

FROM EXPERT DISCOURSE TO STRATEGIC ARCHITECTURE IN HIGHER EDUCATION: A LONGITUDINAL TOPIC MODELING APPROACH

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Abstract:

The continuous transformation of higher education, shaped by internationalization, digitalization, labor market dynamics, and increasing institutional competitiveness, has intensified the need for strategic adaptation within universities. The purpose of this study is to identify the dominant strategic priorities for the development of Romanian universities based on the recommendations formulated by specialists from the national higher education system between 2014 and 2025. The research focuses on two main questions: which strategic themes were considered the most relevant over time and how these priorities varied across the main development regions of Romania. A text mining approach was applied using Orange Data Mining on a final corpus of 944 validated responses, while topic modeling was performed through the Negative Matrix Factorization algorithm to identify the dominant thematic structures. The analysis was further supported by temporal and territorial comparisons of the extracted themes. The results revealed ten major strategic topics, among which internationalization, interdisciplinary projects, partnerships between universities, teaching quality, and academic staff development emerged as the most prominent directions. Important variations were also identified across years and development regions, reflecting the influence of institutional and socio-economic contexts on university development priorities. The findings provide useful implications for university managers and decision-makers by supporting the design of development strategies adapted to both institutional needs and regional specificities.

Key words: higher education; strategic priorities; topic modeling; Romanian universities; text mining

1. Introduction

The transformations in higher education over the last two decades have significantly changed the way universities define their institutional strategies and set their development priorities (Giesenbauer & Müller-Christ, 2020; Marshall, 2025). Internationalization, digitalization of academic processes, global competitiveness, and the need to strengthen the relationship between the university and the labor market have led to a reconfiguration of the mission of universities at European and international level (Vakulenko, Świrk & CohenMiller, 2025). Higher education institutions are evaluated by their capacity to integrate research, the quality of the teaching process, curricular innovation, and inter-institutional cooperation in a coherent strategic framework (Marinoni & Pina Cardona, 2024; European Education and Culture Executive Agency 2024). In this context, university policies include the development of professional skills, the expansion of partnerships with the economic environment and the strengthening of institutional management capacity.

At European level, the Bologna process and the consolidation of the European Higher Education Area have supported the convergence of university policies and the development of common objectives regarding academic quality, mobility, and social relevance of universities (Eurydice, 2024). The application of these directions depends on the national context and the institutional particularities of each university system. Recent reports (European Education and Culture Executive Agency 2024) show that universities face difficulties regarding internationalization, retention of academic human resources, sustainable financing, and adaptation of study programs to economic and social changes. In Romania, according to Eurydice (2024) these challenges are accentuated by the territorial differences between university centers, the imbalances between educational offer and labor market requirements, as well as the need to strengthen academic quality in a system undergoing a continuous reform process.

Literature (Angiola, Bianchi & Damato, 2019; Cosenz, 2022) frequently analyses university strategic directions by assessing educational policies, institutional performance, and academic governance mechanisms. Cross-sectional studies (Heaton, Teece & Agronin, 2023) on the recommendations made by academic actors are less developed, although they provide relevant information on perceived priorities at the institutional level and their dynamics in relation to social and economic changes.

The purpose of this research is to identify the main strategic directions regarding the development of universities in Romania based on the recommendations formulated by specialists from the national higher education system in the period 2014–2025. The analysis pursues two research questions:

- RQ1. *Which are the dominant strategic themes reflected in the recommendations formulated by specialists from the Romanian higher education system regarding the development of universities?*
- RQ2. *To what extent do these strategic priorities vary over time and across the main development regions of Romania?*

To respond to these questions, the research used a text mining approach applied to a corpus formed by validated answers of specialists in higher education. Thematic modeling

performed through the Negative Matrix Factorization algorithm allows the identification of dominant thematic structures based on term co-occurrence and semantic proximity. Comparative temporal and territorial analysis allow the observation of thematic variations between years and regions.

The originality of the research results from the integrated analysis of university strategic priorities from a longitudinal and regional perspective. It also allows observing the evolution of institutional priorities and identifying differences between development regions, necessary for the substantiation of university strategies adapted to the current context of higher education in Romania.

2. Literature review

The ongoing change processes in the greater context of higher education can be seen as being driven by internationalization, digitalization, and wider transition to the knowledge-based economy (Gudissa et al., 2025). To respond adequately to the dynamic realities and various challenges, universities should introduce management tools which will assist them in optimizing their internal operations and developing high-performance capabilities (Ospina-Rozo & Muñoz-Moreno, 2025). The strategic adaptation process in higher education institutions (HEIs) is affected by inherently political processes and regulatory constraints, occurring in wider institutional settings (Stenvall-Virtanen, 2025). In recent times, the world of higher education has become more and more similar to neo-managerialism, forcing universities to compete and perform as central points of broad economic development (Piromalli, 2023). To cope with the ongoing challenges, university leaders rely on the strategic decision support system based on data, which is helpful in prioritizing university development, predicting scientific trends, and managing educational programs (Berezkin, Kozlova, & Martynyuk, 2023). Strategy-making in the education sector requires the involvement of the faculty and internal processes within institutions and alignment with specific policies (Gudissa et al., 2025; Stenvall-Virtanen, 2025).

One of the dominant themes in the strategic development of HEIs lies in the transition to digital transformation. According to Akour & Alenezi (2022), modern higher education faces a major change to adapt to the evolving digital world, redefining the objectives of university education to ensure that students possess the necessary digital competencies needed in current working environments. The process of digitalization is viewed not only as a trend, but also as an absolute necessity for the very survival and competitiveness of modern educational institutions (Rosak-Szyrocka, 2024). It is essential to understand that the integration of digital technology makes it possible to adopt new methods of education, including hybrid forms of learning and digital universities, thus providing better flexibility and access to education (Popelo et al., 2024). The problem of adopting new technological approaches should be approached carefully and in line with existing educational practices, as the complex nature of several academic disciplines requires an incremental approach, not just a top-down solution (Øvrelid, 2022).

In addition to digitalization, internationalization has shifted from being a secondary activity to becoming an indispensable factor for the progress and long-term strategic

development of HEIs (Moeliodihardjo, 2024). Institutions raise their reputation and competitiveness through the creation of relational capital, which is manifested by: establishing strategic partnerships, interaction with local communities, and collaboration within worldwide higher educational institutions and companies. Consequently, global engagement is not limited to the mobility of students, but the internationalization of education programs and cooperation across borders that increase institutional capabilities (Ospina-Rozo & Muñoz-Moreno, 2025). Students' mobility, such as the Erasmus+ program, is found to be essential to HEIs policy. Şahin, Bulut-Şahin, & Söylemez, (2024) reveal that there is still inequality in geographical and subregional terms, causing discrepancies in geographical networks that may inhibit the principle of equality. Effective partnership management with external organizations is crucial since it not only promotes the education of students but also fosters valuable knowledge exchange in global conditions (Vargas-Merino & Vivanco Aquino, 2026).

To be able to respond promptly and efficiently to the changes in the labor market caused by automation and rapid innovations, universities need to ensure teaching quality and multi-field approaches (Akour & Alenezi, 2022). The integration of several departments in academic studies makes interdisciplinarity easier and facilitates combining knowledge from several disciplines to provide solutions for the challenging problems facing the modern dynamic world (Ospina Rozo & Muñoz Moreno, 2025). The role of academic professionals in this process cannot be underestimated because their activities include research, societal contribution, and teaching (Moeliodihardjo, 2024). In response to these challenges, universities focus on developing their staff's careers, providing them with necessary digital skills, and creating effective reward systems (Ospina Rozo & Muñoz Moreno, 2025). As Gudissa et al. (2025) mentions, the participation of scholars in the activity of companies via consultancy, research, and employee training helps them gain useful experience that can be used when forming further policies or strategies. At the same time, Mula-Falcón et al. (2023) elaborate the fact that crises, such as the COVID-19 outbreak, reveal some weak spots in university functioning and make it necessary to adapt work methods and continue pedagogical training.

Strategic priorities of universities are significantly determined by the specifics of the institutions and regions. Universities in Romania, just as any universities around the world, are currently undergoing digital transformation and undergoing substantial reforms related to governance. Drăgan et al., (2025) show that in the context of Romanian universities, there is growing attention given to issues of financial transparency, higher education policies, and performance-based management. Strategic words such as "governance", "policy", and "performance" are used consistently and show that Romanian universities are restructuring themselves due to the demands of the new economy and requirements of integration into the international community. Consequently, this territorial adjustment corresponds to the global trend when universities are forced to align the fulfillment of their academic mission with organizational efficiency, as well as with digital integration (Drăgan et al., 2025).

3. Methodology

The objective of this research is to identify the main strategic directions for the development of universities in Romania, based on the recommendations formulated by specialists from the Romanian academic environment (i.e.: academics, researchers, and management consultants). The analysis focuses on the dominant themes reflected in these recommendations, their evolution over time and in different development regions.

3.1. Data collection

The initial database included all annual questionnaire responses collected by Romanian Academic Management Society between 2014 and 2025 from specialists in the Romanian higher education system. Respondents were invited to provide three recommendations for universities in Romania, with the aim of improving institutional preparation, academic performance, and adaptability to various educational, social, and economic challenges. Data collection was conducted annually between December and March through Google Forms.

The initial sample consisted of 1604 responses, distributed across the entire analyzed period. The descriptive structure of the sample, including the annual distribution of respondents, gender composition, and average age, is presented in Table 1.

Table 1. Annual descriptive profile of the respondents

Year	No. of respondents	Female	Male	Mean age
2014	120	63	41	44.8
2015	135	51	56	46.3
2016	121	42	79	49.0
2017	148	66	82	47.2
2018	127	50	77	46.7
2019	114	46	68	47.9
2020	153	70	83	48.1
2021	173	87	86	48.5
2022	144	75	69	48.7
2023	121	50	71	51.5
2024	97	51	46	49.7
2025	151	94	57	50.0

Source: authors

According to the data presented in Table 1, the sample reflects a relatively balanced gender structure throughout the analyzed period, with a slight predominance of male respondents in most years. The highest number of participants was recorded in 2021, with 173 respondents, while the lowest participation was observed in 2024, with 97 respondents. The average age remained relatively stable across the entire period, varying between 44 and 51 years.

3.2. Data analysis

Given the qualitative and unstructured nature of the collected responses, a text mining approach was considered appropriate for identifying the dominant strategic themes emerging from the dataset (Antons et al., 2020). The large volume of textual information required a systematic analytical method capable of extracting recurring patterns, thematic structures, and strategic recommendations across the entire period of analysis. Topic modeling was selected as the most suitable technique because it enables the identification of latent thematic clusters based on word co-occurrence and semantic similarity (Martin & Johnson, 2015; Mu et al., 2022).

After data collection, all responses were exported in .csv format and organized into a textual corpus for further processing. Before the analytical stage, the database was subjected to a cleaning and validation process to eliminate incomplete responses, duplicate entries, and recommendations that were not relevant to the research objective. From the initial sample of 1604 respondents, only valid and relevant textual recommendations were retained for analysis, resulting in a final corpus of 944 observations. Additional filtering was applied to preserve only meaningful textual content suitable for thematic analysis.

The analytical workflow was developed in Orange Data Mining (Demšar et al., 2013), a visual programming platform commonly used for text mining and topic modeling, as it allows the reproducible construction of analytical pipelines without requiring programming knowledge. The complete workflow used in this study is shown in Figure 1.

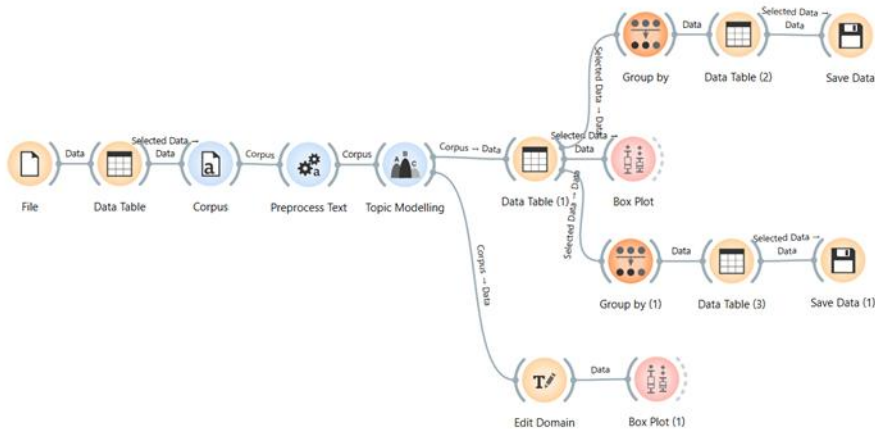


Figure 1. Research workflow

(Orange Data Mining – Demšar et al., 2013)

The analytical workflow (Figure 1) consisted of three main stages: data preparation, topic modeling, and statistical interpretation of the extracted themes. In the first stage, the dataset was imported and transformed into a textual corpus using the File, Data Table, and

Corpus modules. The second stage involved text preprocessing, including lowercase transformation, word-level tokenization, punctuation, numbers, and non-informative terms. A document frequency filter was applied using relative thresholds between 0.10 and 0.90 to remove both excessively rare and excessively frequent terms. Part-of-speech filtering was also introduced by keeping only nouns and adjectives, as these lexical categories retain the strongest semantic relevance for identifying strategic themes.

In the third stage, topic modeling was performed using the Negative Matrix Factorization (NMF) algorithm within the Topic Modeling module. The number of topics was predefined at 10, allowing the identification of ten thematic clusters and a top of topics based on word co-occurrence, semantic similarity.

After topic extraction, the resulting topic distributions were transferred for statistical examination using Group by and Box Plot widgets to analyses thematic variation by year and by development region.

4. Results/findings

4.1. Topic modeling

The topic modeling analysis was performed to identify the main strategic directions reflected in the recommendations formulated by specialists from the Romanian higher education system. For this purpose, the Negative Matrix Factorization (NMF) algorithm was selected within the Topic Modeling module of Orange Data Mining (Demšar et al., 2013). NMF is an unsupervised dimensionality reduction technique that decomposes the term-document matrix into non-negative matrices of lower rank, allowing the extraction of semantically coherent topics through additive combinations of representative words (Lee & Seung, 2000; Lopes & Ribeiro, 2015).

Each of the 10 identified topics was automatically generated by the algorithm based on the relative importance and co-occurrence of words. Following the standard methodological approach used in topic modelling studies (Omojowo, 2025), the algorithm first produced lists of representative keywords for each topic, after which thematic labels were assigned through qualitative interpretation of the semantic content, as can be seen in Table 2.

Table 2. Main thematic clusters identified through topic modeling

Topic	Representative keywords	Final thematic label
Topic 1	research, modernization, strategies, universities, international, internationalization	Internationalization of universities and modernization of institutional strategies
Topic 2	growth, studies, economics, environment, solutions, collaboration	Strengthening cooperation with the economic environment
Topic 3	consultancy, management, courses, continuous, services, analysis	Development of executive training and managerial consultancy services
Topic 4	academic environment, projects, collaboration, partnerships,	Development of partnerships between universities

	cooperation	
Topic 5	teaching, didactic staff, performance, teaching quality, didactic	Enhancing teaching performance and improving the educational process
Topic 6	research, quality, publications, scientific output, support	Improving research quality and valorization of scientific results
Topic 7	research, teams, academic partnerships, involvement, programs, projects	Development of interdisciplinary projects
Topic 8	leadership, decision-making, governance, coordination, organizational development	Strengthening leadership capacity and institutional decision-making
Topic 9	study programs, management, international experience, students, curricula	Modernization of study programs and improvement of student experience
Topic 10	research, training, scientific requirements, professional development, professors	Continuous training of academic staff and adaptation of professional competencies

Source: authors in Orange Data Mining (Demšar et al., 2013)

Therefore, the results from Table 2 indicate that the recommendations formulated by specialists from the Romanian higher education system are structured around several strategic priorities related to institutional modernization, academic quality, managerial development, and inter-institutional cooperation.

The first topic reflects the process of internationalization and institutional strategic adaptation, structured around terms such as research, modernization, strategies, universities, international, and internationalization. The results are consistent with recent national higher education policies in Romania, where internationalization has become a strategic priority through programs aimed at increasing the international relevance, quality, and visibility of Romanian universities (Eurydice, 2024). The emphasis on global academic integration also corresponds to international trends, where universities increasingly focus on international partnerships, mobility, foreign language programs, and global competitiveness (Marinoni & Pina Cardona, 2024).

The second topic, labeled strengthening cooperation with the economic environment, presents the relationship between universities and the economic sector, based on keywords such as growth, economic environment, collaboration, and solutions. Thus, there is a national concern regarding the alignment of higher education with labor market demands, graduate employability, and the development of dual education programs (Eurydice, 2024). Recent reforms in Romania support this direction through projects focused on adapting educational provision to labor market needs and strengthening university-business cooperation.

The third topic, labeled development of executive training and managerial consultancy services, is associated with executive education, professional training, and managerial support activities, including words such as consultancy, management, courses,

continuous, and services. This cluster reflects the growing involvement of universities in lifelong learning processes and the diversification of academic services beyond traditional teaching and research functions. Universities increasingly provide continuing education programs, postgraduate professional training, leadership development courses, and consultancy services addressed to public institutions, private organizations, and administrative structures.

Additionally, several topics reflected directions related to the institutional development of Romanian universities. The fourth topic, labeled development of partnerships between universities, included terms such as projects, collaboration, partnerships, and cooperation, indicating the importance of stronger academic networks and institutional cooperation. The fifth topic, labelled enhancing teaching performance and improving the educational process, focused on teaching, didactic staff, performance, and teaching quality, highlighting the need for pedagogical improvement and educational effectiveness.

The sixth topic, labelled improving research quality and valorization of scientific results, was formed around research, quality, publications, and scientific output, reflecting the importance of scientific productivity and academic visibility. The seventh topic addressed interdisciplinary collaboration through terms such as research teams, programs, and projects, supporting joint academic initiatives and cross-disciplinary research.

The eighth topic focused on institutional governance and strategic coordination, while the ninth topic reflected the modernization of study programs and student-centered education through curriculum adaptation and improved academic experience.

The last topic, labeled continuous training of academic staff and adaptation of professional competencies, highlighted the importance of professional development and the continuous adjustment of academic staff to new educational and scientific requirements.

Further, Table 3 presents the ranking of the identified strategic themes according to their total weight within the analyzed corpus. The total weight reflects the cumulative contribution of each topic across all institutional strategic documents included in the database. A higher total weight indicates a stronger thematic presence, suggesting that the respective topic occupies a more prominent position in university strategic planning and managerial priorities.

Table 3. Ranking of strategic themes by total weight

Rank	Topic	Thematic Label	Total Weight
1	Topic 7	<i>Development of interdisciplinary projects</i>	126.27
2	Topic 4	<i>Development of partnerships between universities</i>	114.37
3	Topic 5	<i>Enhancing teaching performance and improving the educational process</i>	108.48
4	Topic 1	<i>Internationalization of universities and modernization of institutional strategies</i>	103.27
5	Topic 3	<i>Development of executive training and managerial consultancy services</i>	101.95

6	Topic 8	<i>Strengthening leadership capacity and institutional decision-making</i>	101.70
7	Topic 2	<i>Strengthening cooperation with the economic environment</i>	92.66
8	Topic 10	<i>Continuous training of academic staff and adaptation of professional competencies</i>	84.59
9	Topic 9	<i>Modernization of study programs and improvement of student experience</i>	75.76
10	Topic 6	<i>Improving research quality and valorization of scientific results</i>	25.70

Source: authors in Orange Data Mining (Demšar et al., 2013)

The results show that Topic 7, Development of interdisciplinary projects (126.27), occupies the first position, suggesting that universities place strong interest in interdisciplinary collaboration, academic partnerships, and project-based institutional development. This is followed by Topic 4, Development of partnerships between universities (114.37), and Topic 5, Enhancing teaching performance and improving the educational process (108.48), indicating that inter-institutional cooperation and teaching quality represent central priorities in university strategic management. Topic 1, Internationalization of universities and modernization of institutional strategies (103.27), together with Topic 3, Development of executive training and managerial consultancy services (101.95), also records substantial weights, reflecting the importance of strategic adaptation to international academic standards and the diversification of institutional services.

At the opposite end of the ranking, Topic 6, Improving research quality and valorization of scientific results, records the lowest total weight (25.70), indicating a comparatively lower strategic emphasis on research valorization within the analyzed institutional documents.

4.2. Temporal analysis of strategic priorities

To identify the evolution of strategic priorities over time, the prevalence of each thematic topic was analyzed annually for the period 2014–2025. The analysis was based on the mean topic distribution generated through the Group By modules in Orange Data Mining (Demšar et al., 2013), allowing the identification of dominant themes and shifts in institutional concerns across different years (Table 4).

Table 4. Evolution of strategic topic by year based on mean prevalence (2014–2025)

Year	Topic 1	Topic 2	Topic 3	Topic 4	Topic 5	Topic 6	Topic 7	Topic 8	Topic 9	Topic 10
2014	0.109	0.118	0.059	0.135	0.122	0.037	0.133	0.148	0.062	0.071
2015	0.157	0.092	0.109	0.093	0.092	0.020	0.192	0.121	0.043	0.075
2016	0.089	0.118	0.087	0.125	0.098	0.017	0.134	0.072	0.067	0.186

2017	0.104	0.055	0.139	0.105	0.123	0.033	0.169	0.102	0.095	0.070
2018	0.077	0.126	0.094	0.136	0.091	0.029	0.151	0.108	0.087	0.094
2019	0.116	0.102	0.086	0.194	0.129	0.017	0.090	0.108	0.079	0.072
2020	0.095	0.131	0.061	0.125	0.133	0.017	0.130	0.132	0.090	0.069
2021	0.087	0.089	0.089	0.116	0.128	0.033	0.145	0.113	0.103	0.080
2022	0.141	0.089	0.099	0.097	0.122	0.032	0.112	0.082	0.099	0.120
2023	0.126	0.064	0.063	0.127	0.112	0.029	0.148	0.122	0.092	0.097
2024	0.101	0.113	0.073	0.144	0.093	0.036	0.175	0.091	0.096	0.072
2025	0.138	0.060	0.395	0.032	0.109	0.017	0.026	0.065	0.029	0.043

Source: authors in Orange Data Mining (Demšar et al., 2013)

The temporal distribution of strategic themes presented in Table 4 reflects a gradual reconfiguration of priorities within the Romanian higher education system between 2014 and 2025. In 2014, the highest values were recorded for the eighth theme, strengthening leadership capacity and institutional decision-making (0.148), followed by the fourth theme, developing partnerships between universities (0.135) and the seventh theme, developing interdisciplinary projects (0.133). While in the following years, the focus progressively shifted towards internationalization, interdisciplinary development, and professional training. In 2015, the seventh theme reached its highest value (0.192), while the first theme, internationalization of universities and modernization of institutional strategies, also increased significantly (0.157). In 2016, the dominant position was occupied by the tenth theme, continuing education of academic staff and adaptation of professional skills (0.186), reflecting the growing importance of professional development and qualification of academic staff.

Between 2017 and 2020, the results show a stronger orientation towards the quality of teaching, curriculum improvement, and institutional partnerships. The fifth theme, related to improving the educational process, and the fourth theme, focused on partnerships between universities, maintained relatively high and stable values. In 2019, the fourth theme recorded one of the highest values in the entire series (0.194), suggesting an increased focus on institutional collaboration and strategic academic networks. During the same period, themes associated with cooperation with the economic environment and modernization of study programs also remained relevant.

After 2020, strategic priorities have become increasingly linked to institutional adaptation, resilience, and long-term sustainability. In 2022 and 2023, the first theme related to internationalization regained importance, while the seventh theme continued to maintain a strong presence. In 2024, interdisciplinary projects again represented one of the most visible strategic directions (0.175), confirming the persistence of collaborative academic initiatives.

The year 2025 shows a significant increase in the third theme, the development of executive training and management consulting services (0.395), representing the highest value recorded in the entire analysis. The result suggests a stronger orientation towards

continuing education, executive training, and the expansion of university services beyond traditional teaching and research activities.

4.3. Territorial distribution of strategic priorities

The regional analysis of strategic themes allows the identification of differences in institutional priorities across the main development regions of Romania. The values presented in Table 5 represent the mean prevalence of each topic by region, highlighting the strategic directions that received greater attention depending on local academic, economic, and institutional contexts.

Table 5. Regional distribution of strategic priorities in Romanian universities

Territorial distribution	Topic 1	Topic 2	Topic 3	Topic 4	Topic 5	Topic 6	Topic 7	Topic 8	Topic 9	Topic 10
Bucharest-Ilfov	0.104	0.101	0.094	0.123	0.107	0.030	0.138	0.128	0.081	0.086
Centre	0.106	0.084	0.150	0.098	0.094	0.019	0.146	0.085	0.127	0.076
North-East	0.121	0.084	0.159	0.147	0.172	0.027	0.099	0.075	0.052	0.044
North-West	0.080	0.103	0.112	0.150	0.079	0.018	0.189	0.097	0.066	0.106
South-East	0.094	0.163	0.191	0.039	0.078	0.016	0.066	0.104	0.109	0.139
South-Muntenia	0.123	0.111	0.066	0.175	0.120	0.017	0.176	0.087	0.032	0.090
South-West	0.098	0.058	0.117	0.139	0.155	0.009	0.094	0.085	0.064	0.139
West	0.126	0.104	0.084	0.107	0.132	0.040	0.118	0.117	0.075	0.092

Source: authors in Orange Data Mining (Demšar et al., 2013)

According to the results, in the Bucharest-Ilfov region, the highest values were recorded for the seventh theme, the development of interdisciplinary projects (0.138), the eighth theme, the strengthening of leadership capacity and institutional decision-making (0.128), and the fourth theme, the development of partnerships between universities (0.123). The concentration of large universities, research centers and decision-making institutions explains the stronger orientation towards governance, collaborative research, and strategic institutional partnerships. A similar emphasis on collaboration can be observed in the Center and North-West regions, where interdisciplinary projects and partnerships between universities occupy dominant positions. In the Central region, the third theme, the development of executive training and management consultancy services (0.150), and the seventh theme (0.146) present a stronger orientation towards continuing education and academic cooperation, while the ninth theme, related to curriculum modernization, also registers a significant value (0.127). In the North-West region, the seventh theme reaches the highest regional value in the entire table (0.189), followed by the fourth theme (0.150), reflecting the importance of research collaboration and the creation of institutional networks. In the North-East region, the fifth theme, improving teaching performance and improving the educational process (0.172), becomes the dominant strategic priority, followed by the third theme (0.159) and the fourth theme (0.147). The South-West region presents a similar orientation, where the fifth theme

(0.155) remains the most visible strategic direction, along with partnerships and the development of academic staff.

The South-East region presents a different strategic profile, where the third theme, the development of executive training and management consultancy services (0.191), and the second theme, the strengthening of cooperation with the economic environment (0.163), register the highest values. This distribution reflects a stronger connection between universities and the needs of the regional labor market, together with the development of continuing education services and applied managerial support. In South-Muntenia, the seventh theme (0.176) and the fourth theme (0.175) dominate the regional structure, while the first theme, related to internationalization and institutional modernization, also remains visible (0.123). The strategic orientation of this region is therefore centered on academic cooperation, partnerships, and institutional positioning within broader national and international networks.

The West Region presents a more balanced distribution, where teaching quality (0.132), internationalization (0.126) and interdisciplinary projects (0.118) maintain similar values.

5. Discussions

The results of the thematic modeling analysis show that the strategic priorities formulated by specialists in the Romanian higher education system are focused on institutional modernization, academic quality, and inter-university cooperation. The recurrence of themes such as internationalization, interdisciplinary projects, university partnerships, teaching quality, and continuous development of academic staff indicate that Romanian universities are primarily concerned with adapting to external changes and strengthening internal institutional capacity. According to AlQhtani (2025) and Aldogihier et al. (2025) this also reflects the transition of universities towards more complex organizational models, in which teaching and research are accompanied by stronger managerial responsibilities and increased social and economic involvement.

The identification of internationalization as one of the dominant strategic themes indicates the growing importance of external academic visibility and institutional competitiveness. Universities increasingly seek participation in international partnerships (Heitor, 2015), mobility programs (Juškevičienė, et al., 2022), joint research projects (Mohrman, Ma & Baker, 2008) and foreign-language study programs (Davis, 2022). The average academic pressure corresponds to recent European higher education policies, where internationalization is associated with academic reputation, research performance, and access to transnational funding opportunities (Marinoni & Pina Cardona, 2024).

The strong presence of interdisciplinary projects and partnerships between universities shows that institutional collaboration has become a stable development priority. The high prevalence of these themes suggests that universities increasingly rely on academic networks, joint research structures, and collaborative projects as instruments for improving institutional performance and research visibility. Similar conclusions are found in previous studies (Banciu & Vevera, 2023; Hedges et al., 2021; Lanskoronskis et al., 2009), where inter-institutional cooperation is associated with higher research

productivity, stronger innovation capacity, and improved access to competitive funding. The persistence of these topics across multiple years indicates that collaboration is perceived as a structural component of university development.

Teaching quality and improving the educational process also occupy a prominent position among the priorities identified. This result reflects the increasing pressure on universities to improve pedagogical practices, curriculum relevance, and the academic experience of students. The relationship between teaching quality and institutional legitimacy has been widely discussed in literature (Kim, Sun & Youngs, 2019; Suranta et al., 2026), especially in relation to graduate employability and student satisfaction. The Romanian context presents a similar orientation (Corboș et al., 2020; Popa et al., 2025), especially through reforms focused on dual education, curriculum revision, and adaptation of study programs to labor market requirements.

The prominence of executive training and managerial consultancy services suggests an extension of university functions beyond traditional academic activities. Universities increasingly participate in lifelong learning, postgraduate professional training, and consultancy activities for public institutions and private organizations (Camacho-Zuñiga et al., 2025). The strong increase of this topic in 2025 indicates a stronger institutional orientation towards continuing education and professional certification. International studies (Awad, 2025) describe this development as part of the broader transformation of universities into organizations with wider economic and social responsibilities.

The temporal analysis indicates that strategic priorities changed gradually during the period 2014–2025. In the first years of analysis, governance, leadership capacity, and institutional decision-making occupied a more visible position. This pattern suggests that universities were initially more concerned with internal organizational consolidation and managerial coordination. In the following years, internationalization and interdisciplinary collaboration became more prominent, reflecting stronger integration into competitive academic environments. Between 2017 and 2020, the increased relevance of teaching quality and university partnerships indicates stronger attention toward curriculum development and institutional cooperation. After 2020, the results show a stronger orientation toward resilience, adaptability, and diversification of academic services, particularly through executive education and professional training.

The regional analysis confirms that development priorities are influenced by local institutional contexts. Bucharest-Ifov presents stronger values for governance, interdisciplinary projects, and partnerships between universities, which can be associated with the concentration of large universities, research centers, and national decision-making institutions. North-West shows the highest value for interdisciplinary projects, reflecting a strong orientation toward collaborative research and academic networking. South-East records higher values for executive training and cooperation with the economic environment, indicating a closer relationship between universities and regional labor market demands. North-East and South-West show stronger concern for teaching quality and academic staff development, suggesting a stronger focus on educational consolidation and professional support.

6. Conclusions

The purpose of this research was to identify the main strategic directions regarding the development of universities in Romania based on the recommendations formulated by specialists from the national higher education system during the period 2014–2025. The analysis aimed to answer two research questions concerning the dominant strategic themes reflected in these recommendations and the extent to which these priorities vary over time and across the main development regions of Romania. The results showed that the most recurrent strategic priorities are related to internationalization, interdisciplinary projects, partnerships between universities, teaching quality, continuous academic staff development, and cooperation with the economic environment. The temporal analysis indicated that the relevance of these priorities changed in relation to institutional adaptation and broader socio-economic developments, while the territorial analysis revealed that regional differences are visible mainly in the prioritization of specific strategic directions rather than in the general structure of university development concerns.

From a theoretical perspective, the study contributes to the literature on higher education management by extending the understanding of strategic university development through the analysis of recommendations formulated directly by academic specialists. Most previous studies examine university transformation through institutional indicators, governance models, or policy evaluation frameworks. This research approaches the subject from the perspective of perceived strategic priorities and their thematic organization through text mining techniques. The use of topic modeling provides an interpretation of qualitative academic recommendations and supports the identification of thematic structures that reflect institutional concerns across different contexts of university development.

From a practical perspective, the conclusions provide support to university managers, policy makers and decision-makers involved in higher education planning. The identification of dominant priorities in the Romanian university environment allows for strategic planning and the allocation of institutional resources in a more efficient way. The results of the study also support the development of more flexible strategies, adapted to both national objectives and European level policies.

The main limitation of this study is related to the nature of the dataset, which is based on self-reported recommendations formulated by specialists and therefore reflects perceived priorities rather than direct institutional performance indicators. In addition, although the analysis covers multiple years, the study follows a cross-sectional analytical logic focused on thematic prevalence rather than on causal longitudinal tracking of institutional change. Future research may extend this approach by integrating quantitative institutional indicators such as research performance, graduate employability, or international rankings to compare perceived priorities with measurable university outcomes.

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