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Academic Productivity in the Context of Disasters: A Spatial Analysis of Landscape Architecture Departments in Türkiye

Afetler Bağlamında Akademik Üretkenlik: Türkiye'deki Peyzaj Mimarlığı Bölümlerinin Mekânsal Analizi

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Abstract

This study analyzes the spatial relationship between landscape architecture departments and research universities across Türkiye and the disaster risk levels of their respective provinces. This research adopts the perspective that landscape architecture plays a critical role in disaster management, particularly as climate change, rapid urbanization, and environmental degradation intensify disaster risks. Methodologically, the researchers scanned a total of 2.397 theses comprising 1.904 master's and 493 doctoral dissertations published by the Turkish National Thesis Center between 2002 and 2023, and identified 62 disaster-themed theses through keyword-based classification. Disaster risk maps from the Ministry of Environment, Urbanization, and Climate Change of the Republic of Türkiye and university location information obtained from the Council of Higher Education (YOK) Atlas were analyzed using Geographic Information Systems (GIS). Using the obtained coefficient a and coefficient b values, the overall and disaster-focused productivity of landscape architecture departments was compared and correlated with spatial risks. The findings revealed that universities in provinces such as Ankara, Bursa, Van, and Düzce exhibited strong trends in both high overall productivity and disaster-focused theses production. In contrast, in some cities, despite high risk levels, disaster-themed production was low. Consequently, the analysis revealed that landscape architecture departments developed academic production with sensitivity to spatial risks and made critical contributions to topics such as post-disaster recovery, green infrastructure, and nature-based solutions. The study aims to contribute to providing scientific decision support in disaster planning through GIS-based analyses and to strengthening university-local government collaborations.

Özet

Bu çalışma, Türkiye genelindeki peyzaj mimarlığı bölümlerinin ve araştırma üniversitelerinin, bulundukları illerin afet risk düzeyleriyle olan mekânsal ilişkisini analiz etmektedir Araştırma, iklim değişikliği, hızlı kentleşme ve çevresel bozulmanın afet risklerini artırmasıyla birlikte, peyzaj mimarlığının afet yönetiminde kritik bir rol oynayabileceği yaklaşımını temel almaktadır. Yöntem olarak, 2002–2023 yılları arasında Türkiye Ulusal Tez Merkezi'ndeki 1.904 yüksek lisans ve 493 doktora tezi (toplam 2.397) taranmış; anahtar sözcük temelli sınıflama ile 62 afet temalı tez belirlenmiştir. T.C. Çevre, Şehircilik ve İklim Değişikliği Bakanlığı'nın afet risk haritaları ve YÖK Atlas'tan alınan üniversite konum bilgileri Coğrafi Bilgi Sistemleri (CBS) kullanılarak analiz edilmiştir. Elde edilen katsayı a ve katsayı b değerleriyle, peyzaj mimarlığı bölümlerinin genel ve afet odaklı üretkenliği karşılaştırılmış ve mekânsal risklerle ilişkilendirilmiştir. Bulgular, Ankara, Bursa, Van ve Düzce gibi illerdeki üniversitelerin hem yüksek genel üretkenlik hem de afet odaklı tez üretiminde güçlü eğilimler sergilediğini, bazı şehirlerde ise yüksek risk düzeyine karşın afet temalı üretimin düşük olduğunu ortaya koymuştur. Sonuç olarak, peyzaj mimarlığı bölümlerinin mekânsal risklere duyarlılıkla akademik üretim geliştirdiği; afet sonrası iyileştirme, yeşil altyapı ve doğa-temelli çözümler gibi konularda kritik katkılar sunduğu belirlenmiştir. Çalışma, CBS tabanlı analizlerle afet planlamasında bilimsel karar desteği sağlanmasına ve üniversite yerel yönetim iş birliklerinin güçlendirilmesine katkıda bulunmayı hedeflemektedir.

INTRODUCTION

Climate change, rapid urbanization, overuse of natural resources, and environmental degradation have significantly increased the frequency and severity of disasters in the 21st century, seriously threatening the physical structure of cities and the resilience of societies to disasters (Dwirahmadi et al. 2019). The 35% increase in the number of large-scale disasters in Türkiye between 2000 and 2023 alone highlights the importance of risk reduction strategies (Özsalman and Yıldırım 2024). Disasters not only cause loss of life and property, but also leave lasting impacts on social structure, environmental sustainability, and economic stability (Yin 2024). Therefore, developing strategies to reduce disaster risks and integrating them into spatial planning processes plays a decisive role in increasing societal resilience (Başkaya 2023).

Spatial planning encompasses multidimensional processes such as protecting natural thresholds, limiting the use of endangered areas, and preparing post-disaster recovery scenarios (Erdoğan and Öztürk 2019). The effectiveness of these processes increases with the contribution of professional fields that can evaluate nature-human interactions in a multi-scale and interdisciplinary manner (Kaya and Uzun 2019). Landscape architecture is one of the disciplines that directly contributes to the disaster management process by developing highly ecologically sensitive spatial solutions (Aksoy et al. 2020). It provides the scientific basis for risk assessments and response plans by analyzing the relationships between land use, topography, hydrography, natural areas, and settlements (Kondo et al. 2018). It also develops strategies such as permeable surface designs, nature-based solutions, and green infrastructure networks against floods, landslides, earthquakes, and fires (Duvernoy and Gambino 2021).

Disaster risk maps are strategic tools used in the spatial planning process to predict the spatial impacts of hazards, determine their probabilities, and assess potential damage. They play a key role in identifying risky areas and guiding planning decisions, particularly in regions under pressure from urbanization. Increasing hydrological imbalances and topographic vulnerabilities due to climate change have necessitated spatial modeling of disaster risks and their integration into administrative decisions (Yılmaz and Tezer 2023).

Geographic Information Systems (GIS) provide a robust infrastructure for such analyses, enabling scientifically based mapping of disaster risks and the integration of spatial analyses into planning processes (Çabuk 2014). GIS-based approaches are increasingly being used in landscape architecture research and offer applicable outputs for developing post-disaster recovery scenarios and risk reduction strategies (Graham et al. 2022).

Provinces in Türkiye where research universities are located, despite their high level of development, exhibit high vulnerability to many types of disasters. Landscape architecture departments at these universities contribute to the preparation of disaster risk maps with their technological infrastructure and interdisciplinary interaction capacity, and they develop risk reduction strategies through collaborations with local governments. Postgraduate theses are one of the most concrete indicators of this production (Kalkan and Başkaya 2024). However, the existing literature lacks comprehensive research systematically examining the spatial relationships between disaster risk and academic productivity in the field of landscape architecture.

This study aims to reveal the potential role of landscape architecture departments in disaster management in Türkiye through their academic production capacity and the production of disaster-themed theses using GIS-based spatial analysis. In this context, coefficient a (general thesis production capacity) and coefficient b (disaster-themed production level) indicators, normalized by year of production, were developed. This approach allows for fair comparisons across universities of varying ages and sizes, providing a data-based perspective for both academic strategy development and disaster management policies. Thus, the landscape architecture perspective, which has received limited attention in the disaster management literature, offers a unique contribution to the literature with its interdisciplinary, innovative, and practical perspective.

MATERIAL AND METHODS

This study examines how disaster risk levels spatially correspond to the locations of landscape architecture departments and research universities in Türkiye. The analysis jointly evaluates postgraduate thesis data, disaster risk maps, and university location information. The study employs Geographic Information Systems (GIS)-based mapping and comparative coefficient analyses. The methodological process consists of four stages: (i) research area and university selection, (ii) data collection, (iii) calculation of academic productivity coefficients, and (iv) mapping and visualization.

Stage 1. Research Area and University Selection

This study draws on the findings of a doctoral thesis defended in 2024. The data used includes figures updated as of 2023. The scope of the study consists of universities offering graduate-level landscape architecture education across Türkiye. The authors identified universities through the Council of Higher Education (YOK) Atlas database and included departments with active postgraduate programs in the study. This selection was made to enable comparative analysis across universities and to assess the levels of disaster-themed theses production consistently. Additionally, research universities, as defined by the Council of Higher Education (YÖK), were considered a separate focal point due to their scientific production capacity and the leading role they play in disaster-themed research. These institutions were represented by different symbols during the spatial analysis process and analyzed comparatively.

Stage 2. Data Collection

Three main data sets were used in the research. Thesis Data: Master's and doctoral theses accessed from the Council of Higher Education National Thesis Center between 2002 and 2023 were examined. These were classified according to their subjects, and disaster-themed ones were additionally coded and separated. The classification criteria used in disaster-themed theses were developed considering the types of disasters observed in Türkiye and disaster terms commonly used in the literature. In this regard, a total of 23 keywords directly related to disaster risk, such as "earthquake, flood, overflow, tsunami, fire, landslide, climate change, disaster management," were identified. The keywords were used to systematically scan the master's and doctoral theses conducted in the Department of Landscape Architecture in the Council of Higher Education Thesis Center database. Theses whose suitability for the keywords was confirmed were included in the study, and a total of 62 theses were examined in detail.

Disaster Risk Data: T.R. Türkiye Disaster Risk Maps published by the Ministry of Environment, Urbanization, and Climate Change were used. The data includes earthquake, flood, landslide, rockfall, and avalanche hazard types.

University Location Data: Geographic coordinate information and status of universities (whether they are research universities) were obtained from the YOK Atlas and the official university websites and transferred to the GIS environment.

Stage 3. Calculating Academic Productivity Coefficients

The coefficient a and coefficient b indicators developed in this study are based on a comparison method that standardizes the postgraduate theses production performance of higher education institutions by taking into account the number of years the institutions have been in operation. Coefficient a reveals institutional productivity by calculating the total number of postgraduate theses per active production year since the university's establishment. Coefficient b applies the same calculation method to disaster-themed theses, thereby quantifying the level of academic orientation towards disaster topics. This method eliminates temporal advantages or disadvantages in comparing universities of different ages and sizes. It serves as a preliminary analysis tool examining the spatial distribution of disaster-themed academic production. Evaluating these two indicators together provides a comparative overview of universities' academic orientations in both general scientific productivity and disaster management. However, because the coefficients reflect only production volume, qualitative dimensions such as research depth, interdisciplinary interaction, or academic impact are excluded from the scope of this study.

Stage 4. Mapping and Visualization Process

All data obtained in the study were processed and visualized using ArcGIS 10.3.1 software to perform spatial analyses and create thematic maps. The mapping process was carried out in the following steps:

• Universities offering graduate-level landscape architecture education across Türkiye were placed on the map using geographic coordinate information.
• Risk data for disaster types such as earthquakes, floods, landslides, rockfalls, and avalanches were taken from the Turkish Disaster Risk Maps and classified according to risk levels, and separate thematic layers were created for each disaster type.
• Coefficient a and coefficient b values were visualized using point symbols and color scales to facilitate spatial comparison.
• Research universities were distinguished on the maps with different symbols, and their disaster-themed academic production levels were analyzed comparatively with those of other universities. This approach enabled the spatial evaluation of academic productivity indicators together with disaster risk levels; Thus, the relationship between the disaster-focused academic contributions of universities and the risk profile of the region in which they are located has been revealed holistically.

FINDINGS

This study examined the spatial overlap between disaster risk levels and the provinces where landscape architecture departments are located across Türkiye. The coefficient a, representing the general thesis production capacity of universities, and the coefficient b, representing the disaster-themed thesis production capacity, were comparatively evaluated. The findings reveal the relationship between both general academic productivity and disaster-focused orientations and the disaster risk profile of the regions where universities are located. The coefficient a and coefficient b values presented in Table 1 reveal the general academic productivity and disaster-themed productivity levels of landscape architecture departments in Türkiye. They are an important data source for analyzing the quantitative and qualitative dimensions of research output in the Turkish higher education system.

Table 1. The distribution of universities according to their coefficient a/b scores (Kalkan and Başkaya 2024)

Universities with the Highest t Score	**Coefficient_a (t/y)**	**Total_Graduate_Thesis (t)**	**Total_Production_Year (y)**
Ankara University	12.67	469	37
Süleyman Demirel University	7.47	127	17
Van Yüzüncü Yıl University	6.57	46	7
İnönü University	6.2	31	5
Bartın University	6.06	91	15
Bursa Uludağ University	5.4	27	5
İstanbul Technical University	5.18	140	27
Namık Kemal University	5.16	31	6
Düzce University	5	80	16
Çukurova University	4.82	241	50
Universities with the Highest d Score	**Coefficient_b (d/y)**	**Number_of_Thesis_Related_to_Disaster (d)**	**Total_Production_Year (y)**
Bursa Technical University	1.66	5	3
İnönü University	1	5	5
Recep Tayyip Erdogan University	1	2	2
Van Yüzüncü Yıl University	0.57	4	7
Namık Kemal University	0.5	3	6
Kastamonu University	0.28	2	7
Düzce University	0.25	4	16
İzmir Demokrasi University	0.25	1	4
Yeditepe University	0.25	1	4
Çankırı Karatekin University	0.2	1	5

Table 1 lists the leading universities according to the coefficient a and coefficient b values. The institution with the highest coefficient_a is Ankara University (12.67), which has demonstrated a strong and sustainable academic capacity by producing a total of 469 postgraduate theses over a 37-year production period. Following this are Süleyman Demirel University (7.47), Van Yüzüncü Yıl University (6.57), and İnönü University (6.20). These institutions maintain a balanced productivity both numerically and over time. Higher coefficient values are also noted in universities with relatively younger foundations, such as Bartın University (6.06) and Namık Kemal University (5.16). A lower coefficient for a well-established institution like Çukurova University (4.82) suggests that production is spread over longer time intervals or that there is seasonal variability in these productions.

An examination of the coefficient b values reveals that Bursa Technical University (1.66) has the highest rate of disaster-themed theses production. The production of a total of five disaster-themed theses in just three years demonstrates a strategic orientation in the field of disaster management. İnönü University (1.00) and Recep Tayyip Erdoğan University (1.00) are also among the universities focusing on disaster-focused studies, demonstrating the relationship between these institutions' locational risk awareness and their academic focus. It is noteworthy that universities located in high-disaster risk regions, such as Van Yüzüncü Yıl University (0.57) and Düzce University (0.25), also have high disaster-themed productivity coefficients.

Some universities demonstrate a balanced academic profile by exhibiting high performance in both indicators. İnönü University stands out, ranking high in both overall productivity and the production of disaster-themed theses. Van Yüzüncü Yıl University similarly demonstrates strong performance in both indicators. Despite its high coefficient a, Ankara University does not rank among the top disaster-themed theses. Conversely, Bursa Technical University, while ranking lower in overall productivity, leads in disaster-focused production. These differences reflect the direction of institutional strategies, the weighting of specialized fields, and the research interests of faculty.

While universities in Istanbul hold a strong position in terms of overall academic productivity, they contribute more limitedly to disaster-themed productivity. This suggests that the research priorities of universities in metropolitan areas are directed towards different thematic areas rather than environmental risks. Institutions such as Namık Kemal University, Kastamonu University, and Çankırı Karatekin University demonstrate a specific concentration of disaster-themed theses, but this trend has not become systematic.

Data indicate that universities with more recent foundations are increasing their tendency towards disaster-themed academic production. This increase is particularly pronounced in universities located in high-risk regions. Universities in provinces such as Düzce, Van, Bursa, and Rize are focusing on disaster management in line with their geographical location and developing academic sensitivity to local vulnerabilities.

The overall picture reveals that the disaster-themed academic production capacity of landscape architecture departments in Türkiye is not homogeneously distributed; rather, it varies depending on geographic location, institutional strategy, and academic orientation. These findings show that institutions with high coefficients can lead collaborations to increase knowledge in the field of disaster management. In contrast, institutions with low coefficients need to develop new academic strategies to improve their awareness in this field.

Figure 1 presents the spatial distribution of universities offering graduate-level landscape architecture education across Türkiye. Provinces marked in gray on the map represent locations with landscape architecture departments, while research universities are also indicated with symbols. This distribution demonstrates the geographical expansion of landscape architecture education in Türkiye and the potential contributions of higher education institutions in various provinces to areas such as regional planning, environmental planning, and disaster risk management.

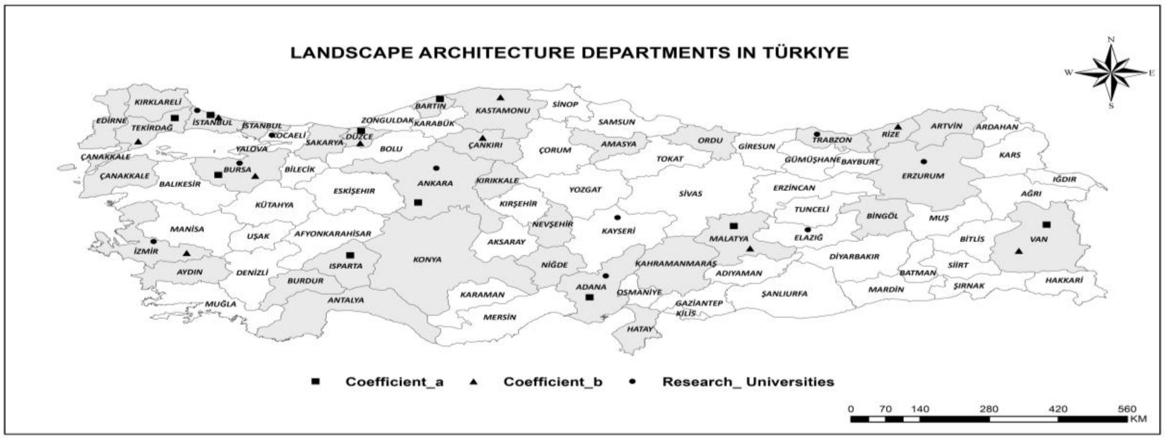

Figure 1. Distribution of landscape architecture departments and research universities (Kalkan and Başkaya 2024)

According to the coefficient a and coefficient b values reflecting the production levels of universities, academic concentrations in specific centers are striking. These coefficients are high in provinces such as Ankara, Bursa, Van, Düzce, and Isparta, and these universities appear to play a more active role in both general academic production and disaster-themed studies. These provinces are notable examples not only in terms of student capacity but also in terms of scientific production related to regional risks. Many research universities are located in cities with high populations and well-developed academic infrastructures. The map reveals that these institutions function as central bodies directing academic production in their regions and play decisive roles in disaster-themed studies. Figure 1 provides not only a geographic distribution but also an analytical framework that visualizes how academic trends are shaped at the regional level and the potential impact areas of landscape architecture departments.

Figure 2 presents an integrated risk map that assesses the provinces where landscape architecture departments are located across Türkiye, along with various disaster types (earthquakes, floods, avalanches, landslides, and rockfalls). The red, yellow, pink, and brown dots on the map demonstrate that Türkiye has a highly complex risk profile in terms of disaster diversity and intensity. Red-dense areas represent active fault lines and areas where past earthquakes have been concentrated. Landscape architecture departments are located in cities such as Istanbul, Düzce, Erzurum, and Izmir, along the North Anatolian Fault (NAF), the East Anatolian Fault (EAF), and the tectonic zones in Western Anatolia. The fact that these universities are located in regions with a high earthquake risk necessitates that the discipline directly contribute to disaster-focused planning processes. High expectations are placed on these departments in areas such as earthquake resilience, spatial risk analysis, and post-disaster restoration (Figure 2).

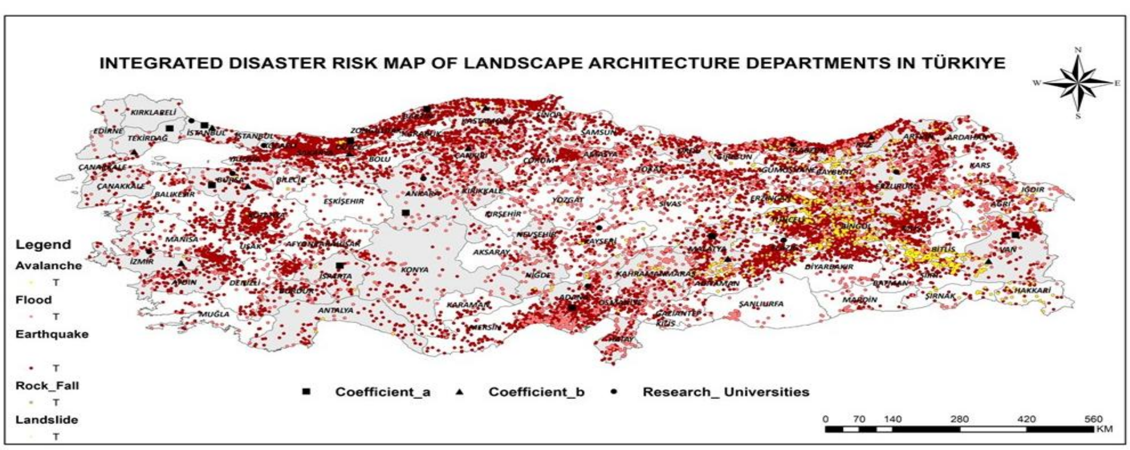

Figure 2. Spatial Distribution of landscape architecture departments and disaster risk levels (Kalkan and Başkaya 2024)

Avalanche risk areas, marked with yellow dots, are particularly concentrated in the Eastern Anatolia and Black Sea regions. Provinces like Erzurum, Trabzon, Van, and Bingöl coexist with both avalanche hazard and landscape architecture education, increasing the need for disaster-focused landscape planning in these areas. Considering the terrain's slope, climatic conditions, and snow cover, nature-based solutions developed by landscape architecture departments in these regions could be effective in reducing disaster risks. Pink dots indicate flooding, particularly concentrated in the Black Sea and Marmara regions. Topographical structure and heavy rainfall in the Black Sea region, along with rapid urbanization and industrial activity in the Marmara region, exacerbate this risk. Integrating these risks into landscape architecture programs leads to specialization in themes such as water management, permeable surface planning, and green infrastructure. Research universities located in flood-prone areas have the potential to develop interdisciplinary solutions. Brown dots represent rockfall risk, particularly concentrated in the mountainous regions of the Eastern Black Sea region, Eastern Anatolia, and Central Anatolia. In these areas, vegetation, slope control, and geotechnical practices must be integrated. Landscape architecture departments can develop environmentally compatible designs to protect against rockfalls, both preserving environmental integrity and securing residential areas. Landslide hazards are particularly pronounced in the Black Sea and Eastern Anatolia regions, where gray areas mark them. The Black Sea's steep slopes and intense rainfall are among the primary factors that increase this risk. Land use planning, erosion control, and soil stabilization efforts undertaken by landscape architects in these regions reduce disaster risk. Universities can develop ecosystem-based disaster management strategies in this context. Another striking finding on the map is that some universities in provinces with high disaster risk also have high coefficient b values. Bursa, Ankara, Van, Düzce, and Kastamonu, in particular, stand out in terms of both high disaster risk and graduate thesis production capacity. This suggests that universities are allocating more resources and attention to disaster-focused academic activities. The increase in disaster-themed theses at newly established universities may be linked to the orientation of academic staff and regional risk awareness. For example, Recep Tayyip Erdoğan University, Van Yüzüncü Yıl University, Bursa Technical University, and Düzce University, in addition to being located in high-risk regions, also exhibit a high concentration of disaster-themed thesis production. The limited academic production on disasters in provinces with low coefficients highlights the need for greater investment in disaster-focused research at these universities. It is of strategic importance at the national level for landscape architecture departments to take a more active role in post-disaster recovery, resilient green infrastructure planning, and nature-based solution development, particularly in regions at high risk of earthquakes, floods, and landslides.

The findings revealed that landscape architecture departments in Türkiye do not exhibit a homogeneous distribution in terms of academic productivity and disaster-themed work. This variation across universities indicates not only current production levels but also potential areas for collaboration in the future for disaster risk reduction and landscape planning policy development. Therefore, it is crucial to consider the obtained spatial and quantitative data as a fundamental reference for developing strategies to strengthen the disaster-focused academic capacity of both high- and low-scoring institutions.

DISCUSSION

The findings of this study reveal that a significant portion of landscape architecture departments in Türkiye are located in high-disaster risk areas, and this situation drives disaster-themed academic production. The intensive production of disaster-related theses by institutions such as Van Yüzüncü Yıl University, Düzce University, Bursa Technical University, and İnönü University, particularly following large-scale earthquakes, demonstrates that the academic agenda directly interacts with spatial risk factors. This finding aligns with the concept of spatial vulnerability defined by Huo et al. (2012) and supports the synchronization of academic production with environmental conditions (Huo et al. 2012).

Ankara University stands out for its limited number of disaster-themed theses, despite its high overall thesis production coefficient. This suggests that, in addition to spatial risk perception, academic specializations also play a role in production differences among universities. This limitation can be explained by the university's location in a low-disaster risk region and its research agenda being focused more on specific, specialized areas. A similar study conducted by Zhou et al. (2014) also found that the risk zones in which universities are located influence thesis production themes. This suggests a significant spatial relationship between disaster risk and academic production coefficients (Zhou et al. 2014).

The limited production of disaster-themed theses in high-risk regions like Istanbul can be explained by a shift in academic orientation toward other themes or the diversion of research funds to non-disaster topics. This suggests a strategic disconnect in the integration of academic production with disaster management policies at the national level. It is possible to bridge this gap with national research agendas, interdisciplinary collaborations, and targeted incentive mechanisms that will strengthen policy-research interaction (Demir et al. 2022). The recent shift towards disaster-focused theses production by universities with established academic structures since their founding demonstrates both an awareness of local needs and the shaping of research policies in a way that considers environmental risks. However, the sustainability of this trend has not yet been tested in the long term. Future bibliometric time-series analyses can more clearly assess whether this trend translates into long-term scientific productivity.

The discipline of landscape architecture can contribute not only to the replanning of the built environment in disaster management but also to the restoration of ecological systems, the development of nature-based solutions, and the integration of green infrastructure strategies (Rusche et al. 2019). The multiple functions of green infrastructure practices, such as flood risk reduction, heat island mitigation, and carbon sequestration, are becoming increasingly important in disaster risk reduction strategies (Singh et al. 2020, Irfeey et al. 2023). This aligns with the "ecosystem-based disaster management" approach. The appropriate design and integration of green infrastructure is considered a critical land use strategy in managing the impacts of natural disasters, especially in cities.

Kabisch et al. (2016) examines how nature-based solutions can be used to combat and adapt to climate change. The study highlights the role of green spaces and infrastructure in cities' climate and air quality, while also providing important findings on carbon capture and storage. Increasing green spaces not only provides ecological benefits but also contributes to improving air quality in cities and adapting to climate change (Kabisch et al. 2016).

A study by Wang et al. (2023) highlights the importance of carbon sequestration in urban green spaces. The research emphasizes the need for structured and managed urban ecosystems and highlights the importance of careful ecosystem management to increase the carbon sequestration potential of these structures (Wang et al. 2023). Such practices have the potential to accelerate post-disaster recovery processes.

Shao and Kim (2022) provide a comprehensive review examining the functions of different types of green infrastructure in mitigating urban heat island effects. It explains how green roofs, parks, and other green spaces can help control temperature rise in urban areas, detailing their multiple benefits (Shao and Kim 2022). Such approaches play a critical role in enhancing ecosystem services and reducing disaster risks.

While the majority of existing studies on the relationship between disaster risk and spatial planning are conducted within the scope of engineering and urban planning disciplines, studies addressing the spatial contributions of landscape architecture departments in the context of disaster management are quite limited. However, spatial planning has the potential to increase the resilience of settlements by organizing the physical environment, integrating social and economic elements, and considering risks in reducing disaster risks (Dişkaya and Emir 2021). Integrating this approach with nature-based solutions contributes to the development of resilient cities by supporting the continuity of ecosystem services. The discipline of landscape architecture, on the other hand, undertakes multidimensional functions such as protecting spatial thresholds, developing post-disaster recovery scenarios, and reducing social vulnerabilities (Plue et al. 2022, Dandoulaki et al. 2023). A study conducted in Taiwan examined in detail the impact of green infrastructure on post-disaster recovery. Hsu and Chao's article, "Economic Valuation of Green Infrastructure Investments in Urban Renewal: The Case of the Station District in Taichung, Taiwan," highlights the potential for green infrastructure to provide rapid economic returns and explores the role of these investments in post-disaster recovery processes. The study presents findings that green infrastructure not only provides aesthetic and ecological benefits but also reduces long-term economic costs (Hsu and Chao 2020). Similar studies conducted in Türkiye will allow for more comprehensive inferences regarding the discipline's post-disaster response capacity.

In this study, GIS-based spatial analyses enabled a comparative and temporal examination of the spatial relationship between disaster risk and academic production coefficients. The findings indicate significant spatial overlap between high thesis production levels and disaster risk intensity in provinces such as Van, Bursa, and Düzce. These suggest that academic productions should be evaluated, not only with quantitative indicators but also within the geographical context (Kalkan and Başkaya 2024).

However, advanced spatial statistical methods are needed to conduct such analyses more thoroughly and reliably. Techniques such as Moran’s I, Local Moran’s I, and Getis-Ord Gi, in particular, enable the detection of spatial autocorrelation at both the global and local levels, enabling more precise identification of spatial patterns (Vu et al. 2021). Furthermore, supporting these analyses with interactive visualization tools and dynamic mapping techniques will produce more accessible and interpretable outputs for decision-makers.

The coefficient a and coefficient b indicators used in this study allowed for a standardized comparative analysis of universities' thesis production potential. However, these indicators cannot directly measure qualitative dimensions such as the academic impact of theses, policy implications, or interdisciplinary impact. In future research, it is recommended that these indicators be used in conjunction with citation analyses, social network analyses, and content analysis. Furthermore, systematically scanning open data sources (e.g., Scopus, Web of Science, Google Scholar, etc.) will increase data reliability.

In light of all the findings, this study proposes a model specific to the landscape architecture discipline: the "Spatial Academic Orientation Model (SAYM). This model is built on three components: (1) Regional Disaster Risk (geophysical vulnerability), (2) Academic Production Momentum (number and density of theses), and (3) Institutional Adaptive Capacity (the university's potential to respond to local risks). The model enables the analysis of scientific production behavior of universities in a spatial context and can be used as a decision support tool for disaster-focused academic planning at the national level.

Overall, landscape architecture departments in Türkiye, with their locations in high-risk disaster areas and their academic potential, have the potential to play a strategic role in shaping national disaster management policies. To effectively utilize this potential, universities must strengthen their collaboration with local governments, support nature-based solution approaches, and integrate into spatial decision support systems. Thus, the discipline of landscape architecture will make tangible contributions to enhancing both environmental and societal resilience throughout the entire process of pre-disaster risk reduction, disaster management, and post-disaster recovery.

CONCLUSION AND RECOMMENDATIONS

This study examines the relationships between the spatial distribution of landscape architecture departments in Türkiye and disaster risk levels using GIS-based analyses, and holistically assesses the patterns between academic production capacity and disaster-themed theses. The findings reveal that a significant portion of landscape architecture departments are located in provinces at high disaster risk, with provinces such as Bursa, Ankara, Van, and Düzce demonstrating high performance in terms of both overall productivity (coefficient a) and disaster-themed theses (coefficient b). However, despite high risk levels in some metropolitan cities, the limited production of disaster-themed theses suggests a lack of direct correlation between spatial vulnerability and academic orientation. The trend toward disaster-focused production observed in newly established universities suggests that the academic research agenda in Türkiye is becoming more responsive to regional needs.

The unique contribution of this study is that it offers a data-based perspective on both disaster management policies and academic strategy development processes by analyzing the location of landscape architecture departments in high-risk disaster areas and their academic production trends. The resulting spatial data provides concrete guidance for strengthening the scientific and practical contribution capacity of landscape architecture in high-risk disaster areas.

A Disaster-themed thesis was identified in the study based on the titles and keywords used in the theses. Due to terminological differences and author preferences, some studies may not be classified as disaster-themed. Furthermore, this study relies solely on a quantitative dataset and does not directly measure qualitative dimensions such as thematic depth, level of interdisciplinary contribution, or academic impact. This leads to partial deficiencies in determining the level of disaster-focused production, limiting the scope of the findings.

Based on the findings, the following recommendations have been developed: Research agendas should be supported in landscape architecture departments located in high-disaster-risk provinces to increase the production of disaster-themed graduate theses; academic planning and funding mechanisms should be established to encourage a focus on disaster topics at universities in high-risk regions with low coefficient b values; the trend toward disaster-focused production observed in newly established universities should be strengthened and sustained through interdisciplinary and field-focused projects; and research universities in disaster-prone regions should actively contribute to disaster planning and risk reduction efforts in collaboration with local governments. Furthermore, the spatial analysis and coefficient-based assessment approach used in this research can be applied to different disciplines and other types of environmental risk to develop comparative models. Examining disaster-themed thesis production through a time series will allow for the dynamic monitoring of changes in academic trends.

Overall, landscape architecture departments in Türkiye, with their location in high-risk disaster areas and their academic potential, have the potential to play a strategic role in shaping national disaster management policies. To effectively utilize this potential, it is crucial for universities to strengthen their collaboration with local governments, support nature-based solution approaches, and integrate into spatial decision support systems.

In this respect, this study offers a theoretical contribution to disaster risk-based spatial planning approaches from a landscape architecture perspective; it proposes a unique framework that analyzes the knowledge production dynamics shaped by universities' risk-society-academia triangle. By demonstrating that the discipline should play an active role in pre-disaster risk reduction and resilience-enhancing processes, rather than post-disaster, it adds a new dimension to conceptual discussions regarding the future role of landscape planning.

AUTHOR'S NOTE

This paper has been produced from the author's doctoral thesis completed in and has been prepared based on the data and analyses derived from the thesis.

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