Journal of Infrastructure, Policy and Development 2024, 8(16), 10054.
https://doi.org/10.24294/jipd10054

Article

A maturity model for performance management in education systems: Evidence from Morocco

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CITATION

Benlhabib H, Berrado A. (2024). A maturity model for performance management in education systems: Evidence from Morocco. Journal of Infrastructure, Policy and Development. 8(16): 10054. https://doi.org/10.24294/jipd10054

ARTICLE INFO

Received: 5 November 2024
Accepted: 2 December 2024
Available online: 19 December 2024

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Abstract: Performance Management is a major concern to various stakeholders in Education System, it is considered to be key driver to improve school effectiveness and learning quality. However, the complexity of education Systems, has made it challenging to apply an effective PM model. This study paper introduces a maturity model with six dimensions, fifteen Capability Areas and forty-two Best-Practices to assess education systems' organizational capacity for performance management. It provides deep insights into their structural and functional characteristics and serves as a framework for decision-makers to identify and implement missing practices while enhancing existing ones. The maturity model was developed following the Design Science Research methodology to ensure both rigor and relevance. A bottom-up approach guided its design, integrating insights from extensive literature reviews and lessons learned from benchmark countries. The evaluation process employed a qualitative approach, using focus groups with a carefully selected cohort of academics, experts, and practitioners. The Moroccan case study serves as part of the "Reflection and Learning" phase, providing an initial test for the model and paving the way for further empirical research. Future studies will aim to test, refine, and extend the model, facilitating its application across diverse educational contexts.

Keywords: performance management; education system; design science research; maturity models; Morocco

1. Introduction

Performance Management (PM) has for a long time been a concern in education. The current context of the globalization and the knowledge economy around the world has given it an increased importance. In fact, scholars highlighted the link between education and growth on the basis of human capital theory (Mincer, 1958), and an important positive correlation between education quality and growth has been proven (Ibourk, 2013) especially for developing countries (Benlhabib and Berrado, 2020; Hanushek and Wofsmann, 2007).

PISA tests and other international tests like TIMSS and PEARLS generally reveal performance insights that are deeply disappointing for some countries despite high investment in schooling. At the same time, they provide very encouraging insights for others countries with reduced education costs and/or a socially equitable distribution of learning outcomes. These findings have advanced the debate, of experts and practitioners, on the international tests results further for a better understanding and extensive analysis to better situate the results in the countries national, educational, social and economic context. Moreover, the increasing complexity of Education System reforms that has been demonstrated by several scientific studies, especially in low-income countries, has prompted several

researchers to explore various development pathways (Benlhabib and Berrado, 2020; Looney, 2011).

Our impetus for creating the MM-PMES stems from the proven benefits of maturity models for organizations implementing PM, as they promote organizational learning and best practices (Bititci et al., 2015). Particularly noteworthy is our observation that existing literature lacks maturity models specifically tailored to project management within the education system (Lasrado et al., 2015; Pereira and Serrano, 2020).

Thus, the aim of our research paper is to develop a maturity model for PM in education systems. In other words, this means to develop a maturity model to allow inherently for the assessment of the organizational capability of an education system with all its components in managing performance. This choice is justified by the fact that the education system components are closely linked and it is difficult to improve the maturity of one component independently of the others. Thus, the main research question is as follow: “How can the maturity of PM in Education System be defined and assessed?”.

In this context, we developed in this paper a general Maturity Model for PM in education systems. In fact, assessing the maturity of education system in terms of PM can provide additional evidence that explain differences among countries. The resulting maturity model, structured in six dimensions, each consisting of Capability Areas and Best Practices, can provide a better understanding about the organizational capacity needed in education system to succeed the PM and to make better use of its potential values.

The remainder of this paper is organized into five main sections, followed by a conclusion. In section 1, we present the general context of performance management in education and give an overview of the concept of maturity models. In the next section, we explain the methodology adopted in this work for the design of the maturity model for performance management in educational systems. Section 4 is devoted to the presentation of the proposed model. The case study of Morocco will be developed in Section 5, applying this model and the corresponding assessment model. A more in-depth discussion is provided in Section 6 to explain how this maturity model can guide a country like Morocco in adopting performance management to improve the maturity of its education system.

2. Background of PM in education systems and maturity models

2.1. Overview of PM in education system

As previously discussed, PM in education system means the global context of performance that concern all the components of the education system. this is aligned with the concept of Standard-Based-Assessments (SBA) as advanced by the OECD division of education which is mainly advocates for a holistic and five level based system that focus on improving student learning performance (Benlhabib and Berrado, 2019; OECD, 2013). The proposed SBA framework supports the view that evaluation and assessment in school systems need to be built on the interdependence of its parts in order to generate complementarities, avoid duplication and prevent

inconsistency of objectives. **Figure 1** gives an overview of this framework (Phelps, 2014).

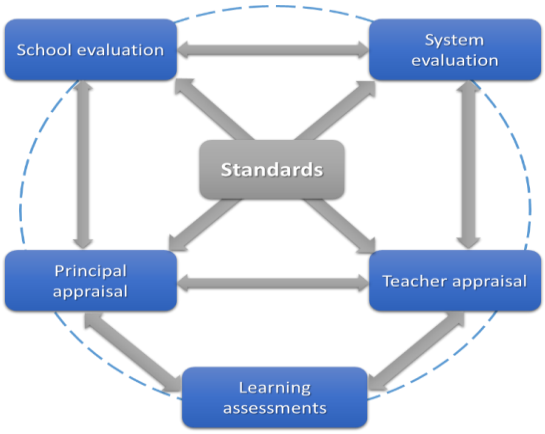

Figure1. Standards-based assessments and evaluation framework.

From a governance perspective, the performance concept underwent a fundamental mutation in educational systems around the world. The idea of public services education within countries faced a radical change through processes of modernization instilled by NPM concepts. This is more than restructuring with new types of work and cultures. The main features are the switch in emphasis from policy formulation to management and institutional design, from process controls to output controls, from integration to differentiation, from statism to subsidiarity. In most countries, education system structures moved gradually from a centralized model to a decentralized one, integrating gradually new governance models based on school's autonomy. These models were crafted and shaped in a specific way regarding the "tradition" of each country (Gunter et al., 2016). In general, school's autonomy varied across countries. We can be witnessing for a weak level, where only powers over budget, personnel, planning and competition for pupils are transferred to local authorities, to a large margin of school autonomy where principals and teachers are more accountable and a higher emphasis is putting on quality of learning, efficiency and effectiveness.

2.2. Maturity models and related concepts

The concept of maturity model was originally presented by Gibson and Nolan (1974) to assess the maturity of an Information System (IS). A maturity model is a conceptual model that consists of a sequence of discrete maturity levels for a class of processes in one or more business domains, and represent an anticipated, desired, or typical evolutionary path for these processes (Becker et al., 2009).

The key elements of maturity models are dimensions, maturity levels and maturity model instrument (Jääskeläinen and Roitto, 2015). Dimension and its subcomponents define the specific Capabilities Areas (CA) to be evaluated, the evaluation variables (or the assessment items) to be measured and the reasons why these variables are chosen. The Maturity model instrument defines how these variables are measured. This is done with maturity levels. Maturity levels describe the stage in stable conditions or coherent modes of operation in each of the

evaluation variables. The initial stage of maturity is characterized by an organisation with little capacity in the field under consideration. The highest level represents a total maturity with a conception of perfect modes of operating in each of the evaluation variables.

In short, maturity models can allow inherently to assess organizational maturity, guide building capabilities and define an improvement path to increase process's effectiveness and efficiency by displaying the best procedures in accordance with good management practices (Pereira and Serrano, 2020).

3. Methodology for the design of the MM-PMES

Based on recent literature reviews that explored methodologies, methods and guidelines for maturity models development (Benlhabib and Berrado, 2022; Lasrado et al., 2015; Pereira and Serrano, 2020), an analysis of the Performance Management in Education Systems (PMES) field guided our choice of scientific approach for the MM-PMES development. We have adopted the Design Science Research (DSR) as a common methodology for developing maturity models (Benlhabib and Berrado, 2022; Lasrado et al., 2015; Pereira and Serrano, 2020). In fact, it addresses both the rigor and relevance of research related to real-world issues (Hevner et al., 2004). It is a suitable research approach when researchers need to work in close collaboration with organizations, for testing new ideas in a real context (Lasrado et al., 2015). The key feature of DSR is specific problems solving oriented. It allows to obtain a satisfactory solution for the situation even if the solution is not optimal. However, the solutions generated by DSR should be liable to generalization for a specific class of problems. This generalization for a class of problems can enable other researchers and practitioners in various situations to use the generated knowledge. Thus, the artefacts that are constructed or evaluated by Design Science Research may result in theories improvement (Hevner et al., 2004). Design Science Research based guidelines propose three main cycles: (a) the relevance cycle, which presents connections to the real-world environment; (b) the rigor cycle, which is based on the use of knowledge sources; and (c) the design cycle, which represents a cycle of creating and evaluating artefacts until they work well for the studied problem (Hevner et al., 2004).

Otherwise, the approach for the MM-PMES development is bottom-up since the PMES field is established (De Bruin et al., 2005). In fact, there are two arguments in support of this observation. Firstly, the general consensus on the need for countries to adopt performance management, reached by the international organizations that influence education policy. Then, the presence of reference frameworks developed by these organizations that bring together a set of benchmarks and good practices. Finally, the existence of several model countries who are top performing and have an accumulated proven and effective experience in PMES that goes back more than thirty years.

Thus, we have carried out a five-steps approach for MM-PMES development based on Mettler guideline, as follow: (1) Identify need and specify problem domain; (2) Define scope of model application and use (3) design the model; (4) evaluate the design; and (5) Reflection and learning. Moreover, two case studies were being

selected from top-performing countries and two other case-studies were being selected from countries presenting some particularities. We have chosen to perform these cases through literature reviews given education system specificities (Mettler et al., 2010).

In the following we detail the rest of MM-PMES development steps. Knowing that the first step is already defined in previous paragraphs.

3.1. Step 2: Define the scope of the model application and use

The MM-PMES allows to assess the PM maturity of an education system along six dimensions. Each dimension includes several Capability Areas which are defined based on several Best Practices. We give below a brief definition of the constituents of the MM-PMES structure: (1) The Dimension: The six dimensions together cover the breadth of "PM in education systems" field. Each Dimension consisted of several Capability Areas, which represent the core capacities required to enable the Dimension. Together, they represent the different 'lenses' through which the capacity of education system in managing performance can be evidenced and analyzed; (2) The Capability Areas: Within the six Dimensions, the Capability Area describe what it means to possess PM capacity. Most Capability Areas are composed of a number of Best Practices which structure the Capability Areas into more concise parts and are directly related to evidence gathering and measurement; (3) Best Practices: Each Capability Areas is composed of several Best Practices. A Best Practice is a basic organizational method that is easier to understand. The number of Best Practices depends on the themes emerging from the content of the Capability Area and the overall complexity of the Capability Area. These Best Practices will serve as the basis for the assessment of the maturity level of education system along Capability Areas within each of the six dimensions. **Figure 2** gives an overview of the MM-PMES structure.

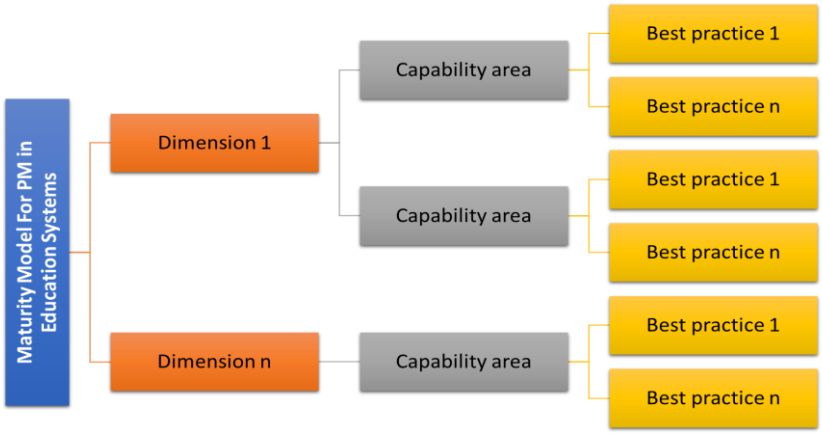

Figure 2. The structure of the MM-PMES.

3.2. Step 3: Design the model

It is about describing the MM-PMES dimensions and for each dimension describing Capability Areas and Best Practices. To this end, the OECD's case studies analysis was carried out through a literature review. This analysis concerned all OECD countries overall. But it mainly involved four reference countries, namely

CANADA, SOUTH KOREA; FRANCE and CHILE. The logic behind this choice is to identify areas of capacity and good practices common to countries that have successfully implemented PM in their education systems. For this, we have referred to studies and works that have carried out transnational benchmark[1]. Then, we have study specifically the case of reference countries presenting some useful features for the maturity model. **Table A1** in Appendix summaries the main features of each reference country interesting our research.

Thereby, through all these case studies we have highlighted the main Best Practices deduced from lessons learned or from arrangements undertaken for successful PM in the respective education systems. Otherwise, we have enriched this work by general Best Practices recognized by the scientific community on PM. A classification of these Best Practices into dimensions and Capability Areas was carried out on the basis of the maturity model structure developed in step 2. This phase resulted in forty-two Best Practices within fifteen Capability Areas, representing together the breadth of national capacity that an educational system requires to be effective in managing performance.

We did not conduct a systematic literature review but used Scopus, Web of Science, and Google Scholar to ensure a comprehensive search. The review covered publications from January 2007 to December 2023, using search strings like "Performance Management", "Education Systems", and "Maturity Models", combined with Boolean operators. Filters were applied to include peer-reviewed articles, books, journals, and conference papers in English or French. These databases were chosen for their extensive indexing of relevant literature, and the time frame captured recent advancements. Additionally, we incorporated reference works from official websites of international organizations and benchmark countries to enrich the theoretical framework.In the following, we explain how this framework was evaluated and amended to form the final maturity model.

3.3. Step 4: Evaluate the design

Basing on the DSR methodology, a well-executed evaluation method must be performed to demonstrate the utility, the quality and efficacy of the MM-PMES. In the continuation of the scientific approach adopted in the study, we proposed to hold two focus groups for the validation step of the first two deliverables produced as part of this work. The first focus group was hold with academics[2] who appreciated the model, from scientific perspectives, as a valid and useful benchmark and orientation for the PME development. The second focus group met with seven experts given the nature of the proposed maturity model that requires specialized and confirmed expertise[3]. It was held in three stations. The first station aimed to validate the validity and relevance of the proposed Maturity Model on the basis of dimension and sub-dimensions. The second station aimed to validate the maturity assessment model on the basis of the maturity levels and the assessment items. The third station focused on using the maturity model to measure the maturity of the education system in Morocco.

We employed thematic analysis combined with elements of framework analysis, using tools like the maturity model's conceptual framework, questionnaires, and

peer-review templates. This systematic approach categorized feedback and linked it to the model's structure, refining it based on expert insights. Additionally, a literature review addressing issues raised by experts informed further updates to the model.

The Moroccan case study initiates the "Reflection and Learning" phase, testing the model and paving the way for future empirical research for generalization. Data analysis combined thematic analysis guided by a conceptual framework with a comparative evaluative approach, validating and enriching the model. In short, the exchange with the experts during the two focus-groups permitted to note a general convergence around the proposed maturity model and lead to some improvements.

4. Presentation of the proposed MM-PMES

A Maturity Model in application to PMES field will allow the identification of Capabilities Areas and Best Practices whose criteria and characteristics will serve as benchmarks for organizations to measure their maturity in terms of PM and to identify the way to improve it.

Following the proposed approach, we provide a reflection on the research results. The main result of this comprehensive research is the development of a maturity model for PM in education systems. As the entire maturity model is too comprehensive to be presented within a research paper, only the salient features of the model are presented in this section[4]. **Table A2** in Appendix shows the relevant references we have used to develop the capability areas and best practices classified by reference countries.

4.1. Maturity model for PM in education systems: The dimensions

The MM-PMES is comprised of six dimensions which together constitute the breadth of national capacity that an educational system requires to be effective: (1) Dimension 1: Strategy; (2) Dimension 2: Organization; (3) Dimension 3: Processes and Information Technology; (4) Dimension 4: Building PM knowledge and capabilities; (5) Dimension 5: Evaluation as a PM support function; (6) Dimension 6: Education Policy. **Figure 3** gives an overview of the MM-PMES dimensions.

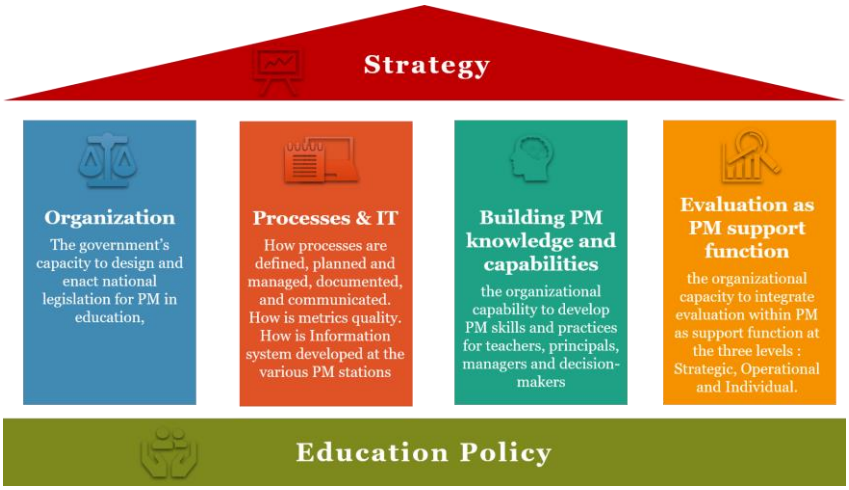

Figure 3. The dimensions of the MM-PMES.

4.1.1. Dimension 1: Strategy

This dimension explores the education system's capacity to develop and implement national strategies for education integrating PM principles and concepts. It considers effective strategic planning and implementation (Brudan, 2010). It is recommended a strategic alignment at all levels with a better linkage between medium and long-term objectives (Ehren and Baxter, 2020; Looney, 2011), and the adoption of a participatory approach so that PM leaders have the ability to understand stakeholders needs, conduct change and provide participation, ownership and learning in contrast with bureaucracy, compliance mentality and balkanization (Newcomer and Brass, 2016). Dimension 1 consists of two Capability Areas and seven Best Practices as shown in **Figure 4**.

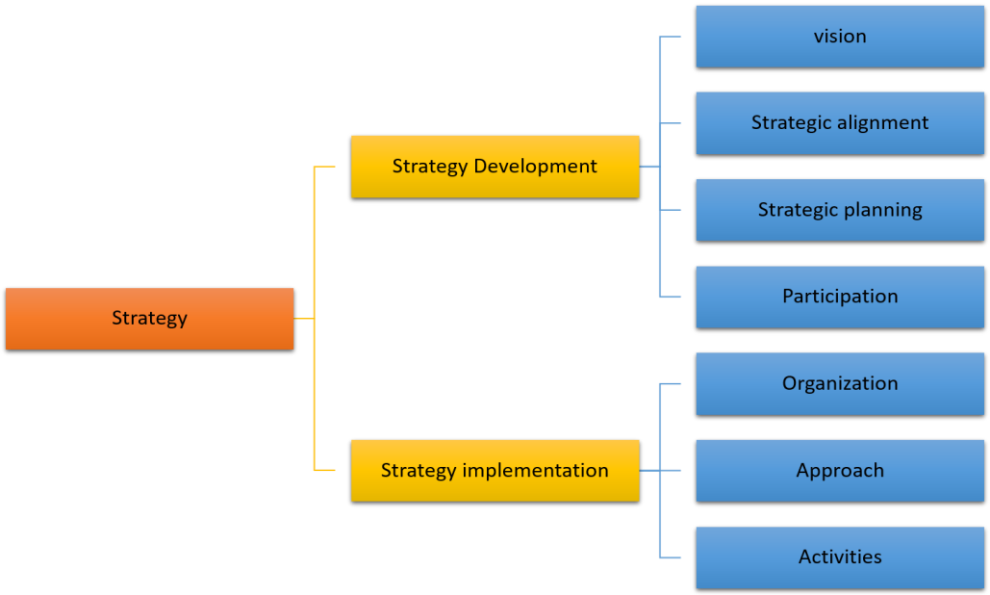

Figure 4. The capability areas and best practices of the "strategy" dimension.

4.1.2. Dimension 2: Organization

It examines the government's capacity to design and enact national legislation that directly and indirectly relates to PM in education, with a particular emphasis placed on the institutional design and the sharing of roles between different decision-making levels. This description highlight specially the general trend to decentralization and devolution of responsibilities to local level and to school-based management. From another perspective, this dimension observes issues such as accountability and "Incentive Systems" that are in place. The idea is to "establish legal and policy frameworks that promote empowerment and transparency as well as participatory governance and coordinated partnerships at all levels and across sectors (Verger and Parcerisa, 2017). Dimension 2 consists of three Capability Areas and nine Best Practices as shown in **Figure 5**.

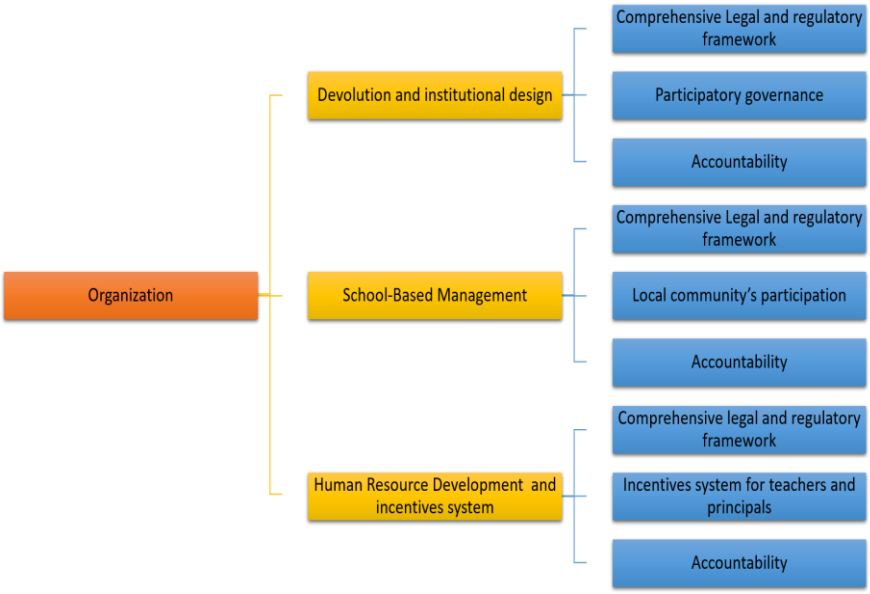

Figure 5. The capability areas and best practices of the "organization" dimension.

4.1.3. Dimension 3: Processes and information technology

It addresses effective and widespread use of PM processes into the education systems and the IT platform that support it. PM processes concern specially: (1) setting performance expectations; (2) observing performance; (3) integrating performance information; (4) the rendering of a formal summative performance evaluation; (5) generating and delivering performance feedback; (6) the formal performance review meeting; and (7) performance coaching (Schleicher et al., 2018). The first capability Area is not just about the processes' coverage and the quality of metrics but also the ability to adapt to the culture and traditions of the schools, as well as to specific professions (Gunter et al., 2016). Otherwise, the second capability area concern the functional coverage of the IT platform, its legal adoption, the quality of data, and the ability of the organization to drive transformation through IT (Capusneanu et al., 2012; Goh et al., 2015; Yang and Torneo, 2016). Dimension 3 consists of two Capability Areas and six Best Practices as shown in **Figure 6**.

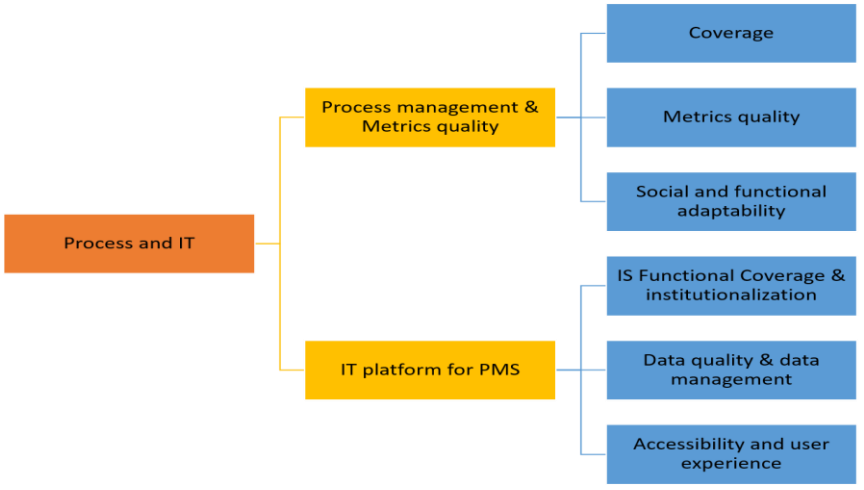

Figure 6. The capability areas and best practices of the "process and IT" dimension.

4.1.4. Dimension 4: Building PM knowledge and capabilities

This dimension constitutes a fundamental axis of the MM-PMES. It examines the availability and the quality of the strategy adopted by countries in term of building knowledge and capabilities for various groups of stakeholders (teachers, principals and managers) to reform their profession and to develop performance measurement skills and practices. This strategy is part of a more comprehensive HR strategy, which involves processes such as: selection of candidates; training and accreditation; organizational professionalization (Verger and Pagès, 2018). As explained in **Figure 7**, we have highlighted three Capability Areas that form the basis of the comprehensive strategy to be conducted and approached as a matter of balance and coherence (Looney, 2011):

1) The PM curriculum construct and initial education: It examines the capacity to integrate PM as a discipline in initial education, and to recruiting, developing and retaining high-quality teachers and principals (OECD, 2013).
2) The Professional development programs: It examines the capacity to develop and to implement a high-quality in-service training program and support for teachers, principals and managers.
3) The PM research and innovation: It examines the national capacity to conduct research and innovation on themes in liaison with the PM to build a country-specific PM model.

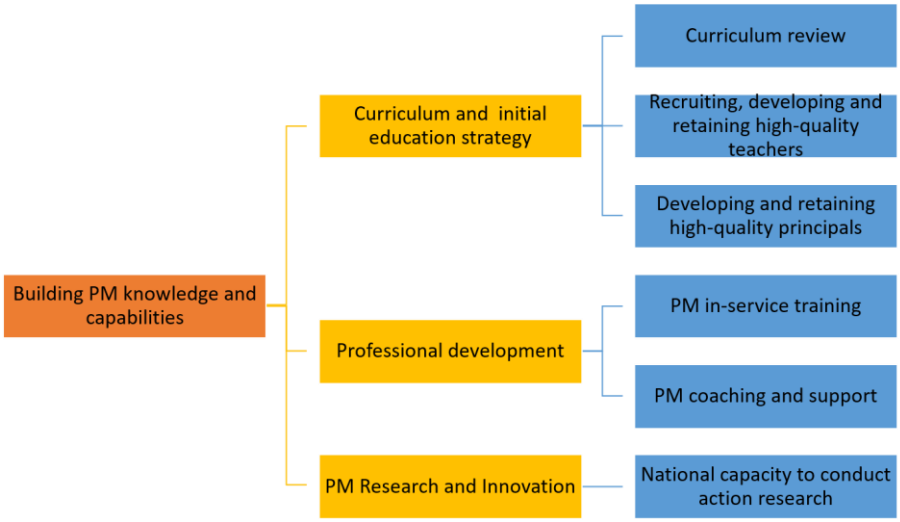

Figure 7. The capability areas and best practices of the "building PM knowledge and capabilities" dimension.

4.1.5. Dimension 5: Evaluation as a support of PM in education

This dimension reviews the organizational capacity to integrate evaluation within PM as a support function at strategic, operational and individual levels (Newcomer and Brass, 2016). To do so, this dimension reviews first of all the capacity to do evaluation and the capacity to use evaluation (Bourgeois and Cousins, 2013) with a particular focus on activities ensuring integration of evaluation within PM. This integration when well-orchestrated contribute to effective learning, cognitive enhancement and changing mind-sets and positive attitude towards

performance measures and approaches (Newcomer and Brass, 2016). Dimension 5 consists of two Capability Areas and five Best practices as shown in **Figure 8**.

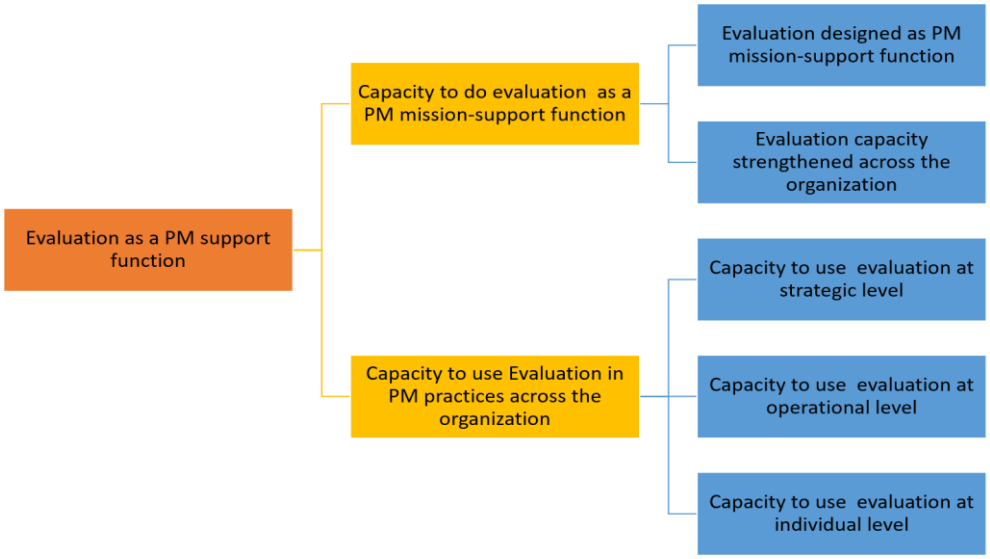

Figure 8. The capability areas and best practices of the "evaluation as a PM support function" dimension.

4.1.6. Dimension 6: Education policy

Education policy concerns more specifically the structural and systemic arrangements put in place to maximize chance to success in terms of student learning and achievement. Regarding education system maturity, this takes into account both the capacity to policy formulation, policy implementation and overcoming hurdles. When formulating policy, it is advisable to align with the strategic development plan for the education and globally with the economic, social, political, and environmental development model. This compasses also the convergence with the international education policy, that's means the alignment with global standards and best practices in education governance as advocated by international bodies like UNESCO, the World Bank, or the OECD. Achieving alignment requires careful consideration of coherence and balance between the demands of globalization and national/local objectives and opportunities (Van Zanten, 2002).

The implementation of the Education policy is also affected by elements of the context that impact positively or negatively the PM system. In fact, the Education Policy is a constituted field that interacts with the broader social, political, and economic environment (Bourdieu, 1999; Verger et al., 2016). That said, in terms of maturity, we are looking to verify the organizational capacities required for the education system to carry out its policy and overcome hurdles of the social and political-economic environment when adopting PM at all levels (Verger et al., 2016). Dimension 6 consists of three Capability Areas and ten Best Practices as explained in **Figure 9**.

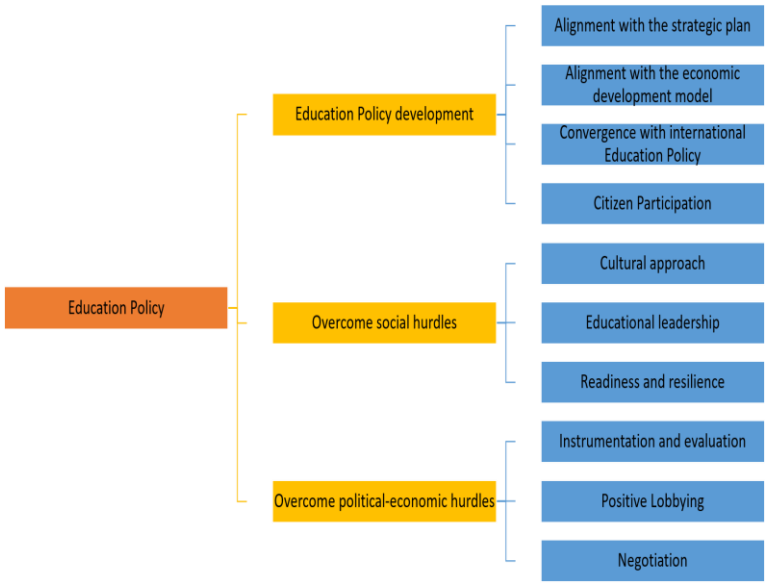

Figure 9. The capability areas and best practices of the "education policy" dimension.

4.2. Presentation of the maturity assessment model for performance management in education systems (MAM-PMES)

Table 1. The five fixed maturity levels and sublevels of the MM-PMES.

Levels	Descriptions	Sublevels
Level 1: startup	The capability area represents a segment where none of the best practices included are actively implemented within the organization. Nonetheless, stakeholders acknowledge the significance of these best practices in enhancing the education performance management system.	• 1.1: Absence of good practices. • 1.2: Existence of some practices but in undocumented and informal manner.
Level 2: formative	For a specific capability area, the implementation of best practices has been successful within the organization but in a limited capacity, such as on an experimental basis or restricted to certain segments of the organization. Stakeholders acknowledge the effectiveness of these best practices and intend to expand their implementation across the organization.	• 2.1: Good practices are under development. • 2.2: Good practices are partially documented
Level 3: established	A Capability Area is at an established maturity level, indicating that all the necessary prerequisites for the widespread and official implementation of the related best practices have been verified (Formalization of the best practices, documentation of the best practices, preparation of the actors). Additionally, this implementation is effective throughout the entire organization.	• 3.1: Good practices are fully documented. • 3.2: Good practices are widely understood and accepted by stakeholders.
Level 4: managed	All stakeholders adopt the best practices comprising the capability area and take ownership of them. They engage in a process of continuous improvement and innovation that leads to an increasing maturation of these best practices.	• 4.1: Good Practices are measured and monitored. • 4.2: Continuous improvements are effective.
Level 5: Optimized	A Capability Area is at an optimized maturity level, indicating that best practices are in a stable state of maturation and there is an optimal balance between stakeholders in operating PM process to reach the best performance. Thus, the capability area is characterized by the proactivity, the agility to change in circumstances (political, economic, social, technical, legal and environmental) and evidence based management. The best practices positively impacting the educational system global performance. The Best practices are documented, formalized and enriched by lessons learned so that the country is able to promote them at international scale.	• 5.1: Good practices are optimized. • 5.2: Best practices are shared

The MAM-PMES is a main result of this research. This allows the identification of assessment items for each best practice and the description of the five fixed maturity levels with the corresponding sub-levels. The MAM is influenced by the

developmental logic of the CMM (Capability Maturity Model) proposed by Carnegie Mellon (Ross et al., 2006). The five fixed maturity levels and sublevels of the MAM-PMES are presented in **Table 1**[5].

5. Morocco case study

Morocco is a typical example of an emerging country where education plays a central role in the economic revitalization and development of the nation. It constitutes the main lever for the opportunity in Morocco's history to accelerate the pace of inclusive and sustainable development. Morocco has made significant progress in achieving the Millennium Development Goals (MDGs), particularly in addressing the challenge of ensuring widespread access to primary education and enhancing secondary school enrollment rates. However, persistent issues such as low learning outcomes and high dropout rates continue to pose significant challenges, particularly for disadvantaged groups such as girls in rural areas and children with specific needs. Various studies have linked these obstacles to issues related to education quality and governance. Overall, Morocco has demonstrated a strong willingness to implement New Public Management (NPM) principles in the education system and to develop the institutional basis of PM within schools, but with minor results on the ground (Benlhabib and Berrado, 2020; Lahjouji and Menzhi, 2018).

5.1. Performance management in Moroccan education system: New trends

Recent studies illuminate the ongoing transformative phase of education policy in Morocco within the context of the SDG/Education 2030 agenda. They highlighted areas for improvement in Morocco's educational reforms. These areas of progress illustrate Morocco's commitment to advancing its education system and aligning it with international agendas and standards (Morchid, 2020). We present in the present study additional evidence of this trend, which is geared toward achieving sustainability and systemic improvements in education. we shed light on the turning point that the education policy in Morocco is experiencing. We note mainly:

- The Education Framework Law 51-17 (EFL), enacted in 2019. The EFL is aligned with the SDG/Education 2030 agenda and ensure a sustainable transformation of the Moroccan education system through a multi-level reform process (Morchid, 2020).
- The New Development Model (NDM), Launched in October 2017 that advocates a new development framework for the country in social, economic and environmental perspectives (Abdouh, 2022). From education perspectives, and in contrast to the EFL, the NDM is an operational governance model that leans towards a realistic and pragmatic liberal trend. It recommends bold reforms, which differ from previous reform approaches (Meqboul, 2021).
- The 2022–2026 Strategic Roadmap for the education system reform, characterized by the paradigm shift in strategy implementation that aligns with the NMD development framework. Thus, a series of structuring provisions and arrangements have been initiated. For instance, a new status for teachers aligned

with the principles of PM and accountability, or the "Pioneer Schools" program that aims to establish an effective based-school-management model centered on student learning and performance assessment (Ibourk et al., 2023).

5.2. Performance management in Moroccan education system: The maturity assessment

To measure the level of maturity for each capability area we have used the Maturity Assessment Model (MAM) proposed in our current research. The evaluation carried out by a focus group of experts and practitioners from the Moroccan Ministry of Education led to a convergence in the assignment of maturity levels to the Moroccan education system and revealed the relevance of the MM-PMES[6]. **Figure 10** shows the graphical representation of the Morocco Maturity in PMES.

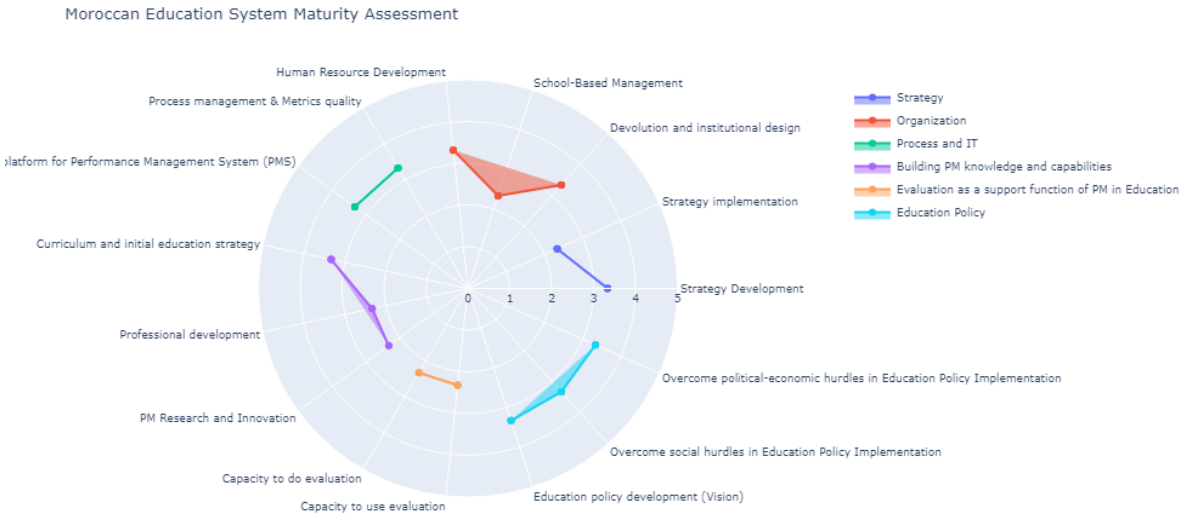

Figure 10. Graphical representation of the Morocco maturity levels in PMES.

6. Discussion

In previous chapters, we explored the question of the maturity of education systems in PM as a way of explaining countries' results in international tests, which sometimes show paradoxical situations. We have chosen to approach this question from a systemic point of view, and have proposed a conceptual model based on six dimensions, fifteen capability areas and forty-two best practices. The corresponding assessment model certainly enables countries to chart a course towards improving the maturity of their education systems in terms of PM and to define a path of progression to maturity on the basis of the hierarchical structure of the maturity model[7].However, the maturity improvement in this area requires a comprehensive, holistic approach and the implementation of a transformation program that recognizes the complex nature of education systems. It is essential, for example, to take into consideration the cultural aspects and traditions of each country (Gunter, 2016; Rivas, 2023). For a country like Morocco, aiming to advance to level 3 of global maturity, the model distinctly outlines the path forward. This entails embarking on an organizational capacity-building initiative, which is essential for

the success of its transformation endeavor, though not necessarily sufficient on its own. Indeed, a comprehensive grasp of Morocco's cultural, social, and economic characteristics, coupled with the establishment of a framework for systemic and gradual educational enhancement grounded in both national and comparative research and experimentation, presents a promising avenue for the achievement of education reform centered on performance management (Rivas, 2023).

7. Conclusion

In various fields, maturity models have provided experts and practitioners with long-term benefits for building the capacity of organizations. The current study presents a conceptual model for assessing the maturity of performance management in education systems. This finding further extend the research by providing a deeper understanding about critical success factors, drivers, accelerators, challenges and pitfalls of performance management in education systems. It also provides leaders with an understanding of the meaningful capability areas for the education systems transformation towards performance, displaying the best practices to increase effectiveness and efficiency.

The validation stage carried out with experts and practitioners confirms the validity of the proposed framework. But what is particularly interesting is its evolutionary nature which allows for an easy integration of improvements and adaptations. Thus, in perspective, we propose to make the maturity model available to the scientific community and practitioners to be tested, evaluated and enhanced. In addition, particular attention can be paid to digital platforms as a key element in supporting maturity progression at all levels of the education system. Otherwise, many development pathways are emerging, including the adaptation of the model to special cases of education systems at territorial or local level or its evolution to be applicable to another field in public sector like Health.

Limitations: This study developed a rigorously designed maturity model for assessing education systems' performance management but remains conceptual, requiring empirical validation. Limited to the Moroccan context due to the need for in-depth knowledge, future research should extend testing to other systems to enhance the model's comprehensiveness and coherence.

Author contributions: Conceptualization, HB and AB; methodology, HB and AB; software, HB; validation, AB; formal analysis, HB; investigation, HB; resources, HB; data curation, HB; writing—original draft preparation, HB; writing—review and editing, HB; visualization, HB; supervision, AB; project administration, HB and AB. All authors have read and agreed to the published version of the manuscript.

Conflict of interest: The authors declare no conflict of interest.

Note

[1] OECD (2004); De Grauwe (2005); World Bank (2010); Looney (2011); OECD (2013); Deng and Gopinathan (2016); Gunter et al. (2016); Verger et al. (2016); UNESCO (2017); Verger and Pagès (2018); Verger et al. (2019).

[2] Four academics from "Mohammed V University" were involved including three of them from Industrial and System Engineering Department.

[3] We have invited four experts from the World Bank, one expert from UNICEF and two experts and practitioners from the Moroccan Ministry of Education

[4] More information about the Maturity Model is available in URL: https://mm-pmes.blogspot.com/

[5] More information about the Maturity Assessment Model is available in URL: https://mam-pmes.blogspot.com/

[6] More Information about The Maturity Assessment of the Performance Management in Morocco education system is available in URL: https://morocco-maturity-pmes.blogspot.com

[7] In fact, moving from one level of capability area maturity to another implies improving the level of maturity of the Best practices that make it up. Idem for dimensions.

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Appendix

Table A1. The main features of reference countries in PM in education.

Reference country	Main features
Canada	CANADA is a Top-performing country that has adopted PM for more than thirty years and combined high performance standards with a socially equitable distribution of learning outcomes (Oecd, 2004). Unlike other countries, CANADA has successfully integrated evaluation within Performance Management processes (Bourgeois and Cousins, 2013; Campbell, 2021; Goh et al., 2015; Kutsyuruba, 2024; Lahey and Nielsen, 2013). In fact, CANADA is among the first countries to set out standards for learning and competence development in central and/or regional documents and to adopt standard based assessment and evaluation at all levels (classes, teachers, head teachers, schools and programs) (Looney, 2011).
Korea	SOUTH KOREA is a Top-performing country that has succeeded in establishing performance management in the education system despite the particular political and social context. In fact, the Korean setting retains a top-down hierarchical structure with politics and bureaucracy that are influenced by Confucian values, which place primacy on harmony and the collective, and reinforce a culture of submissiveness to authority (Yang and Torneo, 2016). Thus, South Korean country has developed distinct features that stem from South Korea's institutional and cultural context (Choi et al., 2024). The institutionalized representation and involvement of civilians in the committee-type bodies that oversee performance evaluation at all levels, and the adoption of a comprehensive and advanced information technology platform, on the other hand, signify a desire to break from the past (Yang and Torneo, 2016).
France	FRANCE is a special case among OECD countries that have taken time to adopt the NPM principles because of difficult political and social contexts. In fact, in the French context, scholars have noted the lack of regulation by the market or business and the French administrative mind-set resistance to the market and privatization aura and to performance measurements and accountability in education (Gunter et al., 2016; Parcerisa, 2017). To overcome these hurdles in PM implementation, French administration have developed best practices through a real hybridization of global and local processes (Van Zanten, 2002). A recent study (Maroy and Pons, 2021) highlights areas of improvement that we have taken into account in our model.
Chile	CHILE is a developing country that adopted early NPM principals in public sector specially in education system. Chile is well-performing in PISA and TIMSS tests. For instance, between 2000 and 2006 this country showed the largest increases in PISA scores in reading and reached high graduation rates for secondary level and internal efficiency has improved steadily. Several developments and best practices in the education sector in this country, related to performance management, have coherently and holistically facilitated the quest for improved student learning. In fact, Chile lead a reform basing on three programs (curricula reform and assessments; teacher management and appraisal; and school performance evaluations) with their own databases that included student performance. This contributed to accountability and helped to identify where and what kind of support was needed for quality education and learning (Ahumada, L., et al., 2016; Cabalin and Andrada, 2023; Ehren and Baxter, 2020; Goe et al., 2013; UNESCO, 2017).

Table A2. Relevant references used in developing the MM-PMES.

Dimension	Capability Area	OCDE	CANADA	KOREA	FRENCH	CHILE	Scientific communauty
Strategy	Strategy development	(Aki and Juho, 2015; Ehren and Baxter, 2020)	(Goh et al., 2015)				(Looney, 2011)
	Strategy implementation		(Goh et al., 2015)				(Brudan, 2010)
Organization	Devolution and institutional design	(De Grauwe, 2005; Rivas, 2023; Verger and Parcerisa, 2017)	(Goh et al., 2015; Maroy and Pons, 2021)	(Yang and Torneo, 2016)	(Maroy and Pons, 2021)	(Goe et al., 2013)	
	School-based Management	(De Grauwe, 2005; Eddy-Spicer et al., 2019; Verger and Parcerisa, 2017; Verger and Parcerisa, 2017)	(Campbell, 2021; Goh et al., 2015; Maroy and Pons, 2021)	(Choi et al., 2024; Yang and Torneo, 2016)	(Maroy and Pons, 2021)		
	Human Resource development	(Clarke, 2017; Deng and Gopinathan, 2016; Verger and Parcerisa, 2017)	(Campbell, 2021; Maroy and Pons, 2021)		(Maroy and Pons, 2021)	(Clarke, 2017; Goe et al., 2013)	
Process and IT	Process management and metrics quality	(Gunter et al., 2016; Looney, 2011; Verger and Pagès, 2018)				(Goe et al., 2013)	(Aho, 2009; Bititci et al., 2015; Cocca and Alberti, 2010; Capusneanu et al., 2012; Schleicher et al., 2018)
	IT platform for PMS	(OECD, 2013, 2017)	(Goh et al., 2015)	(Yang and Torneo, 2016)			
Building PM knowledge and capabilities	Curriculum and initial education strategy	(Deng and Gopinathan, 2016; OECD, 2013; Verger et al., 2016; Verger and Pagès, 2018)	(Campbell, 2021) (Kutsyuruba, 2024)	(Choi et al., 2024)		(Ahumada et al., 2016; Cabalin and Andrada , 2023; Goe et al., 2013)	
	Professional development programs	(OECD, 2004; UNESCO, 2017; World Bank, 2010)	(Campbell, 2021; Kutsyuruba, 2024)	(Choi et al., 2024)		(Cabalin and Andrada, 2023; Ahumada, L., et als., 2016; Goe et al., 2013)	
	PM research and innovation	(OECD, 2004, 2013; Verger and Pagès, 2018)					

Table A2. (*Continued*).

Dimension	Capability Area	OCDE	CANADA	KOREA	FRENCH	CHILE	Scientific communauty
Evaluation as a support function of PM in education	Capacity to do evaluation	(OECD, 2004; World Bank, 2010)	(Bourgeois and Cousins, 2013)				(Newcomer and Brass, 2016)
	Capacity to use evaluation		(Bourgeois and Cousins, 2013)			(Goe et al., 2013)	(Newcomer and Brass, 2016)
Education policy	Education policy development	(Edwards and Klees, 2015; Lenschow et al., 2013; OECD, 2004, 2013; Verger et al., 2016; Verger and Parcerisa, 2017)	(Maroy and Pons, 2021)		(Maroy and Pons, 2021; Van Zanten, 2002)	(Ahumada et al., 2016)	(Bennett, 1991; Brinkerhoff and Brinkerhoff, 2015)
	Overcome the social hurdles in Education policy Implementation	(Deng and Gopinathan, 2016; OECD, 2004; Rivas, 2023; Verger et al., 2016; Wosnitza et al., 2018)	(Campbell, 2021; Goh et al., 2015)			(Ahumada et al., 2016; Goe et al., 2013)	(Brinkerhoff and Brinkerhoff, 2015; Wu, 2015)
	Overcome the political-economic hurdles	(Phelps, 2014; Verger et al., 2016; Verger and Parcerisa, 2017; Verger et al., 2019)	(Maroy and Pons, 2021)	(Yang and Torneo, 2016)	(Maroy and Pons, 2021; Van Zanten, 2002)	(Goh et al., 2015)	