Bridging Competency Frameworks and Experiential Learning: Integrating ECQ, UNESCO, UN, and OECD Models through the FLIGBY Simulation in Public Service Leadership Development

Abstract

This study investigates the structure and determinants of leadership effectiveness in the public service using a large-scale pooled cross-sectional dataset (N = 2,816) derived from the FLIGBY simulation platform (2013–2025). Despite the growing importance of competency-based leadership development, empirical evidence linking international competency frameworks with behavioral performance data remains limited. Addressing this gap, the study integrates international competency frameworks (ECQ, UNESCO, UN, OECD) with simulation-based data derived from the FLIGBY platform and applies Principal Component Analysis (PCA), regression modelling, and cluster analysis. The analysis identified five components, with three emerging as the strongest performance-related dimensions: Empowerment and Motivational Leadership, Relational Intelligence and Diplomacy, and Strategic and Future-Oriented Mindset. Regression analyses show that interpersonal and strategic competencies significantly predict both Managerial Leadership Index (MLI) and Flow, while business-oriented thinking emerges as a particularly strong predictor, leading to the partial rejection of the initial hypothesis, which assumed the dominance of strategic and diplomatic competencies over business-oriented thinking. Cluster analysis reveals three leadership profiles forming a developmental continuum. The findings suggest that leadership effectiveness is driven by an integrated competency system and mediated by the ability to generate engagement and Flow within teams. The study contributes to bridging competency frameworks and behavioral data, highlighting the value of simulation-based experiential learning in public service leadership development.

Keywords: serious games, public service leadership, flow theory, experiential learning, competency frameworks.

1. Introduction

Public service leadership roles face increasingly complex challenges in the rapidly changing social, technological, and institutional environment of the 21st century, which is increasingly characterized by complexity, social expectations for transparency, and digital transformation (Van Wart, 2013). Competencies that ensure strategic thinking, value-based decision-making, and people-centered management practices are essential for effective public service leadership. By the end of the 20th century, the concept of competencies had become a central element of leadership and organizational development, particularly through the integrated examination of skills, abilities, and attitudes (Boyatzis, 2008). Classic competency models, such as Spencer and Spencer (1993), define leadership excellence in terms of behavioral indicators critical to performance. Over the past two decades, numerous organizations and governments around the world have developed leadership competency models that reflect the specific challenges of public service leadership. They aim to identify the key competencies that ensure the effectiveness of public policy-making and organizational management (Bolden et al., 2016).

This study aims *to investigate the interrelationships among demographic variables, leadership competencies, and performance outcomes using anonymized gameplay data from the FLIGBY serious game simulation over a decade, to enhance evidence-based understanding of digital leadership development and support the design of scalable, personalized training programs in cross-cultural environments.*

The *four major international competency models* are: (1) the Executive Core Qualifications (ECQ) model of the US Office of Personnel Management (OPM), (2) the United Nations Educational, Scientific and Cultural Organization (UNESCO) competency framework, (3) the United Nations (UN) competency framework, and (4) the Organization for Economic Co-operation and Development (OECD) leadership competency model. The research explores the applicability of these models in public service, their value system, their measurability potential, and their impact on leadership self-reflection and learning processes. The study pays particular attention to how FLIGBY, as a gamified simulation tool, can contribute to the development of leadership skills in the context of higher education in public-service contexts.

Although development tools based on leadership competency models are playing an increasingly important role in public service leadership training, gamified simulation learning methods remain underrepresented in international literature. In particular, there has been little empirical research on how so-called "serious games" influence leadership self-awareness, decision-making ability, or ethical sensitivity in the public service. This research aims to fill this gap by analyzing the FLIGBY case study and interpreting the results from the perspective of international competency models.

The challenges of public service leadership training and changing competency expectations raise theoretical and practical questions that are worth reviewing in light of the relevant international competency models mentioned above. The following chapter presents literature and theoretical frameworks, with particular reference to the ECQ, UNESCO, UN, OECD, and FLIGBY models.

This study makes three main contributions. First, it empirically integrates major international competency frameworks with behavioral simulation data. Second, it advances an interaction-based understanding of leadership effectiveness by identifying latent competency structures. Third, it demonstrates how simulation-based learning environments operationalize abstract competency models in practice.

The following section develops the theoretical background underpinning these contributions.

2. Theoretical background

The theoretical background of this study is grounded in two complementary strands of literature. First, the study draws on established analytical constructs of leadership competencies: the Executive Core Qualifications (ECQ) model, the United Nations Educational, Scientific and Cultural Organization (UNESCO) competency framework, the United Nations (UN) competency framework, and the Organization for Economic Cooperation and Development (OECD) leadership competency model. Second, flow theory, as developed by Csikszentmihalyi, provides a foundational framework for understanding optimal experience, intrinsic motivation, and engagement in leadership contexts. By linking psychological immersion to performance outcomes, flow theory offers valuable insights into how leaders' cognitive and emotional involvement can influence managerial decision-making and effectiveness. The game's set of 29 leadership competencies reflects core principles derived from transformational, situational, and behavioral leadership theories, integrating them into a multidimensional framework. Together, these perspectives support a comprehensive approach to digital leadership development, bridging motivational psychology with competency-based leadership theory.

2.1 The analytical constructions examined

The four analytical constructions were deliberately selected based on their international representativeness and relevance to public service. The ECQ is the most comprehensive leadership model of the US federal government; UNESCO and UN frameworks represent a multilateral, value-based public service culture; and the OECD model provides the standard for public service integrity and performance development in developed countries.

The *Executive Core Qualifications (ECQ) framework* developed by the US Office of Personnel Management (OPM) is used to select, promote, and develop members of the Senior Executive Service (SES). The model is built around five key areas: Leading Change, Leading People, Results Driven, Business Acumen, and Building Coalitions. These competencies should not be interpreted independently, but rather as interdependent elements that together form the yardstick for leadership excellence. One of the main advantages of the ECQ is that it provides well-structured and objectively assessable behavior-based indicators, which can be effectively integrated into federal HR systems. At the same time, it has been criticized for primarily following a regulatory logic and being less able to respond flexibly to a rapidly changing organizational and social environment.

The *UNESCO Competency Framework* was developed to support the organization's value-based, inclusive and performance-oriented culture (UNESCO, 2016). It defines the core values (commitment to the organization, integrity, respect for diversity and professionalism) and core competencies (communication, teamwork, accountability, innovation, focus on results, planning and organization) that apply to all staff members. In addition, leadership roles require leadership competencies such as driving and managing change, building partnerships, decision-making, and leading and empowering others. The framework serves recruitment and development purposes and aims to align personal behaviors with UNESCO's educational, cultural, scientific and communication mission. The framework's strengths lie in its ethical foundations, its applicability across cultures, and its emphasis on collaborative and innovative practices. Although the framework provides clearly defined values and competencies, it offers fewer detailed behavioral indicators and formal measurement tools than other models.

The *UN Competency Framework* represents a normative and value-based approach that considers effective functioning in a multicultural environment, integrity, inclusiveness and collaboration as fundamental values (United Nations, 2019). The purpose of the framework is not only to support selection, but also to develop a unified organizational culture and set of values (United Nations, 2017). Competencies appear at two levels: core competencies apply to all UN employees (e.g., integrity, professional competence, teamwork, communication, client focus), while managerial competencies target leadership positions (e.g., visioning, decision-making, performance management, change management). The strength of the model lies in its emphasis on ethical and cultural dimensions - for example, the importance of leadership in achieving the Sustainable Development Goals (SDGs) - but it offers relatively few specific measurement tools and behavior-based indicators.

The *OECD Leadership Core Competencies framework* is an internationally applicable competency framework designed to support the development of public service leaders. The model focuses on the following competency areas: future-oriented strategic thinking, fostering innovation, developing people, transparency, and serving the public interest (OECD, 2023). The framework works with three levels of development: Performing, Inspiring, and Leading, which correspond to different stages of leadership development. The OECD's recommendations

(2019, 2020) emphasize the strengthening of leadership competencies, public service integrity, and accountability to citizens. The model is embedded in the OECD's values and ethical standards, while also playing an important role in the transparent operation of HR processes (e.g. recruitment, performance appraisal, mobility, promotion) (OECD, 2021). Gerson (2020) provides a detailed overview of the development trends in the leadership systems of OECD countries, particularly with regard to the development of a high-performing civil service. Although the model does not always provide detailed behavior-based measurement tools, it is well-suited for HR integration and can be flexibly applied in different member state contexts.

The purpose and context of public service leadership competency models vary significantly in several respects. The following section presents a critical comparative analysis of four different systems: ECQ, UNESCO, UN, and OECD.

2.2. Comparative analysis of the models

The analysis is based on eight dimensions: application context, focus areas, standardization, measurability, ethical orientation, area of development, experiential learning, strengths and limitations. The eight comparison criteria (application context, focus area, etc.) were identified inductively based on Boyatzis' (2008) integrated competency model and the OECD's (2019) recommendations, which emphasize both the measurability and development potential of leadership competencies. The purpose of the comparison is not to rank the models hierarchically, but to show the extent to which the competencies developed and measured by FLIGBY fit into international leadership frameworks.

1. *Application environment.* These competency models were developed within different institutional frameworks, which determine their objectives and methods of application. The ECQ, created for the United States federal civil service, supports the selection and development of government leaders, with an emphasis on effectiveness, integrity and adherence to public service values. The UNESCO framework serves a global intergovernmental context where diversity, inclusion and cultural sensitivity are critical. The UN framework meets the needs of the international organizational environment, focusing on managing cultural diversity, ethical behavior and global cooperation. The OECD model targets public service leaders in developed countries, emphasizing customer focus, agility and systems thinking.
2. *Focus areas.* The ECQ prioritizes leadership, results orientation and effective communication, key elements of performance and accountability. UNESCO emphasizes ethical values alongside collaborative and innovative behavior, aligning leadership practices with its mission and strategic objectives. The UN framework emphasizes intercultural sensitivity, collaboration and integrity in a multicultural, multi-stakeholder environment. The OECD model promotes a systems approach, strategic leadership and openness to support adaptive and innovative governance.
3. *Standardization.* The ECQ is highly standardized, with strict criteria and assessment procedures embedded in US federal HR systems. UNESCO ensures common values and competencies across the organization but allows for flexible adaptation to different sectors and field offices, placing it at a medium level of standardization. The UN framework is also moderately standardized; although competencies and behavioral indicators are consistent, they are tailored to individual organizational units. The OECD model maintains a high degree of standardization by applying uniform competency concepts and development tools in member states.

4. *Measurability.* The ECQ is easily measurable through clearly defined indicators, standardized assessments and formal performance procedures. UNESCO's measurability is moderate: competencies are defined, but assessment depends on qualitative judgement and integration into performance systems. The UN framework is also moderately measurable with structured behavioral indicators whose application depends on organizational culture. The OECD model offers clear definitions and assessment criteria, although national adaptations may affect practical consistency.
5. *Ethical orientation.* Ethical principles play a central role in all four models, but their emphasis varies. The ECQ strongly embeds public service values, integrity and accountability. UNESCO has a very strong ethical orientation, focusing on integrity, respect for diversity and organizational commitment. The UN framework also places great emphasis on ethics, based on global responsibility, human rights and cultural diversity. The OECD model presents ethics at a moderate level, framing it primarily through a citizen-centered approach and public trust.
6. *Area for development*. The ECQ is primarily designed for selection and assessment, with limited direct application to development. UNESCO supports both recruitment and continuous professional development, although it is not a dedicated training program. The UN and OECD models address development in part, as they provide guidelines and recommendations for skills development, but neither constitutes a fully structured development framework.
7. *Experience-based learning.* Experience-based learning is least emphasized in ECQ, which relies on formal assessment methods. UNESCO incorporates it through workshops, coaching and workplace initiatives, although it is not its primary method. The UN and OECD models offer moderate experiential learning through training and situational exercises, but these are complementary rather than central features.
8. *Strengths.* The main strength of the ECQ is its objectivity and structure, which makes the model suitable for selection and promotion processes. UNESCO's strengths include its strong ethical and cultural foundation, global applicability, and emphasis on collaboration and innovation. The UN model is highly relevant in multicultural, international contexts due to its global sensitivity and ethical foundation. The OECD model stands out for its focus on innovation and its integration into career management systems that support long-term professional and organizational development. *Limitations.* The rigidity and formal, business-oriented approach of the ECQ may limit its adaptability in creative or less structured environments. The UNESCO framework lacks detailed behavioral indicators and standardized quantitative measures, which may hinder performance evaluation. The broad ethical focus of the UN model sometimes comes at the expense of measurable performance indicators. Despite its innovative orientation, the OECD model offers few concrete tools, and national variations may result in inconsistent application.

Table 1A (See Appendix) summarizes the main features of the competency models, illustrating the different organizational and development logics. The ECQ and OECD models support a structured approach to leadership development that is highly standardized and measurable. In contrast, the UN model offers an approach tailored to the global organizational environment, which is strongly value-based and emphasizes intercultural sensitivity. The UNESCO model takes a global, mission-focused approach that combines strong cultural and ethical foundations with moderate standardization and measurability. While the ECQ and OECD frameworks fit well with formal HR processes, UNESCO and UN models emphasize ethical orientation and cross-cultural cooperation, which is particularly important for organizations operating in diverse and multicultural environments.

Overall, the four models present different approaches to leadership development. The ECQ and OECD models emphasize structure, standardization and measurable results, while the UNESCO and UN models emphasize values, ethics and intercultural competence. Together, they represent a wide range of approaches, from formalized, performance-oriented systems to flexible, mission-oriented systems tailored to different global contexts.

These frameworks not only provide conceptual reference points but also inform the operationalization of competencies in empirical analysis (see Section 3).

2.3. The application of competency models in practice: the role of FLIGBY

The FLIGBY (Flow Is Good Business for You) simulation is a gamified leadership development tool. It is based on Csíkszentmihályi's flow theory, which considers the optimal balance between challenge and ability to be the key to motivation and performance (Csíkszentmihályi, 2003). The simulation is a narrative decision-making game consisting of 23 episodes in which the participant, as the manager of a winery, leads the team through more than 150 decision points. The game's algorithms calculate the scores for 29 leadership competencies based on the combination of decisions made. The measurement is not psychometric but based on a behavioral approach (Buzády & Almeida, 2023). The competencies are assessed by an artificial intelligence-based analysis module, which calculates the performance index from the consequences of the decisions.

The aim of the game is for participants to recognize and practice leadership skills through decision-making situations (Buzády et al., 2024). These include, for example, strategic thinking, decision-making, motivation, empathy, conflict management, supporting innovation, emotional intelligence, and feedback. Its interactive, practical structure encourages participants to develop their leadership style, while immediate feedback promotes self-reflection and continuous improvement.

FLIGBY's competency assessment is based on algorithmic decision tracking: the system scores players' decisions along key dimensions of flow theory (challenge-ability balance, motivation, feedback). Previous research (Almeida & Buzády, 2019; Buzády et al., 2024) has shown that FLIGBY results correlate with indicators of student self-reflection and leadership skill development, making it suitable for use as a developmental but non-standardized measurement tool.

FLIGBY is widely used in education, leadership training, and experiential learning programs to raise awareness of leadership and develop practical skills in an engaging, decision-focused environment. Focusing on flow-based leadership and soft skills development, it allows participants to explore the relationship between decisions, consequences and leadership effectiveness. The simulation's narrative also incorporates ethical considerations, encouraging players to recognize and address dilemmas as part of the decision-making process.

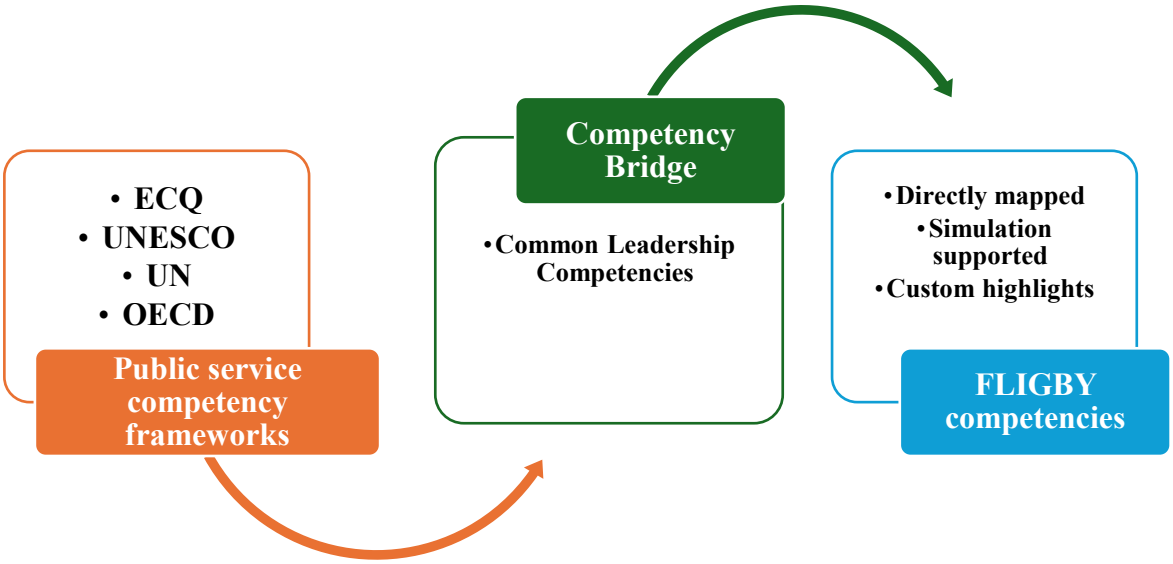
Because the outcomes of the simulation are influenced by participants' decisions, the story, and the specific learning context, FLIGBY is not highly standardized. This variability makes it unsuitable for performance evaluation or use in formal HR assessment systems, and it is not currently used in public service selection or promotion processes. Nevertheless, it can be an effective development tool in both the public and private sectors.

The FLIGBY simulation environment can therefore be used effectively not only for developing leadership skills, but also for developing entrepreneurial and organizational skills in higher education, as demonstrated by the case study by Almeida and Buzády (2019). Their experiences confirm that story-based simulations based on flow theory effectively help participants practice complex decision-making based on human interactions. Siewiorek et al. (2012) showed that simulation games provide a controlled but dynamically changing environment for acquiring leadership skills, where participants can experiment with different decision-making styles without risk. Olejniczak, Newcomer and Meijer (2020) point out that serious games can be used not only for training but also for assessment purposes: they help measure participant performance, explore decision-making mechanisms and engage stakeholders. A case study by McGowan et al. (2023) highlights that the conscious design of gamification elements plays a key role in the effectiveness of game-based learning environments, particularly in the integration of competence development and sustainability goals.

Public service competency models, such as ECQ, UNESCO, UN, and OECD frameworks, provide structured, standardized reference points for the skills, values, and behaviors expected of leaders, primarily for assessment and performance management purposes. FLIGBY complements these models by providing an interactive environment in which leaders and future leaders can practice and refine the competencies outlined in them, including strategic thinking, ethical decision-making, collaboration, innovation, and emotional intelligence. FLIGBY does not replace formal frameworks, but transforms them into active, behavior-based learning experiences, thereby bridging the gap between theoretical definitions and practical application. This synergy brings static competency models to life, promoting self-awareness and adaptive leadership skills that are particularly valuable in the public sector.

Figure 1 illustrates the concept of the "Competency Bridge," which shows the relationship between international public service competency frameworks (ECQ, UNESCO, UN, OECD) and the leadership competencies that can be measured in the FLIGBY simulation. It shows how competency frameworks and leadership skills that can be developed in the simulation can be linked. The "bridge" symbolizes the common competencies that form a connecting element between theoretical models and practical skills development.

Figure 1. Competency bridge: linking international public service competency models with FLIGBY. Source: authors.



As shown in Figure 1, the competency bridge links international public service frameworks to simulation-based developmental competencies.

FLIGBY has been validated in several international studies (e.g., Siewiorek et al., 2012; Almeida & Buzády, 2019), which have shown that the results of the simulation correlate well with self-reflective learning outcomes. The program is therefore primarily a self-reflective development tool rather than a formal psychometric measurement tool.

Table 2A (See Appendix) presents a detailed comparison of the four public service competency models and the 29 competencies of FLIGBY, highlighting the exact matches between the frameworks and exploring how FLIGBY's simulation-based approach enriches and enables these competencies to be put into practice.

While the four frameworks describe these competencies in abstract or behavior-based terms, FLIGBY's experiential structure offers a clear advantage. It places participants in realistic, high-pressure decision-making scenarios that require them to apply these skills dynamically, thereby transforming theoretical constructions into actionable behaviors.

In addition to strengthening these common competencies, FLIGBY places particular emphasis on interpersonal, motivational, and self-awareness skills such as empathy, constructive feedback, and stress management, which are often measured in a more implicit and less explicit way in public service models. These dimensions expand the development cycle by addressing soft skills that are critical for adaptive and effective leadership.

By integrating these models, FLIGBY serves as a practical complement to formal competency frameworks. It operationalizes and tests the competencies defined in the ECQ, UNESCO, UN, and OECD models in a safe, simulated environment, enabling leaders and leadership candidates to refine their skills, increase their self-awareness, and strengthen their ability to respond effectively to complex, real-world challenges.

The overview of the theoretical frameworks and international competency models presented so far has highlighted that excellence in public service leadership cannot be interpreted solely based on measurable, standardized indicators, but is also highly context-dependent and has ethical and interpersonal dimensions. The practical application of the FLIGBY simulation offers an opportunity to resolve this duality: it creates controlled yet realistic situations in which participants can practice the competencies defined in international models in real time, in decision-making situations. Thus, the next empirical part of the research aims not only to validate theoretical models but also to explore how simulation can help participants from public-service-related sectors become aware of and develop their own competencies.

This study focuses on the performance and skill profiles of public sector leaders.

Research Questions (RQ):

- *RQ1:* Which key competencies most significantly determine managerial effectiveness (MLI) and team-level engagement (Flow) in the public sector?
- *RQ2:* How does the structural dimension of leadership competencies (components) relate to performance indicators?
- *RQ3:* How can public service leaders be categorized based on their decision-making patterns (e.g., "Rule-following Administrator" vs. "Flow-generating Leader")?

Hypotheses (H):

- *H1:* For public service leaders, strategic thinking and diplomacy are significantly stronger predictors of success than a purely profit-oriented business mindset.
- *H2:* Strategic and interpersonal competency components exert a significant positive effect on leadership performance (MLI and Flow).
- *H3:* Leadership competency components are interrelated and together form a complex competency structure.

The presentation and comparison of theoretical frameworks provide the basis for the methodology of empirical study. The following sections describe the purpose of the case study, the research questions and hypotheses, the data collection methods used, the participants, and the analysis strategy.

3. Methodology

3.1. Sample and Data Source

The empirical basis of this research is a filtered sub-sample from the global FLIGBY database, specifically targeting the public service sector, comprising *N=2,816* participants. The dataset reflects a *pooled cross-sectional dataset*, covering the period between *2013 and 2025*. Despite the longitudinal time span of data collection, the dataset does not track the same individuals over time. Therefore, the analysis is based on a pooled cross-sectional design, where observations represent independent simulation performances.

The *gender distribution* of the sample is relatively balanced, with a slight female majority: 1,610 women (57.2%) and 1,206 men (42.8%). Participants' ages range from 20 to 71 years (M = 38.88, SD = 10.17), with the highest concentration in the late 30s.

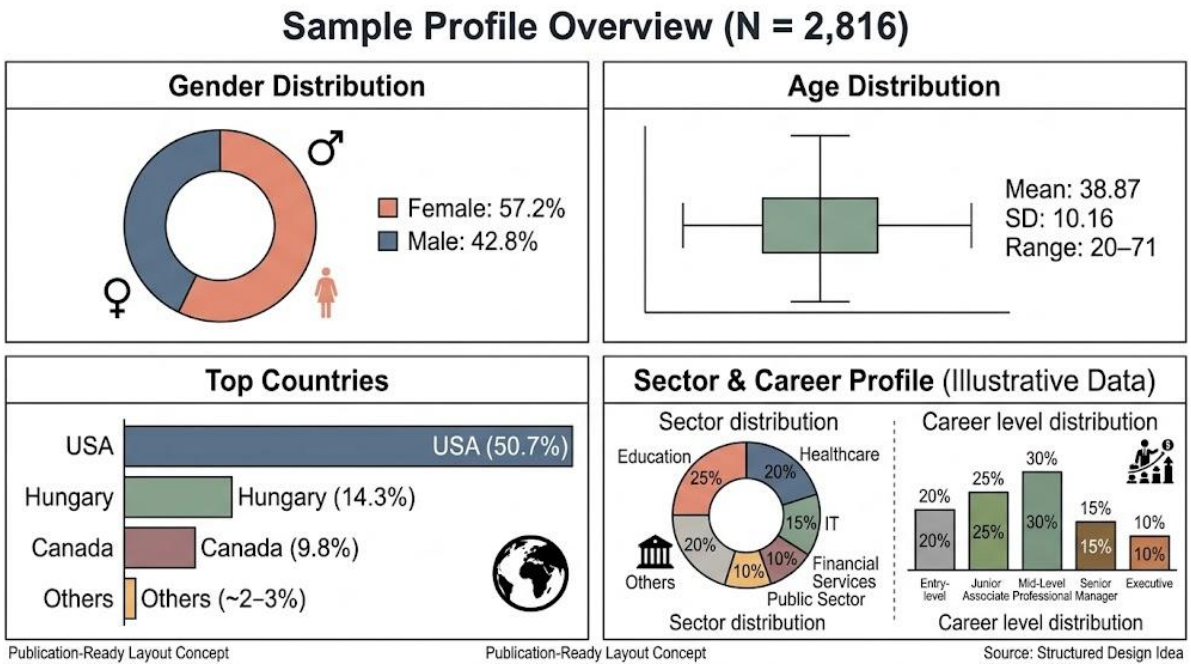
Geographically, the sample was international, with the majority of respondents from the United States (50.7%, n = 1,428), followed by Hungary (14.3%, n = 404) and Canada (9.8%, n = 275). Smaller proportions were observed from Singapore (2.5%), Portugal (2.5%), France (2.2%), and Kazakhstan (2.2%).

In terms of *organizational sector*, respondents were primarily employed in Higher Education (30.9%) and Hospital & Health Care (28.1%), followed by Government Administration (11.9%), Military (9.0%), and Defense & Space (5.5%).

Regarding *career level*, 46.6% of participants were Individual Contributors, 27.5% First Line Managers, 15.8% Senior Managers, and 10.1% Business/Function Heads.

Although the sample includes participants from sectors such as higher education, healthcare, and defense, these are treated as part of a broader public-service-related ecosystem, as they operate within or in close interaction with public governance structures. Accordingly, the sample is interpreted as a public-service-oriented, mixed professional cohort rather than a strictly defined administrative population. Figure 2 summarizes the demographic and sectoral profile of the sample.

Figure 2. Sample profile overview. Source: authors.



3.2. Measures

Leadership Competencies. The analysis includes *29 leadership competencies* measured through the FLIGBY simulation. These competencies reflect behavioral patterns derived from decision-making processes rather than self-reported perceptions.

Each competency score is calculated through an algorithmic evaluation of over 150 decision points within the simulation, ensuring a behavior-based and context-sensitive measurement approach.

Performance Indicators. Leadership effectiveness is operationalized using two key indicators:

- *Managerial Leadership Index (MLI)* – a composite performance metric reflecting overall leadership effectiveness
- *Flow* – the ability to generate engagement and optimal psychological states within the team

Additional outcome variables (Profit and Awards) were included as supplementary indicators.

3.3. Analytical Strategy

A multi-step quantitative analytical framework was applied.

Principal Component Analysis. To identify the latent structure of leadership competencies, Principal Component Analysis (PCA) with Varimax rotation was conducted to identify the underlying competency structure. Throughout the analysis, the extracted dimensions are referred to as *components (PCA-derived factors)*. PCA was selected as an exploratory data reduction technique because the study did not impose priori assumptions about latent component structure. The suitability of the data for PCA was confirmed using the *Kaiser–Meyer–Olkin (KMO) measure* and *Bartlett's test of sphericity.* Components were retained based on eigenvalues (>1) and interpretability criteria. Components were retained based on eigenvalues greater than 1, scree plot inspection, and interpretability considerations. Component loadings above |0.40| were considered significant for interpretation.

Reliability Analysis. Internal consistency of the extracted components was assessed using *Cronbach's alpha,* with values above 0.70 considered acceptable.

Regression Analysis. To examine the predictive power of competency components, *multiple linear regression models* were estimated with MLI and Flow as dependent variables. All variables included in regression models were standardized before analysis to ensure comparability of coefficients. Standardized beta coefficients are reported.

Multicollinearity diagnostics were conducted using *Variance Inflation Factors (VIF*), and all values remained below the critical threshold of 5.

Cluster Analysis. Leadership archetypes were identified using *K-means clustering* based on standardized competency scores. The optimal number of clusters (k = 3) was determined using the *Elbow method* and interpretability considerations. The selection of k = 3 was supported not only by the Elbow method but also by theoretical interpretability and consistency with existing leadership typology literature. Cluster profiles were analyzed to identify distinct leadership patterns.

3.4. Validity and Limitations

While the FLIGBY simulation provides a behavior-based and context-rich dataset, it does not constitute a standardized psychometric instrument. However, previous validation studies have demonstrated its strong association with leadership development outcomes.

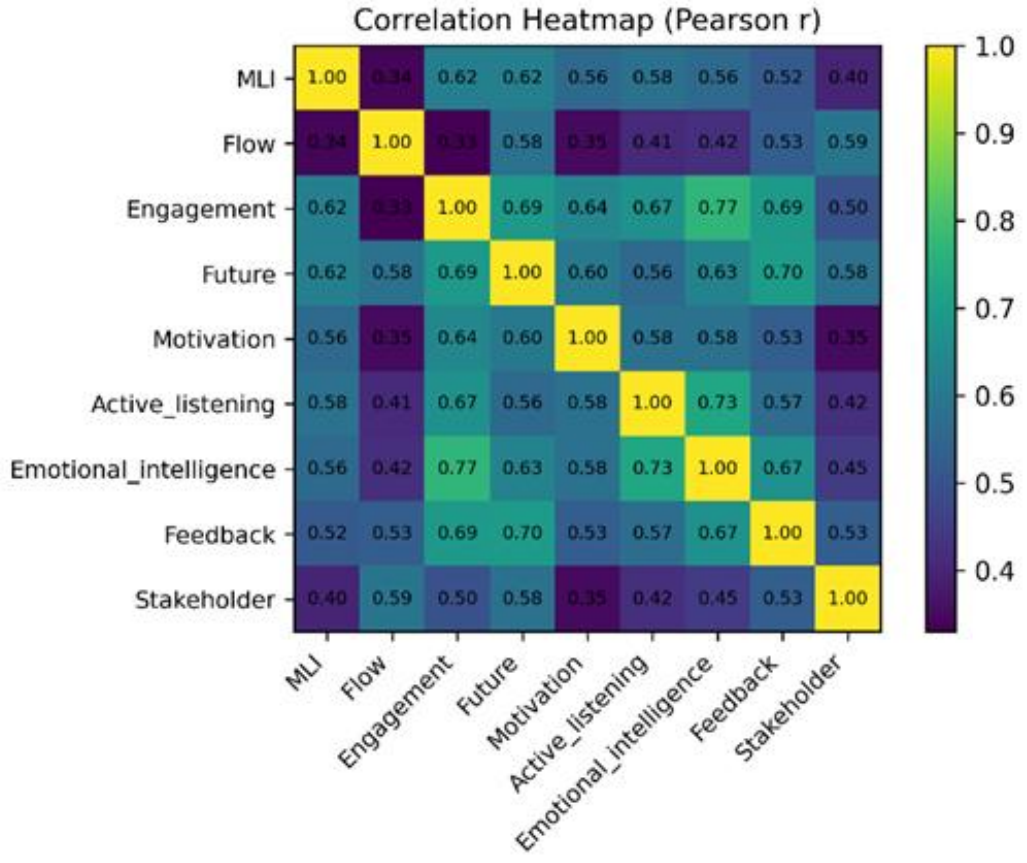
The large sample size and multi-year coverage enhance the robustness of the findings, although the design remains pooled cross-sectional rather than longitudinal, and geographical concentration (primarily US and CEE) may limit generalizability.

4. Results

4.1. Correlational Analysis of Leadership Competencies

The analysis revealed that the strongest correlations with *MLI* were observed for *Building engagement* (r = 0.624), *Future orientation* (r = 0.622), *Active listening* (r = 0.579), and *Motivation* (r = 0.560). In the case of *Flow*, *Stakeholder management* (r = 0.592), *Future orientation* (r = 0.580), and *Feedback* (r = 0.530) were dominant. These findings suggest that leadership effectiveness is associated not only with interpersonal and future-oriented competencies but also with engagement-building, business-oriented, and information-processing capabilities. To further explore these relationships, a correlation heatmap was constructed (Figure 3).

Figure 3. Correlation heatmap of key leadership competencies and performance indicators. Source: authors.



These findings directly address RQ1 by highlighting the dominant role of relational and future-oriented competencies in predicting leadership effectiveness.

4.2. Component Structure of Leadership Competencies

The Principal Component Analysis (PCA) of the 29 leadership competencies revealed *five distinct dimensions*, explaining *71.3% of the total variance*. The internal consistency of these components is high, with *Cronbach's alpha* values ranging between *0.73 and 0.90*, indicating excellent reliability.

The PCA revealed a five-component competency structure underlying public sector leadership effectiveness (Table 1). Detailed component loadings and reliability coefficients (Cronbach's α) are reported in Appendix A (Table A3).

- *C1: Empowerment and Motivational Leadership (18.9% variance):* Includes competencies such as empowerment, motivation, recognizing personal strengths, and building engagement (α = 0.90).
- *C2: Relational Intelligence and Diplomacy (15.2% variance):* Encompasses information gathering, involvement, diplomacy, and active listening (α = 0.84).
- *C3: Strategic and Future-Oriented Mindset (including elements of business-oriented thinking) (16.3% variance):* Focuses on future orientation, stakeholder management, and strategic thinking (α = 0.90).
- *C4: Operational Efficiency and Organization (7.9% variance):* Includes competencies related to effective task execution and workflow management, such as time management, organizing, and prioritizing (α = 0.73).
- *C5: Decisiveness and Crisis Management (13.0% variance):* Encompasses competencies associated with decision-making under pressure and interpersonal effectiveness in challenging situations, including time-pressured decision making, communication, conflict management, teamwork management, and assertiveness (α = 0.83).

Table 1. Reliability statistics of leadership competency components

Component / Scale	Number of Items	Cronbach's Alpha	Interpretation
C1: Empowerment and Motivational Leadership	6	0.9	Excellent
C2: Relational Intelligence and Diplomacy	5	0.84	Good
C3: Strategic and Future-Oriented Mindset	5	0.9	Excellent
C4: Operational Efficiency and Organization	3	0.73	Acceptable
C5: Decisiveness and Crisis Management	5	0.83	Good

Note: Component loadings above |0.40| are displayed. Components were extracted using Principal Component Analysis (PCA) with Varimax rotation.

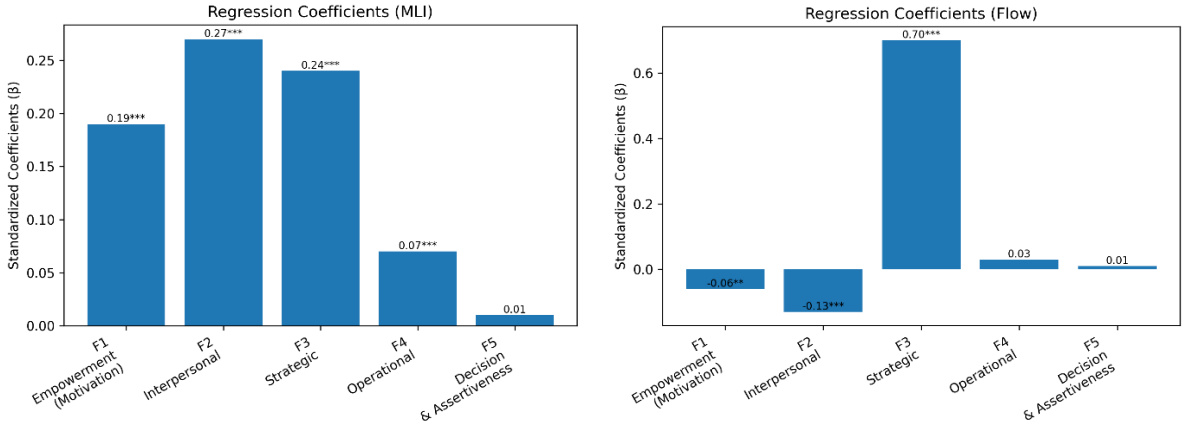
The identified structure provides empirical support for RQ2, confirming that leadership competencies form a multidimensional and interpretable system.

4.3. Regression Analysis: Predictors of Leadership Effectiveness

According to the regression analysis, the model is significant ($p < 0.001$) and explains 46% of the variance in MLI ($R^2 = 0.46$). The *interpersonal factor* ($\beta = 0.27$) and the *strategic factor* ($\beta = 0.24$) proved to be the strongest predictors. In the case of Flow, the model is also significant ($R^2 = 0.36$), reinforcing the importance of the competency component structure. These findings suggest that effective leadership in the public sector requires a *hybrid competency profile,* combining relational, strategic, and performance-oriented dimensions. To assess the predictive

strength of competency components, standardized regression coefficients were estimated (Figure 4).

Figure 4. Standardized regression coefficients (β) for leadership components predicting MLI and Flow. Source: authors.



*** p < .001 ** p < .01

These results contribute to answering RQ3 by demonstrating that leadership profiles can be meaningfully categorized based on competency configurations. Notably, *Business-oriented thinking* demonstrated the strongest individual predictive effect (β = 0.36), exceeding both interpersonal and strategic components in magnitude. To assess the predictive strength of competency components, regression coefficients were estimated

4.4. Leadership Archetypes: Cluster Analysis

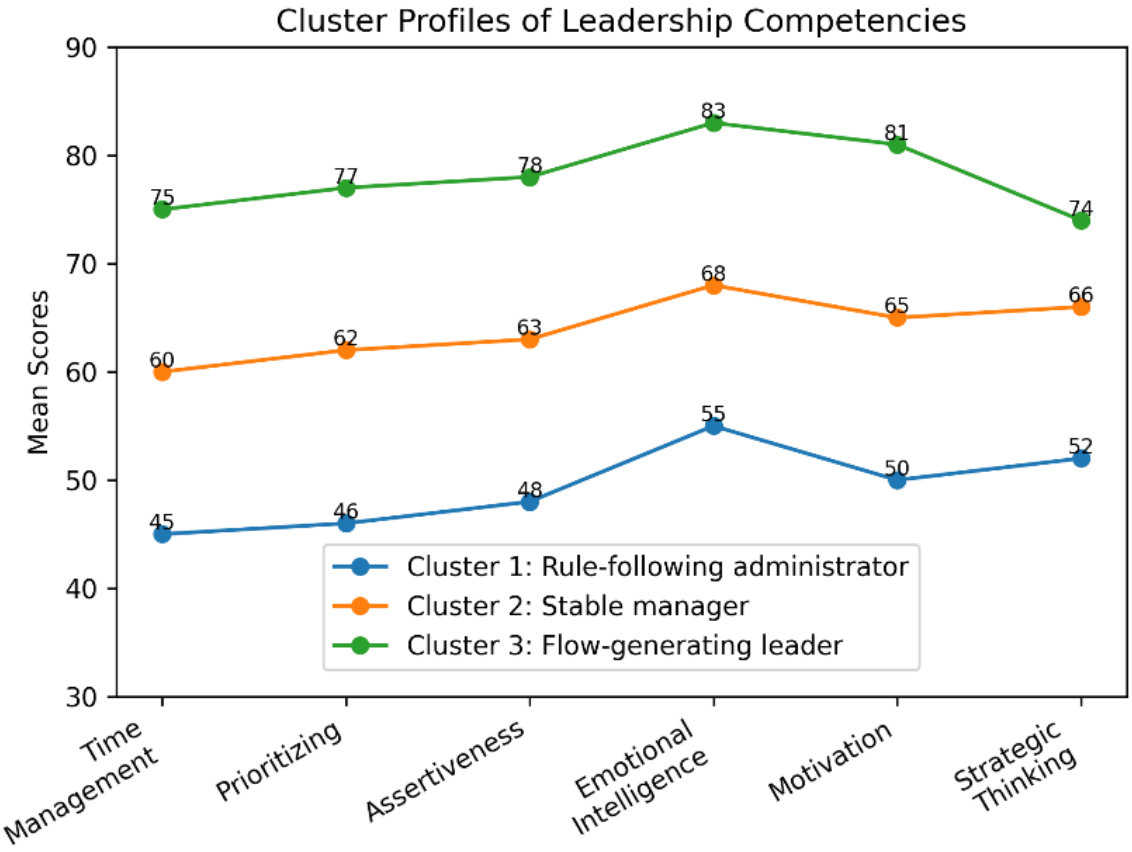
The K-means clustering analysis identified three clearly distinguishable *leadership types*:

1. *Rule-following Administrator* – characterized by lower competency levels and a more operational mode of functioning.
2. *Stable Manager* – exhibits a balanced, moderate-level competency profile.
3. *Flow-generating Leader* – characterized by a high level of emotional intelligence, motivation, and strategic thinking.

Rather than representing fixed categories, these clusters form a *developmental continuum,* where differences are primarily driven by the *overall level and integration of competencies.*

The *Flow-generating Leader* cluster demonstrates consistently higher performance across all indicators, suggesting that leadership effectiveness emerges from *competency synergy rather than isolated strengths*. To identify distinct leadership profiles, cluster analysis results are visualized in Figure 5.

Figure 5. Cluster profiles of leadership competencies across three groups of public sector leaders, Source: authors.



4.5. Hypothesis Testing

The quantitative analysis yielded the following findings regarding our research hypotheses:

- *H1: Not supported.* Contrary to expectations, business-oriented thinking (β = 0.36) emerged as a stronger predictor of leadership effectiveness than strategic thinking or diplomatic competencies.
- *H2: Supported.* Interpersonal and strategic components showed a significant positive effect on both MLI and Flow.
- *H3: Strongly supported.* Correlations between the components (0.56–0.72) indicate an integrated competency structure.

One of the most unexpected findings is the strong predictive role of business-oriented thinking. This result suggests that public service leadership increasingly requires a performance-oriented mindset, reflecting the growing complexity and hybridization of governance environments.

The findings reinforce the interpretation of leadership competencies as a dynamic and integrated system, where effectiveness emerges from the interaction of multiple dimensions rather than isolated strengths.

Flow appears not only as an outcome variable but as a potential mediating mechanism linking leadership competencies to performance, highlighting the importance of engagement-driven leadership.

5. Discussion

This study contributes to the literature on public service leadership, competency-based development, and simulation-based learning by showing that leadership effectiveness is best understood not as the sum of discrete competencies but as the emergent property of an integrated competency system. Across correlational, PCA, regression, and cluster-based analyses, the findings consistently indicate that relational, strategic, and motivational competencies are mutually reinforcing and jointly associated with managerial effectiveness and flow generation. At the same time, the unexpectedly strong role of business-oriented thinking suggests that public service leadership is increasingly shaped by hybrid logics that combine public value, relational capability, and managerial rationality.

5.1. Reframing leadership effectiveness in the public sector

One of the central contributions of this study is its challenge to traditional views of public service leadership that privilege procedural compliance, formal authority, and technical expertise. The results indicate that leadership effectiveness, as operationalized by Managerial Leadership Index (MLI) and Flow, is more strongly associated with competencies such as building engagement, future orientation, active listening, feedback, and stakeholder management than with narrowly administrative or rule-bound orientations. This pattern suggests that effective public service leadership depends less on the execution of predefined procedures and more on the leader's capacity to coordinate people, sustain engagement, and maintain adaptive direction under conditions of complexity.

This finding is consistent with contemporary relational and transformational leadership perspectives, but it also extends them in an important way. Rather than treating relational skill as one competency among many, the present results suggest that relational competence functions as a structural driver of leadership performance. In other words, leadership effectiveness in public service appears to arise from the interaction of interpersonal, motivational, and strategic capacities, not from any single skill in isolation. This has direct implications for competency models in public administration, which often present competencies in segmented categories. The empirical evidence here suggests that such segmentation may obscure the dynamic interdependence that characterizes leadership behavior in practice.

5.2. Competency integration as a theoretical contribution

The component structure identified in this study offers strong support for an integrated view of leadership competence. The extracted components were not independent but moderately to strongly intercorrelated, indicating that leadership competencies cluster into broader functional systems rather than standing alone as unrelated attributes. This matters theoretically because many competency frameworks, including ECQ, UNESCO, UN, and OECD models, tend to organize leadership around discrete categories that are analytically useful for human resource management but may underrepresent behavioral interdependence.

The present findings suggest that leadership should be conceptualized as a dynamic architecture in which empowerment, relational intelligence, and future-oriented thinking co-develop. The strongest component-level predictors of MLI and Flow were not purely technical or administrative, but relational and strategic. This implies that public service leadership development should move beyond additive competency inventories and toward models that

emphasize interaction effects, developmental progression, and contextual adaptation. In this sense, the study contributes to competency theory by showing that measurable leadership effectiveness is better captured through competency integration than through isolated trait-like elements.

These findings also suggest that existing competency frameworks (ECQ, UNESCO, UN, OECD) may benefit from being interpreted not as static taxonomies but as dynamic and interacting systems of leadership capabilities.

5.3. Flow as a generative mechanism, not merely an outcome

A second important contribution concerns the role of Flow. In this study, Flow should not be interpreted simply as an output variable or an experiential by-product of good leadership. Rather, the pattern of results suggests that Flow may function as a generative condition through which leadership competencies shape performance outcomes. Leaders who score highly in strategic and interpersonal domains appear more capable of creating the psychological and interactional conditions that support engagement, coordination, and optimal team functioning.

This interpretation is compatible with Csíkszentmihályi's flow theory, but it also extends the theory into the domain of public service leadership. Flow is often studied as an individual experience; here, it appears as a leadership-relevant, team-oriented state connected to behavioral competence. The findings therefore support a broader understanding of flow as an enabling mechanism within organizational life, particularly in environments that require sustained attention, adaptive collaboration, and meaningful challenge. At the same time, this interpretation remains exploratory because the present study does not formally test a mediation model. Future research should examine whether Flow operates as an indirect pathway linking leadership competencies to performance outcomes.

5.4. The emergence of hybrid leadership logic

Perhaps the most unexpected result of the study is the strong predictive role of business-oriented thinking. This finding complicates any simple opposition between public-service values and managerial performance. Rather than indicating a shift toward marketization in a narrow sense, the result suggests that effective public leadership increasingly requires a hybrid logic in which business-oriented thinking coexists with relational sensitivity, ethical awareness, and strategic coordination.

This hybridization is theoretically significant for at least two reasons. First, it challenges the assumption that business-oriented thinking is structurally foreign to public service leadership. In complex governance environments, leaders may need to combine citizen-centered values with the capacity to prioritize resources, assess trade-offs, and make performance-relevant decisions. Second, it suggests that public service leadership development cannot rely solely on normative or values-based models. Competence in public service now appears to require both moral legitimacy and operational acumen. The present findings, therefore, align with recent debates in public administration that emphasize adaptive governance, managerial complexity, and the blending of public and performance logics.

5.5. Leadership archetypes as developmental configurations

The cluster analysis further reinforces the developmental character of leadership competence. The three identified profiles should not be interpreted as fixed typologies or personality categories. Rather, they appear to represent developmental configurations along a continuum from lower to higher competency integration. The “Rule-following Administrator” reflects a more constrained and operational pattern of decision-making, whereas the “Stable Manager” shows moderate balance across competencies. The “Flow-generating Leader” combines stronger relational, strategic, and motivational capacities and achieves the most favorable performance profile.

This pattern is important because it suggests that leadership development is not merely a matter of acquiring additional skills, but of integrating competencies into more coherent behavioral repertoires. The clusters therefore support a developmental perspective on public leadership: effectiveness appears to increase when competencies become more mutually reinforcing and behaviorally coordinated. This interpretation also helps bridge the gap between static competency models and lived leadership practice. Rather than treating leadership as a set of fixed categories, the findings imply that leaders can move along a developmental trajectory in response to learning, feedback, and reflective practice.

5.6. Implications for simulation-based leadership development

The results also have clear implications for simulation-based learning. FLIGBY appears to function not as a psychometric substitute for formal assessment, but as a developmental environment that makes leadership behavior observable in context. This is an important distinction. The value of the simulation lies in its capacity to capture decision patterns, expose trade-offs, and provide behavioral feedback in a way that conventional self-report instruments cannot. In this sense, FLIGBY bridges the gap between abstract competency frameworks and situated leadership practice.

The study suggests that serious games can support public service leadership development in at least three ways. First, they operate competency frameworks by converting abstract constructs into observable decisions. Second, they create a safe environment for experimentation, allowing participants to test leadership strategies without real-world costs. Third, they support reflexive learning by making the consequences of choices visible. These features make simulation especially suitable for public service education, where leadership must be developed under conditions of uncertainty, accountability, and ethical responsibility.

At the same time, the findings suggest caution. Simulation-based scores should not be interpreted as direct substitutes for formal performance evaluation. Rather, they are best understood as developmental indicators that capture behavioral tendencies in a controlled environment. This distinction matters for both theory and practice. For theory, it means that simulation data can enrich our understanding of leadership behavior without collapsing into conventional assessment logic. For practice, it means that public institutions can use such tools to enhance training, reflection, and developmental feedback, while preserving the distinct role of formal appraisal systems.

5.7. Concluding synthesis

Taken together, the findings support a reconceptualization of public service leadership as an integrated, developmental, and context-sensitive competence system. Leadership effectiveness is shaped by the interplay of relational intelligence, strategic orientation, motivational

capability, and performance awareness. Flow appears to be closely associated with this system, potentially functioning as a generative state that helps translate competence into effective leadership action. The emergence of business-oriented thinking as a strong predictor further suggests that the future of public service leadership lies not in choosing between values and performance, but in combining them within hybrid and adaptive leadership logics.

In this respect, the study contributes to current debates in public administration by showing that competency frameworks remain valuable, but only if they are interpreted as dynamic and interdependent rather than static and fragmented. Simulation-based learning offers one promising way to operationalize this shift, providing a developmentally rich environment in which leadership can be practiced, observed, and refined. The present findings therefore support a more integrated model of public service leadership, one that aligns competency development, experiential learning, and organizational performance within a single analytical framework.

6. Conclusion and Policy Implications

This study set out to examine the structure and determinants of leadership effectiveness in the public service by integrating international competency frameworks with behavioral data derived from a simulation-based learning environment. Drawing on a large-scale dataset from the FLIGBY platform, the analysis combined PCA, regression modelling, and cluster analysis to explore how leadership competencies relate to performance outcomes, particularly the Managerial Leadership Index (MLI) and Flow.

The findings provide consistent evidence that leadership effectiveness in the public sector is best understood as a multidimensional and integrated phenomenon. Rather than being driven by isolated competencies, effective leadership emerges from the interaction of relational, strategic, and motivational capabilities. These competencies jointly contribute to both performance outcomes and the ability to generate engagement within teams.

Importantly, the results also indicate that business-oriented thinking plays a more substantial role in leadership effectiveness than initially expected. This suggests that contemporary public service leadership increasingly reflects hybrid logics, where business-oriented thinking coexists with relational and value-based competencies. At the same time, the strong association between interpersonal competencies and Flow highlights the importance of leadership in shaping psychologically supportive and engagement-rich work environments.

The identification of distinct leadership profiles further reinforces the developmental nature of leadership competence. Rather than representing fixed categories, the observed clusters point toward different levels of competency integration, suggesting that leadership effectiveness evolves through the alignment and reinforcement of multiple competencies over time.

Taken together, these findings contribute to a more nuanced understanding of public service leadership. They suggest that existing competency frameworks remain valuable reference points, but their practical relevance depends on recognizing the dynamic and interdependent nature of leadership behavior. In this respect, simulation-based environments such as FLIGBY offer a promising complementary approach by enabling the observation and development of leadership competencies in context.

6.1. Policy Implications for Public Service Leadership Development

The findings of this study have several implications for the design of leadership development systems in the public sector.

First, the results suggest a need to move beyond strictly modular competency frameworks toward more integrative approaches. Traditional models often treat competencies as separable elements, which may be useful for classification and assessment but less effective for development. Public institutions may benefit from training designs that explicitly focus on the interaction between competencies, particularly the integration of relational, strategic, and motivational dimensions.

Second, the strong association between leadership competencies and Flow points to the importance of engagement as a core outcome of leadership practice. While Flow should not be interpreted as a formal performance metric, it may serve as an important developmental indicator of how leaders create conditions for effective teamwork. Leadership development programs may therefore incorporate elements that enhance leaders' ability to foster engagement, feedback, and adaptive collaboration.

Third, the emergence of hybrid leadership patterns suggests that public service training should not frame performance-oriented and value-based competencies as mutually exclusive. Instead, leadership development systems may need to support the simultaneous cultivation of operational effectiveness, ethical awareness, and relational capability. This has implications for curriculum design, assessment practices, and competency frameworks used in public administration education.

Fourth, the results highlight the potential role of simulation-based learning in leadership development. Serious games such as FLIGBY can complement traditional methods by providing behavior-based feedback in a controlled but dynamic environment. Such tools may be particularly useful for developing complex competencies that are difficult to assess through self-report instruments, including decision-making under uncertainty, stakeholder management, and adaptive leadership.

At the same time, the use of simulation-based tools should be approached with caution. The results derived from such environments are context-dependent and should not be treated as direct substitutes for formal evaluation systems. Instead, they are best used as developmental instruments that support reflection, learning, and skill refinement.

6.2. Limitations and Future Research

Several limitations should be acknowledged when interpreting the findings.

First, although the dataset is large and spans multiple years, it represents a pooled cross-sectional sample rather than a fully longitudinal panel. As a result, causal relationships between competencies and performance outcomes cannot be definitively established.

Second, the sample is geographically concentrated, with a strong representation from the United States and Central and Eastern Europe. While this provides valuable insight into these contexts, the generalizability of the findings to other administrative systems, particularly in the Global South or Asia, remains limited.

Third, the FLIGBY simulation, while behaviorally rich, is not a standardized psychometric instrument. Competency scores reflect decision patterns within a specific simulated environment, which may not fully capture leadership behavior in real-world organizational settings.

These limitations also point toward directions for future research. Further studies could apply longitudinal designs to examine the development of leadership competencies over time, or use structural equation modelling to test the potential mediating role of Flow more explicitly. Cross-cultural comparative research with more balanced samples would also help clarify how leadership competencies interact with institutional and cultural contexts.

6.3. Final Remarks

In an era characterized by complexity, uncertainty, and increasing societal expectations toward public institutions, leadership in the public sector requires more than technical expertise or procedural compliance. The findings of this study suggest that effective leadership is rooted in the ability to integrate multiple competencies, sustain engagement, and adapt to changing conditions.

By linking international competency frameworks with simulation-based behavioral data, this research highlights the potential for more dynamic and practice-oriented approaches to leadership development. Rather than replacing existing models, such approaches can enrich them by bringing theoretical constructions closer to lived leadership experience.

Ultimately, the study supports a shift toward more integrated, adaptive, and development-oriented conceptions of public service leadership that reflect not only what leaders know but how they think, interact, and act in complex organizational environments.

From a policy perspective, this implies that future public service leadership development systems should prioritize integrative, experience-based, and behaviorally grounded approaches over purely formal competency assessment models.

References

Almeida, F. & Buzády, Z. (2019). Learning Entrepreneurship in Higher Education Through Flow Theory and FLIGBY Game. *International Journal of Virtual and Personal Learning Environments (IJVPLE), 9*(1), 1-15. https://doi.org/10.4018/IJVPLE.2019010101

Argyris, C. (1991). Teaching Smart People How to Learn. *Harvard Business Review*, *4*(2), 4-15.

Bolden, R., Morgen, W., & Linacre, N. (2016). *Leadership Paradoxes, Rethinking Leadership for an Uncertain World*. Routledge. https://doi.org/10.4324/9781315751283

Boyatzis, R.E. (2008). Competencies in the 21st century. *Journal of Management Development, 27*(1), 5–12. https://doi.org/10.1108/02621710810840730

Buzády, Z., Wimmer, A., Csesznak, A., & Szentesi, P. (2024). Exploring flow-promoting management and leadership skills via serious gaming. *Interactive Learning Environments*, 32(2), 757–771. https://doi.org/10.1080/10494820.2022.2098775

Csíkszentmihályi, M. (2003). *Good Business: Leadership, Flow, and the Making of Meaning*. New York: Penguin Books.

Fernandez, S., & Moldogaziev, T. (2015). Employee empowerment and job satisfaction in the U.S. federal bureaucracy: A self-determination theory perspective. *The American Review of Public Administration, 45*(4), 375–401. https://doi.org/10.1177/0275074013507478

Gerson, D. (2020). Leadership for a high performing civil service: Towards senior civil service systems in OECD countries. *OECD Working Papers on Public Governance*, No. 40, OECD Publishing, Paris, https://doi.org/10.1787/ed8235c8-en.

Illiash, T. (2013). *Constructing an integrated model of public-sector leadership competencies* (Doctoral dissertation, Rutgers University). Rutgers University Community Repository. https://doi.org/10.7282/T3XS5T07

Kruger, J., & Dunning, D. (1999). Unskilled and unaware of it: How difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of Personality and Social Psychology, 77*(6), 1121–1134. https://doi.org/10.1037/0022-3514.77.6.1121

López-Serrano, M. J., García-Carrión, R., McGowan, S., & Paredes, J. (2025). Teaching soft skills in higher education through serious games: Validation of the Compete! gamification. *Smart Learning Environments, 12*, 49. https://doi.org/10.1186/s40561-025-00401-5

McGowan, N., López-Serrano, A., & Burgos, D. (2023). Serious Games and Soft Skills in Higher Education: A Case Study of the Design of *Compete!*. *Electronics*, *12*(6), 1432. https://doi.org/10.3390/electronics12061432

OECD. (2019). *Recommendation of the Council on Public Service Leadership and Capability*. https://doi.org/10.1787/ed8235c8-en

OECD (2021). *Public Employment and Management 2021: The Future of the Public Service.* OECD Publishing. https://doi.org/10.1787/5f5c9a9f-en

OECD (2023). *Core Competency Framework. Human Resource Management*. Paris: OECD Publishing. https://www.oecd.org/en/about/careers/apply/core-competency-framework.html

OECD. (2017). *Skills for a High-Performing Civil Service*. OECD Public Governance Reviews, OECD Publishing. https://doi.org/10.1787/9789264280724-en

Olejniczak, K., Newcomer, K. E., & Meijer, S. A. (2020). Advancing Evaluation Practice With Serious Games. *American Journal of Evaluation*, *41*(3), 339-366. https://doi.org/10.1177/1098214020905897

Siewiorek, A., Saarinen, E., Lainema, T., & Lehtinen, E. (2012). Learning leadership skills in a simulated business environment. *Computers & Education, 58*(1), 121–135. https://doi.org/10.1016/j.compedu.2011.08.016

Spencer, L. M., & Spencer, S. M. (1993). *Competence at work: Models for superior performance.* John Wiley & Sons.

UNESCO. (2016). *UNESCO Competency Framework*. https://unesdoc.unesco.org/ark:/48223/pf0000245056

United Nations. (2010). *Competency development: A practical guide*. https://digitallibrary.un.org/record/700591

United Nations. (2013). *UN competency framework*. https://hr.un.org/sites/hr.un.org/files/UN%20Competency%20Framework.pdf

United Nations. (2019). *Competencies for the future*. https://careers.un.org/lbw/attachments/competencies_booklet_en.pdf

U.S. Office of Personnel Management. (2017). *Executive core qualifications (ECQs)*. https://www.opm.gov/policy-data-oversight/senior-executive-service/executive-core-qualifications/

Van Wart, M. (2013). Lessons from leadership theory and the contemporary challenges of leaders. *Public Administration Review*, *73*(4), 553–565. https://doi.org/10.1111/puar.12069

Appendix

Table A1. Comparison of competency models along eight dimensions. Source: authors, 2025

Perspective	ECQ	UNESCO	UN	OECD
Context of application	United States federal civil service	Global intergovernmental organizations	International organizational environment	Public service in developed countries
Focus areas	Leadership, results orientation and communication	Ethical values, cooperation, innovation and accountability	Intercultural sensitivity, integrity	Systems thinking, strategic leadership, openness
Standardization	Very high	Medium	Medium	High
Measurability	Easily measurable	Moderately measurable	Moderately measurable	Well measurable
Ethical orientation	High	Very high	Very high	Moderate
Development potential	Limited	Partial	Partial	Partial
Experience-based learning	Low	Moderate	Moderate	Moderate
Strengths	Objectivity, structure	Strong ethical and cultural foundations, global applicability	Strong ethical framework, global sensitivity	Innovation-oriented, easily integrated into career management
Limitations	Inflexible, highly formal, and business-oriented	Lack of detailed indicators and standardized quantitative tools	Broad and general; limited measurable indicators	Few specific tools; inconsistent national implementation

Table A2. Mapping of Public Service Competency Models to FLIGBY's Competencies. Source: authors, 2025

FLIGBY Competency	ECQ Alignment	UNESCO Alignment	UN Alignment	OECD Alignment
Strategic Thinking	Leading Change; Results Driven	Planning & Organizing; Results Focus	Vision; Strategic Thinking	Vision & Strategy; Systems Thinking
Decision-Making	Results Driven; Business Acumen	Accountability	Judgement/Decision-making	Achieving Results
Motivation	Leading People	Collaboration; Innovation	Inspiring Others	Building Engagement
Empathy	Leading People	Respect for Diversity	Respect for Diversity	Inclusiveness
Conflict Management	Building Coalitions	Collaboration	Managing Performance & Conflict	Managing Relationships
Supporting Innovation	Leading Change	Innovation	Creativity and Innovation	Fostering Innovation
Emotional Intelligence	Leading People	Professionalism; Collaboration	Communication; Teamwork	Building Trust
Providing Feedback	Leading People	Collaboration	Managing Performance	Coaching & Mentoring
Integrity	Leading People; Building Coalitions	Integrity	Integrity	Public Service Ethics
Teamwork	Leading People	Teamwork	Teamwork	Collaboration
Communication	Building Coalitions	Communication	Communication	Communicating Effectively

Change Management	Leading Change	Driving & Managing Change	Managing Change	Adapting to Change
Vision	Leading Change	Driving & Managing Change	Vision	Setting Direction
Building Relationships	Building Coalitions	Collaboration	Partnering	Partnering Across Boundaries
Cultural Sensitivity	Building Coalitions	Respect for Diversity	Respect for Diversity	Diversity Awareness
Problem-Solving	Results Driven	Innovation	Creativity and Innovation	Problem-Solving Orientation
Performance Management	Leading People	Accountability	Managing Performance	Delivering Results
Coaching	Leading People	Collaboration	Developing Others	Developing Talent
Stress Management	Leading People	Professionalism	Resilience	Resilience & Adaptability
Learning Orientation	Leading Change	Innovation	Continuous Learning	Learning Agility
Persuasion	Building Coalitions	Communication	Influencing	Influencing Others
Time Management	Results Driven	Planning & Organizing	Planning & Organizing	Planning & Prioritizing
Delegation	Leading People	Empowering Others	Managing Performance	Delegating Effectively
Customer Focus	Results Driven	Accountability	Client Orientation	Service Orientation
Goal Setting	Results Driven	Results Focus	Managing Performance	Achieving Outcomes
Risk Assessment	Results Driven	Accountability	Judgement	Managing Risk
Stakeholder Engagement	Building Coalitions	Collaboration	Partnering	Engaging Stakeholders
Negotiation	Building Coalitions	Collaboration	Influencing	Negotiation Skills
Ethical Decision-Making	Leading People	Integrity	Integrity	Public Service Ethics

Table A3. Component Structure and Reliability of the Competency Model (N = 2,816)

Component (Explained Variance)	**Competency Item (Variable)**	**Component Loading**	**Cronbach's α**
C1: Empowerment and Motivational Leadership (18.9%)	Empowerment	0.84	0.90
	Motivation	0.76	
	Recognizing personal strengths	0.69	
	Delegating	0.68	
	Building engagement	0.65	
	Emotional intelligence	0.64	
C2: Relational Intelligence and Diplomacy (15.2%)	Information gathering	0.76	0.84
	Involvement	0.67	
	Diplomacy	0.65	
	Analytical skill	0.54	
	Active listening	0.52	
C3: Strategic and Future-Oriented Thinking (16.3%)	Future orientation	0.77	0.90
	Stakeholder management	0.75	
	Strategic thinking	0.66	
	Feedback	0.62	
	Business-oriented thinking	0.59	
C4: Operational Efficiency and Organization (7.9%)	Time management	0.80	0.73
	Organizing	0.56	
	Prioritizing	0.52	

C5: Decisiveness and Crisis Management (13.0%)	Time-pressured decision making	0.66	0.83
	Communication	0.62	
	Conflict management	0.59	
	Teamwork management	0.59	
	Assertiveness	0.58	
Total explained variance	71.3%		