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Systematic Review

Leadership and Climate Change Mitigation: A Systematic Literature Review

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Abstract: This systematic literature review (SLR) explores leadership and climate change mitigation in cities. In doing so, it investigates explicit meanings of leadership, enablers of leadership, and leadership similarities and differences across regions. The review utilized three databases on 8 March 2024—Scopus, ProQuest, and Web of Science—curating an initial 496 results, resulting in 30 studies in the final analysis, using a two-reviewer screening process to limit bias and ensure consistency of approach. Inclusion criteria included English-language peer-reviewed articles over a ten-year period. The timeframe used was limited to January 2014 to December 2023 (10 years) to focus on the lead up to and post-implementation of the Paris Agreement. Further, empirical and conceptual studies were included to provide readers of this review with a thorough understanding of leadership work completed since 2014. Exclusion criteria included any studies that focus on adaptation measures and forms of leadership where the focus is on the private business, state, or national level, including leadership and climate change mitigation outside the influence of the local government. The study highlights five distinct meanings of leadership using the Braun and Clarke method of thematic analysis. It found leadership themes related to people (e.g., mayors), policy (e.g., ambitious climate plans), ideas (e.g., new concepts), collective action (e.g., motivating others), and mobilizing power (e.g., through regulations). The enablers of leadership included polycentricity, social capital influences, co-creational and mayor leadership, climate governance, and multi-actor coordination. This review segments the studies based on the findings from the literature, which focus on three continents (North America, Europe, and Asia) with a distinct difference in the meaning and enablers of leadership based on region. The 30 articles shared similarities in content, such as strong mayoral influence, but also had some distinct differences, such as how leadership is enacted based on leveraging market mechanisms, policy, and horizontal and vertical coordination. Finally, research gaps were identified, such as the scant focus on leadership and climate change mitigation in the Global South, to enable future research. Limitations of this study include the utilization of three databases, a focus on only English-language peer-reviewed articles, and a strong climate change mitigation focus.

Keywords: leadership; climate change mitigation; cities; net-zero; GHG; local; urban; leaders

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1. Introduction

Given that urban areas account for over 70% of global greenhouse gas emissions, local leadership is essential in mitigating climate change and preventing unsustainable socioecological system transformations [1–4]. While deep decarbonization is feasible, achieving it will require leadership from local governments and transformative, co-creative leadership approaches [5,6] to redirect our current unsustainable trajectory toward one that supports future generations. Despite the frequent emphasis on the qualities and traits necessary for effective leadership, their tangible impact in the realm of climate mitigation remains largely elusive [7]. The persistent lack of substantial progress over

the past three decades threatens to further exacerbate climate-related challenges, posing a significant risk to life on Earth [1,7,8].

Leadership is seen as subjective, meaning that societies view the concept of leadership differently depending on their value system (i.e., individualism vs. collectivism) [9]. For instance, individualistic Western societies tend to celebrate independence and individualism, whereas many non-Western societies place emphasis on collective outcomes for the benefit of the whole rather than the few [10]. Understanding leadership across geographical and cultural boundaries is crucial as societies strive to address pressing issues like climate change. This research aids in the development and understanding of leadership by investigating leadership meanings, enablers of leadership for climate mitigation, and similarities and differences across the literature

Due to the number of articles that focus on Europe, North America, and Asia, this SLR has segmented its findings based on these three regions. Additionally, it identifies gaps in the literature, providing valuable insights for researchers and policymakers looking to build on existing work.

2. Key Concepts

2.1. Leadership

Leadership can manifest in individuals, groups, or organizational entities in the private, public, or civil society sectors [11]. Demonstrating leadership often involves challenging entrenched industry norms [12]. Leadership literature commonly employs terms like leaders, followers, and laggards, which mirror strategic concepts in business and management [13]. Leaders initiate significant changes, while followers follow suit cautiously, often missing out on opportunities. Laggards can fail to adapt and risk elimination [13].

Leadership has been studied by scholars for centuries, with theories such as traits theory, first introduced by Thomas Carlyle in 1841 in his book, *On Heros, Hero-Worship and the Heroic in History* [14]. Behavioral and situational leadership theories emanated from the mid to late 1960s by scholars such as Robert Blake, Jane Mouton, Paul Hersey, and Ken Blanchard [15]. Since that time, many contemporary theories of leadership have emerged with the intent of understanding the requisite ingredients that make up efficient and effective leadership.

Contemporary leadership theories advocate for multiple approaches to enact change. Co-creational leadership, demonstrated in a 2013 study looking at climate mitigation in Oslo's construction industry, combines transformational leadership with other collaborative leadership approaches [5]. Complex systems leadership theory recognizes the decentralized nature of decision-making in organizations, emphasizing adaptability to environmental dynamics, including natural systems [16,17]. This theory underscores leadership as a collective phenomenon rather than solely relying on designated leaders [18]. This review provides an overview of the state of the field in the literature about the forms of leadership and how they manifest to enable climate change mitigation at the local level.

2.2. Climate Mitigation and Cities

Climate action encompasses efforts aimed at mitigating or adapting to the impacts of anthropogenic global warming, with the goal of reducing climate change disturbances [19]. Mitigation, the focus of this SLR, focuses on deep decarbonization to curb greenhouse gas (GHG) emissions, aiming to prevent a future exceeding 1.5–2 degrees Celsius of warming [1].

Urban areas play a crucial role, contributing over 70% of GHG emissions globally, with local governments having direct/indirect control of up to 52% of their local emissions [20]. Despite this significant contribution, there are considerable limitations and barriers to effective leadership hindering necessary changes for effective local climate change mitigation [8]. This review seeks to understand how different regions lead climate change mitigation by examining local-level enablers and understanding similarities and differences across Europe, North America, and Asia.

3. Research Method and Search Protocol

To understand the current state of the literature on leadership and climate change mitigation efforts in cities, this study explores the various ways in which leadership presents within the climate mitigation space. Employing the PRISMA Framework protocol, a systematic literature review methodology was utilized and subsequently registered in the Open Science Framework (OSF) on 24th October 2024 [21]. The registration reference is osf.io/wezd9. PRISMA ensures consistency and reliability in results, facilitating replication by other scholars, researchers, and stakeholders.

3.1. Database

The search process was conducted and completed on 8 March 2024 using Scopus, ProQuest, and Web of Science. The study utilized the assistance of a librarian at the University of Waterloo and advice from one other reviewer. Scopus was selected for its comprehensive multidisciplinary coverage and for its easy retrieval of bibliometric information such as year of publication [22]. Furthermore, ProQuest and Web of Science have considerably large databases and have also been widely used in systematic literature reviews in large reputable journals [23,24].

3.2. Search Terms

The search terms used for the research question were divided into three major categories, (1) leadership, (2) climate change mitigation, and (3) cities. The search string can be seen below:

"Leadership" OR "leader*"
AND
"Climate" OR "net-zero" OR "net zero" OR "greenhouse gas*" OR "GHG*" OR "carbon"
AND
"Cities" OR "municipal*" OR "local government*" OR "urban" OR "city"

The Scopus search strings identified above included searches within "Article title" only for "leadership" and "leader*", followed by all other terms searched using "article title, abstract, and keywords" using AND and OR along with truncations (*) to produce all relevant documents with varying endings (i.e., municipal* for capturing municipal, municipalities, and municipality).

The same search terms were used for ProQuest as used for the Scopus search. The search strings applied included "Document title" only for "leadership" and "leader*" and "Anywhere except full text—NOFT" for subsequent keywords. Just as with ProQuest and Scopus, Web of Science was searched using the previously noted search string combination of keywords. The search field used in the search was set to "All fields", except for "leadership" and "leader*", which were searched in the "Title" only field.

Scopus returned 104 documents, ProQuest curated 193 documents, and Web of Science produced 199. In summary, the combined searches across all three databases curated 496 results. These articles were then inputted into Covidence, a screening software platform commonly used during the screening process of SLRs, for duplicates removal. From this, 167 were eliminated.

3.3. Inclusion and Exclusion Criteria

Inclusion and exclusion criteria were generated based on several factors by two reviewers. All search queries returned results from peer-reviewed articles over a ten-year period. The timeframe used was limited to January 2014 to December 2023 (10 years), and only English-language articles were included. The primary reason for excluding prior years was to ensure that all work was current and revolved around the lead up to and post-implementation of the Paris Agreement [25]. Empirical and conceptual articles were included to provide readers of this review with a thorough understanding of leadership work completed since 2014. No subject area was initially excluded from the search results, as leadership shows up in many forms.

Exclusion criteria included any studies that focused on adaptation measures. This review also excluded forms of leadership where the focus was at the private business, state, or national level. Leadership and climate change mitigation outside the influence of the local government was out of the scope of this review.

Based on the above inclusion and exclusion criteria, 285 peer-reviewed articles were removed, reducing the total number of articles from 329 to 44 for the full-text eligibility assessment. Two researchers were involved in the screening process, whereby all articles selected as 'maybe' were discussed further by the reviewers to determine suitability based on the identified inclusion/exclusion parameters.

3.4. Selecting Relevant Studies

Of the 44 studies selected based on the abstract, following the full-text read, 14 more were removed due to a lack of focus on climate change mitigation, wrong level impact (leadership discussed primarily at the private business, federal, or state level), or studies published outside of the date range of 2014 through to the end of 2023. This left 30 peer-reviewed articles for data extraction, analysis, and synthesis (Figure 1).

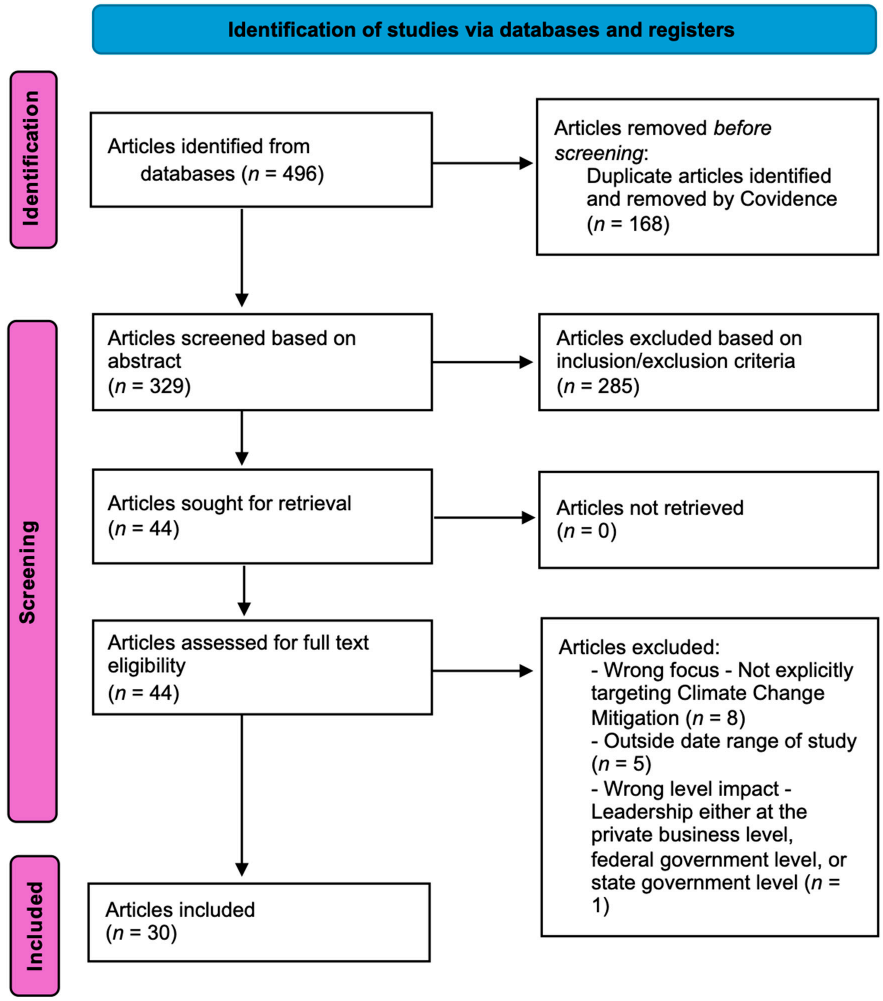

Figure 1. Flow chart of the systematic literature review process [21,26].

3.5. Data Extraction, Analysis, and Synthesis

Data extraction occurred using a combination of NVivo 14 and Microsoft Excel (Excel). Descriptive statistics were captured, including the year of publication, the academic journal in which each study was published, the continent where the work took place, and the

methodological approach taken by each study. This process was discussed at length between two reviewers.

The Braun and Clarke method of thematic analysis was utilized to identify themes within the literature using an inductive approach [27]. For the thematic analysis, this was guided by the following sub-questions:

- What is the meaning of leadership;
- What are the enablers of leadership for climate mitigation;
- What similarities and differences of leadership exist within the literature;
- Current gaps identified within the literature.

The coding for the explicit meanings of leadership was conducted in NVivo using a qualitative deductive and inductive approach. Text explicitly defining leadership constructs was recorded in Excel along with the article reference and respective page number(s). In total, 83 explicit meanings were found, which were combined into 11 categories. These explicit meanings were then further combined into five themes—people, policy, ideas, collective action, and mobilizing power. This method of segmentation allowed for a nuanced thematic categorization by region.

The coding process for 'enablers of leadership for climate mitigation' was conducted in a somewhat similar fashion. Data analysis focused on identifying explicit mentions of 'enabler(s)' and connecting them to explicit leadership meanings drawn from the literature. Naturally, variations by region and local governments exist; however, the bulk of the enablers were able to be appropriately categorized across five specific theme categories: multi-actor coordination, social capital influences, climate governance, co-creational and mayoral influence, and polycentricity.

NVivo 14 and Excel were utilized for coding and identifying similarities and differences across the literature. Furthermore, gaps identified in existing literature, including providing guidance for future research related to leadership and local government climate change mitigation, were coded and recorded. Each of the phases described herein were discussed and reviewed by two reviewers.

4. Results

Descriptive analysis results are presented in Sections 4.1 and 4.1.1, Sections 4.1.2–4.1.4

4.1. Descriptive Analysis

The following descriptive analyses provide an important basis for understanding climate-related leadership from January 2014 through to December 2023. The analysis was conducted by a single reviewer, followed by guidance and advice from a second reviewer to help reduce the risk of bias and enhance the accuracy of interpreted outcomes.

4.1.1. Year of Publication

Figure 2 illustrates the breakdown of publication years for all 30 peer-reviewed articles. The years 2019 and 2022 stand out with the highest number of relevant publications, accounting for 27% and 23% of the total, respectively. Other years contributed 10% or fewer publications. One reason for the spike in publications in 2019 was due to a special issue, which will be discussed in the subsequent section.

4.1.2. Journals

Table 1 provides an overview of journals where the included articles originated. In total, 25 different journals were recorded, with 6 (20%) peer-reviewed articles coming from the Environmental Politics Journal in their 2019 special issue titled, "*Pioneers, Leaders, and Followers in Multilevel and Polycentric Climate Governance*". Each of the remaining 24 studies was published in a variety of other journals. This is an interesting finding, as it begins to demonstrate the emerging and multidisciplinary nature of leadership and climate change mitigation in cities across several disciplines, but no one main location for the conversation.

Another notable highlight is the lack of publications from management-based journals on the subject of leadership and local climate mitigation.

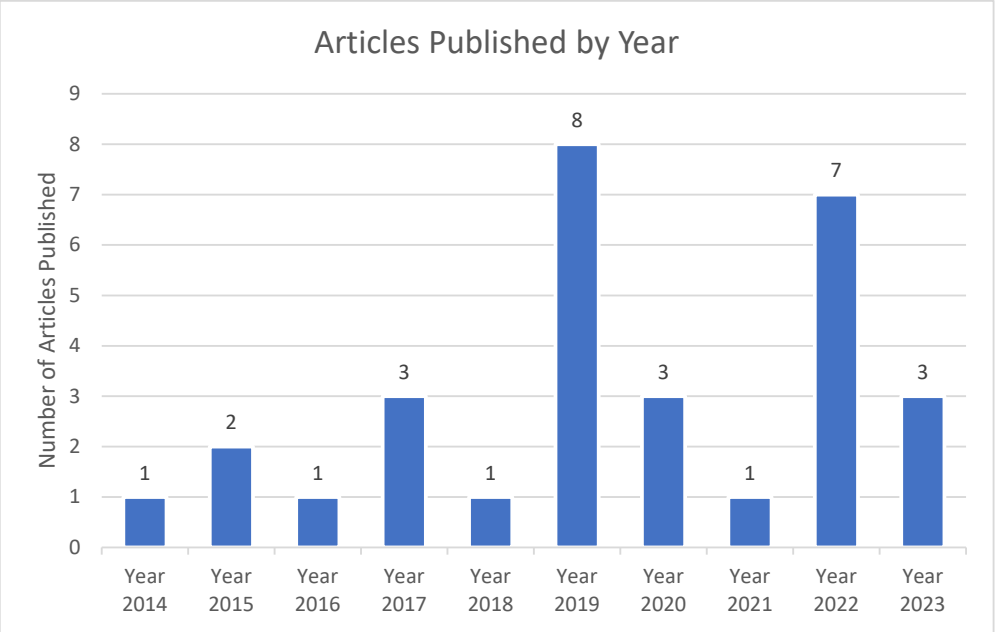

Figure 2. Number of publications published per year (January 2014 to December 2023).

Table 1. Number of publications by journal.

Journal	Number of Publications
Carbon and Climate Law Review	1
Earth System Governance	1
Energy Research and Social Science	1
Environment and Planning C: Government and Policy	1
Environmental Innovation and Societal Transitions	1
Environmental Politics	6
Environmental Science and Pollution Research	1
European Planning Studies	1
European View	1
Frontiers in Energy Research	1
Georgetown Environmental Law Review	1
Global Environmental Politics	1
International Journal of Public Leadership	1
International Journal of Urban Sustainable Development	1
Journal of Environmental Policy and Planning	1
Local Economy: The Journal of the Local Economy Policy Unit	1
Local Environment	1
Policy Studies Journal	1
Public Performance and Management Review	1
Regional Studies	1
Resources, Conservation and Recycling	1
Sustainability	1
The China Quarterly	1
Transylvanian Review of Administrative Sciences	1
Urban Research and Practice	1

4.1.3. Continent Where the Research Took Place

The distribution of geographical focus across the articles analyzed revealed that most studies occurred in Europe (41%), with North America (25%) and Asia (22%) representing almost 50% of those remaining. Africa accounted for just 3%, represented by a single study.

Three studies did not focus on any specific geographical region but instead investigated broader conceptual discussions on leadership and climate action. None of the included studies occurred in any other continent. Based on these findings, results were segmented by region.

4.1.4. Methodological Approach Taken for Included Articles

The breakdown of the methodological approach undertaken for each of the included studies is broken down as follows: 50% qualitative (n = 15), 23% conceptual (n = 7), 20% mixed methods (n = 6), and 7% unspecified empirical analysis (n = 2).

4.2. Thematic Analysis

Thematic analysis results are presented in each of the following subsections.

4.2.1. Meanings of Leadership by Region

Explicit meanings of leadership were recorded to ascertain the various ways in which leadership is discussed within the literature. In total, 83 explicit meanings were captured from the literature and subsequently broken down across 11 leadership categories before being segmented into 5 themes. The distillation of how we arrived at our thematic categorization can be seen in Figure 3.

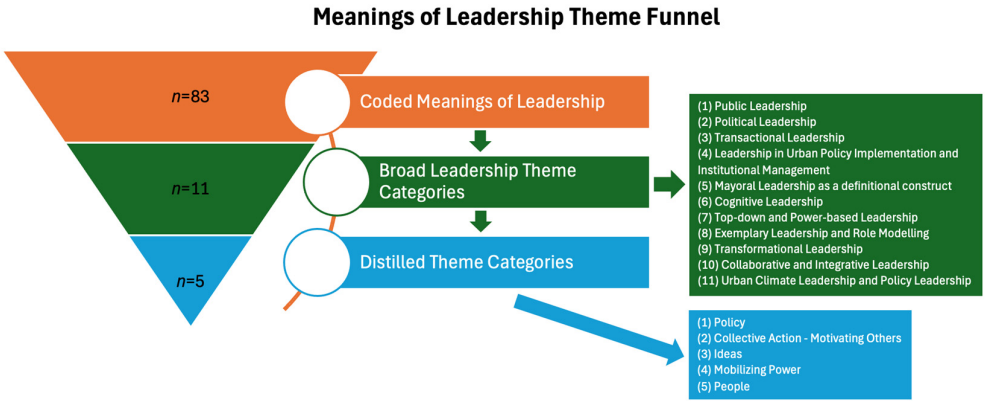

Figure 3. Explicit meanings of leadership theme distillation process.

This section synthesizes findings from studies conducted in Europe (n = 13), North America (n = 8), and Asia (n = 7), highlighting the various ways in which leadership has been explicitly discussed within the literature.

From Table 2, each of the articles was analyzed to determine whether they fell into one or more of the following five theme categories related to leadership meanings—people, policy, ideas, mobilizing power, and/or collective action—motivating others.

Table 2. Leadership meanings classified by theme and segmented across regions.

	Number of Articles by Region				
Leadership Theme Classifier	**Europe**	**North America**	**Asia**	**Non-Specific**	**Total**
Policy	10	4	1	3	18 *
Collective Action–Motivating Others	9	3	1	1	14 **
Ideas	8	0	0	1	9 ***
Mobilizing Power	5	1	0	1	7 ****
People	2	1	1	1	5 *****

* [11,28–44]; ** [11,28,30,32,37–39,41,43–47]; *** [11,28,32,38–41,43,44]; **** [30,39–41,43,44,48]; ***** [29,35,42,49,50].

The theme, 'Policy' includes leadership categories associated with 'urban climate leadership and policy leadership', 'transformational leadership', 'exemplary leadership', and 'transactional leadership' categories which include construct definitions associated with public servant leadership [37], role model leadership [31], and several others. This theme category includes 18 total articles and emphasizes the use of policy and leadership. For instance, climate policy leadership in the City of Oslo, Norway, "communicates a strong will to succeed at the same time as it shows how the city as a community can get there collectively; leadership displays conviction and provides inspirational motivation" [11] (p. 500).

'Collective Action—Motivating Others' is made up of leadership meanings associated with 'collaborative and integrative leadership' as well as 'public leadership'. These leadership categories consist of explicit leadership constructs mentioned in the literature, such as entrepreneurial leadership [38,39,41], collaborative leadership [32], co-creational leadership [28,32], and distributed leadership [28,46], to name a few. Generally, this theme refers to leadership that involves "helping others to make things happen" [45] (p. 2). It represents a total of 14 articles.

The 'Ideas' theme category is associated with 'cognitive leadership', which "involves defining or redefining ideas and concepts such as ecological modernization, which postulates that ambitious environmental/climate measures may also benefit the economy, e.g., in the form of the 'green' or low carbon economy" [43] (p. 10) and 'leadership in urban policy implementation and institutional management' and makes up nine articles. These two categories make up construct definitions, such as cognitive leadership [39,40,43] and instrumental leadership [11,32]. These forms of leadership embody knowledge leadership and idea generation to influence others.

'Mobilizing Power', associated with seven total articles, embodies 'top-down and power-based leadership'. This theme is made up of command and control leadership [30] and structural leadership [38–40], where "governing institutions remain important and can be vehicles for effective leadership" [30] (p. 349). This can also embody leadership exerted by cities that have the economic and political power to influence climate policies on a broader scale [40].

Lastly, 'People', represents mentions within the literature pertaining to leadership driven by city mayors and other elected officials. This theme category makes up a total of five articles. It includes construct definitions of leadership, such as mayoral leadership [29,42,50], political leadership [35,49], and "a model of powerful, personal leadership, which can be identified in the Mouritzen and Svara (2002) classification as a strong mayor form". These forms of leadership emphasize the power of mayors and other elected officials as being critical agents of leadership in climate mitigation.

Table 2 provides insight into understanding how each region employs the various meanings of leadership. For instance, in Europe, leadership meanings related to policy (n = 10), collective action (n = 9), and ideas (n = 8) were mostly discussed. This contrasts slightly with North America, where policy (n = 4) and collective action (n = 3) are the primary areas in which leadership for climate mitigation is defined. Asia, on the other hand, has a focus on people (n = 1) and policy (n = 1) in relation to the government's official position on climate mitigation policy programming. Considered across all regions was a focus on people (particularly mayors), policy, and collective action—motivating others.

Meaning of Leadership Found in Europe

The leadership emphasis of the included studies from Europe is on multidimensional and collaborative contexts [11,28]. Local strategies for climate change mitigation are guided by various leadership styles, including transformational, pragmatic, and transactional. These three leadership styles fall within the leadership theme clusters of 'Ideas' and 'Collective Action—Motivating Others' (Table 2). Hofstad and Vedeld [11] found that transactional leadership is crucial in adapting to new information for effective climate mitigation, though it can be limited by access to national resources or policy restrictions, as seen in Oslo, where the regulatory environment on capital infrastructure is at the mercy of larger national di-

rectives. Moreover, the concept of 'embedded upscaling' could be employed to encourage laggards to reduce their emissions using legislation to enforce minimum standards [40] conducive to a 1.5–2.0-degree Celsius future and foster pioneership and leadership by actors who are already engaged [43]. Through co-creational leadership (collective action), Oslo, Norway, provides a leadership approach that utilizes a combination of transactional and transformational leadership strategies [11]. Oslo collaborates closely with business, industry, and supranational organizations like the UN to access resources, promote reduction strategies, and create access points for citizens and private/public entities to engage with climate mitigation projects [11].

Urban climate leadership—an area closely linked to core-city climate leadership [32] and clustered under the 'Policy' theme—places emphasis on fostering innovative climate mitigation both at the local and global levels. This explicit meaning of leadership often involves administrative leadership, where appointed officials, such as Chief Municipal Officers (CMOs), play a pivotal role in steering climate policy initiatives [11,28].

Explicit definitions of political and administrative leadership in Europe involve leveraging resources provided by local, regional, and national actors within a multilevel governance system [32]. Political leadership, identified under the 'People' theme category, is defined within the literature as leadership exercised by local political leaders who play a crucial role in setting ambitious climate agendas and driving policy initiatives within municipalities [35,49]. Leadership within these domains tends to vary based on political and administrative systems. For example, in Poland, where political leadership is more dominant, mayors play a larger role in climate policy. In contrast, Norway's administrative leadership ensures the success and longevity of new policy instruments beyond electoral cycles [35].

Other explicit mentions of leadership include structural leadership, themed under the 'Mobilizing Power' category, which emphasizes the economic and capacity advantages inherent in European cities, and entrepreneurial leadership, which centers on diplomacy and networking. Wurzel, Moulton, and colleagues [44] address the leadership challenges faced by structurally disadvantaged maritime port cities (SDCs), underscoring the importance of first-mover advantage and the need for tailored approaches that consider each city's unique context. They argue that being the first to seize or access new opportunities can offer significant benefits but also comes with challenges, particularly in SDCs where competition for investment is fierce. Using Bremerhaven and Hull as case studies, Wurzel, Moulton, and colleagues [44] illustrate the diverse structural challenges faced by different municipalities, highlighting that a one-size-fits-all approach to leadership in SDCs is ineffective. Instead, they advocate for customized leadership strategies—whether entrepreneurial, structural, cognitive (aims to foster new ideas), or exemplary—depending on the specific needs of each city. The authors emphasize the importance of evaluating each city's unique multilevel and polycentric governance landscape to determine the most effective leadership approach based on their individual requirements.

Meanings of Leadership Found in North America

The leadership emphasis of the included studies from North America is dynamic and context-specific, adapting to the unique development stages of communities and emphasizing movement leadership and transitions [47]. Although Canada and the United States have shown distinct differences in recent years, both countries share a focus on participatory and adaptive leadership, which prioritizes building collaborative capacities and inspiring others to achieve common goals through policy entrepreneurship [34,37]. These forms of leadership are appropriately themed under the 'Collective Action—Motivating Others' category.

Touchant [37] identifies six key constructs of leadership within the Canadian context, including municipal climate leadership, political leadership, optimal municipal climate leadership, public servant leadership, symbolic leadership, and participatory leadership. These forms of leadership, largely themed under 'Policy' and 'Collective Action—

Motivating Others', are particularly relevant in large Canadian cities where they foster community collaboration among multiple actors and ensure policy and leadership congruency between elected officials and administrative staff. In contrast, city and state leaders in the United States have demonstrated their commitment to climate mitigation, especially in response to federal policies such as the Trump Administration's withdrawal from the Paris Agreement. These local and state leaders have actively protested the federal stance, reaffirming their dedication to the Paris Agreement's mandates and emphasizing their commitment to global climate goals [51,52]. This is especially evident when looking at initiatives like the US Mayors' Agreement and C40, where public pledges and agreements underscore a commitment to climate mitigation [51,53]. Such approaches are integral to broader climate governance efforts as first steps that aim to create low-carbon cities through collaboration and market-driven solutions [29].

Other meanings of leadership take root, such as performative leadership, which is about 'being green' through actions rather than descriptions, emphasizing the practical implementation of green policies [31]. Moreover, leadership in renewable energy highlights the roles of mayors and the influence of social capital in local political leadership [42]. Furthermore, formal influence from regulatory bodies, themed under 'Mobilizing Power', is necessary for effective climate mitigation [30]. Informal influence is defined by leadership manifesting from informal capacities, such as advisory bodies influencing policy and bottom-up leadership, which emerges from grassroots or citizen-led initiatives, especially from smaller communities; these were also referenced as important leadership considerations within the North American context [30]. Lastly, leadership generated from a place of reducing risk and encouraging private actor behavioral change via government is also present within the literature [34] and is appropriately themed under 'Policy'.

Meanings of Leadership Found in Asia

The leadership emphasis in the included studies from Asia is often referenced alongside 'Policy' and 'People'. Urban climate policy is explicitly defined by several constructs that use administrative status, participation, attention, and the influence of top local leaders to enact climate policy programming. For instance, leadership in Japanese cities primarily revolves around the sustainability and adaptability of climate policies, often necessitating strong mayoral influence and collaborative governance [50].

Distributed leadership, a leadership concept themed under 'Collective Action—Motivating Others', recognizes the contributions of multiple leaders, fostering spontaneous collaboration and role-sharing in the implementation of low-carbon city agendas [46]. Direct involvement of mayors in policy coordination is vital for the success of renewable energy transitions, as they serve as key intermediaries within polycentric and multilevel governance systems [50]. Once again, the durability and flexibility of climate policies often require strong mayoral influence and collaborative efforts.

Sustainable leadership, closely linked to distributed leadership and themed under 'Collective Action—Motivating Others', ensures climate policies outlive individual tenures through the combined formal and informal interactions of various leaders [46]. While there were no explicit meanings of leadership provided by Sue et al. [54] and Gong [55], we thought it was worth mentioning that their discussion of leadership highlights many of the political and policy challenges present within Chinese cities. For instance, climate policy implementations in Chinese cities must endure beyond the tenure of individual leaders through bureaucratic entrepreneurs who institutionalize policies at the local level [55]. This is further emphasized when looking at national leadership ideologies and the role they play in China—heavily influencing local climate policy stances through the directives of environmentally conscious national leaders [54]. Elite local leaders, or top leaders, mobilize support and resources for specific policies, including low-carbon initiatives, and are instrumental in the creation and execution of public policy [36].

In China, political changes at the regional or national levels can significantly impact local climate policies, highlighting the importance of strategic leadership positions. Ad-

ditionally, mayoral leadership in renewable energy transitions, characterized by policy expertise and coordination capabilities, is crucial in the Asian context. Local government leadership in low-carbon city pilot initiatives is evaluated on metrics such as administrative status, participation, and attention to urban low-carbon development [36].

4.3. Enablers of Leadership

In the case of enablers of leadership for climate mitigation in cities, a similar qualitative inductive approach was utilized. First, 153 enablers were classified across 11 child themes and then grouped into five parent themes (Figure 4). Figure 4 highlights the emphasis on multi-actor coordination as being a key enabler for climate mitigation within cities across the literature explored in this study. In this case, multi-actor coordination makes up ~55% ($n = 84$) of enablers of leadership for climate mitigation across the literature and encompasses key ideas such as collaborative governance, horizontal and vertical coordination efforts, multilevel governance influence, and the role of coalitions/private sector partnerships. The themes highlighted in Figure 4 show the specific ways in which climate change mitigation is enabled across the 30 peer-reviewed articles explored in this study.

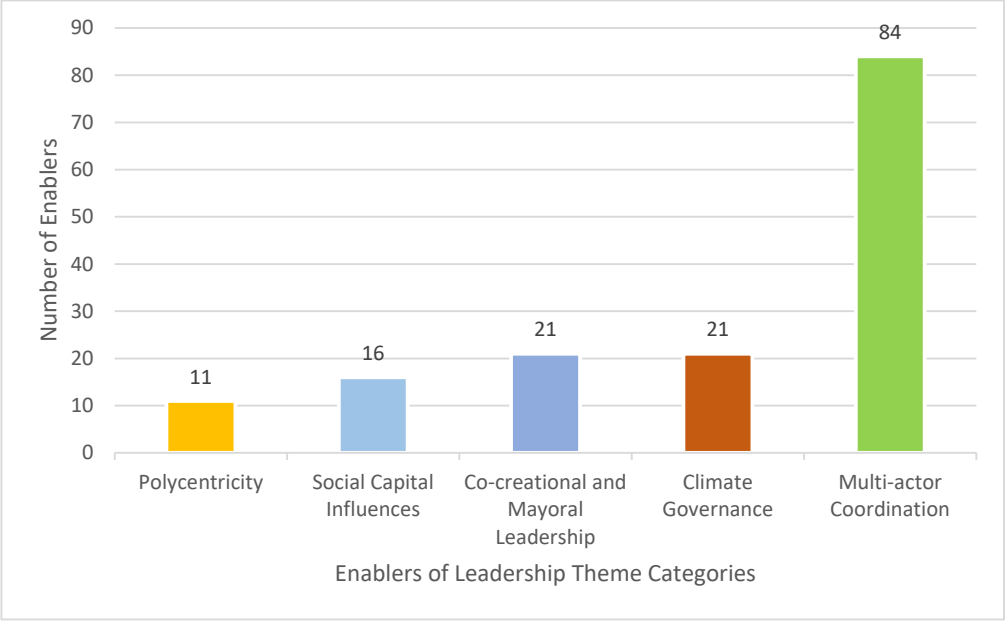

Figure 4. Enablers of leadership for climate mitigation across theme categories.

While general considerations surrounding adequate resources, stakeholder engagement, and institutional capacity are universal leadership enablers for climate mitigation, regional differences highlight the importance of political context, economic support, and community involvement.

In Europe, enablers of leadership for climate mitigation are characterized by multi-actor coordination, including stakeholder mobilization and climate governance, including strong institutional capacities. This is highlighted in cities like Asker, Norway, and mid-sized German cities such as Potsdam and Rostock, where leaders leverage political alliances and socio-cultural awareness to maintain support and followership [11,38,45]. Other leadership enablers include strong structural elements such as a young population, a strong economy, climate-supportive leadership, and strong research ecosystems and collaborative platforms [38]. The EU's multilevel governance system and national funding programs provide financial support and encourage ambitious climate goals [39,40]. Additionally, collaboration platforms and trust-building measures lower participation barriers and enhance stakeholder engagement [28]. Contextual enablers re-emphasize the importance of positive

socioeconomic conditions, energy infrastructure, and previous climate-related experiences. These contextual layers contribute to positive climate mitigation leadership outcomes and have been identified as critical leadership enablers for climate change mitigation in Europe.

North American cities, particularly in Canada and the United States (US), benefit from strong climate governance, social capital, and policy congruency. The dissent caused by unpopular US national policy decisions, such as the withdrawal from the Kyoto Protocol and the Paris Agreement, spurred city and state officials to take independent climate action, leading to initiatives such as the US Mayors' Climate Protection Agreement [30,51,53]. Voluntary climate change mitigation pacts and participation in climate networks enhance political influence and capacity building for effective climate governance [31,37]. Socioeconomic factors, population density, and community resources are also identified as critical enablers of leadership [42]. From a Canadian perspective, municipal climate leadership in cities such as Toronto, Guelph, and Bridgewater are examples of cities where congruency between elected officials and municipal administration, networks, funding, municipal capacity, citizen participation, and mayoral involvement are key enablers of leadership for climate mitigation [37]. Furthermore, participation in climate networks like ICLEI, the FCM-ICLEI Partners for Climate Protection (PCP), and C40 enhance political influence, build capacity, and allow for knowledge sharing of best practices and innovations [37].

Asian cities tend to focus on political sensitivity, local leadership, and the skills of key political and administrative leaders. For example, in China, mid-level bureaucrats play a crucial role in implementing low-carbon policy experiments [55]. Mayoral leadership in Japanese cities and the alignment between political leadership and implementation alliance groups in China significantly enhance policy engagement and effectiveness [50,54]. In Japanese cities, mayors control most expenditures, making them critical partners for climate change mitigation programming. Distributed leadership within residents' association committees in Malaysia emphasizes trust, open communication, and mutual support [46] as being key enablers for effective climate mitigation programming. Distributed leadership recognizes that leadership presents across multiple actors within a city, including those who are not formally recognized as leaders [46]. Distributed leadership focuses on the interaction of participants in leadership roles rather than outcomes [46].

In addition to the geographical contexts discussed above, three articles from this systematic review focus on conceptual studies where leadership was a general focus. Davidson and Gleeson [29] discuss access to experts, international accolades or recognition of work, city involvement in international networks, and the use of policy levers for market-based solutions such as incentives, bonds, green mortgages, and clean development programs as enablers of leadership for climate mitigation. Wurzel, Liefferink, and colleagues [43] (p. 7) emphasize the significance of "institutional, politico-administrative, informational-cognitive and technological capacities as core drivers of leadership/pioneership". They also identify ambition, both internal and external, as enablers of leadership. Sancino and colleagues [33] explain the importance of boundary spanning, which involves actions that go beyond the physical limitations of the city and reach a global audience, and collaboration as key enablers of place-based leadership—leadership that is rooted in specific places, leveraging local resources and context to address climate challenges.

4.4. Similarities and Differences Across the 30 Articles

Leadership and climate policy across all three regions is characterized by a strong emphasis on collaboration across multiple levels of governance, involving various actors such as local, state, national, and international stakeholders [45,46,53]. The durability of climate policies beyond the tenure of initial leaders is crucial for sustained climate mitigation, especially in Asian and European cities [28,55]. Mayors and local leaders play pivotal roles in driving renewable energy transitions, often requiring significant policy knowledge and coordination skills [42,49,50]. Mayoral leadership has been strongly referenced throughout the literature and is a common underlying theme for climate mitigation leadership across North America, Europe, and Asia.

Different forms and dimensions of leadership, as previously discussed, are explored, including transformational, pragmatic, transactional, cognitive, structural, entrepreneurial, and exemplary forms [28,43]. Leadership mechanisms vary widely, with approaches such as leveraging market mechanisms, policy entrepreneurship, and distributed leadership being employed to achieve climate goals [29,37,46].

Despite these commonalities, the meanings of leadership and enablers of leadership for climate mitigation are often context-specific and tailored to the unique challenges and development stages of communities. This is an expected finding, as regions differ, and the countries and cities within each region have their own respective climate mitigation priorities. The influence of social capital and citizen involvement is often highlighted as critical in mobilizing leaders and ensuring successful climate policy implementation [42,47]. Different authors address specific challenges faced by leaders, such as the need for higher-level policy support and the dynamic nature of multilevel governance systems [32,53]. Table 3 helps to summarize many of these differences and similarities found across the literature.

Table 3. Similarities and differences found within the literature.

Similarities	Differences
Collaborative and Multi-actor Involvement: Many authors emphasize the importance of collaboration among various actors at different levels (local, state, national, international) for effective climate leadership [42,45,46,53].	Context-specific Leadership: Some authors focus on the unique context of leadership, such as local political changes affecting climate policy [54] and the tailored approach to community development stages [47].
Policy Endurance: The durability of climate policies beyond the tenure of initial leaders is highlighted as a crucial aspect of leadership [28,55].	Types of Leadership: Leadership is defined through various lenses, such as symbolic [51], strategic urbanism [29], performativity [31], distributed [46], and movement leadership [47].
Role of Mayors and Local Leaders: The role of mayors and local leaders is frequently highlighted as pivotal in driving renewable energy transitions [42,49,50].	Leadership Mechanisms: Different mechanisms are employed to enact leadership, including leveraging market mechanisms [29], policy entrepreneurship [37], and horizontal and vertical coordination [50].
Leadership Forms and Dimensions: Multiple forms and dimensions of leadership, such as transformational, pragmatic, transactional [28], and cognitive, structural, entrepreneurial, and exemplary [43], are discussed.	Focus Areas: Focus areas vary from climate policy enforcement [55] and low-carbon city initiatives [36] to the influence of social capital and citizen involvement in climate policy [42].
Influence and Motivation: Leadership often involves influencing others and motivating various stakeholders to engage in climate mitigation [37,50,56].	Leadership Challenges: Some authors address the challenges leaders face, such as the need for policy support from higher government levels [53] and the dynamic nature of multilevel governance [32].

4.5. Research Gaps Identified in the Literature

Research in the realm of urban climate leadership and governance reveals several research gaps. One is highlighted by Hofstad and Vedeld [11], who underscore the necessity of blending various leadership theories to effectively elucidate city climate leadership within the larger context of urban governance. This blending should explore synergies among different leadership theories, especially within polycentric systems where cities operate as integral components. Similarly, Hofstad et al. [28] point out the lack of practical knowledge concerning how cities engage in climate leadership, emphasizing the need for investigations into different leadership types across diverse settings. They stress the significance of understanding conflicts and path dependencies that may impede co-creational climate leadership, particularly focusing on hybrid forms of urban climate governance that integrate regulatory and collaborative tools.

Furthermore, Christensen [45] underscores the necessity for more research to ascertain the requisite mixes of leadership and institutional designs to achieve various public values. This includes exploring the role of qualitative comparative analysis (QCA) in advancing the contingency approach to collaborative governance utilizing databases on collaborative governance cases for comparative analyses across nations and policy domains. Similarly, Cidell [31] draws attention to the evolving nature of Leadership in Energy and Environmental Design (LEED) standards and the challenges faced by building inspectors in ensuring compliance, urging further investigation into cities' decision-making processes regarding such policies.

Davidson and Gleeson [29] stress the need for significant shifts in beliefs, behaviors, and institutional practices to achieve sustainable urban futures, particularly in the context of low-carbon cities. This resonates with the call by Fraser et al. [42] for comparative research on mayoral roles in energy transition across diverse governance systems, including economically peripheral regions and the Global South. Gong [55] echoes the need for a pluralistic implementation approach, emphasizing the importance of low-carbon bureaucratic capacities and government-business partnerships.

Additionally, Haupt et al. [38] emphasize the oversight in acknowledging mid-sized and small cities' leadership and climate mitigation, advocating for research that explores the relative importance of city characteristics and EU multilevel governance effects on climate policy pathways. Torney [41] further stresses the need to expand frameworks and studies beyond EU-focused examples, especially concerning non-state actors and global climate governance landscapes post-Paris Agreement. Lastly, Touchant [37] underscores the potential of municipalities in fostering comprehensive climate change adaptation and resilience through collaborative governance, emphasizing the importance of understanding social contexts and inequities for successful climate initiatives.

5. Discussion and Conclusions

This investigation contends that leadership is a key ingredient in effective climate change mitigation for the longevity of policy experimentation and implementation [55]. Ideally, blending the strategies discussed thus far, including changes to legislative authority to allow for more municipal autonomy and the application of leadership theory, strategies, and approaches, can foster the right combination of elements to collaboratively engage various actors [28]. These actors include government, citizens, citizen groups, international networks, and public/private partnerships, all working together to enable short- and long-term climate change mitigation programs at the local level.

The role of leaders in cities should seek to bridge divides among divisive citizen groups [11,33,40]. It should use climate literacy and symbolic leadership gestures, such as signing on to international network groups and coalitions, to stimulate climate mitigation interest [51]. Cities can benefit from investing in green building strategies and projects to garner the attention of the construction industry, using performativity theory as a basis for a policy-by-doing approach [31]. Just as the proximity of 'green' cities in the US to non-green cities fosters healthy competition [31], cities worldwide could work together to create recognition programs to celebrate achievements and share best practices and resources [37]. These programs could incorporate even the smallest and most resource-deprived and disadvantaged cities worldwide [39].

These leadership actions could create a market for international investment in innovative climate mitigation technology, services, and actions. Being recognized as an international emissions reduction leader can stimulate interest in business and industry groups, improve low-carbon city development standards at the local level, generate civic pride, and instill a sustainability culture centered on the core principles of climate mitigation as articulated in the Paris Agreement [31].

The research question driving this study is: What is the current state of literature on leadership in cities as it pertains to climate change mitigation? This systematic literature review has highlighted the multifaceted nature of leadership and climate change mitigation

by understanding the ways in which leadership is explicitly defined within the literature, understanding key enablers of leadership, homing in on similarities and differences, and lastly, exploring research gaps across the literature.

As our findings were largely oriented around three regions—Europe, North America, and Asia—this SLR focused on positioning its findings within these three regional contexts. As such, leadership in Europe is characterized by its multidimensional and collaborative nature, involving transformational, pragmatic, and transactional approaches to address climate change at the local level [28]. Political and administrative leaders leverage resources from local, regional, and national actors within a multilevel governance system [32]. Key actions include fostering institutional co-design, trust, and safe environments for dynamic climate governance [11]. European leaders also play crucial roles in horizontal and vertical coordination, pushing boundaries with national and regional bodies to enact climate policies [32].

In North America, leadership often manifests through symbolic actions and strategic urbanism. Local leaders, particularly mayors, leverage partnerships and market mechanisms to create low-carbon cities [29]. Symbolic leadership demonstrates a commitment to climate mitigation through public pledges and agreements, as seen in initiatives like the US Mayor's Agreement and C40 [51,53]. Strategic urbanism involves utilizing tools like the carbon market to foster change [29]. Mayors play pivotal roles in forming partnerships, passing renewable energy resolutions, and engaging in vertical coordination efforts [42].

In Asia, leadership emphasizes the sustainability and adaptability of climate policies. Strong mayoral influence and collaborative governance are crucial, with sustainable leadership ensuring policies endure beyond individual tenures [55]. Distributed leadership fosters spontaneous collaboration and role-sharing, while national leadership ideologies significantly impact local climate policies [46,54]. Mayoral leadership is essential for renewable energy transitions, requiring policy knowledge and coordination skills [50].

This study contributes to scholarship by synthesizing diverse perspectives on the state of leadership and climate change mitigation across each of the three regions. It recognizes unique regional characteristics like political context, economic support, and community involvement. These insights can inform the development of tailored strategies for effective climate governance.

For practical implications, the findings underscore the importance of empowering local leaders, fostering collaboration across governance levels, and leveraging both symbolic and strategic actions to drive climate change mitigation. Cities can enhance their climate leadership by engaging in international networks, building partnerships, and implementing innovative policies that promote sustainable urban development [57].

Future research should address the limitations identified in this study and aim to capture empirical research on the state of leadership and climate change mitigation across continents absent from this systematic review, such as Africa, Latin America, and Oceania. More specifically, additional empirical studies are needed to explore the practical application of different leadership types across diverse settings, as many regions of the Global South are becoming an emerging source of climate change emissions due to rapid population and economic growth [58]. Further, comparative research on the roles of mayors and other key actors in energy transitions across various governance systems, including economically peripheral regions and the Global South, would provide valuable insights [42,58].

The conversation on leadership and climate mitigation is missing contributions from the management literature, something worthwhile for future scholars to investigate. A contribution from a management perspective may illuminate key strategic leadership modalities outside the multidisciplinary work conducted on the topic to date, which might propel climate mitigation leadership more broadly across polycentric and multilevel governance domains. Lastly, another research area worth considering includes an investigation into the synergies among different leadership theories, particularly within polycentric

systems, which is essential to understanding how cities can effectively engage in climate leadership within the larger context of urban governance [11,59].

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