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Faculty Segmentation in Higher Education: Evidence from Factor and Cluster Analyses Across Different Governance Contexts in Public and Private Universities

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Abstract: *Performance measurement systems (PMS) have become central governance instruments in contemporary public sector organizations, including universities. In higher education, these systems shape how academic performance is evaluated and how institutional priorities are implemented. Using survey data from 557 faculty members at public and private universities in Lebanon and Kuwait, the analysis identifies six dimensions that influence faculty perceptions: institutional engagement and values, rewards and recognition systems, HRM practices and faculty development, technological readiness and system effectiveness, research productivity and collaboration, and perceived organizational barriers. Hierarchical and K-Means clustering reveal three faculty profiles: engaged and productive faculty, satisfied but cautious faculty oriented toward stability, and autonomous researchers facing institutional constraints despite strong interest in professional development. Although similar cluster structures appear across countries, sectoral differences emerge between public and private institutions. The findings show that performance measurement systems operate as governance arrangements whose effects depend on institutional design and administrative structures, contributing to debates in public administration on performance regimes and professional motivation in hybrid public organizations.*

Keywords: *Faculty performance; higher education; public–private governance; HRM systems; exploratory factor analysis; clustering; institutional barriers; engagement; research productivity*

JEL: *I23; I28; J24; J45; M12; M54; C38; C39*

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Introduction

Performance measurement systems (PMS) have become key governance instruments in contemporary higher education, influencing faculty engagement, accountability, and perceptions of institutional effectiveness. By converting complex academic activities into assessable indicators, PMS shapes motivation, professional behavior, and the perceived legitimacy of managerial practices. From a public administration perspective, these systems are not only managerial tools but also governance instruments that structure accountability relationships between universities, governments, and society. Understanding how academic staff interprets such systems is therefore essential for evaluating how performance regimes operate within professional public organizations.

Recent scholarship draws attention to the limits of standardised evaluation models and calls for more context-sensitive approaches that more effectively reflect the multidimensional nature of academic work and institutional governance environments (Jain et al., 2023; Çınkır et al., 2021).

In response to this perspective, the present study examines the underlying dimensions shaping faculty perceptions of PMS and identifies distinct faculty profiles. It further explores how these profiles vary across governance arrangements (public versus private universities) and national contexts (Lebanon and Kuwait). By approaching PMS as governance mechanisms rather than solely managerial tools, the study adds to ongoing discussions in public administration about accountability, institutional capacity, and public value creation in higher education.

1. Background: Performance Measurement Debates in Higher Education

From a governance perspective, performance measurement systems (PMS) in higher education structure accountability, allocate incentives, and signal institutional aims. Rather than functioning only as HRM tools, they operate as means through which policy goals and organizational missions are translated into accessible outputs. In doing so, they shape evaluation practices, professional autonomy, funding distribution, and institutional legitimacy.

Despite their growing importance, arguments persist over how such systems should be designed and interpreted. A large body of research argues that existing PMS frequently capture only a limited part of academic work and tend to undervalue the full range of faculty contributions over teaching, research, and service activities (Thunnissen & Boselie, 2024; Masatoshi, 2023). Disagreements also endure regarding the selection of indicators, the interpretation of performance measures, and their conformity with institutional missions and regulatory requirements (Jain et al., 2023; Karsantık & Çetin, 2021).

Empirical studies show that definitions of performance vary across governance settings. Indicator selection and priorities differ across countries and institutional sectors, reflecting variations in regulatory systems, administrative oversight, and strategic orientation (Jain et al., 2023; Karsantık & Çetin, 2021). In public

universities, evaluation criteria are frequently tied to public accountability and policy objectives, while private institutions may emphasize indicators linked to competition and managerial strategy (Steccolini et al., 2020). These differences emphasize the importance of context-sensitive approaches to performance evaluation in higher education.

1.1 The Limits of Uniform Performance Regimes

If performance measurement systems operate as governance mechanisms, their effects are unlikely to be uniform across academic staff. Faculty work is inherently multidimensional, combining teaching, research, service, and administrative responsibilities amid diverse institutional conditions. Standardised evaluation models, therefore, run the risk of overlooking important differences in how performance systems are regarded and experienced. A multidimensional perspective permits a more accurate recognition of faculty contributions and supports governance approaches that encourage excellence while accommodating varied institutional missions (Nehme et al., 2025).

Research also shows that faculty responses to performance assessment are determined by institutional type, governance context, and professional orientation (Kanwal & Baacha, 2025). From this perspective, a segmentation approach helps identify distinct patterns of engagement, alignment, or resistance within the same institutional environment. Rather than assuming uniform reactions to accountability mechanisms, segmentation highlights how perceptions of fairness, development opportunities, and organizational limitations influence faculty responses.

Grouping faculty into empirically derived clusters, therefore, provides a way to examine how governance arrangements translate into distinct motivational and behavioral profiles. This approach tackles the limitations of uniform evaluation models and supports the building of more context-sensitive performance frameworks (Lee et al., 2023).

1.2 Study Purpose and Research Questions

Building on the governance perspective outlined above, this study examines how faculty perceive and interpret performance measurement systems across different institutional contexts. In higher education, PMS function not only as managerial instruments but also as governance mechanisms that structure accountability, influence professional motivation, and shape how academic contributions are recognized. By identifying the latent dimensions underlying these perceptions, the study seeks to understand how performance systems are experienced by academic staff and whether these experiences correspond to distinct professional orientations.

Universities provide a relevant setting for examining these dynamics because they combine elements of public administration, professional autonomy, and organizational accountability. In public institutions in particular, performance

systems often mediate tensions between administrative oversight and the discretionary nature of academic work.

The study therefore explores whether systematic patterns exist in faculty interpretations of performance systems and whether these patterns differ across governance contexts. Attention is given to institutional sector (public versus private) and national context (Lebanon versus Kuwait), which represent different regulatory and administrative environments.

The research addresses the following questions:

- **RQ1:** What latent dimensions underlie faculty perceptions of performance measurement systems?
- **RQ2:** What distinct faculty profiles emerge from these dimensions?
- **RQ3:** Do these profiles vary according to governance context, particularly institutional sector (public vs. private) and country (Lebanon vs. Kuwait)?

Dealing with these questions contributes to discussions on performance management in public and hybrid organizations by showing how governance arrangements influence professional responses to performance regimes.

1.3 Rationale for country selection

Lebanon and Kuwait were selected because they represent different governance arrangements in higher education within the same regional context. In Kuwait, the sector operates under a centralized regulatory framework. Bodies such as the Private Universities Council (PUC) and the National Bureau for Academic Accreditation and Education Quality Assurance (NBAQ) exercise relatively strong oversight and align institutional practices with national policy objectives (Alameddine, 2023). In Lebanon, higher education is more decentralized and strongly influenced by commercial trends. Although the Ministry of Higher Education provides the regulatory framework, enforcement is limited, allowing many private institutions to operate with substantial autonomy (Mazloum, 2023). This contrast offers a useful setting for examining how governance structures shape faculty perceptions of performance measurement systems.

Universities are especially important for public administration research because they combine public accountability with professional autonomy. Within this environment, performance measurement systems function not only as managerial tools but also as governance mechanisms that determine how accountability expectations and professional incentives influence academic work.

Comparing Lebanon and Kuwait therefore allows examination of how different governance models, ranging from centralized supervision to more decentralized arrangements, affect faculty interpretations of performance systems. At the same time, the shared regional context helps reduce broader sociocultural variation, allowing institutional governance differences to be examined more clearly.

1.4 Contributions

This study adds to research on performance measurement and governance in higher education and professional public organizations in several ways. First, it identifies and validates a six-factor framework capturing key dimensions that determine how faculty interpret performance measurement systems. The framework spotlights both motivational and institutional factors that determine how performance regimes operate within academic organizations.

Second, the study develops a three-cluster typology that differentiates faculty profiles by levels of engagement and their relationships with institutional processes. This segmentation approach shows that performance systems generate varied responses among academic staff rather than uniform reactions, demonstrating differences in governance context and institutional conditions.

Methodologically, the study follows a structured analytical sequence including data preparation, validation, exploratory factor analysis, and clustering. This approach delivers an open framework that can be replicated in future research on perceptions of performance systems among professional staff (Qonitan et al., 2025; Mula-Falcón & Caballero, 2025).

Finally, the findings add to debates on performance management in public and hybrid organizations by showing how governance arrangements influence professional responses to performance regimes. The results also suggest that universities may benefit from more differentiated approaches when designing performance systems and institutional support mechanisms.

2. Literature Review and Conceptual Framing

This section reviews key theoretical and empirical contributions on faculty performance measurement, governance arrangements, and HRM practices in higher education. It also outlines the conceptual basis linking these strands of literature to the study's focus on latent dimensions and segmentation.

From a public administration perspective, performance measurement systems can be viewed as components of wider performance regimes that organize accountability relationships and guide organizational behavior. Within governance arrangements such as New Public Governance (Liddle, 2021), these systems function not only as managerial tools but also as institutional mechanisms that coordinate professional actors, assign resources, and signal strategic priorities. Universities provide a relevant setting for examining these dynamics because they combine public accountability, professional autonomy, and hybrid governance structures. In those environments, performance regimes often mediate tensions between bureaucratic supervision and the discretionary nature of academic work (Burns, 2022).

2.1 Performance Measurement as Governance in Universities

Performance measurement has become an important governance mechanism in higher education, shaping accountability, evaluating professional contributions, and aligning institutional activities with policy priorities. Increasingly, indicators and data systems translate teaching, research, and service into assessable outputs that inform funding allocation, accreditation processes, and public reporting (Shubily et al., 2021). These developments are often associated with New Public Management reforms, which encourage public institutions to adopt managerial practices emphasizing efficiency, measurable outcomes, and stronger accountability mechanisms (Stroińska, 2020).

Despite these objectives, tensions persist among the various components of academic work. Research productivity often receives greater weight in evaluation systems, particularly in research-oriented institutions, eliciting concerns about fairness and the sufficiency of current evaluation systems (Mula-Falcón & Caballero, 2025). Studies also indicate that transparent and impartial evaluation practices are associated with stronger faculty engagement and retention (Singh & Patel, 2025; Ryan, 2021).

Recent research reveals the value of complementing quantitative indicators with qualitative and developmental approaches, including peer review and broader forms of expert evaluation. Such practices can reduce the risks associated with audit-driven systems while maintaining academic autonomy (Magomedova, 2026). At the same time, the design and effects of performance systems vary across institutional missions, disciplinary traditions, and governance arrangements, implying the need for more context-sensitive approaches to performance management in universities (Popęda & Hadasik, 2023; Lebkhachi & Chraibi, 2025).

2.2 Governance Context and Institutional Differences in Higher Education

Governance arrangements in public and private higher education institutions create structural differences that shape human resource management (HRM) practices and academic motivation. Public universities generally operate within bureaucratic administrative systems defined by hierarchical decision-making and strong regulatory supervision, which may constrain institutional responsiveness and organizational flexibility (Espinosa-Jaramillo et al., 2024).

Private institutions, in contrast, often enjoy greater managerial discretion, allowing them to implement more flexible incentive structures and leadership practices that can adapt more easily to changing educational priorities. These institutional conditions influence how faculty perceive organizational support and access to professional development opportunities.

Empirical studies suggest that faculty in private institutions often show higher levels of contentment and involvement, a pattern frequently linked to the greater responsiveness associated with private governance models (Bakri & Erfan, 2025; Chikukwa, 2024). As a result, governance structures play an important role in

directing HRM practices and the evaluative cultures that influence academic motivation.

2.3 Faculty Perceptions of Performance Systems: Engagement, Recognition, Development, Technology, Research Productivity, and Barriers

Various factors shape how faculty experience performance systems in universities, including engagement, recognition, development-oriented HRM practices, technological readiness, research productivity expectations, and institutional barriers. Faculty engagement tends to be stronger when HRM practices support professional development and offer meaningful career opportunities (Singh & Patel, 2025; Yamoah et al., 2024).

Fair recognition of academic contributions is also a key motivational factor. When recognition processes are perceived as inconsistent or inequitable, levels of engagement may decline and intentions to leave the institution may increase (Salunkhe et al., 2024). Technological readiness further influences faculty productivity, as access to adequate digital infrastructure and training supports both teaching and research activities (Wijayadne, 2021).

At the same time, institutional constraints, such as limited research support or restricted access to scholarly resources, can negatively affect faculty performance and satisfaction. Considering these dimensions is therefore important to understand how performance systems shape the academic work environment and institutional effectiveness (Parati & Galicia, 2025).

2.4 Segmentation Approaches for Understanding Professional Responses to Performance Regimes

The diversity of motivation among academic staff has led researchers to apply segmentation approaches in HR analytics. By grouping employees with similar characteristics, institutions can identify behavioral patterns and develop participation approaches suited to different faculty profiles (Madhumitha & Pougajendy, 2024). Segmentation allows more targeted HR initiatives, supporting faculty satisfaction and retention through aligning policies with the needs and motivations of specific groups.

In the context of talent management and performance systems, segmentation may lead to stronger engagement and more favorable organizational outcomes than uniform management approaches, as differentiated strategies are more likely to respond to varied career expectations (Kumar & Vikrama, 2025).

2.5 Conceptual Model Linking Performance Measurement Design, Governance Context, and Faculty Profiles

The conceptual model proposes that faculty perceptions of performance systems, captured through six latent factors, shape distinct performance orientations among

academic staff. These orientations are influenced by institutional governance arrangements, particularly differences between public and private universities.
Sectoral characteristics embedded in HRM practices, organizational culture, and administrative structures are expected to play a stronger role in shaping faculty engagement than the national context alone. Examining these sectoral dynamics, therefore, provides a clearer understanding of how governance environments shape faculty perceptions and behavioral responses to performance systems (Albin Joe & Suganya, 2023).

2.6 Methodological Rationale: Identifying Latent Structures and Faculty Profiles

The methodological approach adopted in this study reflects common practices in HRM, organizational behavior, and higher education research. Exploratory Factor Analysis (EFA) is widely used to detect underlying psychological or perceptual constructs in survey data (Ramesha et al., 2025). After identifying these dimensions, K-means clustering can be applied to group individuals based on shared attitudes or response patterns.
Combining factor analysis with clustering is consistent with HR analytics approaches that use dimensionality compression followed by classification to detect patterns in complex behavioral datasets (Mishra et al., 2025). This analytical sequence permits the construction of faculty profiles that can guide more targeted institutional and HR strategies.
Given the limited empirical evidence on how faculty interpret performance systems across governance settings, the study adopts an exploratory approach intended to identify latent perception structures and help continue discussions on performance management in professional public organizations.

3. Methodology

This study adopted a quantitative cross-sectional approach to explore faculty perceptions of performance measurement systems in higher education and to examine how these perceptions contribute to the emergence of different faculty profiles. Data were collected through a structured survey administered to academic staff in public and private universities across Lebanon and Kuwait. The final sample included 557 valid responses, providing a large, varied dataset sufficient to support multivariate analysis.

3.1 Survey Instrument and Measures

The survey comprised demographic items, factual questions, and a set of Likert-scale statements designed to capture faculty perceptions across multiple key domains: institutional engagement, recognition practices, development-related support, use of technology, research activity, and perceived organizational constraints. Established

models in human resource management, organizational behavior, and higher education informed the instrument. It was constructed to reflect the breadth of faculty responsibilities spanning teaching, research, and service.

3.2 Data Preparation

Before conducting the statistical procedures, the dataset underwent standard cleaning. Responses were reviewed for missing values, inconsistencies, and non-numeric entries. Only numeric variables were retained for quantitative analysis, while open-ended answers were used descriptively. Likert-scale items were standardized to a 1–5 scale, while continuous variables such as satisfaction and performance scores (ranging from 0 to 100) were left in their original scales to retain their analytical usefulness. Reverse-coded items were carefully reviewed to ensure agreement in direction across all constructs. Once cleaned, the final dataset was prepared for reliability and validity testing, followed by multivariate analyses in SPSS.

3.3 Reliability and Validity Procedures

The study evaluated the internal consistency of the scales by calculating Cronbach's alpha. The values across the main sections ranged from 0.714 to 0.943, which falls within the acceptable-to-excellent range. This suggests that the items in each section were grouped meaningfully. Items with low item-total correlations were reviewed, but none were removed since each played an important conceptual role in representing the wider construct. Overall, these results support the dataset's internal stability and dependability, indicating that the items successfully capture the key dimensions of performance measurement in higher education.

3.4 Extraction of Latent Dimensions

Given the exploratory nature of the study, an Exploratory Factor Analysis (EFA) was undertaken on all validated Likert-scale items. This approach permitted moving beyond the survey's original themes and uncovering deeper, underlying performance dimensions that spanned multiple sections. To achieve a clear and interpretable factor structure, Principal Axis Factoring with Varimax rotation was employed. The data showed strong suitability for factor analysis, with a high sampling adequacy score (KMO = 0.951) and a highly significant Bartlett's sphericity test (χ^2 = 14,208.21, df = 595, $p < 0.001$).
Six latent factors with eigenvalues exceeding 1 were extracted, jointly accounting for 61.69% of the total variance.

Table 1. Latent Factors

Factor	Key Items	Conceptual Label	Interpretation
1	Adherence to policies, interdisciplinary collaboration, service contributions, mentoring, diversity, workload fairness	Institutional Engagement and Values	Reflects commitment to collaboration, inclusion, and adherence to institutional principles.
2	Rewards alignment, promotion transparency, professional development satisfaction	Rewards and Recognition Systems	Captures satisfaction with fairness and transparency of reward and promotion mechanisms.
3	Faculty engagement, recruitment, updated policies, training programs	HRM Practices and Faculty Development	Represents institutional practices that foster professional growth and faculty development.
4	University use of technology, satisfaction with digital tools, self-use of technology, job satisfaction	Technological Readiness and System Effectiveness	Measures perceived effectiveness and integration of technology in performance systems.
5	Research quality, funding, conferences, collaboration projects	Research Productivity and Collaboration	Reflects active academic engagement and scholarly contribution.
6	Bureaucracy, restrictive policies, resistance to change, budget limitations	Institutional Barriers	Highlights structural and administrative challenges constraining faculty performance.

Source: Own Work

These factors represented core elements of how faculty assess performance measurement systems: institutional engagement and values, rewards and recognition systems, HRM practices and faculty development, technological readiness and system effectiveness, research productivity and collaboration, and institutional barriers. Regression-based factor scores were calculated for each respondent and used in the subsequent segmentation procedure.

3.5 Segmentation Approach

To derive distinct faculty profiles, the study used a clustering procedure based on factor scores from an exploratory factor analysis. Using these latent dimensions, rather than individual survey items, ensured that the segmentation reflected deeper attitudinal structures rather than superficial item-level variation. The analysis used a two-stage clustering strategy. First, hierarchical clustering (Ward's method) provided an initial indication of the number of meaningful groups. The resulting agglomeration pattern suggested a strong three-cluster structure.

Second, a K-Means algorithm was run using the factor scores as input, with the hierarchical results guiding the initial centroid positions. This procedure converged quickly and produced three well-separated clusters, each with distinct patterns across the latent dimensions. The combined use of hierarchical and partitioning techniques is well supported in the segmentation literature, as this approach enhances the interpretability of the resulting clusters and reduces sensitivity to initial seed values.

3.6 Validation Strategy

The robustness of the cluster solution was assessed through several internal and external validation procedures. Internally, comparisons of cluster centroids and analyses of inter-cluster distances were used to evaluate separation and cohesiveness among groups. External validation examined differences in cluster membership across institutional sectors and national contexts. These relationships were tested using chi-square statistics and corresponding effect size measures. Significance levels were verified using Monte Carlo simulation (10,000 replications, 99% confidence intervals) to account for possible departures from distributional assumptions. Cluster stability was also assessed by repeating the clustering procedure with multiple initialization schemes. Each run produced the same three-cluster solution, indicating that the results were not dependent on starting values.
Together, these procedures support the reliability of the analytical process, from data preparation and factor extraction to clustering and validation and align the study with established quantitative practices in HRM and higher education research.

3.7 Methodological Considerations and Limitations

Several methodological considerations should be considered when interpreting the results. First, measurement equivalence across the two national samples was examined using a multi-group confirmatory factor analysis (CFA) to test measurement invariance between Lebanon and Kuwait. Configural invariance assesses whether respondents conceptualize the underlying constructs similarly across groups. The analysis indicated acceptable model fit in both samples, suggesting that the six-factor structure remains reasonably stable across the two contexts and supporting the use of pooled data for subsequent analyses.
Second, factor extraction employed Varimax rotation. Although the conceptual dimensions examined in the study may be related, orthogonal rotation was chosen to improve interpretability plus produce clearer separation among factors. Varimax rotation reduces cross-loadings and generates more distinct factor structures, which is particularly useful when factor scores are later used in clustering procedures. This approach is frequently used in exploratory segmentation studies focused on identifying differentiated profiles rather than modelling structural relationships among constructs.
Finally, the study relies on self-reported perceptions collected through a survey of academic staff. Perceptual data are appropriate because the research studies how

faculty interpret and experience performance systems within their institutions. Although self-reported responses may involve subjective interpretation or social desirability bias, several measures were used to reduce these risks, including anonymity assurances and the inclusion of respondents from multiple universities across public and private sectors. The sample of 557 valid responses also provides a broad representation of faculty perspectives. Subsequent studies might complement perceptual data with institutional indicators such as promotion outcomes, evaluation records, or research productivity measures.

4. Results and Analytical Findings

In this section, the empirical findings are presented. Before interpreting the segmentation results, measurement invariance across the two national contexts was examined to ensure that the underlying factor structure operates similarly across Lebanon and Kuwait.

4.1 Measurement Invariance Across Countries

Before interpreting the segmentation results, measurement invariance across the two national contexts was examined using multi-group confirmatory factor analysis. A configural invariance model was estimated to test whether the six-factor structure identified in the exploratory analysis operates similarly across Lebanon and Kuwait. The model demonstrated acceptable fit in both groups. For Kuwait, the fit indices were CFI = 0.905, TLI = 0.897, and RMSEA = 0.067. For Lebanon, the model produced CFI = 0.883, TLI = 0.873, and RMSEA = 0.074. These values fall within commonly accepted thresholds for complex multi-factor models.
Taken together, the results provide evidence of configural measurement invariance, indicating that faculty members in Lebanon and Kuwait interpret the underlying constructs in broadly comparable ways. This supports the validity of pooling the data for the subsequent segmentation and comparative analyses.

4.2 Latent Structure of Faculty Perceptions

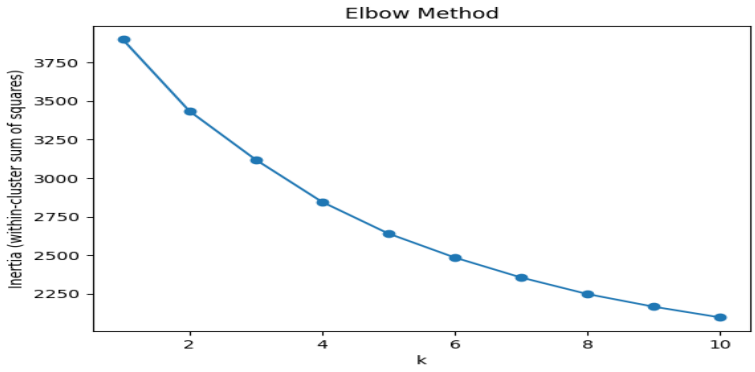
The factor analysis yielded a consistent set of six dimensions for summarizing how faculty interpret their campus environment. The first dimension reflects institutional adequacy and shared academic values, comprising items related to collegiality, fairness, collaboration, and adherence to academic norms. The second factor reflects how faculty perceive rewards and recognition, focusing on how straightforward the promotion process is and on their satisfaction with opportunities for professional development. The third factor centers on HRM and development practices, including recruitment, policy updates, and training programs. The fourth factor relates to technology and system effectiveness, showing that digital tools and administrative systems now play a distinct role in shaping the performance environment. Research productivity and collaboration emerged as distinct factors, underscoring the

importance of scholarly activity in academic work. Finally, institutional barriers- such as bureaucracy, limited resources, and resistance to change- emerged as a separate and independent factor. Altogether, these six dimensions account for 61.69% of the total variance, offering a solid basis for identifying broader faculty profiles.

4.3 Cluster Structure and Segment Sizes

Cluster analysis based on the six factor scores produced a three-group solution that was both stable and interpretable. The Elbow method was used to support the selection of the optimal number of clusters. As shown in Figure 1, the within-cluster sum of squares declined sharply up to k = 3 and then began to level off, indicating diminishing returns from adding further clusters. This supported the adoption of a three-cluster solution.

Figure 1. Elbow Method Results for Optimal Cluster Selection



Source: Own Work

Hierarchical and K-Means procedures converged on the same structure, and the final iteration produced minimal centroid movement.

Table 2. Cluster Sizes

Cluster	Number of Cases	% of Total
1	205	36.8%
2	228	40.9%
3	124	22.3%
Total	**557**	**100%**

Source: Own Work

The distribution shows that no single orientation dominates the sample; instead, faculty perceptions reflect three relatively balanced viewpoints.

4.4 Cluster Profiles

The cluster centers show apparent differences in how faculty groups perceive their context within the institution.

Table 3. Final Cluster Centers (Factor Means)

Factor	Cluster 1	Cluster 2	Cluster 3
F1 – Institutional Engagement and Values	0.51	0.05	–0.93
F2 – Rewards and Recognition Systems	0.12	0.18	–0.53
F3 – HRM Practices and Faculty Development	0.15	–0.31	0.31
F4 – Technological Readiness and System Effectiveness	–0.07	0.11	–0.09
F5 – Research Productivity and Collaboration	0.41	–0.01	–0.66
F6 – Institutional Barriers	0.59	–0.80	0.50

Source: Own Work

Cluster 1 – Engaged and Productive Faculty: Faculty in this cluster show the most substantial alignment with institutional values and report the highest levels of research productivity. Interestingly, they also perceive relatively high organizational barriers, which suggests that their professional motivation remains strong even in the face of procedural or structural challenges.

Cluster 2 – Satisfied but Cautious Faculty: Faculty of this cluster report engagement and recognition levels close to the overall sample mean, yet they score lowest on factors related to professional development. They also identify fewer organizational barriers than the other groups. The response pattern indicates a tendency to favor stability and familiar work routines over engagement in developmental initiatives or research-oriented career paths.

Cluster 3 – Autonomous Researchers Facing Constraints: These academics report the lowest levels of engagement and recognition yet show the strongest interest in development and HRM-related growth. At the same time, they perceive significant institutional barriers. Their overall pattern reflects a clear focus on research and professional development, but with a weak sense of connection to the broader institution.

Together, these clusters provide a differentiated view of how faculty interact with institutional processes.

4.5 Differences Across Clusters

To assess whether the clusters differed meaningfully across the six factors, a series of one-way ANOVA tests was conducted using the standardized factor scores as dependent variables. Levene's test indicated unequal variances for five of the six dimensions ($p < .01$), leading to the use of the Games–Howell post hoc test, which handles variance differences well. Five of the six factors showed statistically significant differences across clusters ($p < .001$), confirming that the three groups are clearly separated based on multiple performance-related areas. The only exception was technology-related perceptions (F4), which approached significance but did not meet the threshold ($p \approx .052$), suggesting that faculty views on technological readiness and system effectiveness are relatively consistent across groups. These results show that the clustering is meaningful, with apparent differences between the groups in how they view engagement, recognition, development, research activity, and organizational barriers.

4.6 External Validation: Country and Sector Effects

This section evaluates the external validity of the clusters by comparing their distribution across countries and institutional sectors.

4.6.1 Country (Lebanon vs. Kuwait)

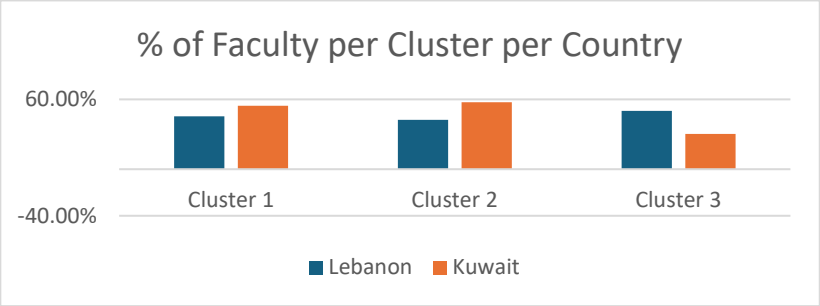
Cluster distribution did not vary significantly between the two countries ($\chi^2 = 1.804$, $p \approx .405$; Cramer's $V = .057$).

Table 4. Cluster Distribution by Country

Cluster	Lebanon	Kuwait	Total	% within Cluster	% within Country
1	93	112	205	45.4 % / 54.6 %	36.9 % / 36.7 %
2	97	131	228	42.5 % / 57.5 %	38.5 % / 43.0 %
3	62	62	124	50.0 % / 50.0 %	24.6 % / 20.3 %
Total	252	305	557	45.2 % / 54.8 %	100 % / 100 %

Source: Own Work

Figure 2. Percentage of Faculty per Cluster by Country



Source: Own Work

Table 5. Chi-Square Tests

Test	Value	df	p (2-sided) Monte Carlo (99 % CI)	Effect Size (Cramer's V)
Pearson χ^2	1.804	2	.405 (.392 – .417)	.057 (n.s.)

Source: Own Work

As shown in Table 4 and Figure 2, the cluster patterns for Lebanon and Kuwait are broadly similar. This is supported by the chi-square results in Table 5, which reveal no significant national variation. The segmentation is therefore stable across the two country settings.

4.6.2 Sector (Public vs. Private)

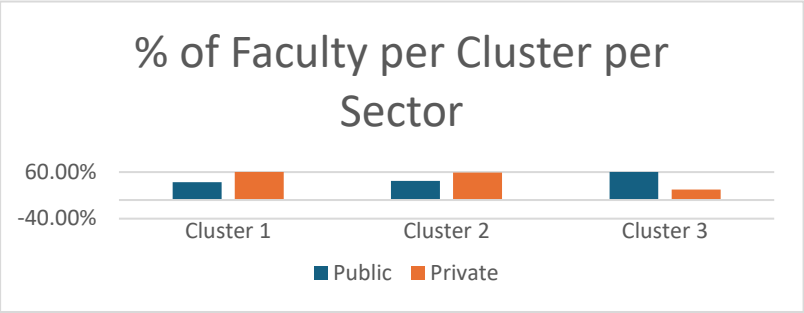
Sectoral context, in contrast, showed a clear and statistically significant association with cluster membership ($\chi^2 = 21.379$, $p < .001$; Cramer's V = .196). Public-sector faculty were strongly represented in Cluster 3, while private-sector faculty were more likely to fall within Clusters 1 and 2.

Table 6. Cluster Distribution by Sector (Public vs. Private)

Cluster	Public	Private	Total	% within Cluster	% within Sector
1	78	127	205	38.0 % / 62.0 %	31.2 % / 41.4 %
2	94	134	228	41.2 % / 58.8 %	37.6 % / 43.6 %
3	78	46	124	62.9 % / 37.1 %	31.2 % / 15.0 %
Total	250	307	557	44.9 % / 55.1 %	100 % / 100 %

Source: Own Work

Figure 3. Percentage of Faculty per Cluster by Sector



Source: Own Work

Table 7. Chi-Square Tests

Test	Value	df	p (2-sided) Monte Carlo (99 % CI)	Effect Size (Cramer's V)
Pearson χ^2	21.379	2	.000 (.000 – .000)	.196 (p < .001)

Source: Own Work

Table 6 and Figure 3 show how faculty clusters differ across public and private institutions. The chi-square results in Table 7 confirm a significant sector effect. Together, these findings suggest that institutional governance appears to play a larger role than national context in shaping faculty experiences with performance systems.

4.7 Robustness and Sensitivity Checks

Several diagnostic checks were used to confirm the stability of the results. Most item communalities were above .50, showing that the items were well represented in the factor solution. The standardized factor scores also showed no extreme outliers, staying within an approximate range of ±3.5. Re-running the K-Means procedure with varied initialization points consistently reproduced the same three-cluster configuration, and the inter-cluster distances exceeded recommended benchmarks, indicating strong separation among the groups. Taken together, these checks affirm that both the factor structure and the clustering solution are methodologically robust and capture substantive differences present in the data.

5. Discussion

5.1 What the Factors Reveal About Faculty Perceptions

The six-factor structure provides a comprehensive view of how faculty perceive performance measurement systems. Rather than viewing evaluation simply as an administrative requirement, faculty link it to broader institutional conditions,

including collegial engagement, recognition, development opportunities, technological support, research activity, and structural constraints. These perceptions appear to be shaped largely by how performance systems are experienced in everyday academic work rather than by formal policies alone. The strong loadings on items related to institutional engagement indicate that transparency, collaboration, and fairness are important elements in how faculty interpret performance systems. At the same time, the emergence of institutional barriers as a distinct factor suggests that issues such as bureaucracy and limited resources are perceived as integral components of the performance environment rather than as peripheral concerns.

5.2 Interpreting the Three Profiles as HR-Relevant Segments

The three clusters translate the latent dimensions into distinct faculty profiles. **Cluster 1 (36.8%)** includes highly engaged academics who sustain strong research productivity while reporting notable organizational barriers. Despite these constraints, their responses indicate strong alignment with institutional goals and professional responsibilities. **Cluster 2 (40.9%)**, the largest group, consists of faculty who report general satisfaction and relatively few obstacles but show limited interest in research advancement or professional development. This group appears to value stability and predictable work conditions more than opportunities for growth or change. **Cluster 3 (22.3%)** comprises research-oriented academics who operate with considerable independence yet report heavy administrative burdens and insufficient recognition. Although motivated to develop professionally, they appear less connected to institutional processes, suggesting a group whose potential contribution may be underutilized.

A notable pattern is the coexistence of high institutional engagement with strong perceptions of organizational barriers among the most productive faculty. Rather than discouraging participation, bureaucratic constraints appear alongside sustained professional commitment. This suggests that faculty motivation may be shaped more by professional norms and academic values than by administrative conditions. In this sense, academic work reflects characteristics of professional bureaucracies, where disciplinary commitment can sustain performance despite institutional constraints. At the same time, persistent barriers may impose hidden costs on highly engaged academics, with possible implications for long-term institutional effectiveness.

5.3 Governance Effects: Why Sector Matters More Than Country

The comparison of cluster positions between Lebanon and Kuwait revealed similar patterns, suggesting that faculty orientations remain relatively consistent across national settings within the region. However, there were clear and meaningful differences between sectors. Public universities had a larger share of faculty in the "autonomous but constrained" group, which aligns with environments with more complex procedures, rigid administrative layers, and limited systems for recognition. On the other hand, private institutions, where HR structures tend to be more flexible

and performance-based incentives are more common, had more engaged and satisfied faculty. This points to governance structures as the key factor shaping how faculty experience performance systems, more so than cultural or national differences. The findings support the idea that institutional design and internal management practices have a more substantial impact on academic behavior than broader national contexts.

5.4 Implications for Public Administration and Governance Research

The findings also contribute to broader debates in public administration regarding governance arrangements and organizational autonomy in professional public organizations. The coexistence of strong professional engagement with perceptions of bureaucratic constraints reflects tensions commonly observed in professional bureaucracies, where institutional rules coexist with strong professional norms guiding individual behavior. In addition, the stronger influence of institutional sector compared with national context highlights the importance of organizational governance structures in shaping how performance regimes are experienced by professionals. These results support arguments in the public management literature that institutional design, managerial autonomy, and administrative capacity at the organizational level can have more immediate effects on professional behavior than broader national governance environments. Universities therefore provide a useful setting for examining how performance regimes operate within hybrid governance systems that combine elements of professional autonomy with increasing demands for accountability.

5.5 Implications for Performance Measurement Design

The segmentation results imply that a one-size-fits-all evaluation is unlikely to yield consistent results across a diverse faculty. Institutions might benefit by aligning expectations for performance and support structures with the needs of each faculty group. For those who are already engaged and productive, reducing unnecessary administrative barriers would create environments with more opportunities for leadership and autonomy. Slightly more cautious but satisfied faculty members might respond to clearer paths for research and development, connecting them more closely to academic life overall. For independent researchers working within a difficult structural situation, activities such as increased recognition, more inclusive decision-making, and targeted research support could help build stronger ties to institutional goals. Taking a differentiated approach does not mean treating people unequally- recognizing the different ways faculty contribute and providing the support they require. Moving away from rigid, uniform systems and toward more responsive, profile-based models could lead to greater fairness and make institutions more effective overall.

5.6 Positioning Within the HR Analytics Literature

The analytic process –including data preparation, reliability testing, exploratory factor analysis, segmentation, and validation– is consistent with contemporary HR analytics frameworks that stress transparency, descriptiveness, and evidence-based decision-making. By revealing hidden patterns and creating action-oriented faculty profiles, the study shows how analytics can connect individual perceptions to organisational consequences. This system adds to the current discussion about how data-driven techniques could underpin a more subtle performance-management arrangement in higher education. The findings demonstrate that segmentation is more than a mere technical endeavour; it provides an empirical screen through which organisations can understand their staff and develop policies appropriate to diverse types of academic contribution.

6. Practical Implications and Policy Guidance

This section considers how the study's findings can inform institutional policy, governance design, and day-to-day management within higher education. The recommendations are organized to address the distinct needs of public and private universities, outline an implementation pathway, and highlight the safeguards required to ensure fair and accountable use of performance data.

6.1 Strategies for Public and Private Universities

For public institutions, the results suggest a need to address structural barriers that restrain faculty participation. Procedural flexibility, administrative simplification, and performance clarity would help loosen the constraints imposed by the institutional barriers factor. Recognition mechanisms for both research and service contributions should be strengthened. Inculcating a culture of collegiality among academics through initiatives such as interdepartmental projects or joint governance structures might reconnect faculty disenchanted with university decision-making.
Private universities do better in terms of faculty involvement and perceived transparency but have their own woes. Fairness and transparency of assessment processes are paramount, given that these institutions often operate to a great extent using performance-based models. There may be incentives to promote deeper research engagement- seed grants, conference support, developmental sabbatical- that can increase productivity without undercutting current strengths. The continued need to make professional development available and meaningful is also necessary to maintain the current success of cluster placements.

6.2 Implementation Roadmap

A practical roadmap for applying these findings may follow three steps. First, institutions can conduct internal diagnostics to identify the distribution of their

faculty profiles using factor and cluster indicators. Second, targeted interventions can be designed to respond to the needs of each segment- for example, empowerment strategies for engaged faculty, developmental support for autonomous researchers, or motivational incentives for cautious faculty. Third, monitoring mechanisms should be established, using both quantitative indicators (e.g., factor scores, engagement metrics) and qualitative feedback to track the effectiveness of these interventions over time.

6.3 Risk and Governance Safeguards

Any such system of differentiated review and focused HR practices must include built-in mechanisms to ensure equity and accountability. Moreover, of course, human oversight and participatory policy-making are necessary if data-based HR is to be grounded in inclusivity, contextualisation, and ethics. Human oversight remains essential for interpreting performance data and preventing automated reporting systems from producing misleading or overly rigid evaluations. Documentation of audit trails reflects how decisions on performance are taken, and regular checking of variation and dispersion can show signs of any bias. Moreover, fairness safeguards should be incorporated into the segmentation process to prevent the unintentional reproduction of existing structural inequalities. Incorporating such safeguards preserves the analytical rigor of performance measurement systems while safeguarding their ethical integrity- both essential for maintaining public trust and institutional credibility.

7. Limitations and Future Research

This section outlines the main limitations of the study and considers how these constraints shape the interpretation of the findings. It also identifies several avenues for future research to deepen and extend the evidence base surrounding faculty segmentation and performance perceptions.

7.1 Design and Regional Scope

Although the study provides a detailed view of faculty perceptions across two higher education systems, its cross-sectional design limits the ability to conclude temporal changes in performance orientations. Faculty attitudes may shift in response to policy reforms, leadership transitions, or broader labour market dynamics, none of which can be captured within a single time point. The sample also comes from two countries in the same general region, limiting the generalisability of the findings. Although we did not find substantial differences across national contexts in this study, this does not mean that entirely different segmentation patterns may not emerge from divergent regulatory environments elsewhere.

Future research across additional governance systems would therefore help clarify how institutional design and regulatory environments shape faculty responses to performance regimes.

7.2 Measurement Considerations

The analysis relies exclusively on self-reported perceptions, which are subject to individual interpretation and potential bias. While the use of validated Likert-scale items strengthens internal consistency, binary and open-ended responses were excluded from the reliability and factor analyses because they do not conform to the psychometric assumptions required. Their exclusion means that some contextual nuances—particularly those conveyed through narrative comments—do not directly inform the latent structure. Moreover, although the factor scores underpin the segmentation, they reflect perceived rather than objective performance or productivity.

7.3 Directions for Extension

These limitations give rise to several future research directions. Longitudinal studies might track faculty movement between clusters over time and provide evidence of stability (or responsiveness to policy interventions) for each faculty characteristic group. Extending the analysis to additional higher education systems or other professional public organizations could provide deeper insight into how governance structures shape performance perceptions. Methodologically, one could try different clustering methods, such as Gaussian Mixture Models or density-based approaches (e.g., DBSCAN) , to see whether the same profiles emerge under alternative assumptions. Lastly, connecting cluster membership to behavioral or institutional outcomes (e.g., retention, research productivity, and student evaluations) would help illuminate how these profiles manifest as measurable contributions.

8. Conclusions

The study presents a clear six-factor structure that captures the main areas influencing faculty perceptions of performance-related systems. Using these dimensions, the analysis identifies three distinct faculty groups that reflect fundamental differences in how they engage with their institutions, view recognition, seek professional growth, and deal with structural challenges. While faculty in both Lebanon and Kuwait show similar general patterns, the sector of the institution is the main factor distinguishing faculty experiences. This highlights the significant role governance structures play in shaping academic experiences.

The segmentation framework provides a practical approach to designing performance measurement systems that account for the different ways faculty experience their work, rather than applying a one-size-fits-all model. By identifying whether faculty are engaged, cautious, or constrained, institutions can design HR strategies that enhance perceptions of fairness, foster motivation, and promote

sustained academic development. These findings support the growing call for more evidence-based and context-specific HRM practices in higher education.

Beyond its practical implications, the study also contributes to broader debates in public administration and governance research. The findings illustrate how performance regimes operate within professional public organizations where formal accountability mechanisms coexist with strong professional norms and institutional autonomy. The results highlight the importance of organizational governance structures in shaping how performance systems are interpreted and experienced by professionals. Universities, therefore, provide a valuable setting for examining how hybrid governance arrangements balance professional autonomy with growing demands for transparency and accountability.

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Ethical Considerations

The research was conducted in accordance with high ethical standards, including maintaining participant anonymity, ensuring voluntary participation, and complying with institutional ethical norms.

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