equifinality. It is particularly suitable for studies with a medium number of cases in heterogeneous institutional contexts.

2. Field, Sample, and Data Collection

The study was conducted on a theoretical sample of 25 Moroccan public enterprises with a commercial character, selected from the 57 establishments targeted by the performance reform, representing a sampling rate of 43.8%, well above the 20% threshold often considered the minimum in comparative case studies (Yin, 2018). These enterprises operate in various sectors (transportation, energy, infrastructure, etc.) and are particularly exposed to modernization and performance demands.

Data were collected using a methodological triangulation combining:

Questionnaires administered to managers responsible for control, planning, and evaluation.

Semi-structured interviews with senior executives.

Documentary analysis of activity reports, performance audits, budget documents, and internal indicators.

This plurality of sources allows cross-checking managerial discourse against formal practices, thereby enhancing the internal validity of the data.

3. Modeling Overall Performance

The dependent variable, « overall performance », was modeled based on three fundamental dimensions derived from public management literature:

Effectiveness: achievement of strategic objectives defined by the state.

Efficiency: optimization of financial, human, and technical resource use.

Service quality: level of satisfaction perceived by users or beneficiaries.

A multi-criteria weighting of these dimensions was performed based on expert consensus and empirical validation to create an aggregated overall performance score. This score serves both as the dependent variable in the fsQCA analysis and as a benchmark for numerical comparisons (cross-simulation).

4. Selection and Calibration of Causal Conditions

Based on an extensive literature review and a preliminary exploratory survey, six explanatory conditions were selected for their potential to interact with overall performance:

Table 1 : Causal Conditions: Synthetic Definitions

Condition	Synthetic Definition
Organizational Culture	Degree of shared values, norms, and meaning among members of the organization
Tenure in Position	Length of time managers have held their positions
Hierarchical Levels	Pyramid or flat structure of decision-making levels
Budget Simplification	Degree of fluidity in budgeting processes
IT Modernization	Integration of management and reporting technologies
Cooperation	Degree of collaboration between national and international partners

Source: self authors

These conditions were calibrated as fuzzy-set scores ranging from 0 to 1, following Ragin's methodology (2008), with three thresholds defined: non-membership (0), crossover/ambiguous point (0.5), and full membership (1). Thresholds were established using descriptive statistics and empirically validated against case data.

Table 2 : Causal condition calibration

Source: self authors

5. fsQCA Analysis

The analysis was performed using fsQCA 4.1, following these steps:

Setting a minimum frequency threshold of 1 for inclusion in the analysis.

Setting the consistency threshold at 0.80 to ensure the relevance of retained configurations.

Extracting sufficient causal configurations, distinguishing intermediate and parsimonious solutions.

- Constructing a truth table based on observed combinations of conditions.

Tableau 3 : Extract from the truth table

Configuration	Culture	Cooperation	SPB	MSI	Tenure	Hierarchy	Consistency	Performance
1	1	1	1	1	1	0	0.95	Effectiveness
2	1	0	1	1	1	1	0.91	Efficiency
3	1	1	0	1	1	1	0.87	Quality
...

Source: self authors

The results identified several combinations of conditions leading to high performance levels, illustrating the equifinality logic inherent in the configurational method. These results were then cross validated with the weighted overall performance scores to test the coherence and complementarity between qualitative insights and quantitative validation.

6. Proposed Research Model

Based on the literature review and empirical results, public enterprise performance cannot be understood in a linear or isolated manner but rather through a combination of interdependent factors. fsQCA analyses revealed that overall performance arises from specific configurations incorporating organizational culture, IT modernization, budget simplification, inter-organizational cooperation, as well as governance-related factors and managerial tenure.

These results confirm the configurational and equifinal logic (Fiss, 2011; Misangyi et al., 2017), whereby multiple pathways can lead to the same high-performance outcome. They also align with studies highlighting management control systems as structuring mechanisms of public performance (Ferreira & Otley, 2009; Bouckaert & Halligan, 2018).

Concurrently, constructing a weighted performance evaluation model, based on a mathematical equation integrating coefficients for the different dimensions (effectiveness, efficiency, and quality), complements the configurational approach by providing a quantitative and comparative view of results. This methodological articulation between qualitative-comparative logic (fsQCA) and weighted

Condition	0 (Non-membership)	0.5 (Crossover)	1 (Full membership)
Organizational Culture	< 0.25	0.50	> 0.75
Cooperation	< 0.30	0.60	> 0.80
Budget Simplification	< 0.20	0.50	> 0.80
IT Modernization	< 0.20	0.40	> 0.70
Tenure in Position	< 2 years	4 years	> 6 years
Hierarchy (levels)	> 6 levels	4 levels	< 2 levels

quantitative simulation offers an original framework for analyzing public enterprises, linking strategic diagnosis and operational management.

Thus, the final research model (Figure 1) illustrates the interplay between:

Contextual and organizational conditions (culture, IT systems, cooperation, governance, etc.).

The management control system as a structuring mechanism.

Dimensions of overall performance (effectiveness, efficiency, quality). (Fig 1)

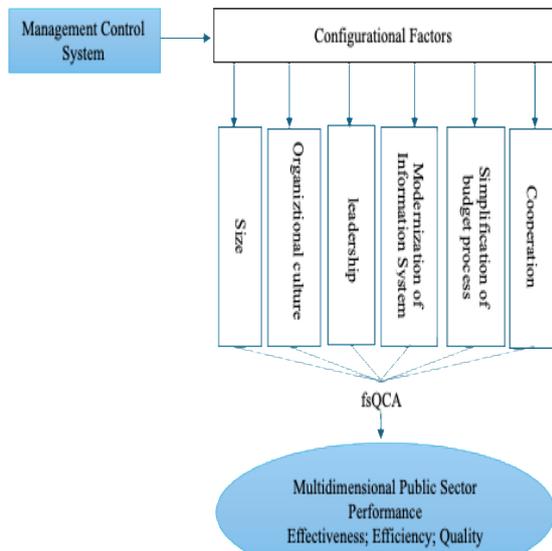


Fig. 1: Integrated configurational Model linking management control system and multidimensional performance in public sector companies

V. RESULTS

1. Quantitative Evaluation of Public Enterprise Performance: Toward an Integrative Model

Evaluating the performance of public enterprises is a complex exercise due to their multiple missions, institutional constraints, and non-profit objectives. Observing the lack of robust tools specifically adapted to the Moroccan context, we developed a mathematical model for evaluating overall performance, complementing the qualitative and configurational analyses derived from the fsQCA method.

This model formalizes performance as a weighted function of three fundamental dimensions, Quality (Q), Effectiveness (E), and Efficiency (F), identified as central through our empirical analysis and validated by the study of high-performing causal configurations. The general equation proposed is as follows:

$$Perfi = Qi.Pq + Ei.Pe + Fi.Pf \text{ (eq.1)}$$

where Q, E, and F represent the scores obtained in the three dimensions, and Pq, Pe, Pf are the weighting coefficients reflecting their strategic importance according to the evaluated scenario.

To test the robustness and flexibility of the model, a series of numerical simulations was performed, varying the initial weights in the discrete set {0;0.5;1} and then extending them to the interval [0;1] in increments of 0.1. This variation allows modulating the impact of each dimension on overall performance and adapting the evaluation to the strategic

priorities of each public enterprise or sector (e.g., prioritizing quality in healthcare or efficiency under tight budget constraints).

Simulations were conducted on a sample of Moroccan public enterprises, initially processed in Excel and subsequently analyzed using Python to visualize performance in three dimensions and detect dynamic patterns. The operational formula applied to each entity *i* is: (Eq1)

For example, a scenario with the following weighted scores:

$Q \cdot Pq = 0.969$, $E \cdot Pe = 0.877$, $F \cdot Pf = 0.929$ results in a total performance of 2.775. Using the average values observed in our sample ($Q = 0.969$; $F = 0.929$; $E = 0.877$) with equal weights provides a reference performance score, adjustable according to strategic priorities.

Based on this formalization, we developed an integrated performance evaluation table including:

Indicators grouped by dimension (Q, E, F) with a 10-point scale.

Weighted aggregation producing a global score.

Visual representation enabling quick identification of underperformance or optimal performance areas.

This table aims to serve as an operational management tool for public decision-makers, allowing objective evaluation, prioritization of action levers, and monitoring of performance evolution over time. This mathematical approach complements the qualitative fsQCA analysis by providing structured quantification of performance, exploring alternative scenarios via weight variation, facilitating inter-enterprise and inter-sector comparisons, and fostering a culture of evaluation and accountability in the Moroccan public sector.

2. Cross-Analysis: Causal Configurations and Quantitative Performance Modeling

A Dual Perspective on Organizational Performance

Our research results are based on two complementary approaches:

On one hand, a configurational analysis (fsQCA) identifying combinations of causal factors associated with high performance.

On the other hand, a weighted mathematical model providing direct quantification of performance across three fundamental dimensions: quality, effectiveness, and efficiency.

Each approach addresses a different aspect of the problem:

The fsQCA method highlights equifinality and the diversity of paths leading to performance.

The quantitative model, conversely, allows measurement of obtained performance, simulation of alternative scenarios, and decision-support tools.

3 Convergences: Centrality of Key Factors in Both Approaches

Table 4 : Cross-analysis reveals notable convergences:

Key Element	fsQCA Results	Performance Model
Organizational Culture	Present in 100% of high-performance configurations	Associated with the quality dimension
Simplification of Procedures	Frequently present in high-performance configurations	Contributes to efficiency through streamlined processes
IT Modernization	Important conditional variable in multiple solutions	Impacts both efficiency and quality
Internal/External Cooperation	Key factor in high-performance configurations	Enhances service quality and collective effectiveness
Tenure in Position	Present in some optimal combinations	Less directly quantifiable, but linked to organizational stability

Source: self authors

Thus, certain qualitative levers necessary for performance translate into measurable improvements in at least one of the Q, E, or F dimensions in the quantitative model.

4 Divergences and Complementarities

Some insights emerge only from one approach, highlighting their complementarity:

fsQCA reveals synergies among factors, e.g., a strong culture combined with internal cooperation and a modern IT system can achieve high performance even if efficiency is moderate.

The quantitative model allows:

Numerical estimation of overall performance.

Identification of imbalances between dimensions.

Customization of weights according to strategic priorities.

A public enterprise can exhibit high performance in the mathematical model (e.g., 2.7/3) without appearing in a high-performance fsQCA configuration if it lacks a key factor (e.g., cooperation) not captured in the quantitative equation.

5. Toward an Integrated Approach

We propose articulating both approaches in a hybrid logic. fsQCA identifies causal configurations underlying performance, guiding organizational reforms, management practices, and structural decisions. The weighted model serves as an operational monitoring tool, enabling performance measurement, scenario simulation, and dashboard construction for decision-makers. This combination allows identifying an optimal configuration, quantifying actual

performance, and highlighting levers to sustainably improve future outcomes.

5.6 Methodological Contribution of Combining fsQCA and Weighted Modeling

This articulation provides a novel analytical framework for Moroccan public enterprises by combining:

Configurational abduction: to explore recurring patterns and explain diverse performance trajectories.

Quantitative deduction: to simulate, test, and evaluate the impacts of concrete actions.

This dual approach links strategic diagnosis (fsQCA) with operational performance management (weighted model), offering a comprehensive and enriched reading of public sector performance.

VI. DISCUSSION: FSQCA AND PUBLIC PERFORMANCE

This section discusses fsQCA results in relation to classical public performance dimensions (effectiveness, efficiency, and quality) and theoretical frameworks. The cross-analysis provides insights into causal configurations in Moroccan public enterprises and situates them empirically in contemporary public management debates.

1. Organizational Culture as a Structuring Core

One major finding is the recurrence of organizational culture in all high-performance configurations, making it a necessary condition in our model. This aligns with Schein (2010), for whom culture is the invisible cement of organizational behavior, and Denison (1990), linking dimensions like involvement, consistency, and adaptability to overall performance. In Moroccan public enterprises, shaped by bureaucratic heritage and strong institutionalization, culture stabilizes and mediates between performance logic and ingrained practices.

This finding also echoes Bouckaert & Halligan (2008), who argue that public performance cannot rely solely on technical instruments without shared values.

2. Specific Combinations for Performance Dimensions

Configurational analysis identified multiple paths to performance, mobilizing different levers according to targeted dimensions:

Effectiveness: achieved through clarity of responsibilities, managerial stability, and alignment of objectives and resources (Boyne, 2002).

Efficiency: associated with modernized IT systems, streamlined procedures, and standardized processes, reflecting rationalization logic (OECD, 2005; Osborne & Gaebler, 1992; Dunleavy et al., 2006).

Service Quality: strongly linked to transversal cooperation, active user engagement, and organizational learning (Behn, 2003).

3. Equifinality and Systemic Complementarity

fsQCA demonstrates equifinality: multiple condition combinations can produce the same performance level. Examples include:

A configuration with strong cooperation, IT modernization, and short tenure achieves performance through collective dynamics and agility.

Another with long tenure, strong culture, and simplified procedures shows stability can produce positive effects if supported by appropriate tools.

These compensations confirm Malmi & Brown (2008) and Gerdin (2005): «It is not the MCS alone that influences performance, but its interaction with structural, strategic, and cultural dimensions». The management control system mediates tensions between bureaucratic requirements, result orientation, and political expectations.

4. Beyond Classical MCS Approaches in the Public Sector

Traditional MCS approaches inspired by the private sector (Anthony, 1965) focus on planning and control. In this context, MCS appears as:

A regulatory tool (Simons, 1995), managing tensions between innovation and compliance.

A legitimizing lever, structuring transparency and meeting oversight expectations.

A coordination space, integrating human resources, digital tools, and organizational rules.

This aligns with Van Dooren, Bouckaert & Halligan (2010), framing public performance as a cyclical process of production, evaluation, and learning. This study demonstrates that this process can only be modeled configurationally, sensitive to complex factor interactions.

VII. CONCLUSION, CONTRIBUTIONS, LIMITATIONS, AND PERSPECTIVES

This research aimed to explore how the management control system (MCS), approached from a configurational perspective, influences the different dimensions of performance in Moroccan public enterprises. Using a methodology based on fuzzy-set Qualitative Comparative Analysis (fsQCA), we analyzed combinations of causal conditions likely to explain high levels of organizational performance, assessed across its three fundamental dimensions: effectiveness, efficiency, and quality.

The results reveal multiple configurations, reflecting a logic of equifinality, in which organizational culture consistently plays a central role. This finding, recurrent across all high-performing combinations, highlights that public performance does not result solely from technical tools or formal control mechanisms but rests primarily on a structuring cultural foundation. These results corroborate the

contributions of Denison (1990), Schein (2010), and Bouckaert and Halligan (2008), who emphasize that any public modernization effort relies on stakeholder engagement and the consolidation of shared organizational values.

Furthermore, the study highlighted specific pathways toward each performance dimension:

Effectiveness is fostered by clarity of responsibilities and strategic alignment.

Efficiency largely depends on the modernization of tools and the streamlining of procedures.

Quality relies on interdepartmental cooperation, user orientation, and organizational learning.

This cross-analysis demonstrates that public performance cannot be conceived monolithically. It results from complex interactions among structural factors (procedures, information systems), human factors (experience, cooperation), and cultural factors. In this regard, the fsQCA approach proves particularly fruitful for overcoming the limitations of linear approaches and for highlighting logics of complementarity, substitution, and mutual reinforcement among factors.

Contributions of the study

Theoretical: Enhances understanding of public MCS using a hybrid approach integrating public management frameworks and configurational analysis; supports context-specific rather than universal MCS prescriptions.

Methodological: Illustrates fsQCA's relevance for multidimensional and contextual organizational phenomena, identifying empirically valid non-linear causal paths.

Practical: Provides Moroccan public decision-makers with actionable guidance: invest in organizational culture, foster cooperation, stabilize teams, and ensure coherent alignment of responsibilities, resources, and evaluation systems.

Limitations and Perspectives

As with any study, this research has limitations. It is based on a configurational analysis at a single point in time, focusing on a sample of commercial public enterprises. Extending the research to other types of public enterprises (socially or territorially oriented, etc.) could broaden the generalizability of the findings. Additionally, the study relies on calibrated qualitative data, which, although rigorous, involves threshold choices and interpretation that may influence the results.

Future longitudinal studies could complement this research by assessing the sustainability of high-performing configurations and their ability to evolve over time. Integrating citizen-oriented indicators (user satisfaction, transparency, trust) would also help capture the intangible dimensions of public performance more effectively.

REFERENCES

- [1] Anthony, R. N. (1965). Planning and control systems: A framework for analysis. Harvard Business School Press.

- [2] Behn, R. D. (2003). Why measure performance? Different purposes require different measures. *Public Administration Review*, 63(5), 586–606.
- [3] Bouckaert, G., & Halligan, J. (2008). *Managing performance: International comparisons*. Routledge.
- [4] Bouckaert, G., & Halligan, J. (2018). *Performance management in the public sector*. Routledge.
- [5] Boyne, G. A. (2002). Public and private management: What's the difference? *Journal of Management Studies*, 39(1), 97–122. <https://doi.org/10.1111/1467-6486.00284>
- [6] Christensen, T., & Lægreid, P. (Eds.). (2007). *Transcending new public management: The transformation of public sector reforms*. Ashgate.
- [7] Denzin, N. K. (1978). *The research act: A theoretical introduction to sociological methods*. McGraw-Hill.
- [8] Dubois, A., & Gadde, L.-E. (2002). Systematic combining: An abductive approach to case research. *Journal of Business Research*, 55(7), 553–560.
- [9] Ferreira, A., & Otley, D. (2009). The design and use of performance management systems: An extended framework for analysis. *Management Accounting Research*, 20(4), 263–282. <https://doi.org/10.1016/j.mar.2009.07.003>
- [10] Fiss, P. C. (2011). Building better causal theories: A fuzzy set approach to typologies in organization research. *Academy of Management Journal*, 54(2), 393–420. <https://doi.org/10.5465/amj.2011.60263120>
- [11] George, B., Walker, R. M., & Monster, J. (2019). Does strategic planning improve organizational performance? A meta-analysis. *Public Administration Review*, 79(6), 810–819. <https://doi.org/10.1111/puar.13104>
- [12] Greckhamer, T., Furnari, S., Fiss, P. C., & Aguilera, R. V. (2018). Studying configurations with qualitative comparative analysis: Best practices in strategy and organization research. *Strategic Organization*, 16(4), 482–495. <https://doi.org/10.1177/1476127018786487>
- [13] Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In *Handbook of Qualitative Research*, eds. Denzin & Lincoln, Sage.
- [14] Hatchuel, A., & Weil, B. (1992). L'expert et le système: Gestion des savoirs et métamorphose des acteurs dans l'entreprise industrielle. *Economica*.
- [15] Hood, C. (1991). A public management for all seasons? *Public Administration*, 69(1), 3–19. <https://doi.org/10.1111/j.1467-9299.1991.tb00779.x>
- [16] Jick, T. D. (1979). Mixing qualitative and quantitative methods: Triangulation in action. *Administrative Science Quarterly*, 24(4), 602–611.
- [17] Kaplan, R. S., & Norton, D. P. (1996). *The balanced scorecard: Translating strategy into action*. Harvard Business School Press.
- [18] Kettunen, P., & Kallio, J. (2021). Public sector performance measurement: Combining measurement, learning and accountability. *Public Management Review*, 23(1), 1–22. <https://doi.org/10.1080/14719037.2019.1637011>
- [19] Misangyi, V. F., & Acharya, A. G. (2014). Substitutes or complements? A configurational examination of corporate governance mechanisms. *Academy of Management Journal*, 57(6), 1681–1705.
- [20] Misangyi, V. F., et al. (2017). Embracing causal complexity. *Journal of Management*, 43(1), 255–282.
- [21] Misangyi, V. F., Greckhamer, T., Furnari, S., Fiss, P. C., Crilly, D., & Aguilera, R. V. (2017). Embracing causal complexity: The emergence of a neo-configurational perspective. *Journal of Management*, 43(1), 255–282. <https://doi.org/10.1177/0149206316679252>
- [22] Moynihan, D. P. (2008). *The dynamics of performance management: Constructing information and reform*. Georgetown University Press.
- [23] Nørreklit, H. (2003). The balanced scorecard: What is the score? A rhetorical analysis of the balanced scorecard. *Accounting, Organizations and Society*, 28(6), 591–619. [https://doi.org/10.1016/S0361-3682\(02\)00097-1](https://doi.org/10.1016/S0361-3682(02)00097-1)
- [24] Osborne, S. P. (2006). The new public governance? *Public Management Review*, 8(3), 377–387. <https://doi.org/10.1080/14719030600853022>
- [25] Ragin, C. C. (2000). *Fuzzy-set social science*. University of Chicago Press.
- [26] Ragin, C. C. (2008). *Redesigning social inquiry: Fuzzy sets and beyond*. University of Chicago Press.
- [27] Ragin, C. C., & Davey, S. (2016). *fsQCA 3.0 software*. Irvine, CA: University of California.
- [28] Reichertz, J. (2010). Abduction: The logic of discovery of grounded theory. *Forum Qualitative Sozialforschung*, 11(1).
- [29] Schneider, C. Q., & Wagemann, C. (2012). *Set-theoretic methods for the social sciences: A guide to qualitative comparative analysis*. Cambridge University Press.
- [30] Simons, R. (1995). *Levers of control: How managers use innovative control systems to drive strategic renewal*. Harvard Business Press.
- [31] Simons, R. (1995). *Levers of control: How managers use innovative control systems to drive strategic renewal*. Harvard Business School Press.
- [32] Speklé, R. F., & Verbeeten, F. H. M. (2014). The use of performance measurement systems in the public sector: Effects on performance. *Management Accounting Research*, 25(2), 131–146. <https://doi.org/10.1016/j.mar.2013.07.004>
- [33] Van Dooren, W., Bouckaert, G., & Halligan, J. (2015). *Performance management in the public sector*. Routledge.
- [34] Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). Sage Publications.
- [35] P.B. Thanedar, S. Kodiyalam, Structural optimization using probabilistic constraints, *Structural Optimization* 4, Vol236-240, 1992.
- [36] R. Storn, Differential evolution a simple and efficient heuristic for global optimization over continuous Spaces, *Journal of Global Optimization* 11, p.341-359, 1997.
- [37] M. Clerc, J. Kennedy, The Particle Swarm Optimization Stability, and Convergence in a Multidimensional Complex Space, in : *IEEE Transactions on Evolutionary Computation*, vol. 6, p.58-73, 2002