Article

Tourism and Hospitality Research
2026, Vol. 0(0) 1–20

DOI: 10.1177/14673584261421811
journals.sagepub.com/home/thr
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The multi-step movements of digital nomads: A network perspective on destination connectivity

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Abstract

This study explores the multi-step mobility of digital nomads and its implications for global tourist flows and destination connectivity. Unlike traditional tourists who typically travel to a single location and return, digital nomads move through multiple destinations in a continuous and dynamic pattern. Using network theory as the conceptual framework, the study integrates Geographic Information Systems (GIS), network analysis, and netnographic methods within a mixed methods design to examine spatial mobility and inter-destination relationships. Data derived from the Nomad List platform were analysed to map tourist flows and identify key nodes within the global mobility network. Centrality measures, such as degree, betweenness, and closeness, were used to determine which cities act as hubs and which remain peripheral. The findings indicate that cities such as Bangkok, Lisbon, New York, and Barcelona serve as central hubs, while others occupy marginal positions within the network. The study shows that digital nomads influence not only individual destination dynamics but also broader spatial structures. Their mobility is shaped by factors beyond tourism appeal, including digital infrastructure, affordability, and ease of access. This study contributes to the literature by reconceptualising digital nomad mobility as aggregate multi-step configurations and by modelling inter-destination connectivity through a network-based approach, rather than focusing on single-destination choice or individual travel itineraries. Additionally the study advances the literature by reconceptualizing digital nomad mobility as aggregate multi-step configurations and framing digital nomads as structural mobility actors within global tourism networks.

Keywords

tourism geography, digital nomad, tourist flow, destination connectivity, network analysis

Introduction

Tourism operates within globally structured networks, forming a dynamic system in which destinations are interconnected (Scott et al., 2008). Tourist flows refer to the spatial mobility of individuals between destinations, and this mobility is shaped not only by geographical proximity but also by transportation infrastructure, economic linkages, digital accessibility, and the positions of destinations within global networks (Shao et al., 2020).

Traditional tourist mobility has been examined within a round-trip model in which tourists travel to a destination, stay for a certain period, and generally return to their point of origin (Yang and Wong, 2013). However, digital nomads stand out as a type of tourist who, due to their mode of working, are not limited to a single location and instead generate aggregate multi-step mobility patterns (Mancinelli, 2020). Rather than traveling to one destination and returning, digital nomads move from one location to another, their movements produce recurrent inter-city transitions within broader mobility systems (Orel, 2019). This cycle reveals how certain cities become central nodes in global networks directing nomad flows and how structural connections between destinations are shaped.

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While existing research largely focuses on which destinations digital nomads prefer (Mou et al., 2020; Yang and Wong, 2013), the dynamic, multi-step nature of this mobility has often been overlooked. There is limited understanding of not only where digital nomads go, but also where they move afterwards, and how such aggregate inter-city flows contribute to the structure of global tourism networks. Based on the network theory, this study conceptualizes digital nomads as mobile actors who enhance global connectivity, influence the centrality and interdependence of destinations, and contribute to the restructuring of global tourism flows (Barabási, 2002).

While connectivity and centrality are useful for identifying destinations' positional roles within an aggregate mobility system, they should not be interpreted as direct proxies for long-stay residence or destination desirability for digital nomads. Accordingly, this study maps aggregate inter-city transition configurations as a network of directional movements and uses centrality metrics to explain how destinations function as hubs, bridges, or peripheral nodes in the mobility structure. The analysis does not claim to measure duration-based residence, retention, or "being based" in a city; rather, it explains how cities are positioned within the broader system of multi-step nomadic movements.

The aim of this study is to understand the roles digital nomads play within global mobility networks and aggregate transition structures, to identify which destinations emerge as central or peripheral, and to examine how the network structures resulting from digital nomad mobility are reshaping the global tourism system.

In this context, the following research questions guide the study.

- What is the spatial pattern of digital nomad tourist flows?
- After arriving at one destination, where do digital nomads move to next, and how is this mobility network structured?
- Which destinations act as hubs and which are peripheral nodes in the tourism network?

The contributions of this study can be summarized in three key areas:

Theoretically, this study extends conventional tourist flow models by applying network theory to digital nomads' mobility networks and aggregate transition structures, showing how they generate global cycles and reshape relational dynamics among destinations. Methodologically, it proposes an original model that integrates network analysis, GIS, and netnography to capture both destination choices and transitions. Practically, the findings offer guidance for destination management, competitiveness, and nomad visa programs, helping cities not only attract nomads but also position themselves as central nodes in global mobility networks.

Despite a growing body of research on tourist flows, the mobility turn, and tourism–migration linkages, much of the existing literature continues to conceptualize mobility through single trips, destination choice, or short-term movements. Studies on digital nomadism, in turn, have largely approached nomads as a lifestyle group or market segment, focusing on motivations, place attributes, and individual experiences. This leaves a theoretical gap in understanding how the repeated, multi-step movements of digital nomads operate at a systemic level, shaping inter-destination relations beyond isolated visits. Addressing this gap, the present study reconceptualizes digital nomad mobility as aggregate multi-step configurations and frames digital nomads as structural mobility actors whose movements reorganize relational patterns within global tourism networks.

While existing studies on digital nomadism primarily focus on destination choice and place-based attractiveness, they often treat destinations as isolated units rather than as interconnected nodes within broader mobility systems. As a result, there is limited understanding of how digital nomads move onward after arriving in a destination, how inter-destination linkages are formed, and how such movements contribute to the relational structure of global tourism networks. Addressing this gap requires shifting the analytical focus from static destination preferences to the positional roles of cities within aggregate mobility configurations shaped by multi-step nomadic movements. Against this backdrop, this study examines digital nomads as structural mobility actors whose movements generate directional inter-city connections and reshape global tourism networks. Drawing on network theory, the research maps aggregate transition flows derived from the Nomad List Network Graph and applies GIS-based flow analysis and network centrality metrics to identify how destinations function as hubs, gateways, bridges, or peripheral nodes within the mobility system. Rather than equating connectivity with long-stay residence or destination desirability, the study conceptualizes centrality as an indicator of network positionality within multi-step mobility configurations. In doing so, it advances tourism geography by reframing digital nomadism not as a static lifestyle tied to individual destinations, but as a dynamic form of mobility that reorganizes inter-destination relationships at a global scale.

Theoretical background

Tourist flow refers to the movement of tourists between places, including its direction and intensity, and is

widely used to explain travel decisions, destination preferences, and experiences (Lee et al., 2023; Liu et al., 2021a; Martínez et al., 2020; Mou et al., 2022; Peng et al., 2016; Qiu et al., 2023; Zhong et al., 2011). The analysis of mobility has a long tradition in tourism geography, with early studies mapping spatial patterns in the 1970s–1980s (Lundgren, 1972; Pearce, 1981). Lundgren's destination hierarchy highlighted center–periphery relations, while Pearce's travel sequences explained multi-destination choices. Later, Flognfeldt (1999) showed that tourists often adopt multi-stop strategies, confirming that mobility is not linear but relational and multi-layered. In the 2000s, this understanding deepened with the "mobility turn" in the social sciences (Sheller and Urry, 2006). This shift conceptualized individuals' relationship with space not through stasis but through continuous mobility. Particularly, the tourism–migration nexus literature (Hall and Williams, 2002), which focuses on the intersections between tourism and migration, has approached tourist mobility not merely as a form of leisure consumption but as part of temporary life strategies. These approaches offer important theoretical frameworks for understanding hybrid mobility forms such as digital nomadism. Building on this literature, the analytical framework developed in this study examines aggregate multi-step mobility configurations to analyze the inter-destination connectivity generated by digital nomads.

Understanding the factors that shape tourist flows is critical for the successful management and development of tourism destinations (Bowden, 2003; Chen et al., 2024; Yang and Wong, 2013). Therefore, many studies focus on identifying the determinants of these flows. Among the most prominent factors are geographical proximity (Yang et al., 2018), religion (Khalid et al., 2024), terrorism (Doğru-Dastan and Tütüncü, 2024), and visa restrictions (Li and Song, 2013). There is a reciprocal relationship between tourist flows and global connectivity. Connectivity through airline links, infrastructure, and trade networks enhances accessibility and destination appeal (Garay-Tamajón et al., 2022; Paulino et al., 2019; Zhong et al., 2020). Conversely, intense flows reinforce connectivity, as frequent visitation leads to expanded flights, improved infrastructure, and stronger economic, cultural, and social ties.

Given the relationship between tourist flows and destination connectivity, it can be concluded that aggregate tourist flows influence the global competitiveness of destinations. Destinations may actively seek to improve their global linkages to attract more tourists (Li and Liu, 2022). Strategies may include expanding airline routes, organizing international events, and investing in tourism-related infrastructure (Wang et al., 2021). Therefore, tourist flows shape not only the competitive positioning of destinations in the global arena but also impact the global economy (Jackman and Greenidge, 2010).

Network theory offers a framework for analysing social, economic, and spatial relationships through the lens of actors (nodes) and their connections (edges) (Barabási, 2002; Borgatti and Halgin, 2011). It is a powerful tool in understanding tourist flows between different geographical regions and how destinations interact (Scott et al., 2008). According to this theory, tourism destinations act as nodes within the global tourist mobility network, aggregate tourist flows constitute the edges between these nodes. (Xiao et al., 2021). Within this framework, certain destinations emerge as central hubs, while others remain peripheral. Central destinations strengthen their position in the network due to high volumes of tourist flows, whereas peripheral destinations are characterized by their dependence on the central ones (Shao et al., 2020).

In the context of tourism, network theory is often explored through three main mechanisms (Scott et al., 2008; Chung et al., 2019a).

- Centrality: This indicates how central a destination is within the global tourist network.
- Connectivity: This reflects the strength of a destination's direct and indirect connections to others. As tourist flows increase, so does the destination's accessibility within the global network (Paulino et al., 2019).
- Interdependency: This highlights the mutual dependence that exists between destinations within tourism networks.

Analysing these network structures plays a critical role in identifying the functions of destinations within tourist flows. Unlike traditional tourists, new-generation travellers such as digital nomads are not anchored to a single destination; instead, their movements generate aggregate inter-destination transitions that expand and reorganize global tourism networks (Mancinelli, 2020). Through these aggregate mobility configurations, certain destinations become more central while others are integrated into broader network structures, reshaping tourism flows at a systemic level (Orel, 2019).

In recent years, the global mobility of digital nomads has gained increasing attention in tourism geography (Hannonen, 2020; Holleran and Notting, 2023) and mobility studies. Recent research emphasizes that digital nomad mobility is characterized by aggregate multi-step configurations that reshape relational structures between destinations (Lee et al., 2023; Qiu et al., 2023; Mou et al., 2022; Akgiş İlhan et al., 2024 underlines the fragility of global tourism flows and their

susceptibility to external crises, while Wheway and Punmanee (2017) demonstrate how peripheral destinations, such as those in Thailand, gradually integrate into global networks through rising visitor interest. Together, these studies highlight the limits of classical destination-choice models and support a network-based perspective focused on aggregate multi-step mobility, interdependency, and shifting centralities.

Tourist flows are shaped not only by destination appeal but also by structural factors such as VFR travel (Backer, 2012), business mobility (Wickramasinghe and Bamford, 2020), diasporic links (Hall and Williams, 2002), and visa regimes (Li and Song, 2013), alongside historical-economic and colonial legacies (Wang et al., 2021). Major digital nomad hubs like Paris, London, and Singapore also function as centers of business and migration, showing that nomad mobility is embedded in wider structural networks. This study thus examines the positional roles of digital nomads within aggregate mobility networks, focusing on how their movements reinforce centrality, transform destinations' roles, and connect.

Methodology

Research design

This study conceptualizes digital nomad mobility not as single-destination travel but as an aggregate, multi-step directional configuration shaping global connectivity. To capture this complexity, a mixed-method design was employed (Creswell, 2007), guided by the principle of complementarity (Greene et al., 1989). Quantitative methods, including GIS-based flow and network analyses, were used to model intercity mobility and identify structural features such as centrality and connectivity. Complementing this, netnography provided contextual insights into nomads' experiences, attitudes, and motivations that help interpret the observed mobility structures. Together, these methods form an integrated framework that addresses both the structural and experiential dimensions of digital nomad mobility (Figure 1).

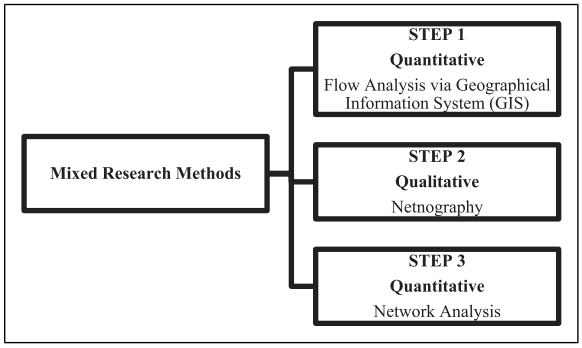

Figure 1. Research design.

Population and sampling

The study population consists of global digital nomads who share travel preferences and mobility patterns on online platforms. Using purposeful sampling, five destinations from each of six continents with the highest levels of activity were selected, resulting in 30 cities and 1006 user comments analyzed. The selection of the top five destinations per continent was guided by analytical rather than representational considerations. This approach was adopted to ensure global comparability across regions while keeping the network structure analytically manageable. Focusing on the most visited cities allows the identification of high intensity nodes that play a structurally significant role in shaping aggregate mobility configurations. Rather than aiming for exhaustive coverage, the study prioritizes destinations with sufficient flow volume to meaningfully contribute to the analysis of network centrality, connectivity, and inter destination relations. Mobility data were obtained from the Nomad List *Network Graph* (2014-2024), which records about 300,000 travels by 19,000 nomads across 50 cities worldwide (Nomad List, 2024). The dataset, constructed from transition frequencies and subsequent city visits, was spatially classified and examined through network analysis (Figure 2). The selected cities represent the most popular destinations, with popularity defined by the number of visitors in the *Network Graph*. Thus, cities with larger flows were treated as both nodes with high transition intensity within aggregate mobility networks.

Modelling aggregated multi-step mobility in aggregated flow data

In this study, individual travel itineraries of digital nomads are not reconstructed. Instead, the analysis is based on aggregate, directed inter-city transition data derived from the Nomad List Network Graph. These data capture how frequently transitions occur between cities, allowing the examination of recurring directional connections between destinations rather than full individual mobility trajectories. Accordingly, the analytical focus is on the structural properties of mobility networks rather than on individual-level travel behaviour.

In this study, multi-step mobility is conceptualized as a systemic property of mobility networks rather than as a sequence of individual travel itineraries. While individual trajectories are not reconstructed, the presence of recurring and directional inter city transitions captures

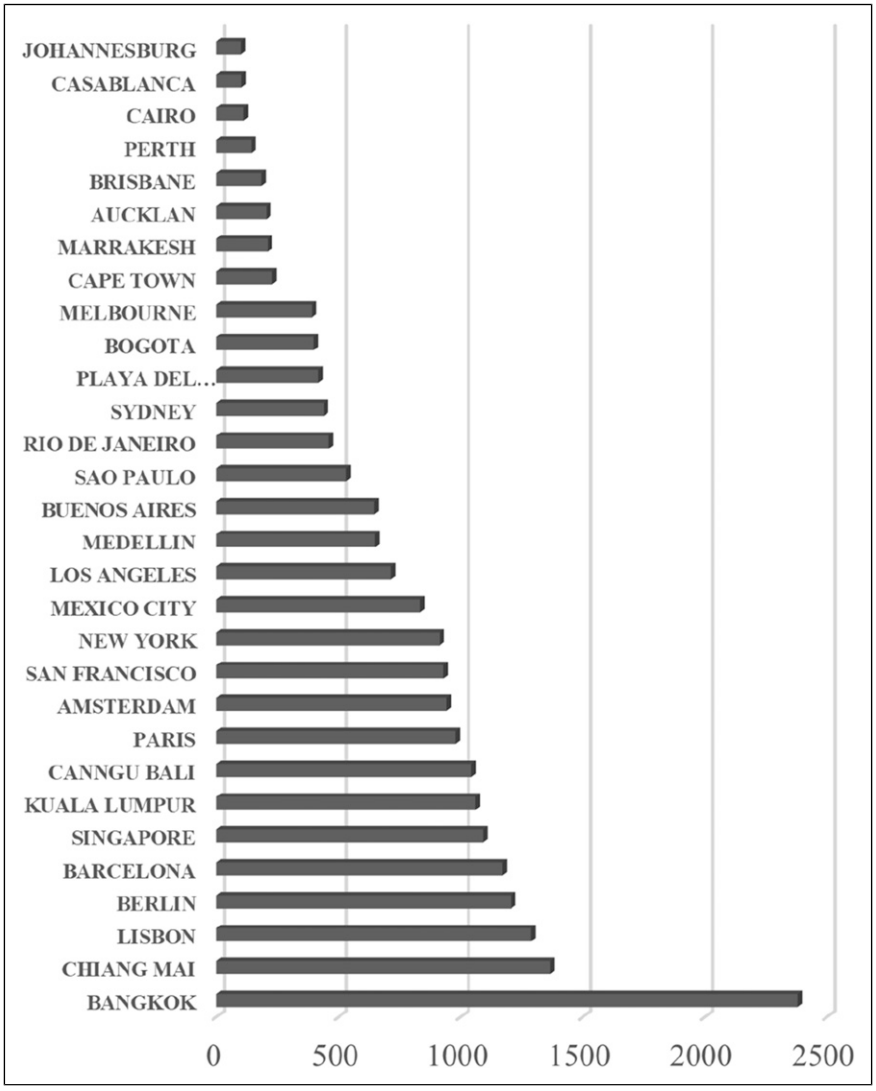

Figure 2. The most frequently visited destinations.

the multi-step nature of digital nomad mobility at an aggregate level. This approach allows the analysis of how repeated onward movements between destinations generate structured mobility configurations across the network. Such an approach aligns with mobility research that conceptualizes movement patterns as emergent properties of networks rather than as purely individual trajectories (Büscher et al., 2011; Sheller and Urry, 2006).

Therefore, in this study, multi-step mobility is analyzed at a systemic level through directional connections between destinations, rather than through individual time-ordered choices. This method contributes to understanding how the spatial preferences of digital nomads evolve within a global network structure. In this study, multi step mobility is examined at an aggregate and systemic level, rather than through individual level travel itineraries. The available data capture directional inter city transition frequencies rather than the full sequence or duration of individual stays. Accordingly, the analysis focuses on recurring mobility configurations between destinations, which reveal how digital nomads collectively shape inter destination connectivity, rather than on extended residence or embedded living in specific places.

Step 1. Mapping the flows

This study employed a GIS-based flow analysis to examine the spatial mobility of digital nomads, a method widely used in tourism research to reveal the direction and intensity of tourist movements (Liu et al., 2023). Data were obtained from the Nomad List *Network Graph* (2014-2024), comprising over 900 directional intercity connections, where each row represented an origin destination pair with weighted values

indicating the number of nomads. Intercity mobility was modeled as a directed and weighted network, with cities defined as nodes and movements as edges. Geographic coordinates were integrated into ArcGIS, enabling mapping of cities and visualization of flows as scaled lines. To illustrate connection intensity, the natural breaks classification method was applied with a yellow-to-red gradient, normalized by continent for comparability. This approach provided a clear visualization of aggregate inter destination mobility configurations across regions. The use of Nomad List constitutes both a strength and a limitation of this study. As a global digital platform, Nomad List provides large scale, longitudinal data on inter-city mobility patterns of digital nomads, enabling the analysis of aggregate transition structures that are difficult to capture through traditional data sources. At the same time, the data reflect the activity of a specific platform-based community and do not aim to represent the entire digital nomad population. Accordingly, Nomad List is treated as an analytically valuable source for mapping mobility networks rather than as a statistically representative dataset.

Step 2. Enhancing Quantitative Findings through Netnography

In this study, netnography is employed as a contextual and illustrative method rather than as a standalone qualitative analysis. The qualitative material is used to support the interpretation of network based findings, not to generate inductive themes or generalizable qualitative results. As defined by Kozinets (1998), netnography is a flexible method that enables the observation-based examination of experiences and interactions occurring in online environments. In this context, a total of 1006 user comments shared on the Nomad List platform between 2014 and 2024 were examined. These comments were located within the city profiles of 30 of the destinations with the highest levels of user activity across six continents.

Instead of systematic coding, the study adopted a contextual illustration approach, using qualitative data to clarify quantitative findings rather than to generate inductive generalizations (Eriksson and Kovalainen, 2008; Hannonen, 2020). Cape Town's centrality, for instance, is explained by comments emphasizing affordability and an active nomad community, while Chiang Mai's strong connectivity reflects repeated references to fast internet, low costs, and coworking spaces. Lisbon's hub role is likewise supported by user remarks highlighting infrastructure, climate, and community. These illustrative insights show how lived experiences contribute to destination roles and enhance the interpretation of quantitative results, a practice common in tourism geography research involving digital traces and big data (Chen et al., 2024).

In this study, not all user comments available on the Nomad List platform were analyzed. The netnographic content was used to give meaning to the findings derived from the spatial network analysis that forms the core of the study, and to qualitatively interpret inter-destination orientations and preferences based on user comments. Accordingly, the analyzed comments were selected from among those that reflect typical trends and narratives related to specific destinations and are relevant to the study's objectives. This method allows for in-depth analysis using a limited number of but contextually rich examples (Flyvbjerg, 2006).

Step 3. Analysing the Centrality and Connectivity of Destinations

To model the aggregate mobility of digital nomads between destinations and analyze the roles of destinations within the global network structure, network analysis was employed (Scott et al., 2008). Network analysis enables the evaluation of the spatial structure of aggregate tourist flows and the relative positional importance of destinations within the system, typically through metrics such as connectivity, centrality, and flow structure (Baggio et al., 2010).

In this study, a directed and weighted network structure was constructed, in which each city was modeled as a node and each connection as an edge. One of the key metrics used in this structure is CB (Betweenness Centrality), which measures how frequently a destination lies on the shortest paths between other cities, revealing the city's function as a "transfer hub" (Freeman, 1977; Liu et al., 2021b). CD (Degree Centrality) represents the number of cities directly connected to a destination, while weighted outdegree reflects the total weight of outbound connections from a city i.e., the number of digital nomads moving (the number of digital nomad transitions originating from that city) from that city to others (Jung et al., 2017; McKercher and Lew, 2004). These metrics made it possible to analyze which destinations serve as central nodes, transit points, or peripheral locations in the mobility patterns of digital nomads.

In this study, the connectivity score is used as a composite indicator reflecting a destination's overall level of network embeddedness. It is calculated by combining degree-based connectivity (number and intensity of direct inter city links) with the weighted volume of outgoing and incoming flows. Rather than representing a new centrality metric, the connectivity score summarizes how strongly a destination is connected within the aggregate mobility network.

Exploratory checks using alternative network metrics (e.g., eigenvector centrality) produced broadly similar hub rankings, suggesting that the identification of core destinations is robust to metric choice.

Degree centrality

Degree centrality is a fundamental centrality metric that measures the number of connections a node (a destination) has within a network. In other words, it indicates how many other destinations a particular destination is directly connected to. Destinations with a high degree centrality function as important transfer points within aggregate tourist flow networks (Freeman, 1979).

$$CD(v) = deg(v)$$

where deg(v) is the degree of node v.

Betweenness centrality

Betweenness centrality measures how often a node appears on the shortest paths between other nodes in the network. In the context of tourism, it reflects a destination's ability to channel and redirect aggregate tourist flows (Freeman, 1977). Destinations with high betweenness centrality serve as key transit points within the network.

$$CB(v) = \Sigma\,(\sigma\_st(v) / \sigma\_st)$$

where σ_st is the total number of shortest paths from node s to node t, and σ_st(v) is the number of those paths that pass through node v.

Closeness centrality

Closeness centrality measures the average distance from a node to all other nodes in the network. In other words, it indicates how 'close' a destination is to all other destinations (Sabidussi, 1966). Destinations with high closeness centrality occupy a central position within aggregate inter-destination flows and provide relatively efficient access to many other destinations.

$$CC(v) = 1 / \Sigma\, d\,(v, t)$$

where d (v, t) is the shortest distance between node v and node t.

Hubs and peripheral nodes

Central destinations are defined as the nodes with the highest number of connections within the network. These are cities that have direct links with many other destinations and play a key role in directing aggregate tourist flows. Mathematically, central destinations are identified as the nodes within the top 10% in terms of degree centrality (Scott and Carrington, 2011). In this study, cities designated as hubs are defined as the top five destinations with the highest degree centrality values within the network.

Peripheral destinations are defined as the nodes with the fewest connections within the network. These are destinations with limited links and low levels of aggregate inter-destination flow concentration. Mathematically, peripheral destinations are identified as the nodes with the lowest degree centrality values. In this study, cities designated as peripheral nodes are defined as the five destinations with the lowest degree centrality scores.

Validity and reliability

This study ensured validity and reliability by combining multiple data sources and methods. Quantitative approaches, including GIS and network analysis, were complemented with qualitative netnography, enhancing both analytical rigor and interpretive depth. Nomad List data, reflecting recent mobility patterns, contributed to internal validity, while purposeful sampling across continents supported analytical generalizability and cross regional relevance. Reliability was strengthened through repeatable analytical procedures, algorithm-based GIS and network analyses, interpretive consistency in netnographic analysis, and manual verification during data cleaning. Overall, these procedures provide a sound framework for understanding global digital nomad mobility.

Limitations of the study

The data for this study derive from the Nomad List platform. Nomad List users are predominantly English speaking, platform literate digital nomads who actively engage in online communities and share mobility related information. As such, the dataset reflects the practices and mobility patterns of a specific digital nomad subculture rather than the full diversity of global mobile workers. This profile influences the types of destinations, transitions, and narratives that become visible in the data, and should be understood as an analytical boundary of the study rather than as a source of bias. Nevertheless, digital traces and user generated data are widely used in mobility research where representative sampling is difficult (Chen et al., 2024; Mou et al., 2022; Zeng, 2021). Such sources are valued not for representativeness but for mapping community patterns, as in (Mou et al., 2020) study of mapping of Chinese tourists in Japan. In this context, the aim here is not to generalize all nomad behavior but to analyze the

mobility networks shaped by Nomad List users, a boundary that a clearly defined analytical boundary that supports internal validity and interpretive clarity.

Although the platform covers over 300 cities, this research focused on the five most-visited destinations on each of six continents. Netnographic data, based on personal experiences, may also carry subjectivity, but this was mitigated through independent evaluation by three researchers. A key limitation of this study is the absence of dwell-time and individual-level itinerary

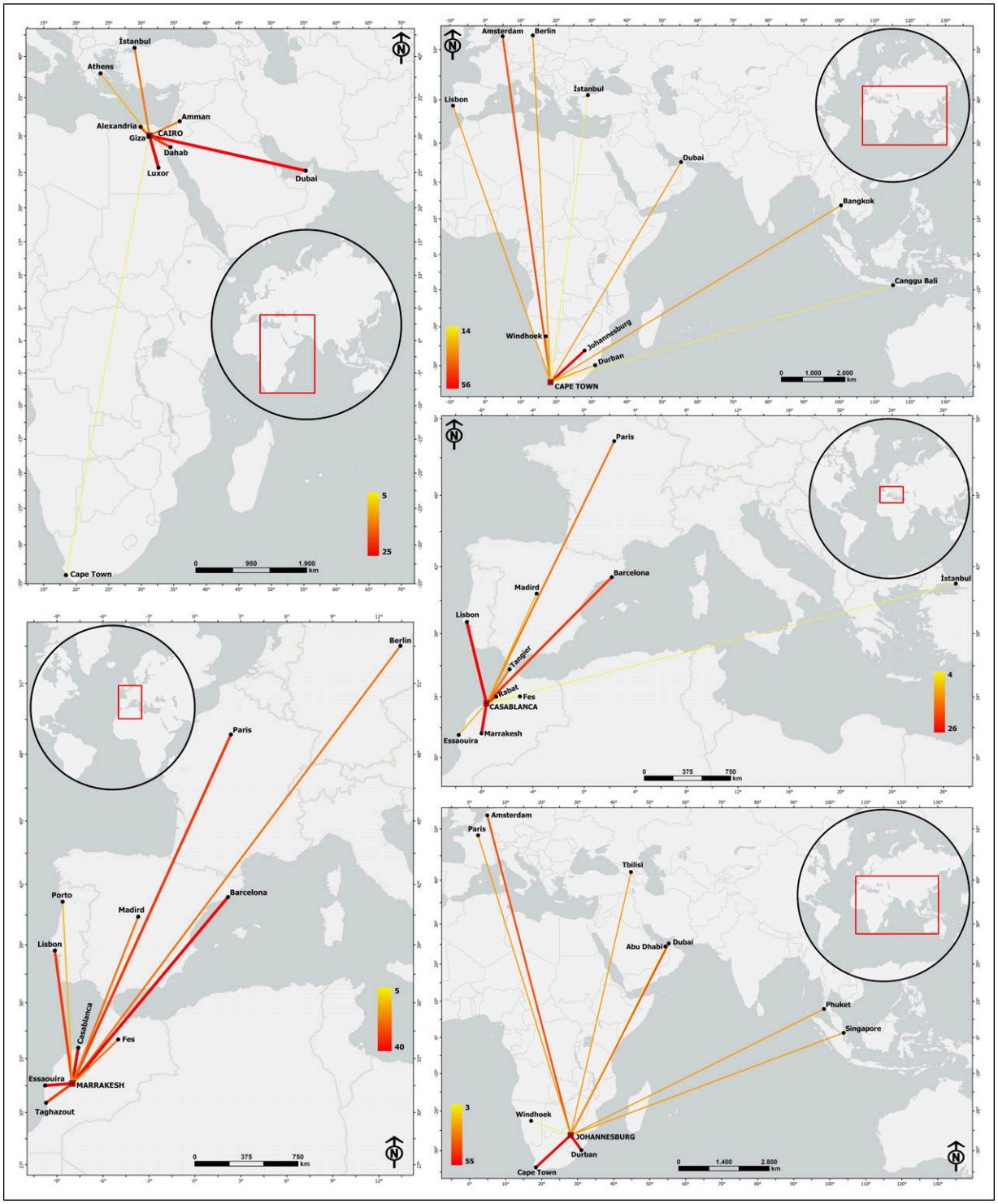

Figure 3. Global movement patterns of digital nomads between major urban destinations (2014–2024).

data, which prevents the separation of transit movements from long-stay residence and the estimation of retention or return rates. As a result, the analysis cannot distinguish digital-nomad base locations from short-stay gateways. Future research integrating duration-based mobility traces could further differentiate residence-based networks from transit-oriented mobility structures. Consequently, the study cannot compute residence-based indicators such as a Residence Index, Stay-to-Transit ratios, or retention measures, which would be necessary to distinguish digital-nomad base locations from short-stay transit nodes. Accordingly, the netnographic component is deliberately limited in scope and does not aim to provide a comprehensive qualitative analysis, but rather to contextualize the network-based findings.

Results

The flows of the digital nomads

The study identified how digital nomads move on a global scale, which destinations are linked by high volumes of flow, and the spatial patterns of these movements. In Africa, Cape Town emerges as a central hub both within the continent and in transcontinental mobility, especially due to its strong connections with European cities such as Lisbon and Barcelona. Digital nomads frequently highlight Cape Town's strengths in terms of infrastructure, community structure, and work–life balance. As one user commented, *"Cape Town seems like the ideal next destination for me. I've been in Europe for a while, and I'm looking for a change of pace. The combination of adventure activities and a solid infrastructure for digital nomads makes it very appealing."* Another noted, *"After spending some time in Lisbon, I'm considering heading to Cape Town next. I've heard so many good things about the digital nomad community there, and the city's mix of natural beauty and modern amenities sounds like a perfect balance."* Figure 3 illustrates the onward mobility of digital nomads who visit various destinations in Africa, along with the intensity of these routes.

Similarly, Nairobi serves as a major connecting point within Africa. One user explained this shift by saying, *"The energy of Cairo is contagious, and the city's infrastructure is catching up to support the influx of digital nomads. Next, I'm considering Nairobi to see how the tech scene compares."* Marrakech also stands out with its ties to European cities like Madrid and Paris, functioning as a bridge between Europe and Africa. Comments emphasize Marrakech's cultural diversity and work-friendly atmosphere; for example, one user noted, *"I enjoyed my time in Marrakech, but now I'm looking forward to exploring something different. Cape Town is on my radar due to its blend of outdoor activities and robust digital nomad scene."*

The fact that many digital nomads move from Cairo to European cities also highlights its role as a transcontinental gateway. Overall, cities such as Cape Town, Nairobi, Marrakech, Cairo, and Dar es Salaam are recognized as key centers for digital nomads in Africa. These cities function as major nodes in both intra- and intercontinental mobility networks. Cultural experiences, technological infrastructure, and community support are among the primary factors influencing nomads' destination preferences.

Figure 4 shows Bangkok as a central hub in the digital nomad network, with dense connections to Chiang Mai, Phuket, and other Southeast Asian cities. User comments emphasize its strong infrastructure, cultural vibrancy, and coworking opportunities, while also noting a preference to move on to more relaxed destinations such as Bali. Chiang Mai is also a prominent digital nomad destination, with strong connections to cities like Bangkok, Ho Chi Minh City, and Kuala Lumpur. According to user experiences, Chiang Mai is particularly valued for its affordability and sense of community. For instance, one nomad commented, *"Chiang Mai continues to impress with its affordable cost of living and a strong digital nomad community. The variety of coworking spaces available makes it easy to find a place that suits your working style."* Another user planning their next move remarked, *"After spending time in Bangkok, I'm considering heading to Chiang Mai next. The city's reputation as a digital nomad hotspot, with affordable living and numerous coworking spaces, is very appealing."*

Phuket is likewise seen as a valuable destination within the network. As noted in one comment, *"Phuket's mix of beach life and professional resources makes it a top choice for digital nomads looking for a place to recharge. The availability of coworking spaces and a supportive community also helps make work-life balance easier."* Another significant hub in Asia is Bali, which frequently emerges as a follow-up destination after Bangkok and Chiang Mai. Meanwhile, Singapore, with its links to Kuala Lumpur, Jakarta, and Ho Chi Minh City, plays an important role in facilitating regional mobility.

Figure 5 highlights Lisbon as a key European hub, with strong flows to Porto, Madrid, Barcelona, and Madeira. User comments point to its mix of historic charm and modern infrastructure, affordable living, and vibrant community, making it both a favored base for nomads and a gateway to wider European and transatlantic mobility. Berlin holds a central position in the network due to its extensive connections across various parts of Europe. It is frequently preferred by digital nomads for its advanced technological infrastructure, cultural diversity, and work-friendly environment. As reflected in a user comment, *"Berlin's startup ecosystem is*

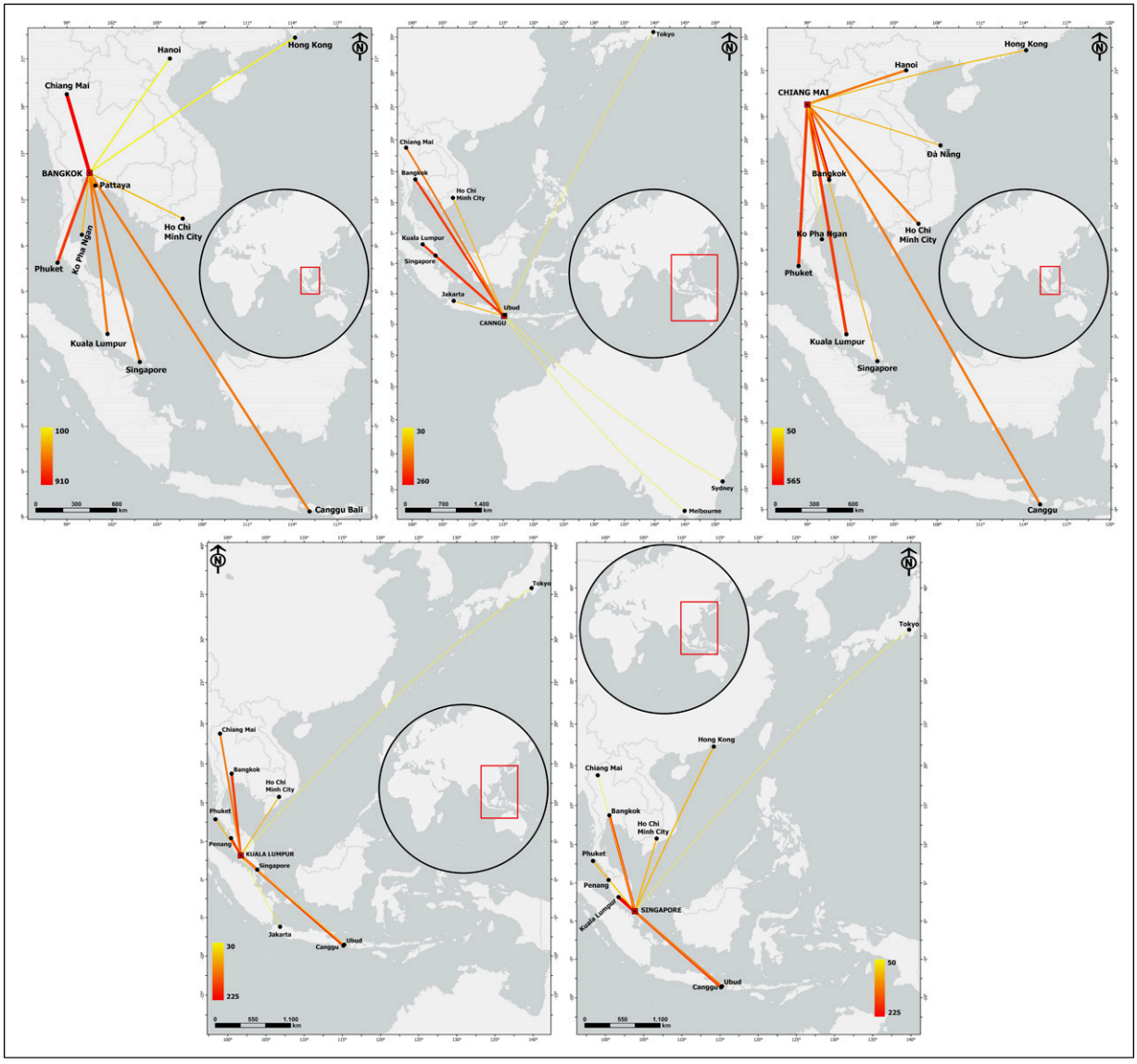

Figure 4. Digital nomad movements in Southeast Asia, with Chiang Mai and Bangkok emerging as central nodes.

one of the strongest in Europe, which is a big draw for digital nomads in the tech industry. The city's blend of innovation and creativity creates an inspiring environment for work."

Paris, with strong connections to cities such as Amsterdam, Barcelona, Lisbon, and even New York, facilitates both intra-European and transatlantic mobility. The city's transportation infrastructure is often praised by nomads for its convenience and accessibility. One user stated, *"Paris is not just a beautiful city but also a strategic hub for digital nomads. The ease of travel to other European cities and even the Americas makes it a great base for those who like to move around* frequently."

Barcelona also plays a vital role in Europe's digital nomad landscape, acting as both a destination and a gateway. According to one review, *"Barcelona has a thriving digital nomad scene with easy access to other parts of Europe. It's common for nomads to use Barcelona as a launchpad for trips to the Americas or other European destinations like Berlin or Paris."* Overall, cities such as Lisbon, Berlin, Paris, Barcelona, and Amsterdam are at the heart of digital nomad mobility in Europe, maintaining strong links not only within the continent but also with key destinations across the Americas.

Figure 6 illustrates digital nomad mobility in North America, with New York emerging as a key transcontinental hub due to strong links with European cities such as Paris, Amsterdam, and London. User comments highlight its robust infrastructure and professional opportunities, describing the city as a mix of creativity and business. As one nomad noted, New York's fast-paced lifestyle is both challenging and

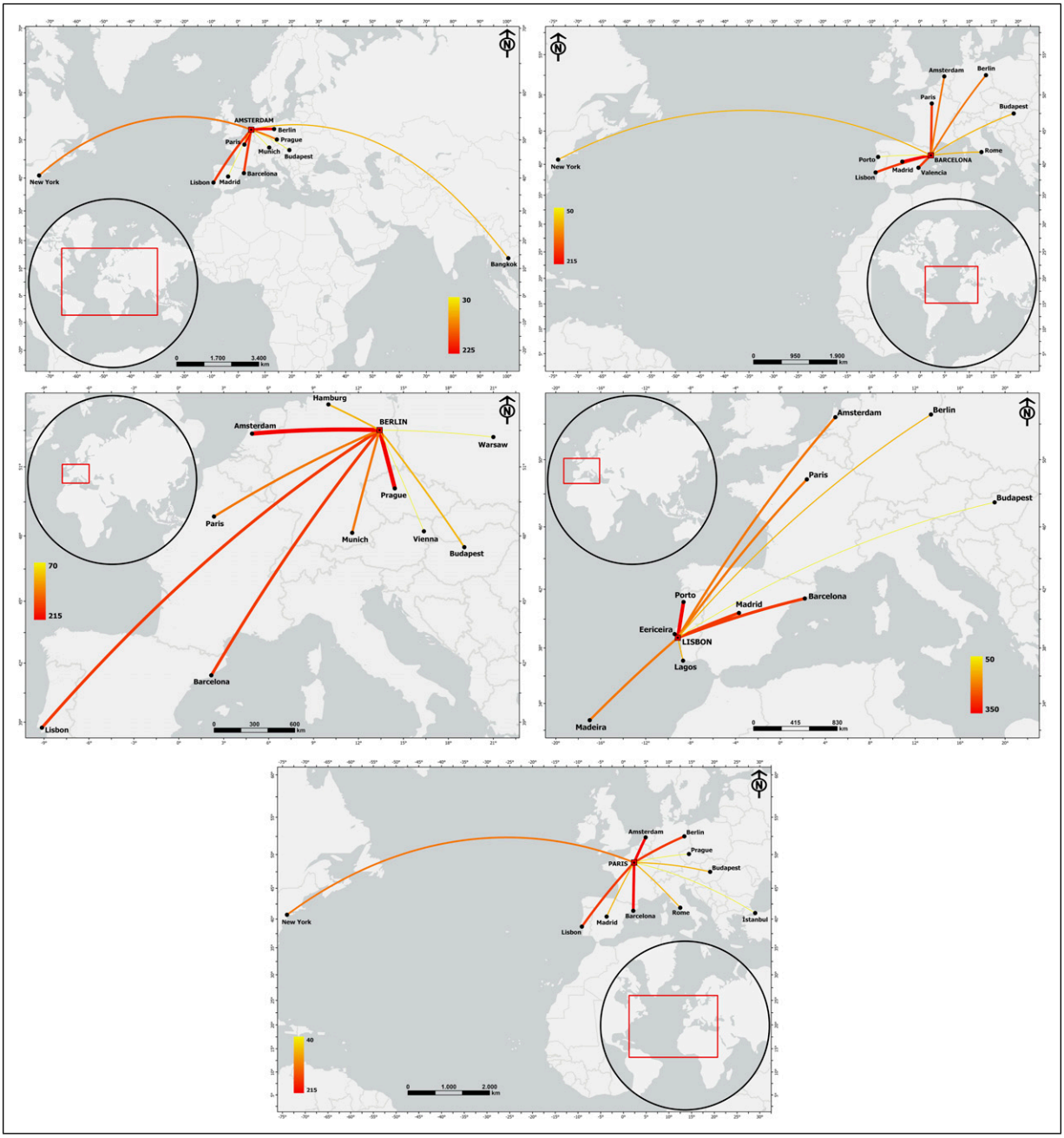

Figure 5. Flows between popular European digital nomad destinations.

rewarding, often chosen as the next stop after European hubs like Lisbon. Los Angeles also stands out with its connections to cities like Tokyo and Paris, positioning it strategically in terms of both Pacific and Atlantic global linkages. Similarly, San Francisco is highlighted by users for its status as a technology hub. One nomad explained, "San Francisco is a magnet for digital nomads, especially those in the tech industry. The city's thriving startup scene and proximity to other major tech hubs on the West Coast make it an ideal base for remote workers."

Mexico City maintains a central position within the digital nomad network in Latin America, particularly due to its high connectivity with Miami and New York. It is seen by users as a culturally rich and affordable destination. As one comment noted, "Mexico City offers a great balance between affordability and quality of life. The food scene is amazing, and there's always something new to explore. It's a fantastic hub for digital nomads looking to experience a different side of Latin America."Meanwhile, Miami acts as a gateway to Latin America and the Caribbean, with significant mobility

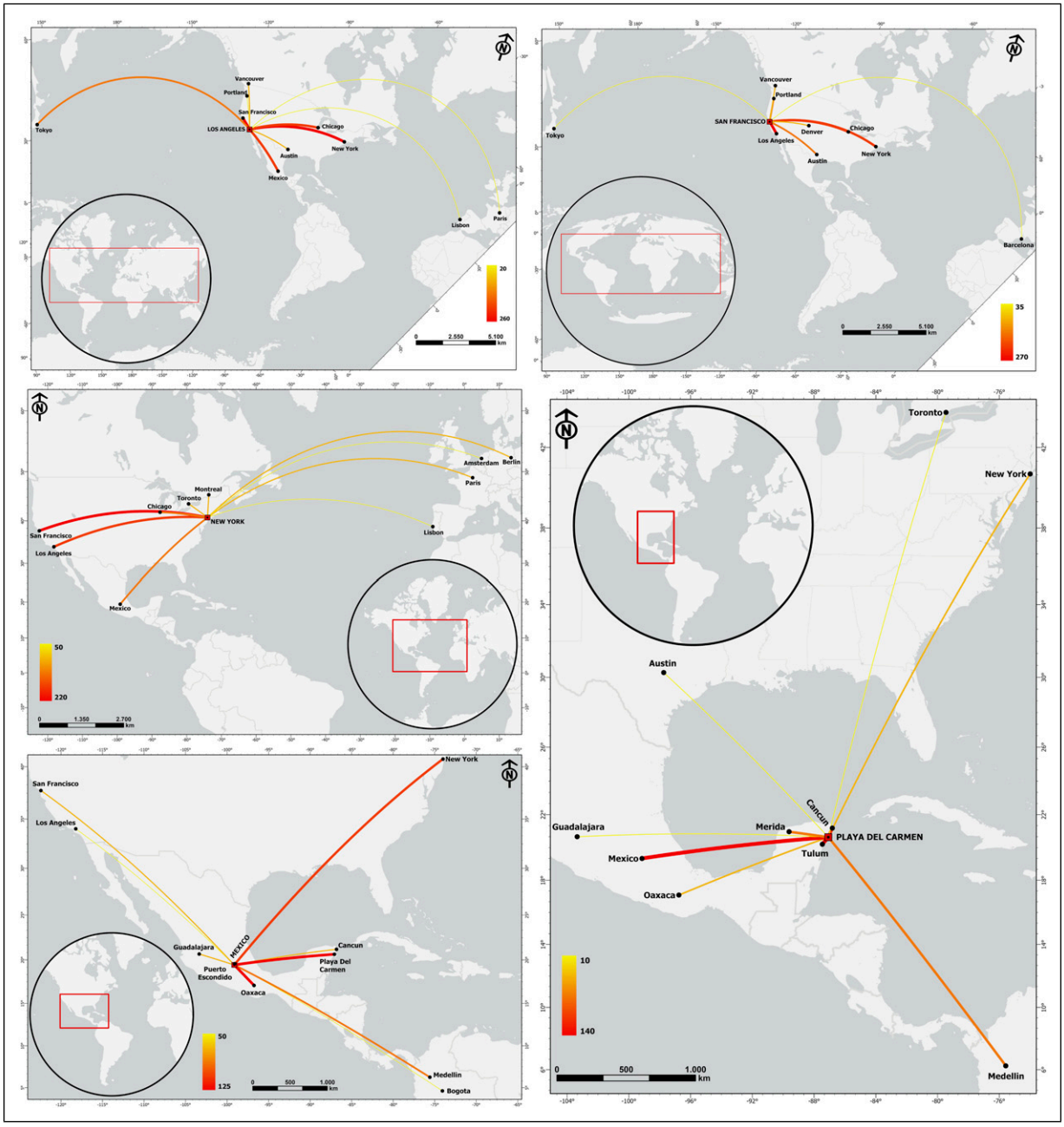

Figure 6. Connectivity among Latin American destinations favored by digital nomads.

toward destinations such as Havana, Mexico City, and San Jose. Its strategic geographic location and international accessibility make it a frequent transition point for digital nomads traveling between continents.

According to Figure 7, Buenos Aires is one of the most important hubs for digital nomads in South America. The city maintains strong intra-continental connections with major cities such as Santiago, São Paulo, and Lima, and also serves as a transcontinental center through its links with distant destinations like Madrid and New York.

São Paulo holds international significance due to its connections with European cities like Madrid and Paris. User reviews emphasize both its strengths and challenges. One nomad remarked, *"The city's (São Paulo) infrastructure is well-developed, but the safety concerns in certain areas can be an issue. The internet connection is reliable in most parts of the city."* São Paulo is often appreciated for its cultural diversity and professional networking opportunities, yet factors like high living costs and traffic congestion are frequently mentioned as limitations.

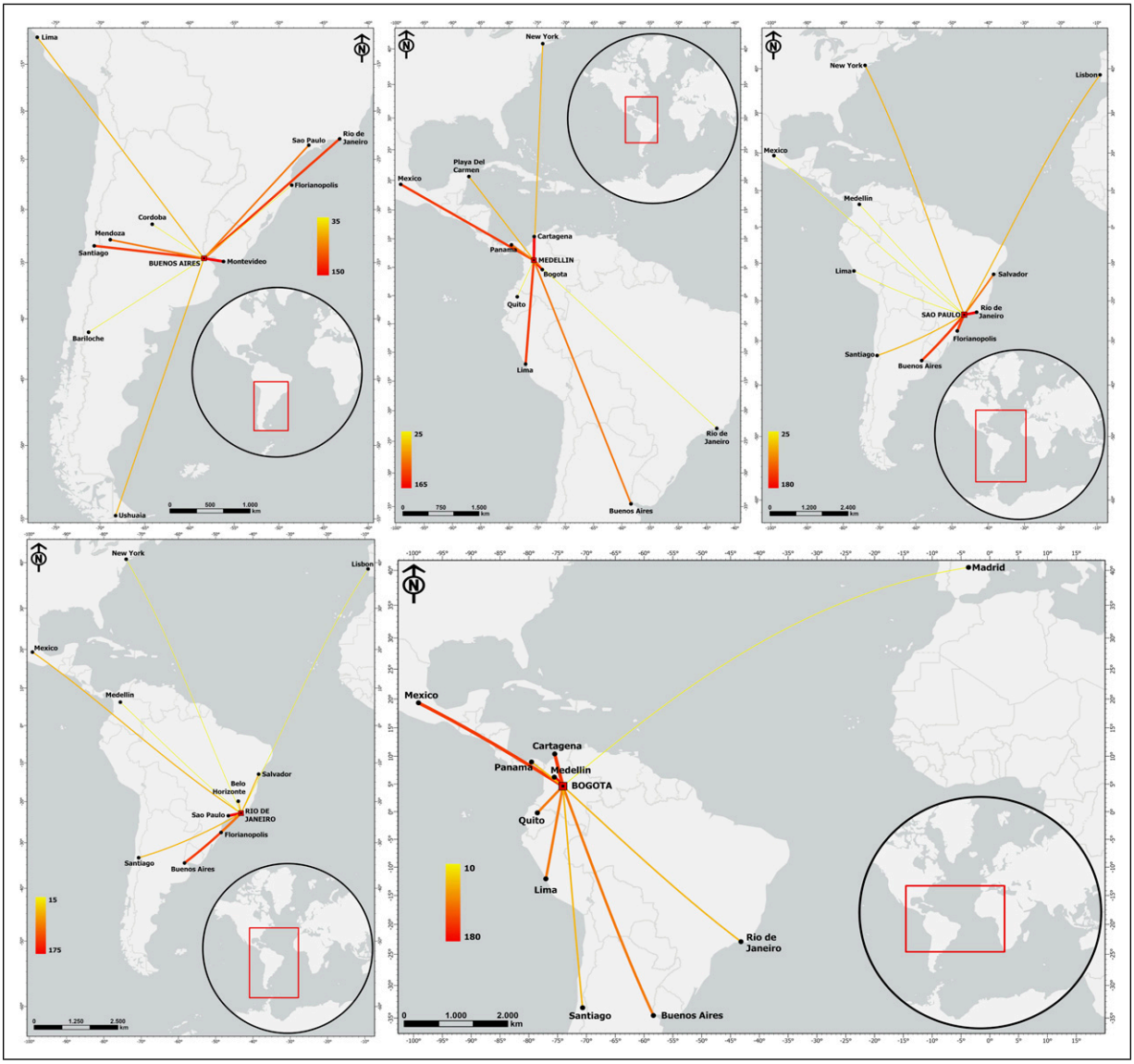

Figure 7. Flow map of digital nomad movements in Africa and the Middle East.

Lima stands out with its affordable cost of living and a growing digital nomad community. As noted by one user, *"Lima offers a unique blend of modern and traditional elements. The city has a growing community of digital nomads, and the cost of living is affordable compared to other major cities in the region."* The city is well-integrated into the South American network, particularly through its connections with Buenos Aires, São Paulo, and Bogota. Although Bogota offers various opportunities for digital nomads, concerns remain regarding local safety conditions. A comment from one nomad summarized this perspective: *"While Bogota offers a lot of opportunities, safety concerns in certain areas can be an issue for digital nomads."*

Figure 8 shows that Sydney is a key hub for digital nomads in Oceania. The city maintains strong connections with major urban centers such as Melbourne, Auckland, and Tokyo, and also establishes transcontinental links with the Americas via Los Angeles. According to user comments, Sydney is especially valued for its advanced technological infrastructure and professional work environment. One user noted, *"The infrastructure in Sydney is top-notch, with reliable internet and plenty of coworking spaces. However, the high cost of housing and living expenses might be a downside for some."*

Melbourne is a significant digital nomad destination, closely connected to Sydney, Auckland, Singapore, and London. It is praised for its cultural vibrancy and strong community, though high living costs remain a key concern for many nomads. As one user stated, *"While Melbourne offers a high quality of life, the cost of living is*

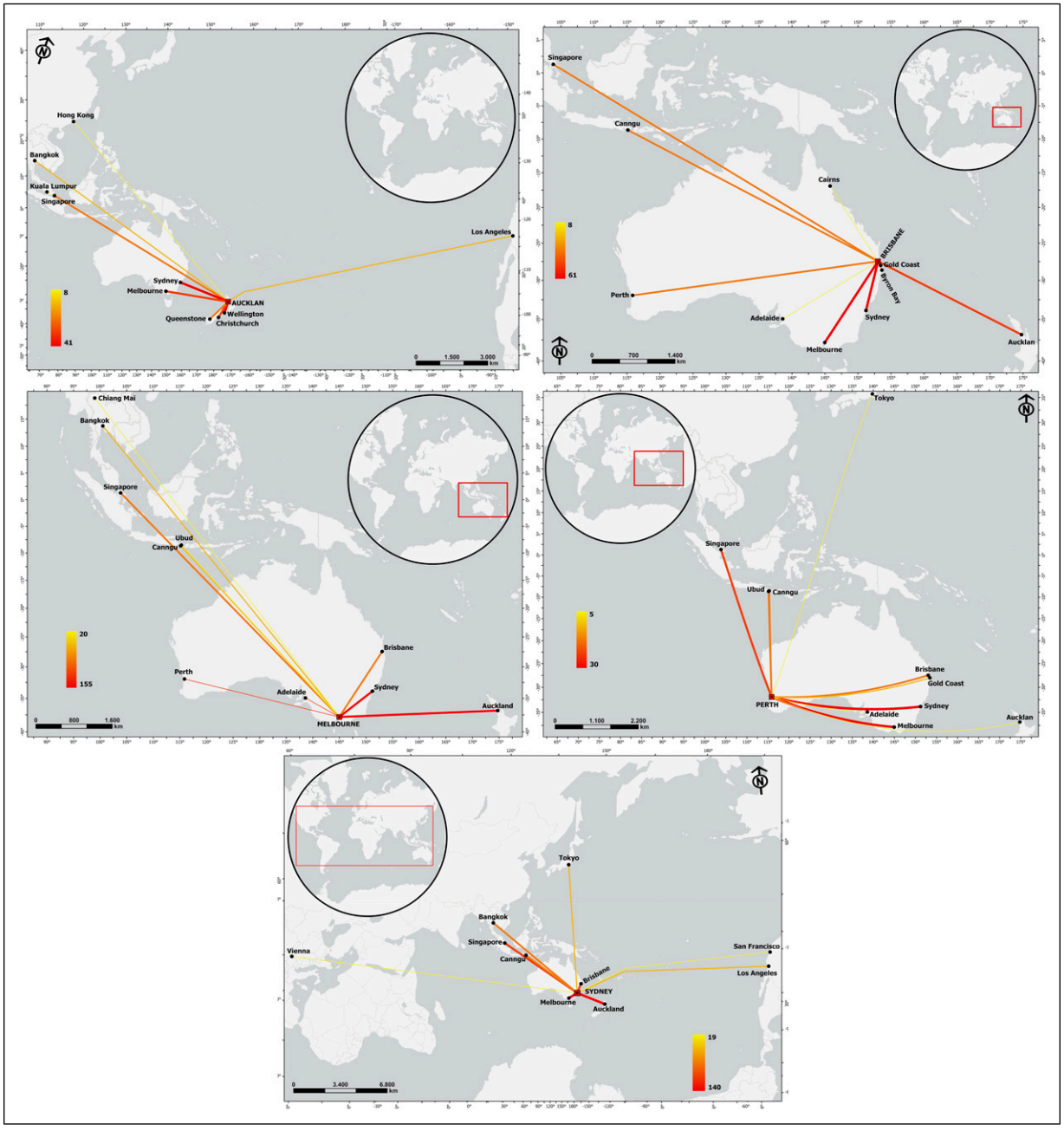

Figure 8. Digital nomad flows across Oceania.

relatively high, which might be a consideration for some digital nomads. However, the city's work-life balance and friendly locals make it an attractive place to stay." Bali stands out as a strategic transit point between Asia and Oceania, with its robust connections to both Sydney and Melbourne underlining its role as a regional hub for digital nomads. The movement patterns in this region suggest that Bali often functions as a transitional node in multi-step mobility routes, reinforcing its importance in broader intercontinental flows.

The centrality and connectivity of destinations

The analysis results indicate that certain cities stand out in terms of centrality and connectivity within digital nomad mobility networks. Based on the degree centrality, betweenness centrality, and closeness centrality scores, the top 25 cities with the highest overall values were identified.

According to Table 1, the cities with the highest degree centrality are Bangkok, New York, Lisbon, Barcelona, and Paris. These cities possess extensive

networks of direct connections and engage with numerous other destinations. They are frequently preferred by digital nomads and play a significant role in global mobility. Bangkok ranks among the most connected destinations within the network, serving as a central point in Southeast Asia for digital nomads. New York, with its broad accessibility, emerges as a key transit hub in North America. Lisbon and Barcelona are major centres in Europe, frequently linked to a wide array of destinations by digital nomads. Paris, with its strong intra-European connectivity, occupies a core position within the network. These cities serve as primary transfer and meeting points for digital nomads due to their numerous direct links.

Cities with a high closeness centrality hold a strategic advantage in terms of accessibility to all other nodes within the network. These locations enable digital nomads to move more efficiently between destinations by minimizing travel distance and time, making them favourable transition points in multi-step mobility patterns.

On the other hand, cities with the lowest degree centrality are considered peripheral destinations, as they have fewer connections within the network and more limited direct interactions. These cities are located in regions with lower levels of nomadic mobility (Figure 9). Based on the analysis results, both central destinations (hubs) and peripheral nodes were identified. Central destinations are those where digital nomads form the most intensive connections and where tourist flows are primarily directed. In contrast, peripheral destinations are cities with fewer links in the network and where tourism mobility is more limited.

Discussion

This study explores the multi-step mobility patterns of digital nomads between destinations and demonstrates how such mobility shapes the structure of global tourism networks. From this perspective, digital nomads are analysed not primarily as residents of individual destinations, but as mobility actors whose repeated stays and onward movements jointly produce relational network structures across cities. The findings go beyond analysing the initial arrival of digital nomads to a single destination by also examining their subsequent movements, thereby offering a more comprehensive understanding of the direction and intensity of aggregate tourist flows. This approach provides a more dynamic and relational analytical framework compared to traditional tourist flow models (Mancinelli, 2020; Yang and Wong, 2013).

Digital nomads differ significantly from traditional tourist profiles in terms of mobility patterns, spatial preferences, and travel strategies. Whereas traditional tourists typically travel to one destination, stay for a limited period, and return to their point of origin (Yang and Wong, 2013), digital nomads exhibit continuous and multi-step mobility (Mancinelli, 2020; Orel, 2019). This multi-step mobility perspective extends beyond

Table 1. Centrality and connectivity of destinations.

	City	Degree centrality	Betweenness centrality	Closeness centrality	Connectivity score
1	Bangkok	0.3076	0.0749	0.5436	92
2	New York	0.2508	0.0685	0.5320	75
3	Lisbon	0.2474	0.0351	0.5059	74
4	Barcelona	0.2341	0.0212	0.5042	70
5	Paris	0.2307	0.0327	0.5076	69
6	Berlin	0.2073	0.0769	0.4933	62
7	Amsterdam	0.1906	0.0413	0.5059	57
8	Dubai	0.1839	0.0420	0.4966	55
9	Singapore,	0.1806	0.0181	0.4607	54
10	Kuala Lumpur	0.1705	0.0753	0.4571	51
11	Canggu,	0.1672	0.0483	0.4650	50
12	Mexico City	0.1672	0.0198	0.4352	50
13	Istanbul	0.1638	0.0197	0.4784	49
14	San Francisco	0.1505	0.0274	0.4901	45
15	Tokyo	0.1505	0.0318	0.4768	45
16	Budapest,	0.1371	0.0078	0.4496	41
17	Chiang Mai	0.1304	0.0097	0.4302	39
18	Los Angeles	0.1304	0.0213	0.4925	39
19	Madrid	0.1304	0.0112	0.4476	39
20	Medellin	0.1170	0.0010	0.4051	35

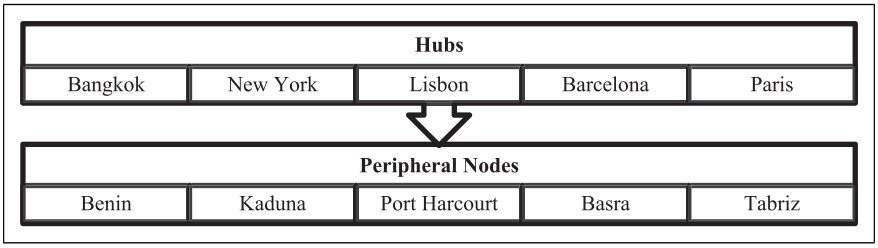

Figure 9. Hubs and peripheral nodes in the global flow network of digital nomads.

single-location engagement and captures the relational networks that nomads generate across cities through onward movements.

According to the centrality and connectivity analyses, cities such as Bangkok, New York, Lisbon, Barcelona, and Paris emerge as key hubs, showing the highest degree centrality and network density. These cities serve not only as highly connected nodes but also as crucial transit points during further mobility (Freeman, 1979; Scott et al., 2008). This finding aligns with the dynamics of centrality proposed by Shao et al. (2020). The attraction of digital nomads to these cities is supported by multiple factors, including infrastructure quality, density of digital communities, and ease of transportation (Mancinelli, 2020; Orel, 2019). Network analysis also reveals that peripheral destinations possess more limited connectivity within the global network. These cities are located at the fringes of the system and exhibit lower levels of aggregate mobility. This reflects the findings of Wheway and Punmanee (2017), who suggest that the positions of destinations within tourism networks can shift over time and that cities may assume more central roles as flows increase.

Importantly, high levels of connectivity and centrality should not be interpreted as indicators of long-term residence or destination desirability for digital nomads. Some highly connected cities may primarily function as transit hubs or gateways, facilitating onward mobility rather than serving as long-stay bases. In this sense, cities such as major global transport and business hubs can appear central in the network due to their role in enabling multi-step movements, even if affordability or cost-of-living constraints limit extended residence. Accordingly, the centrality patterns identified in this study are best understood as reflecting mobility roles within an aggregate network structure, rather than as rankings of destinations based on embedded or long-term nomadic presence.

Patterns of intercontinental mobility demonstrate that digital nomads function as bridges between global networks. Transitions from New York to Paris or Sydney to Los Angeles reflect not only individual preferences but also the strategic role of these cities as global transit nodes (Zhong et al., 2020). The flexible and multi-nodal nature of digital nomads is also consistent with Barabási's (2002) principles of density and scalability in complex network systems.

The movements of digital nomads provide a rich perspective for understanding the positions and interdependencies of destinations within global networks. Key cities identified in the study, such as New York, Paris, London, Berlin, and Bangkok, hold strong connections within the global network of digital nomad flows. These destinations reinforce their central positioning within global mobility networks and are embedded in wider flows of trade, culture, and knowledge through their extensive inter-city ties. This finding supports Shao et al. (2020), who emphasize the function of these destinations as central hubs within global network structures.

Observed inter-city routes of digital nomads reveal interdependent relationships between destinations. For instance, movements from Berlin to Amsterdam or Bangkok to Bali reflect not only geographic proximity but also mutual dependencies shaped by economic, social, and cultural ties. Chung et al., 2019b argue that global tourism networks are becoming increasingly consolidated over time and that cost-reducing factors, such as shared languages, geographical distance, and visa policies, are becoming more influential in attracting international tourists than natural or cultural attractions. Accordingly, strong connections between these destinations support the continuity of global networks.

The movement patterns of digital nomads offer significant insight into how global networks are being reshaped. Increasing connectivity and visibility of destinations such as Bangkok or Medellín within mobility networks suggest that these cities may assume new roles in global networks they previously did not occupy. Wheway and Punmanee (2017) note that growing interest in destinations outside of Bangkok in Thailand has supported their integration into broader network structures. Similarly, a number of destinations may gain more prominent positions in global networks due to increased digital-nomad flows, contributing to a gradual reconfiguration of network structures.

Digital nomads are constantly interacting with diverse cultural contexts across the world (Orel, 2019). In

this sense, their mobility patterns position them as bridges within global networks, a dynamic also noted in the digital nomadism literature (Mancinelli, 2020). The intercontinental connections revealed in this study, such as movements from New York to London or Sydney to Los Angeles, reflect this bridge-like network role. Through these inter-city connections, digital nomad mobility is embedded in broader processes of knowledge and experience circulation, contributing to integration across different cultural and economic systems.

The connections between destinations with high concentrations of digital nomads reveal the dynamic structure of global networks, while also highlighting potential vulnerabilities within these systems. For example, crises in a specific destination, such as political instability, natural disasters, or security concerns (Akgiş İlhan et al., 2024), can affect connected cities within the network. User comments also point to these vulnerabilities. Issues such as power outages and increasing safety concerns in Cape Town, rising living costs in Berlin, or seasonal overcrowding in Bali are reflected in shifts in digital nomad mobility patterns. Similarly, problems such as poor digital infrastructure or weakened local nomad communities may reduce flows to or from a destination. Therefore, digital nomad mobility reflects not only individual-level mobility considerations but also structural fragility points within global networks.

Conclusion

This study offers a novel approach to understanding the spatial patterns of aggregate inter-destination flows and the global connectivity structure between destinations by analysing the multi-step mobility patterns of digital nomads. Unlike traditional tourist profiles, digital nomads do not simply travel to a single destination; instead, they move on to multiple destinations, resulting in a complex and multilayered mobility structure. The network theory framework adopted in the study enabled the analysis of this multi-step mobility, revealing the structural relationships between destinations through indicators such as degree centrality, betweenness centrality, and closeness centrality.

The findings indicate that cities such as Bangkok, Lisbon, New York, Barcelona, and Paris hold central positions within global tourism networks and serve as key transit points within digital nomad mobility networks. In contrast, peripheral destinations with fewer connections were also identified, showing limited integration within aggregate digital nomad mobility networks. The study interprets this core periphery relationship not only as a spatial structure but as a system shaped by the interaction of multiple factors, including digital infrastructure, cost of living, community influence, and accessibility. Furthermore, the integrated use of network analysis based on Nomad List data, together with GIS and netnography techniques, enabled a holistic examination of digital nomad mobility.

The findings indicate that digital nomads tend to use certain destinations in recurrent and interconnected patterns. This suggests that digital nomadism is not merely an individual lifestyle choice, but rather a structural form of mobility that contributes to shaping the spatial organization of the global tourism system. The networks generated through digital nomad mobility are reshaping the positionality of destinations within the global system and offer a new perspective for tourism planning. This research contributes to the academic literature while also providing a scientific foundation for tourism planners, policymakers, and destination managers to more explicitly account for digital nomad mobility in future planning efforts.

Theoretical and practical implications

This study frames digital nomadism not only as a tourist typology but also as a form of mobile agency that actively shapes inter destination relations. By applying network theory, the research challenges traditional one way tourist flow models and highlights multi directional, relational, and core periphery patterns generated through structured, multi-step mobility. In this respect, digital nomadism extends beyond an individual lifestyle choice and emerges as a systemic mobility process that reorganizes spatial relationships between destinations.

The netnographic insights further demonstrate that destinations assume functional roles within sequential nomadic journeys rather than serving as interchangeable places. Cities such as Chiang Mai tend to function as environments perceived as conducive to longer stays, associated with focus, productivity, and affordability, whereas destinations such as Bali or Medellín are often valued for social interaction, lifestyle experimentation, and community-oriented experiences. These complementary roles suggest that digital nomads' mobility trajectories are relational and path dependent, shaped by how cities are positioned within broader mobility configurations rather than by isolated attractiveness alone.

From a practical and hospitality-oriented perspective, these findings carry direct operational implications. The distinction between mobility hubs, gateways, and longer stay oriented destinations implies that cities require differentiated tourism and hospitality strategies. Transit-oriented hubs may prioritize flexible short stay accommodation, high turnover capacity, and seamless connectivity, whereas longer-stay nomad destinations benefit from monthly pricing structures, serviced

apartments, co-living models, and the integration of accommodation with coworking spaces. For hospitality operators, recognizing a city's mobility role can inform product design, pricing strategies, community building services, and seasonal demand management.

At the destination level, the hub–periphery distinction is particularly relevant for cities reassessing their position within global digital nomad networks. Rather than competing solely for visibility or rankings, destinations can strategically leverage their functional role by aligning city branding, digital infrastructure investment, visa schemes, and nomad-friendly policies with the type of mobility they attract. In this sense, the study provides a framework for understanding how digital nomad mobility reshapes destination hierarchies and offers actionable insights for tourism planners, hospitality stakeholders, and policymakers seeking to engage with long-stay and mobile work oriented travel markets.

From a hospitality operations perspective, the findings suggest that digital nomad mobility requires differentiated product and service strategies depending on a destination's functional role within the mobility network. In long-stay hubs such as Chiang Mai, where nomads tend to prioritize affordability, productivity, and routine, hospitality providers may benefit from offering monthly pricing models, serviced apartments, and integrated accommodation–coworking products that support extended stays. In contrast, gateway cities such as Lisbon function as hybrid hubs combining transit and temporary residence, calling for flexible accommodation options, short-to-medium stay products, and seamless connectivity between lodging, coworking spaces, and urban services.

Future research

While this study offers significant findings by focusing on the multi-step mobility of digital nomads, it also opens several avenues for future research. First, the current study only concentrates on inter-city tourist flows. Future studies could explore digital nomads' spatial preferences at a micro-scale, such as neighbourhoods, districts, or co-working spaces. Additionally, while this research relies on digital platforms as a data source, future work could be enriched through in-depth interviews, ethnographic fieldwork, or mobile app data. The study employs centrality and connectivity metrics; however, incorporating a temporal dimension could enable analysis of seasonal or period-based mobility patterns of digital nomads. Future research could operationalize a residence-based digital nomad network by integrating dwell-time thresholds, return or retention rates, and longitudinal mobility traces. Such an approach would allow the separation of transit-oriented gateways from long-stay nomad bases and enable the comparison of centrality patterns across layered mobility networks. This layered perspective would further clarify how different destinations contribute to digital nomad ecosystems in distinct but complementary ways.

Acknowledgement

The authors would like to express their sincere gratitude to The Scientific and Technological Research Council of Türkiye (TÜBİTAK) for its valuable support through the project number 123K051.

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Ethical considerations

Ethics approval for this research was obtained from the Ethics Committee of Social and Human Sciences, Kırşehir Ahi Evran University (Decision No: 2023/04/06, Date: 10.05.2023).

Funding

The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by The Scientific and Technological Research Council of Turkey (TÜBİTAK), Türkiye (Project No: 123K051).

Declaration of conflicting interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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