

RESEARCH NOTE / NOTA DE INVESTIGACIÓN

Gender and Governance in Andalusian Public University Departments: An Empirical Exploration

La cuestión de género en el gobierno de los departamentos universitarios públicos andaluces: una exploración empírica

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ABSTRACT

The unequal representation of men and women in the leadership of university departments remains a significant challenge to the advancement of gender equality in higher education. To examine this phenomenon, an original ad hoc census of departments across Andalusian public universities was constructed. The census was designed *ex ante*, with a set of indicators defined prior to fieldwork to capture key organisational characteristics of the department as the unit of analysis. In particular, indicators were operationalised to measure the sex composition of management teams and selected institutional characteristics associated with departmental governance, including equality plans and indicators related to academic performance. As an exploratory exercise, an Exhaustive CHAID segmentation model was applied to illustrate the potential of the census for identifying organisational configurations associated with female leadership. Taken together, the census provides evidence that is rarely available at the departmental level and offers a valuable resource that can be used by universities for the diagnosis, monitoring and evaluation of gender equality policies.

KEYWORDS: gender inequality; university governance; academic leadership; higher education governance; university departments

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RESUMEN

La desigual representación de hombres y mujeres en la dirección de los departamentos universitarios es un problema para el avance de la igualdad de género. Para analizar este fenómeno, se ha elaborado un censo original ad hoc de departamentos de universidades públicas de Andalucía. El censo se diseñó ex ante: antes del trabajo de campo se definieron un conjunto de indicadores para captar rasgos organizativos del departamento como unidad de análisis. En particular, se operacionalizaron indicadores sobre la composición por sexo de los equipos de dirección y algunos rasgos institucionales asociados (como planes de igualdad y señales de desempeño académico). Como ejercicio exploratorio, se aplicó un modelo de segmentación Exhaustive CHAID para ilustrar el potencial del censo en la identificación de configuraciones asociadas al liderazgo femenino. En conjunto, el censo aporta evidencia poco disponible a escala departamental y puede transferirse a las universidades para diagnóstico, seguimiento y evaluación de políticas de igualdad.

PALABRAS CLAVE: brecha de género; gobierno universitario; liderazgo académico; gobernanza universitaria; departamentos universitarios.

1. Introduction

Research on gender within higher education systems has, for decades, documented the persistence of barriers that reproduce inequalities between women and men. The literature identifies these inequalities at different yet interconnected levels, including disciplinary segregation (Zheng *et al.*, 2023; Else, 2024), disparities in academic career progression (Meza-Mejia *et al.*, 2023) and access to leadership positions. In the latter area, the evidence points to two recurring patterns: women remain underrepresented in leadership roles, and regulatory advances tend to have limited or uneven effects on the distribution of authority (Burkinshaw and White, 2017).

A substantial body of this research has focused on the central governing bodies of universities, including rectors' offices, vice-rectors' offices and other senior institutional positions. However, less attention has been paid to the meso-organisational level of governance, particularly to academic departments and their management teams. This gap is especially relevant in the Spanish higher education system, where departments constitute a core unit for teaching coordination, the organisation of academic work and routine administration. Consequently, the empirical issue extends beyond gender parity in senior leadership to encompass the level at which responsibilities are allocated, tasks are organised and everyday decisions are made, with cumulative effects on career trajectories and opportunities. Against this backdrop, this research note addresses two questions: (1) what is the sex distribution within departmental management teams? and (2) how is representation by sex distributed across positions with different levels of authority within departmental governance structures (headship, deputy headship and departmental secretary)?

For the sake of conceptual clarity, this study distinguishes between a theoretical and an empirical level of analysis. At the theoretical level, it examines gender inequality in access to departmental governance. At the empirical level, it uses representation by sex in departmental governance positions as an indicator of that inequality. Measurement is based on the inference of sex from the names of the individuals holding these positions. This procedure does not capture gender identities or non-binary categories. Accordingly, the findings should be interpreted as patterns of representation by sex in formal governance positions that may, or may not, align with gender. On this basis, the study describes the sex gap in departmental leadership and analyses its internal distribution across positions within management teams.

The research forms part of the project *Institutions, Academic Labour Markets and Mobility: An Analysis of the Andalusian University System* (PRY043/22), which includes a specific focus on departments because of their value as a lens through which to observe professional and governance dynamics within the higher education sector. The study design constructs a census from institutional web sources and records 19 organisational indicators, described in the methodology section. These indicators make it possible to explore patterns associated with both vertical segregation (the relative underrepresentation of women in departmental headship positions) and horizontal segregation (the unequal distribution of men and women across roles within management teams, distinguishing between headship, deputy headship and departmental secretary positions). The contribution of this research note is threefold: (i) it provides a department-level database in an area where standardised records are scarce; (ii) it offers an up-to-date overview of representation by sex in departmental leadership positions; and (iii) it explores departmental profiles associated with different patterns of management team composition.

Following this introduction, the note is organised into four sections. The literature review examines the principal concepts relating to gender inequality and situates the Spanish case within the broader scholarly debate. The methodology section describes the research design, the census variables and the analytical procedure. The following section presents the findings on representation by sex in departmental governance. Finally, the discussion considers the implications of these findings for institutional gender equality policies in higher education.

2. Literature Review

2.1. Gender inequality and authority in university governance

The literature on gender in higher education consistently shows that inequalities are particularly visible within university governance structures, where questions of power and the distribution of formal authority come most clearly into view (Long, 2001; Fox, 2010). Within higher education systems, these inequalities are associated both with the formal design of governance arrangements (the structure of governing bodies and the rules governing access to them) and with the differential allocation of responsibilities.

As a result, the gender gap cannot be reduced to workforce composition alone. Rather, it manifests cumulatively across hierarchical levels that exercise greater control over resources, agendas and institutional recognition (Bird *et al.*, 2004).

To structure this analysis, the study draws on two complementary concepts. Vertical segregation refers to the relative underrepresentation of women in positions of greater authority within governance structures (here, departmental headship). Horizontal segregation refers to the relative concentration of women in particular governance roles – especially those involving support, coordination or organisational ‘maintenance work’ – which tend to carry lower public visibility and status despite forming part of the management team (Bird *et al.*, 2004). At the departmental level, and for operational purposes, this dimension is conceptualised as positional horizontal segregation and is observed through the unequal distribution of men and women across positions within management teams, distinguishing between headship and deputy headship/departmental secretary roles.

Research on the situation in Spain broadly supports this diagnosis. A number of studies have documented patterns of both vertical and horizontal segregation (Castro *et al.*, 2019; Gallego-Morón and Matus-López, 2023; Rekalde and Iglesias, 2017). However, the available evidence exhibits a scale bias, as it focuses primarily on senior governing bodies and provides only limited insight into the meso-organisational level, particularly the department (Navarro-Astor *et al.*, 2017). This level is especially significant because departments perform a dual function: they structure academic coordination (teaching and research) while also translating formal rules into concrete practices of work organisation.

2.2. The formal institutionalisation of equality and the Spanish regulatory framework

In Spain, the regulatory framework governing equality was consolidated through Act 3/2007. Within the higher education system, the Act promoted the development of equality plans with explicit objectives aimed at reducing inequalities and improving the representation of women in governance structures (Ministry of Equality, 2007). Subsequently, the Framework Act on the University System (LOSU, 2023) reinforced this approach by establishing gender equality as a cross-cutting principle of higher education policy and introducing guidelines for balanced representation in collegiate bodies.

At the same time, the implementation of these policies encouraged the creation of equality units and gender equality committees. These structures have contributed to embedding equality as an organisational norm while providing the technical capacity required for institutional intervention. However, the specialised literature highlights considerable variation in their organisational positioning, resource allocation and effective influence over decision-making processes (Pastor *et al.*, 2020). Consequently, the formal adoption of equality measures does not automatically translate into observable changes in the distribution of authority, particularly where internal mechanisms for monitoring and accountability are absent within specific organisational units.

2.3. The indicator deficit and the blind spot in middle leadership

A central concern in the literature is that the evaluation of equality plans is constrained by the scarcity of longitudinal indicators and the discontinuity of available data (Pastor *et al.*, 2020; Castaño Collado, 2023). Within higher education, this problem is reflected in the lack of indicators measuring representation by sex in intermediate governance positions. Data sources aggregated by sex and professional category – such as institutional reports and general statistical records – tend to omit the sex composition of departmental leadership positions. This limits the capacity to identify internal inequalities within intermediate decision-making arenas and weakens the design of evidence-based corrective measures (Rekalde and Iglesias, 2017; Navarro-Astor *et al.*, 2017).

From an organisational perspective, this deficit is linked to the incomplete integration of a gender perspective into information systems, strategic planning and institutional evaluation processes (Pastor *et al.*, 2020). Some analyses interpret this gap as a consequence of equality being recognised as a legitimate organisational norm while remaining diluted in practice, in the absence of indicators, incentives and clearly defined responsibilities (Castaño-Collado, 2023). This absence effectively renders departments a blind spot (Navarro-Astor *et al.*, 2017; Pastor *et al.*, 2020). In this sense, departments constitute a level of governance that remains insufficiently visible within institutional information systems, which justifies empirical strategies aimed at reconstructing evidence on intermediate forms of university governance.

Accordingly, this study proposes an operational indicator of representation by sex in intermediate university governance positions, based on the systematic reconstruction of their sex composition. The methodology section details the indicators employed, the operationalisation of the variables and the coding criteria applied.

3. Methodology

This research note constructs a census of 506 departments across the Andalusian public university system.³ The census was compiled through the direct observation of institutional web sources. This approach was necessary given the absence of official records at departmental level. It also provides a replicable baseline for comparative research.

The study population comprises the 506 departments recorded by the Integrated University Information System (SIIU) for the 2022/2023 academic year. In terms of coverage, three figures are distinguished: (i) the theoretical SIIU universe/census ($N = 506$); (ii) the observed database with active institutional websites ($n = 498$); and (iii) the departments valid for analyses for which the sex of the department head could be determined ($n = 496$).

Data collection was carried out manually during the first half of 2023. For each department, all information available on its website and associated published documents (including annual reports where accessible) was recorded. Data collection followed a standardised

protocol for data recording and coding. Departmental websites were accessed through the main website of each university (via the departments section and corresponding links), after which their internal pages were systematically explored. As certain types of information tend to be concentrated in recurring locations (for example, 'Contact' or 'Department Information'), the protocol incorporated a navigation strategy specifically targeting these sections. Only information located on the department's own website was considered valid (including its pages, tabs and integrated documents), with external, non-integrated sources (e.g. independent repositories) being excluded.

To standardise coding procedures and minimise discretionary decisions, the protocol established operational rules for each variable. A limited search rule was applied, whereby each indicator was investigated for up to 30 seconds. Where information was ambiguous or incomplete, a conservative coding criterion was adopted, assigning the lowest-value category. This procedure reduces the risk of overestimating information availability (false positives) and therefore provides a cautious estimate of public visibility. Accordingly, the proxies employed capture the presence, clarity and accessibility of publicly available information on organisational practices and resources.

Substantively, the variables were grouped into five domains (see Table 1 in the Appendix): (a) departmental identification and contact information; (b) departmental structure and gender balance in leadership; (c) research output and knowledge transfer; (d) academic career policies (recruitment and promotion); and (e) current affairs and communication. From a measurement perspective, four types of variables were distinguished: (i) nominal; (ii) ratio; (iii) dichotomous nominal; and (iv) ordinal-scale variables. Most proxies were coded using an ordinal scale ranging from 1 to 3 (1 = absent/inaccessible; 2 = partial or insufficient; 3 = clear and complete). In ambiguous cases, the conservative criterion was again applied, assigning the lowest-value category. This minimum-value assignment rule was used specifically for the information-related proxies. Where a variable could not be coded (for example, where it was not possible to identify the sex of the department head), the case was treated as missing data, thereby avoiding unwarranted imputations.

The analytical strategy combines (i) descriptive tables and (ii) segmentation models using Exhaustive CHAID with cross-validation (SPSS). First, descriptive tables are used to provide contextual insight into patterns across categorical variables, offering a transparent and readily interpretable point of comparison.

Second, two Exhaustive CHAID segmentation trees are estimated, each with a different dependent variable: (1) the sex of the department head and (2) the proportion of women within the management team, calculated after excluding the department head. In the latter case, the term 'management team' refers to the proportion of women occupying deputy headship and departmental secretary positions (i.e. the management team excluding the department head). This definition prevents the indicator from being mechanically determined by the sex of the department head and makes it possible to observe positional horizontal segregation as a pattern of differential role allocation within leadership structures (headship versus deputy headship/departmental secretary positions).

The choice of CHAID reflects the exploratory nature of the study and the measurement scale of the available data. Most predictors are categorical or ordinal, including the 1–3 proxies measuring the visibility and accessibility of publicly available information. Moreover, the analysis is not based on a strictly specified causal hypothesis. Unlike parametric approaches, which impose assumptions regarding functional form and additivity, CHAID enables the iterative identification of combinations of conditions through successive partitions based on χ^2 tests, generating a hierarchical set of segmentation rules that classify departments into internally homogeneous subgroups with respect to the outcome variable. This structure facilitates the substantive interpretation of the findings in terms of organisational configurations associated with a greater or lesser presence of women in positions of formal authority.

To reduce the risk of overfitting and trivial segmentation, the algorithm was parameterised using cross-validation and minimum node sizes of 40 (parent node) and 20 (child node). This configuration maximises both the stability of the tree and the interpretability of the terminal nodes. Given the potential imbalance between outcome categories, and the resulting difficulty of accurately classifying the minority category, the model is interpreted primarily as a tool for identifying profiles and segmentation patterns rather than for individual-level prediction. Accordingly, the findings are interpreted as configurational associations and complemented by descriptive analyses.

4. Results

4.1. Descriptive statistics for the departmental population and observed dataset

The population comprises 506 departments (SIIU, 2022/2023 academic year). The analyses are based on the 496 departments with active websites and publicly available names and surnames for all members of the management team, from which sex was inferred. The data reveal the presence of vertical segregation, understood as the underrepresentation of women in the position with the highest level of formal authority.

Table 1
Distribution of departmental leadership positions by sex (unit: departments)

Total	% men (n)	% women (n)
% department heads	70.56 (350)	29.44 (146)

Note: Valid N_dep = 496 (departments for which the sex of the department head could be identified).
Source: own research.

For deputy headship and departmental secretary positions (excluding department heads), as well as for management team positions overall (including department heads), the proportion of women indicates a relatively greater female presence in deputy headship and departmental secretary roles than in departmental headship. This pattern is consistent with positional segregation, understood as the relative concentration of women in roles with lower hierarchical status and visibility (department headship versus deputy headship and departmental secretary positions).

Table 2
Distribution of positions by sex (unit: positions)

Total	% men (n)	% women (n)
% deputy headship and departmental secretary positions (excluding department heads)	62.67 (639)	37.33 (383)
% management team positions (including department heads)	65.1 (985)	34.9 (528)

Note: These figures refer to coded positions/persons rather than departments. The percentages describe the distribution of positions by sex, not the proportion of departments with a given composition.
Source: own research.

4.2. CHAID analysis results

The analysis estimates two decision trees using the Exhaustive CHAID algorithm to identify segmentation patterns associated with the presence of women in departmental governance. The first model uses as its dependent variable the proportion of women within the management team (deputy headship and departmental secretary positions), excluding the department head. The outcome variable is grouped into three categories (less than 40%, between 40% and 60% and more than 60%). The second model uses the sex of the department head as the dependent variable (0 = man; 1 = woman). In both models, the procedure selects predictors with significant discriminatory power ($p < 0.05$) from the sixteen indicators described in the methodology section, subject to the predefined stopping criteria (minimum parent and terminal node sizes, and cross-validation).

First model: proportion of women within the management team (deputy headship and departmental secretary positions)

The first model yields no additional partitions under the specified stopping criteria (risk = 0.444; standard error = 0.022). The algorithm selects only the sex of the department head as the root node. Where the department is headed by a man, the representation of women in departmental secretary and deputy headship positions tends to fall within the lower ranges. Conversely, where the department head is a woman, female representation tends to fall within the higher ranges.

The tree structure introduces no further branches and, consequently, given the variables included and the parameterisation adopted, the model identifies no additional predictors with significant discriminatory power for the proportion of women within the management team (excluding the department head). This absence of further partitions should be interpreted with caution. The result is consistent with a comparatively weak association between the outcome and the remaining variables, but it may also reflect limitations relating to effective statistical power and model specification (for example, categorisation into ranges, minimum node thresholds and the distribution of cases across categories).

Second model: sex of the department head

The second tree identifies a segmentation structure dominated by a compositional predictor: the sex composition of the deputy headship and departmental secretary positions (excluding the department head). This pattern should be interpreted as evidence of an endogenous configuration of departmental governance – that is, how the management team is structured – rather than as a set of external conditions that determine the sex of the department head. Building on this primary structure, two institutional proxies (the existence of an equality plan and the accessibility of information on academic staff research output) operate as secondary partitions within a specific branch of the tree.

The model generates eight nodes, five of which are terminal nodes, and reaches a maximum depth of three levels (Figure 1). The risk estimate is 0.176 ± 0.016 , indicating a relatively low overall classification error for this type of exploratory procedure.

As shown in Figure 1, the primary segmentation is organised around the sex composition of the management team. The root node separates three branches: mixed deputy headship and departmental secretary teams (men and women), teams composed entirely of women and teams composed entirely of men. Within the branch of mixed teams (Node 1), departmental leadership remains predominantly male. Within the branch consisting exclusively of women (Node 2), the department head is female in 100% of cases. Within the branch consisting exclusively of men (Node 3), departmental leadership is predominantly male, while female department heads appear only marginally.

Within the ‘all-male’ branch, the tree introduces additional subdivisions that should be interpreted as marginal variations within an underlying pattern of strong male predominance. First, the predictor ‘equality plan’ distinguishes subgroups displaying small differences in the proportion of female department heads, without altering the overall predominance of male leadership. Second, within the subgroup lacking an equality plan, the ‘accessibility of information on academic staff research output’ introduces a further secondary partition, again producing only limited variation. In short, these proxies do not structure the tree at its primary level; rather, they act as modifiers within the segment composed entirely of male management teams.

Nevertheless, the analysis remains exploratory in nature. The interpretation should take into account that the principal predictor is compositional and forms part of the organisational phenomenon under examination itself, namely the configuration of the management team. Accordingly, its association with the sex of the department head should not be interpreted as the effect of an external condition, but rather as evidence that positions within departmental leadership teams tend to be organised in a sex-linked and mutually reinforcing manner. Within this framework, the proxies ‘equality plan’ and ‘accessibility of research output information’ should be regarded as secondary partitions rather than as primary substantive determinants.

Furthermore, the model exhibits uneven performance across classes. It correctly classifies 100% of cases with male department heads and 46.6% of cases with female department heads. This pattern is consistent with the underlying imbalance in the population, which is characterised by the predominance of male leadership. Consequently, overall accuracy alone is insufficient for assessing the substantive performance of the classifier. Interpretation should instead draw on class-specific metrics and, ideally, balanced measures such as sensitivity and specificity for each class.

Taken together, the findings point to two empirical regularities. First, there is a close internal association between the sex of the department head and the sex composition of the deputy headship and departmental secretary positions: both elements appear jointly as part of a broader governance configuration. Second, once the segment of entirely male management teams is established, the proxies capturing the formal institutionalisation of equality and the visibility of research-related information introduce only minor variations in the residual presence of female department heads, without altering the dominant pattern.

5. Discussion

This study addresses a deficit in observability at the departmental level through a census-based protocol for reconstructing management teams from institutional web sources and through an indicator of representation by sex disaggregated by position (headship, deputy headship and departmental secretary). This strategy enables both intra- and inter-university comparisons and provides an empirical basis for the study of departmental governance. The descriptive findings reveal patterns of representation by sex consistent with a dual form of segregation: vertical segregation, reflected in the underrepresentation of women as department heads, and positional horizontal segregation, reflected in the unequal distribution of men and women across positions within management teams. The exploratory segmentation analysis further suggests that certain conditions relating to the transparency of research output and the formal institutionalisation of equality are associated with patterns of office-holding, although the available evidence does not permit the identification of underlying mechanisms or the establishment of causal effects.

The results of the segmentation analysis should therefore be interpreted with caution. First, Exhaustive CHAID is employed here as an exploratory technique aimed at identifying combinations of conditions associated with outcome categories rather than as a method of causal inference. The structure of the tree depends on stopping criteria (minimum node sizes, tree depth and cross-validation) as well as on underlying imbalances between categories (for example, the high prevalence of male department heads), both of which affect classification performance and the stability of terminal nodes. Second, the interpretation of the findings depends on issues of construct validity. The indicators used as proxies for 'research output transparency' and 'institutional commitment to equality' capture only partial dimensions of these concepts. The former refers to the public accessibility of information on the research outputs of academic staff (for example, publication lists), rather than to research productivity itself. The equality plan constitutes an institutional characteristic within which the department is embedded, without assuming that the department itself actively publicises or promotes it.

In light of these considerations, the observed patterns are consistent with broader debates on gender and university governance, including the persistence of vertical segregation, positional horizontal segregation and the potential decoupling of formal institutionalisation from substantive changes in the distribution of authority. Accordingly, although the exploratory design and the indirect nature of the indicators preclude the conclusive identification of underlying mechanisms, the findings provide valuable indications that may guide future lines of inquiry: (a) internal rules governing the selection, appointment and rotation of office holders; (b) the distribution of administrative and managerial workloads, together with the incentives and reputational rewards associated with departmental governance; (c) conditions affecting the availability of candidates and the expected returns associated with standing for office; and (d) the informal dynamics of nomination and co-optation. Future research could extend this approach through more refined measurement strategies and confirmatory research designs (for example, logistic and/or multilevel models), as well as through replication across different institutional contexts.

Finally, the implications of the study extend to the practical domains of university policy and institutional information management. If part of the problem lies in the lack of indicators on the sex composition of departmental leadership positions, one immediate implication is the need to standardise the production and publication of a core set of data on departmental governance. In this way, the diagnostic components of equality plans would no longer rely solely on information aggregated by professional category and would instead incorporate the meso-organisational level into analyses of gender equality. A second practical application would be to integrate the proposed indicator into institutions' internal monitoring systems. While such integration would not, in itself, guarantee substantive change, it would reduce the deficit of comparable and verifiable data, facilitate the identification of persistent imbalances and support the design of evidence-informed interventions.

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Notes

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- 3 The International University of Andalusia was excluded due to its multi-campus structure and distinctive institutional arrangement, as were private universities.

Appendix

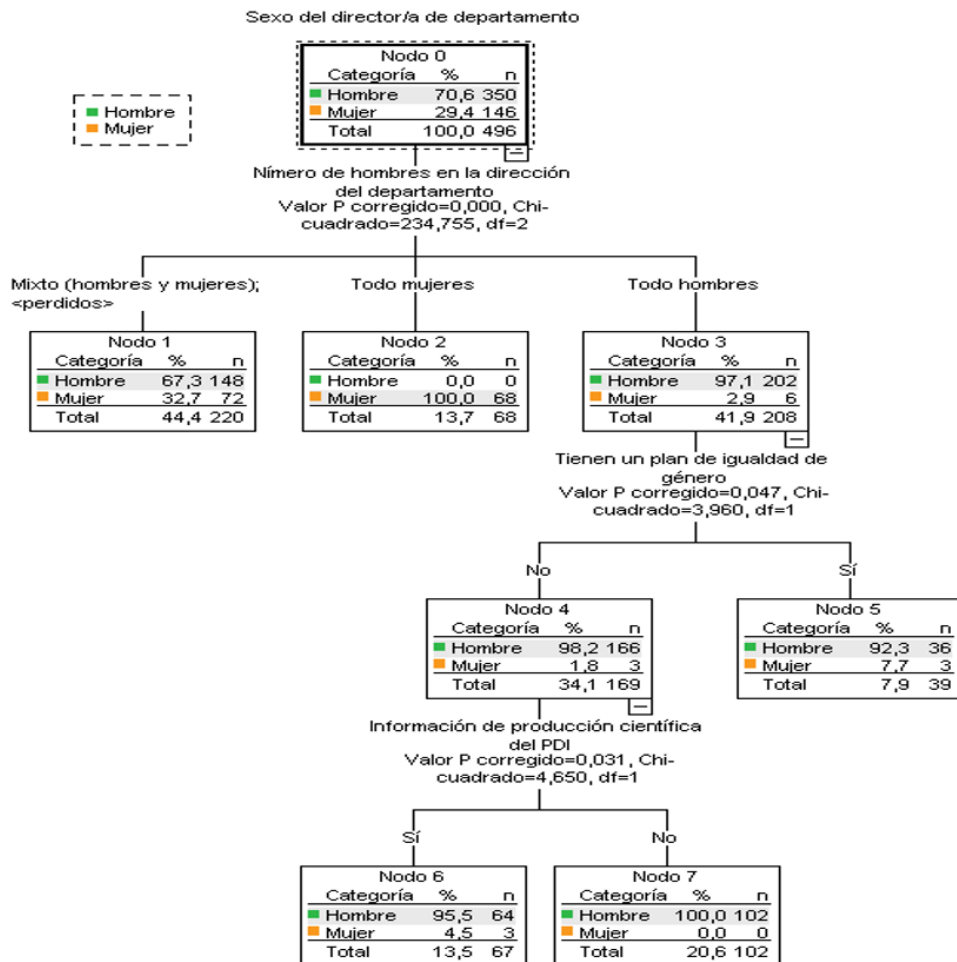
Table 1
List of dimensions and indicators

Dimension	Variables and indicators	Level	Coding
A. Identification	Field of knowledge to which the department belongs	Nominal	1 = Engineering; 2 = Sciences; 3 = Social Sciences and Law; 4 = Arts and Humanities; 5 = Health Sciences
B. Departmental structure and representation by sex in leadership	No. of women in the management team	Ratio	
	No. of disciplinary areas	Ratio	
	Equality plan in place	Dichotomous nominal	1 = Yes; 0 = No
	Internal departmental regulations in place	Dichotomous nominal	1 = Yes; 0 = No
	Publishes the sex distribution of staff	Dichotomous nominal	1 = Man; 2 = Woman
	Sex of the department head	Dichotomous nominal	
C. Research output and knowledge transfer	Information on academic staff research output	Ordinal	1 = Absent/inaccessible; 2 = Partial; 3 = Clear/complete
	Information on staff CVs and academic achievements		
	Information on funded research projects		
	Information on research groups		
D. Academic career policies: recruitment and promotion	Information on degree programmes and doctoral studies	Ordinal	1 = Absent/inaccessible; 2 = Partial; 3 = Clear/complete
	Information on predoctoral and postdoctoral recruitment opportunities		
	Information on academic staff vacancies		
	Information on assessment criteria for contracted academic staff positions		
E. Current affairs and communication	Public engagement news channel for general audiences	Ordinal	1 = Absent/inaccessible; 2 = Partial; 3 = Clear/complete
	Academic news and dissemination channel		
	Overall assessment of departmental website quality		
	Overall assessment of information accessibility		

Source: own research.

Figure 1

Segmentation tree: profiles associated with the sex of the department head



Note: The sex composition of the management team refers to deputy headship and departmental secretary positions; departmental headship is excluded.

Source: own research based on primary data.

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