Walk21 Library

Analysis Report

ACKNOWLEDGEMENTS

EXECUTIVE SUMMARY

The purpose of this report is to provide an overview of knowledge contained within the **Walk21 Library**, the database of the collected proceedings covering 20 years of annual Walk21 conferences, and was commissioned by the **Volvo Research and Education Foundations (VREF)** to support their commitment to global research and education on policymaking in sustainable transport, particularly as it relates to the United Nations Agenda 2030 Sustainable Development Goals.

In commissioning this report, VREF is specifically interested in the extent to which the material contained within the Walk21 Library can contribute to a greater understanding of **walking as a mode of transport,** and to inform a research agenda capable of addressing the specific challenges of those living in the Global South.

The report provides a descriptive overview of the items in the Walk21 Library, exploring differences between academic contributions and the database as a whole across dimensions such as **organisation type**, **method**, **geographic focus** and **terminology**, as well as analysing narrative trends in knowledge-based discussions around walking, through **keyword analysis** and **corpus analysis**, and how these trends have changed over time.

Since its foundation, Walk21 has established itself as the foremost organisation for the promotion of walking and sustainable communities globally. Its conferences have attracted a variety of stakeholders: academics, advocates, practitioners, and policymakers at the highest levels of government, all with a shared interest in walking.

Beginning in 2000, **Walk21 conferences have generated a substantial body of knowledge covering both academic and applied research**, as well as case studies and policy interventions aimed at understanding, promoting and measuring walking in a walkable world. **This knowledge has been preserved in the Walk21 Library.**

While the profile of walking has improved relative to other transport modes in the last 20 years, it remains an underdeveloped area in transport research, generally. This is especially relevant to understanding the experiences of those living in low-income countries, for example, in the Global South where the modal share of walking is high and walking the dominant mode of transport by necessity.

The Walk21 Library represents an extremely valuable resource in this regard. It contains over 1,600 individual items covering research papers, case studies, posters and presentations, from academics, practitioners and policymakers, from a range of countries and territories. Given this volume of walking-focused material, and its international dimensions, the Walk21 Library has the potential to serve as a useful corrective to gaps in knowledge around **walking as a mode of transport**.

In addition to the summary descriptive statistics described above, a keyword analysis of the Library items was also used to identify the most meaningful themes relating to **Walking as a Mode of Transport** around which the Library contents could be organised.

The themes identified are listed below, in order of prominence:

- **Planning for Walking** as a Mode of Transport (**keywords**: *urban design, urban planning, public space*);
- **Promoting Walking** as a Mode of Transport (**keywords**: *promotion, health, community*);
- **Measuring Walking** as a Mode of Transport (**keywords**: *data, evaluation, measurement*);
- **Enabling Walking** as a Mode of Transport (**keywords**: *design, technology, wayfinding*);
- **Developing Policies for Walking** as a Mode of Transport (**keywords**: *government policy, development plans, pedestrian culture*); and
- **Making Walking Accessible** and **Safe** as a Mode of Transport (**keywords**: *safety, mobility, security*).

The review demonstrates the value of combining academic, practitioner and policymaker perspectives in a centralised resource for the development of policy in relation to **Walking as a Mode of Transport**. There is a great deal of consistency among the contributions in terms of their commitment to elevating the status of walking in transport research, and generating the evidence base required to do so with confidence. Nevertheless, there are subtle, but meaningful, differences too in how academic and practitioner contributors engage with the topic of **Walking as a Mode of Transport**. For example, the analysis identifies that academic items within the Library are *relatively* more concerned with **method** and **measurement** than the practice- or policy-focused items, which have a *relatively* greater focus on **promotion** and **communication**.

When we look specifically at keywords, the academic items appear to be more concerned with **the physical environment** and **evidence** whereas the Library as a whole is more concerned with aspects of **implementation** and **communication**. There are no substantive differences in quality between different categories of contributor, simply a difference in the lens they apply to their work.

Again, this highlights the value of the multidisciplinary and collaborative nature of the Walk21 conference and is reflected in the distribution of different research approaches featured in the Library.

Methodologically, the Library is diverse. However, while **qualitative approaches** are the second largest category amongst academic items, **policy** and **case study** items are much better represented in the database at an overall level than qualitative approaches. Overall, the Library is **dominated by items and papers that are coded as quantitative**, and these represent the largest category.

This emphasis on quantitative methods perhaps reflects the need for generalisable measurement standards that can form a robust evidence base for policy development. However, the analysis also illustrates a historic **geographic imbalance**, with the majority of evidence derived from European and North American contexts and cultures. As such, **moving forward, any research agenda that hopes to address the issues in the Global South will need to support work aimed at mitigating these disparities.**

Encouragingly, Walk21's commitment to its mission of global advocacy is evidenced by two Global South conferences in the last decade, in Mexico City (2012) and Bogota (2018). And case studies of experiences and practice contained in the Walk21 Library from these conferences provide contextually-sensitive solutions and applications of walking research from the Global South.

In addition to the uneven geographic focus, the analysis also identifies a skewed distribution in the **thematic areas** represented in the Walk21 Library. While there are a few terms (**urban design, urban planning, health** and **promotion**) that occur significantly more frequently than others, there are also a number of thematic areas that remain *relatively* underrepresented in the Walk21 Library. These include the issues of *gender* and *accessibility*. Although it is perhaps more accurate to say that the issue of *accessibility* is unevenly represented, rather than under-represented, in the Library.

While mobility and visual impairments are addressed to some degree, other impairments, such hearing impairments, are not. Additionally, the *accessibility* keyword has evolved in its use, in terms of its application to code Library items,

from a focus on disabled access to an emphasis on accessibility more broadly construed i.e. general provision of walking infrastructure, permeability, catchment analysis, access to public transport, etc.

This highlights another particularly valuable source of insight provided by the Walk21 Library: **a resource through which the evolution and emergence of thematic areas within walking research can be tracked**, and the ability to assess such changes over time. To do this, this overview of the Walk21 Library compares the text of abstracts from the first 10 years (2000-2009) of the Walk21 conference with abstracts from the second 10 years (2010-2019) and extracts various features for comparison and visualisation. This comparison captures a number of aspects of the evolution that has occurred over the 20 years of the conference.

While the focus of the Walk21 conference remains consistent, it is not static. Most notably, the analysis shows how the conference series has evolved from one supporting a nascent community pursuing a novel transport research programme, around a specific mode of travel, to one that is now contributing to the development of appropriate provision for walking within active and sustainable transport agendas.

Analysis of the Walk21 Library indicates a shift in emphasis over time from an initial focus on the discrete role of walking in transport policy towards closer engagement to the broader transport agenda. This has been achieved through the development of standardised data collection procedures and measurement protocols for walking, as well as greater focus on overarching considerations such as the *economics* of providing for walking, particularly the financial impact and benefits, in transport policy.

Other themes that might be expected to feature more prominently, particularly *climate change*, are emerging as thematic areas likely to dominate into the future and r**eview of the Walk21 Library shows how language is evolving in these emerging thematic areas**. For example, *climate* is - relatively recently - emerging as a companion keyword to items concerned with *sustainability* and similar environmental issues.

The report also provides an analysis of the general **policy alignment of material contained in the Walk21 Library with relevant international policy frameworks,** including: Walk21's International Charter for Walking and the United Nations' 2030 Sustainable Development Goals.

Walk21's International Charter for Walking is a common policy reference for cities, organisations, neighbourhood groups and individuals who wish to encourage more everyday walking and greater walkability. The Charter Principles reflected most heavily in the Library overall were: *well designed and managed spaces and places for people*; *more supportive authorities*; *and supportive land-use and spatial planning.*

It is clear that a walking agenda can contribute to the United Nations' 2030 Agenda for Sustainable Development. This is reflected in the extent to which walking underpins many of the UN's Sustainable Development Goals, for example: **Goal 3 -** Ensure healthy lives and promote well-being for all at all ages; **Goal 9 -** Build resilient infrastructure, promote sustainable industrialisation and foster innovation; and **Goal 11 -** Make cities and human settlements inclusive, safe, resilient and sustainable.

Overall, the report shows a strong level of alignment between the Library material and individual targets within the Sustainable Development Goals. The most frequently addressed indicators were **Target 11.3** (*By 2030, enhance inclusive and sustainable urbanisation and capacities for participatory, integrated and sustainable human settlement planning and management in all countries*) and **Target 11.7** (*By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, particularly for women and children, older persons and persons with disabilities*).

Finally, **the report concludes with a number of recommendations, based on the review of material in the Library, for future research into Walking as a Mode of Transport:**

- Mind the Gaps: Addressing Emerging Research Priorities

In a short period of time, the issues of climate change, zero- carbon travel and the economic impact of sustainability have become critical to any consideration of transport policy. **Walking research must be in a position to rapidly respond to dynamically changing policy environments to maintain its visibility in transport policy globally**, and to promote the value of **Walking as a Mode of Transport**. As such, it is recommended that agile funding and support mechanisms, such as rolling research calls, be developed to support researchers to respond rapidly to emerging policy needs.

- More Capacity Building: Making Walk21 Knowledge Accessible

Many Walk21 contributions lack any of the standard forms of persistent identification, such as Digital Object Identifiers (DOI), that exist in academic publishing. This means that the knowledge presented at Walk21 conference is often not typically discoverable through traditional research literature search and is, thus, less amenable to citation, restricting its reach and impact. **To promote engagement with future Library material, it is recommended that support is given to make Walk21 knowledge more accessible to professional research communities.** This could be achieved through the publication of an academic output, summarising conclusions and narrative themes of Walk21 conferences, or providing selected participants with the opportunity to generate academic scholarship and recognition from their participation at Walk21.

- Geographical Equity: Addressing Balance and Inclusion

Research pertaining to the Global South experience is underrepresented in both the Walk21 database, and in the broader academic literature too. **Achieving Geographical Equity necessarily involves capacity building in underrepresented areas.** As such, it is recommended that support mechanisms, in the form of additional training or financial aid, be developed that might allow those working in under-represented geographic areas to develop their Walk21 work for wider dissemination in either a dedicated Walk21 publication, or in other conventional academic venues. Walk21's 4-regional network strategic model (Americas, Asia-Pacific, Europe and Africa) may provide a mechanism through which this recommendation can be delivered.

- Knowledge into Action: Supporting Policy Effectiveness

During the last 20 years 103 countries have developed a policy for Walking as a Mode of Transport. This represents 50% of countries globally however 44% of the countries with a walking policy are high income, 48% middle income and only 8% low income. **Further research is required to understand what, if any, evidence base underpins this policy and to what extent knowledge is being applied effectively.** The huge global demand for safe places to walk, in response to the COVID-19 pandemic, highlights the need for new research that evaluates the effectiveness of existing policy to global emergencies. This is another opportunity for VREF to underpin policy with relevant and accessible knowledge.

1.INTRODUCTION

Walking is our fundamental and primary mode of mobility. Despite, or perhaps because of its ubiquity and accessibility, it is usually under-valued. This is true at a micro-level, in terms of the lack of attention paid to walking as a mode of travel and the contribution of walking at the beginning and end of journeys by other modes. It is also true at a broader level when overlooking the potential benefits an increased role for walking can play in responding to the challenges of climate change and sustainable development through, for example, the reduction of carbon-emissions, pollution, congestion and increased access and public health.

The enduring motivation for the Walk21 Foundation has always been to support: 'everyone's right to walk in a safe, inclusive and welcoming environment in order to access basic services; enhance public health and ensure an equitable and sustainable transport system. Walk21 work to ensure that the benefits and value of walking are recognised - and recorded - through the development of appropriate standards, guidelines and resources. To this end, the International Walk21 Conference on Walking and Liveable Communities has been held every year since inception in 2000. The proceedings of all these events, contained in the Walk21 Library, can help policy makers, practitioners, academics and walking advocates further their work.

1.1 Background to the Walk21 Library

The Walk21 Library of 1,671 items contains a variety of documents including research papers, case studies, posters and presentations, from academics, practitioners and policymakers, covering a range of countries and territories. The documents contained in the database are the collected proceedings from the International Walk21 Conference series, which has been held annually since 2000, each time in a different country, hosted by a different city or organisation. Over time, the format of these papers has evolved from full written documents with presentations, to mostly presentations and posters. These papers and posters presented at the conference have continued to be selected through peer review by the conference program committees.

The work presented at the conference includes both **primary** (quantitative, qualitative and mixed-methods studies) and **secondary** (review articles, reanalysis of government statistics) research. The Library is hosted online - https://walk21.com/resources/the-library/ - enabling searches by year of conference, location, keywords, author, and date of presentation. It proves to be a continuing reason people visit the site and over the years has had high hit rates.

1.2 Methodology

This report provides a summary of the material contained in the Walk21 Library, including summary statistics and charts outlining, where available, the source (e.g. organisation type), geographic focus and method of each item. To provide VREF with additional insight into the contributions contained in the Library, a form of rapid review technique has been adopted to inform the thematic analysis contained in Chapter 3 of this report.

1.3 Rapid Review

A rapid review is an approach used to summarise evidence accurately and reliably and is particularly useful for the efficient interrogation of knowledge resources, such as the Walk21 Library. It involves a systematic search process based on pre-specified criteria to answer a research question.

For the purposes of this particular report, given VREF's stated interest in the topic, the primary inclusion criterion was the identification of literature, particularly academic literature, contained in the Walk21 Library that addressed the topic of **Walking as a Mode of Transport**.

Typically, the first step in a rapid review process is to identify sources from which the literature to be included in the review will be drawn. In this case, as we were primarily concerned with the contents of the Walk21 Library, a broader literature search was not required. Instead, a keyword analysis was used to identify the most relevant items for inclusion in the review. This also identified six broad themes relating to **Walking as a Mode of Transport** around which the Library contents could be organised.

Given the focused, domain-specialist nature of the Walk21 Library, and the broad keyword selection conventions used for classifying its contents, it was ultimately determined that the vast majority of the Walk21 Library addressed the topic of **Walking as a Mode of Transport**, and a manual, qualitative appraisal of items in the Library was used to filter out those most relevant to the topic of **Walking as a Mode of Transport**. Due to the limitations of those compiling the report, it was necessary to restrict this appraisal to those items written in English or with an English language abstract (the vast majority of documents).

Report Structure

This report begins with a summary of the material contained in the database before turning, in Chapter 3, to a thematic analysis of the items most relevant to the topic of **Walking as a Mode of Transport**. Chapter 4 presents a brief analysis of the library material's policy alignment with relevant international frameworks, Walk21's International Charter for Walking, and the United Nations' Sustainable Development Goals. Chapter 5 examines shifting trends between the first 10 years of the Walk21 conference and the second decade of the conference, through analysis of focus, methods and keywords used in the Walk21 Library. Finally, Chapter 6 summarises the key conclusions of the report and presents recommendations, for a future research programme into **Walking as a Mode of Transport**.

2. DESCRIPTIVE SUMMARY OF THE WALK21 LIBRARY

This chapter presents summary statistics of the Walk21 Library , highlighting the diversity of contributions to Walk21 conferences, particularly in terms of the contributing organisation type and the range of methodologies employed.

To help VREF understand better the nature of content available in the Library, this chapter also presents a comparison of summary statistic, keyword analysis, and language between academic items in the database and the database at an overall level.

2.1 Items by Organisation Type

1,385 items in the database are currently coded by organisation type. Of these, the largest proportion (27%) are from 'Government' organisations. 'Academia' accounts for 24% of all items, the same proportion as NGO (non-governmental organisation) items. 'Private' (usually consultants) and 'Research' (usually non-university based) organisations account for 18% and 7% of these items, respectively. Encouragingly, this relatively balanced distribution between organisation types demonstrates that the conferences are not dominated by any single stakeholder group or audience but brings together the different stakeholders needed for constructive exchange.
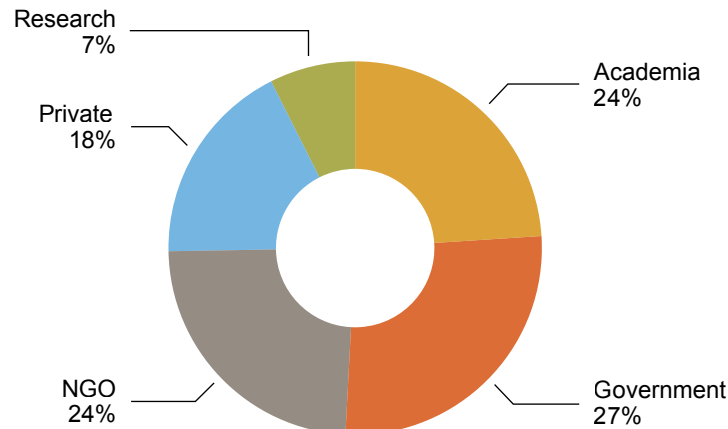
Figure 2.1 Items by Organisation Type

2.2 Items by Geographic Focus

The database contains 1,661 items coded by **Geographic Focus**, generating a total of 1684 codes, reflecting a small number of items with more than one geographic focus. Of these, the largest proportion (44%) are coded as having a focus on **Europe**, more than twice that of **North America** (17%), the next most popular category, and four-times that of **Oceania**-focused items (11%). **Africa** (1%), **Latin America & Caribbean** (6%) and **Asia** (7%) then account for significantly smaller contributions again. 14% of coded items are recorded as having a geographic focus that is '**Not Specific**' which can mean either a global piece or the material is not context specific.
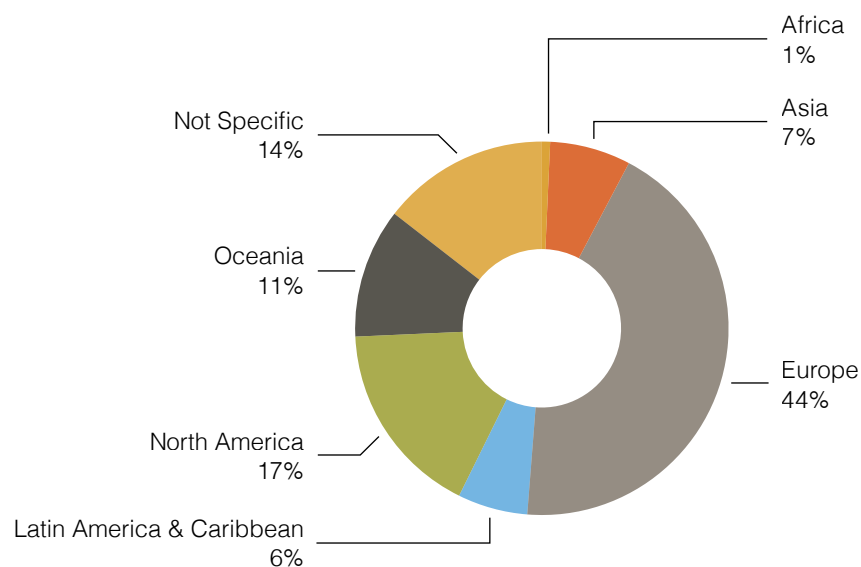
Figure 2.2 Items by Geographic Focus

The uneven distribution illustrated above highlights the current imbalance in presentations that take as their focus territories other than Europe, and particularly the lack of attention to the Global South. In this respect, the Walk21 library reflects broader trends in transport research in which the experiences of those living in low-income countries, particularly in the Global South, is under-researched. Walking was under represented in research in the Global North in the early days of the conference too.

The distribution of geographic focus also reflects the geographical location of the conference, as illustrated by Figure 2.3 above, which have been predominantly in the Global North over time. This contextual analysis is further elaborated in Chapter 5.
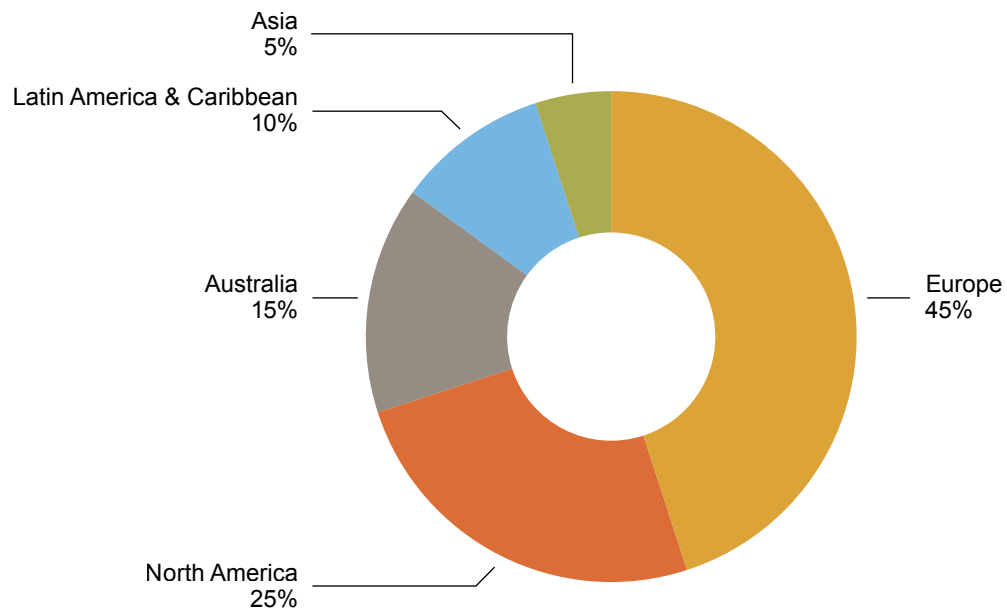
Figure 2.3 Walk21 Conferences by Locations

2.3 Items by Method

The Walk21 database contains both primary research and secondary research (including literature review articles), as well as policy papers and case study presentations.

This variety of approaches is captured by a 'Method' code for items in the Library which indicates the nature of the work presented. Typically, codes such as '**quantitative**', '**qualitativ**e', '**literature review**', '**secondary research**', etc. indicate adherence to formal research methodologies or protocols, whereas '**policy**' and '**case study**' tend to be allocated to more narrative practitioner presentations, plenaries or keynote speeches.

768 items in the database are currently coded by method, generating a total of 952 method codes, reflecting a small number of multi-method items. As illustrated below, Items and papers with a **quantitative** methodology account for more than a quarter (28%) of all those coded by method.

The next largest categories are items coded as **policy** (25%) and **case study** (19%), perhaps reflecting the sizeable proportion of practitioners and policymakers presenting at the conference.
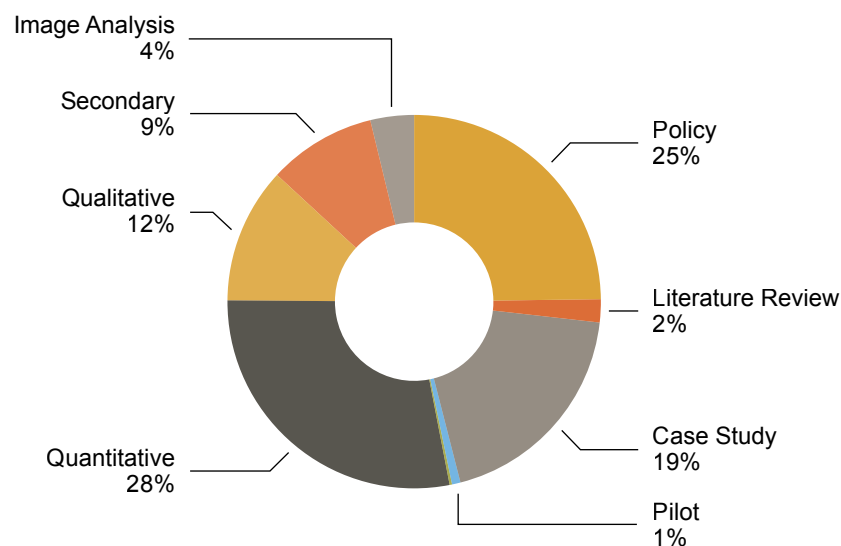
Figure 2.3 Items by Method

Other less popular method / study types contained in the database include **qualitative methods** (12%), **secondary research** (9%) and **image analysis** (4%).

2.4 Summary of Academic Items in Walk21 Library

This section of the report examines the **Academic** Items (24% of the total) in the Walk21 Library in terms of **Geographic Focus** and **Method**, and compares them to the overall database.

2.4.1 Academic Items by Geographic Focus

The database contains 331 academic items coded by **Geographic Focus**, generating a total of 335 codes, reflecting a small number of items with more than one geographic focus. Of these, exactly half (50% (12% of all items)) are coded as having a focus on **Europe**, more than three times that of **North America** (15%) next most popular category and five-times that of **Asia**-focused items (10%). 'Africa' (1%), '**Latin America & Caribbean**' (4%) and '**Oceania**' (7%) account for smaller contributions. 13% of coded items are recorded as having a geographic focus that is '**Not Specific**'.
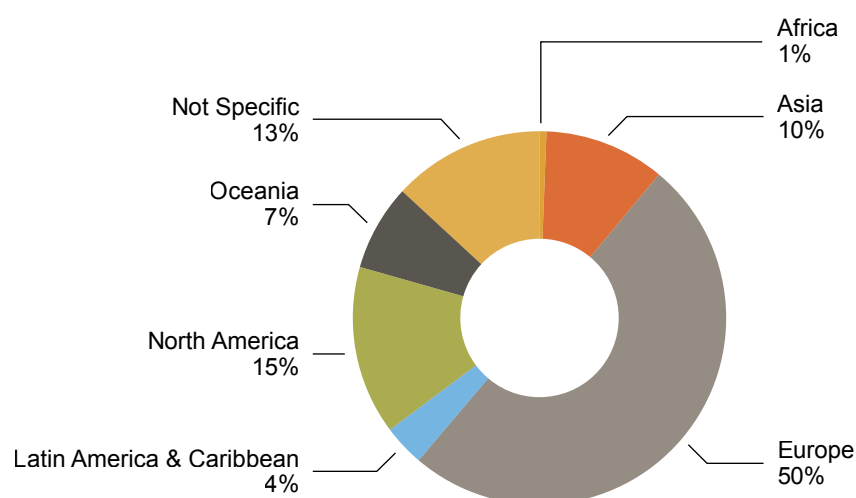
Figure 2.4.1 Academic Items by Geographic Focus

As the table below shows, the uneven distribution of **Geographic Focus** captured earlier in the analysis of the Walk21 Library at an overall level is exaggerated when we look separately at **Academic** items. That is, there is an even greater focus on **Europe** and even less focus on **Latin America & Caribbean** countries in **Academic** items, compared to the database as a whole.

Region	Academic Items	Overall Database
Europe	<u>50%</u>	44%
North America	15%	<u>17%</u>
Oceania	7%	<u>11%</u>
Asia	<u>10%</u>	7%
Latin America & Caribbean	4%	6%
Africa	1%	1%
Non-specific	13%	14%

Table 2.4.1.1 Geographic Focus: Academic Items and Overall Database compared

2.4.2 Academic Items by Methods

Academic items in the Walk21 Library were coded by method, generating a total of 220 method codes, which also included a small number of multi-method items. Items and papers with a **Quantitative** methodology account for more than a third (36%) of all those coded by method. The next largest category is **Qualitative** (17%), followed by **case study** (16%) and **policy** (15%) items, with much small proportions of items coded as **Secondary (8%)** research, **Image Analysis (5%)** or **Literature Review** (3%).
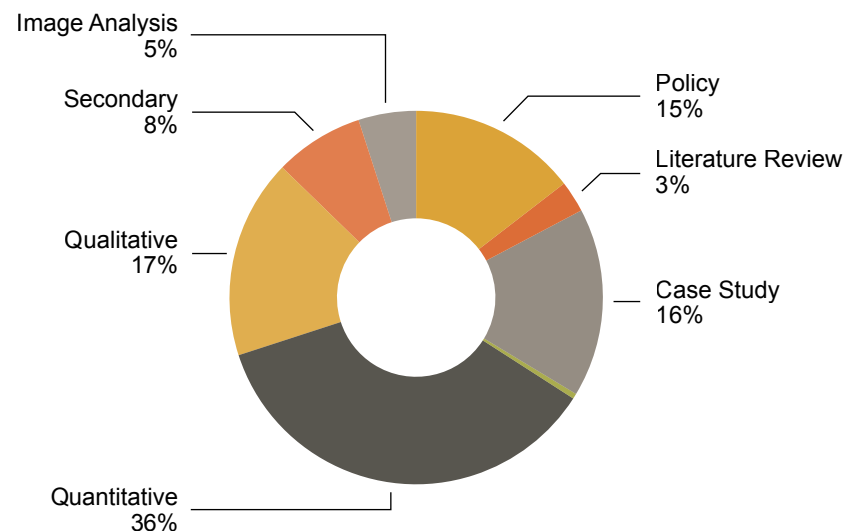
Figure 2.4.2 Academic Items by Method

As the table below shows, the distribution of **Method** varies considerably between the **Academic** items and the Walk21 Library at an overall level. Both **Quantitative** and **Qualitative** method items are considerably better represented in the **Academic** items compared to the Database at an overall level, whereas, perhaps unsurprisingly, **Policy** and **Case study** items are much better represented in the database overall than in the **Academic** items.

Method	Academic Items	Overall Database
Quantitative	<u>36%</u>	28%
Policy	15%	<u>25%</u>
Case study	16%	<u>19%</u>
Qualitative	<u>17%</u>	12%
Secondary	8%	9%
Literature review	3%	2%
Image analysis	5%	4%

Table 2.4.2.1 Method: Academic Items and Overall Database compared

2.5 Keyword and Corpus Analysis

This section of the report examines briefly the overall distribution in keywords for items contained in the Walk21 Library, describing the process used to identify the main themes of the literature, as well as exploring the language used in abstracts and titles of items contained in the database. Again, this compares the overall database to those used exclusively in **Academic** items.

2.5.1 Keyword Analysis

The table below illustrates the distribution of the most popular keywords found in the Walk21 Library. As can be seen, the most frequently used keyword is **urban design**, followed by **urban planning**. In fact, the vast majority of items in the database contain either or both of these keywords. Despite their dominance, it is not clear that their inclusion as keywords to a Library item always reflects its content, suggesting that they may represent some from of disciplinary default (by the coder). It is also worth commenting on relative absences or disparities in use of important keywords. For example, **gender** only appears as a keyword 11 times across the Library, as does **women**. **Disabilities** appears as a keyword 14 times, while **disability** appears 9 times.

Key word	#	Rank
urban design	402	1
urban planning	238	2
promotion	236	3
health	168	4
policy	143	5
public space	140	6
community	113	7
physical activity	109	8
children	102	9
accessibility	97	10
road safety	94	11
safety	94	11
assessment	86	13
public transport	85	14
data	80	15
walkability	75	16
infrastructure	74	17
planning	70	18
perception	63	19
evaluation	60	20

Table 2.5.1.1 Keywords used in Library Database

To identify broader themes, the keywords were clustered algorithmically into particular groupings (or modularity classes) that identified which keyword pairs occurred most frequently with each other. Using this method, the algorithm strengthens the connection between keywords as they co-occur for individual Library items, creating clusters of keywords that correspond to thematic emphases. The network of connections constructed, displayed in the figure below, provides an illustration of the cumulative knowledge of the Library and helps understand the links between different themes, or keyword clusters.

Figure 2.6.1.1 Language used in Academic abstracts and Overall Database abstracts compared

Keywords were thus assigned to particular themes, based on the strength of their connections to other keywords within that theme. The most frequently occurring keywords, such as **urban design** and **urban planning,** which have connections to other keywords across all other themes, were assigned to the theme or keyword cluster to which they were most strongly connected.

This analysis identified a total of six key themes[1], or keyword clusters, that reached a meaningful threshold of significance. and these were used as the basis for the thematic analysis presented in Chapter 3. These are presented below.

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[1]These six key themes accounted for 76% of all keywords used in the Library. The remaining keywords, not assigned to one of the six key themes, were allocated to smaller, less meaningful thematic clusters or collections of arbitrarily connected keywords. These collections may emerge in the future as distinct themes but do not yet have sufficient volume to be recognised as such.

The six themes identified are listed below, in order of prominence:

1. **Planning for Walking** as a Mode of Transport (**keywords**: *urban design, urban planning, public space*);

2. **Promoting Walking** as a Mode of Transport (**keywords**: *promotion, health, community*);

3. **Measuring Walking** as a Mode of Transport (**keywords**: *data, evaluation, measurement*);

4. **Enabling Walking** as a Mode of Transport (**keywords**: *design, technology, wayfinding*);

5. **Developing Policies for Walking** as a Mode of Transport (**keywords**: *government policy, development plans, pedestrian culture*);

6. **Making Walking Accessible** and **Safe** as a Mode of Transport (**keywords**: *safety, mobility, security, development*).

2.5.2.2 Keyword Analysis of Academic Items

It is worth noting the slight differences in the distribution of keywords between those used to summarise the academic items and those used in the database as whole, as illustrated in the table below.

While there is agreement about the four main terms (**urban design, urban planning, health** and **promotion**), items like **perception**, **data** and **public transport** feature proportionally more heavily in the academic items than in the Overall Library, as - to a lesser extent - do **physical activity** and **children**.

2.6.1 Corpus Analysis

Key Word	Academic Items		Overall Database	
	#	Rank	#	Rank
urban design	91	1	402	1
urban planning	56	2	238	2
health	35	3	168	4
promotion	28	4	236	3
physical activity	26	5	109	8
children	25	6	102	9
perception	25	6	**63**	**19**
data	23	8	80	15
public transport	**21**	**9**	85	14
public space	20	10	140	6

Figure 2.6.2.2 Keywords used in Academic items and Overall Database compared

Table 2.5.2.2 Keywords used in Academic Items and Overall Database compared

One of the objectives of the report was to identify and interpret differences between academic items contained in the Library and the database overall. To that end, this section outlines a summary analysis of the language used in the Walk21 Library, contrasting the differences between the language of the academic items and the overall database, using the respective abstracts and keywords as data sources for the analysis.

The analysis was conducted using *Scattertext*[2], an open-source Python library, developed to visualize the relationship between two collections of language (here, the collection of academic items and the database as a whole). *Scattertext* helps to explore distinguishing terms and to identify which words and phrases are more characteristic of a particular collection. These visualisations are explained in greater detail below.

2.6.1.1 Visualising Language Differences - Abstracts

Figure 2.6.2.3 Topics of Academic items and Overall Database compared

The graph above visualises the differences in <u>relative</u> frequency between the language used in the academic item abstracts contained in the Walk21 Library and the abstracts of the entire database. The scatter text uses a two-dimensional coordinate system, with the vertical x-axis value representing each plotted term's frequency in the database of Academic item abstracts, and the horizontal y-axis representing each plotted term's frequency in the database as a whole.

The terms in the top right corner of the plots are those that have a high frequency in both collections (e.g. *public, urban, pedestrian, health*) and those in the bottom left are those with a low frequency in both collections (e.g. *markets, separated, transfer*). The terms in the bottom right corner of the plots are those that appear frequently in the overall database, but *relatively* less frequently in the Academic items database (e.g. *stakeholders, schemes, leaders*), and those in the top left are those that appear frequently in the Academic items database, but *relatively* less frequently in the overall database (e.g. *questionnaires, urbanity, theories*). The column on the right side of the graph lists the words that are most characteristic of the entire collection.

In terms of topics, it is not clear that there is a considerable difference between the academic items and the database as a whole. For example, the fact that the bulk of the terms are concentrated in the top right corner of the plot shows the high degree of commonality observed. However, what we see in terms of differences, perhaps unsurprisingly, is

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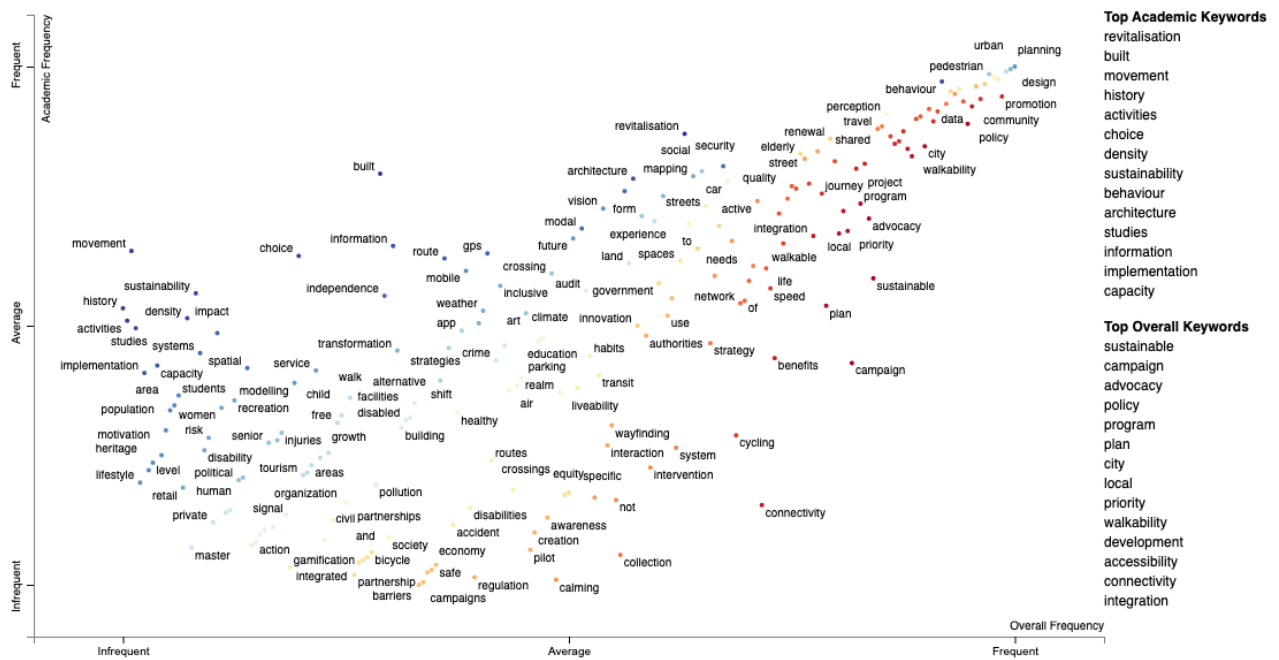[2] https://github.com/JasonKessler/scattertext

that the academic items are *relatively* more concerned with the terms one would associate with knowledge generation and methodology (e.g. *observations, diaries, questionnaires, theories, simulation*), whereas the database as a whole is relatively more concerned with terms one might associate more strongly with advocacy and policy (e.g. *stakeholders, partnership, initiative(s), objective, strategy*).

2.6.2.2 Visualising Language Differences - Keywords

Author	# Items in Library	Association
Sauter, Daniel	14	Urban Mobility Research
Kennedy, Jacky	12	Canada Walks
Koike, Hirotaka	11	Utsonomiya University, Japan
Pharoah, Tim	11	Living Transport
Tolley, Rodney	11	Staffordshire University
Methorst, Rob	9	Transport research Centre AVV
Faure, Anne	8	Rue de l'avenir
Lavadinho, Sonia	8	Geneva University / Bfluid
Martincigh, Lucia	7	Università Roma Tre
Matsalla, Graham	7	Alberta Health Services
Rossiter, Ben	7	Victoria Walks
Stuck, Andrew	7	Rethinking Cities

When we look at the differences between the academic items and the overall database just in terms of the keywords they have used, their differences become clearer. The graph below also adds a column showing the most distinctive (or most representative) keywords used in the academic items and the most distinctive used in the database overall.

Organisation	# Items in Library
Living Streets (UK)	24
University of Calgary	15
Walk21	13
HealthBridge	12
City of Vienna	11
Green Communities	11
Urban Mobility Research	11
CTS EMBARQ México	10
Centre for Transport Studies University College London	9
Delft University of Technology	9
Transport for London	9
Swiss Pedestrian Association	7
ARCH'URBA Consulting Firm	7
Mobiel 21	7

Top Academic Keywords
revitalisation
built
movement
history
activities
choice
density
sustainability
behaviour
architecture
studies
information
implementation
capacity

Top Overall Keywords
sustainable
campaign
advocacy
policy
program
plan
city
local
priority
walkability
development
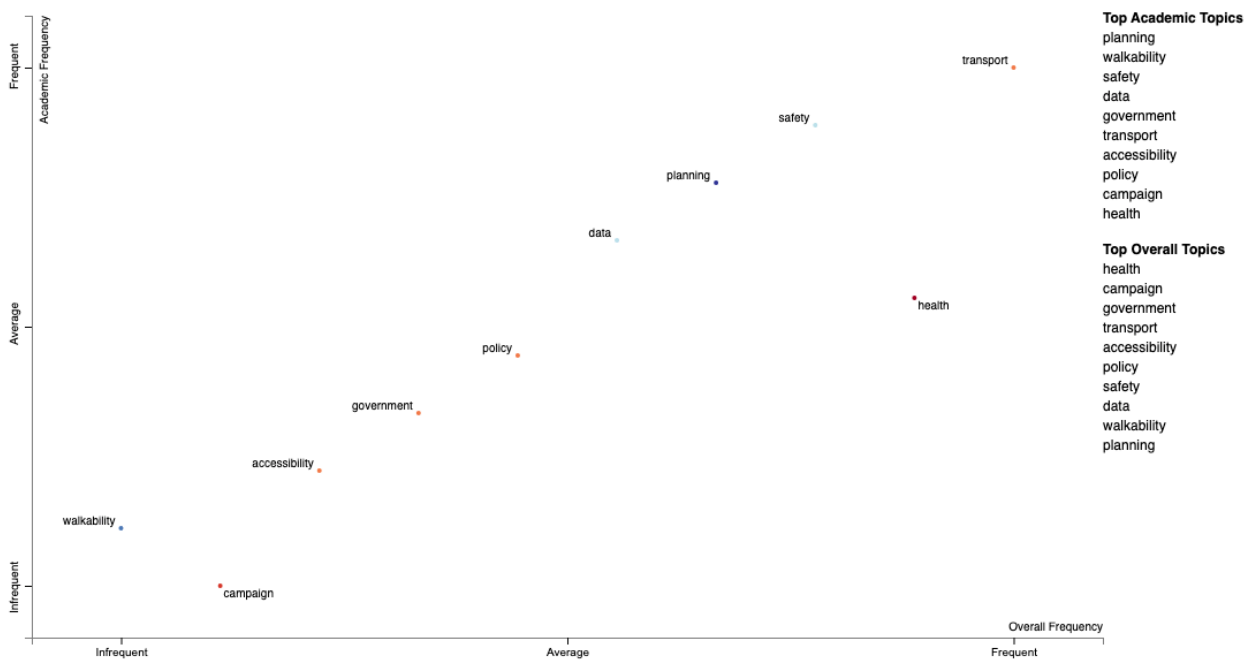accessibility
connectivity
integration

As before, the top right corner is those terms that are both shared by the two collections <u>and</u> frequently-occurring, whereas the top left and bottom right are the *relatively* distinctive terms for academic items and for the dataset as a whole.

The academic items appear to be more concerned with **the physical environment** (e.g. *built, density, architecture*) and **evidence** (e.g. *behaviour, studies, information*) whereas the dataset as a whole is more concerned with aspects of **implementation** (e.g. *integration, plan, city, development*) and **communication** (e.g. *campaign, advocacy, policy*).

Topical terms like *walkability, inter-modality, pedestrianisation*, and *wayfinding* are characteristic of the collections as a whole which suggest that the main difference between the two collections is more one of the lens through which they organise/apply their work than a substantive difference in quality or topic.

2.6.2.3 Visualising Language Differences - Topics

Finally, we compared the two datasets by looking at topics generated by *Scattertext*. Given single word prompts, *Scattertext* produces topics based on language that is associated with use of the prompt words, generating topics for comparison. The ten topics generated were: *accessibility, campaign, data, government, health, planning, safety, transport* and *walkability.*

As before, the top right corner is those terms that are both shared by the two collections. In terms of our interest in **Walking as a Mode of Transport**, it is noteworthy to see that *transport* is the most frequently-occurring topic as a whole. When we look for key differences between the academic items and the overall dataset, *planning, walkability* and *safety* are the most meaningfully distinctive topics for academic items, whereas *health, campaign* and *government* are the most meaningfully distinctive topics for the dataset as a whole.

The plotted location of *walkability* is worthy of further comment here. Its location indicates that, while a distinctive term for the academic dataset, it is still relatively infrequently discussed overall, reflecting its status as a still-emerging term. This also reminds us that this keyword analysis is a static representation of 20 years of work contained in the Walk21 Library and, as such, is less sensitive to the dynamic identification of developing themes and emphases.

2.7 Additional Summary Statistics

This section provide some additional summary statistics from the database that may be of interest to VREF.

2.7.1 Prolific Contributing Authors

### 2.7.2 Prolific Contributing Organisations

The table below identifies the organisations most frequently featured in the Library.

3. THEMATIC ANALYSIS

The keyword analysis of the Walk21 Library items identified six key thematic groupings considered most relevant to the topic of **Walking for Transport**. These six key themes were identified through the network analysis, described in Chapter 2, which clustered groups of keywords together based on the frequency with which they were used in conjunction with each other. The six themes identified, in order of prominence, are:

1. **Planning for Walking** as a Mode of Transport (18% of keywords under this theme);

2. **Promoting Walking** as a Mode of Transport (16%);

3. **Measuring Walking** as a Mode of Transport (14%);

4. **Enabling Walking** as a Mode of Transport (10%);

5. **Developing Policies for Walking** as a Mode of Transport (10%);

6. **Making Walking Accessible** and **Safe** as a Mode of Transport (8%).
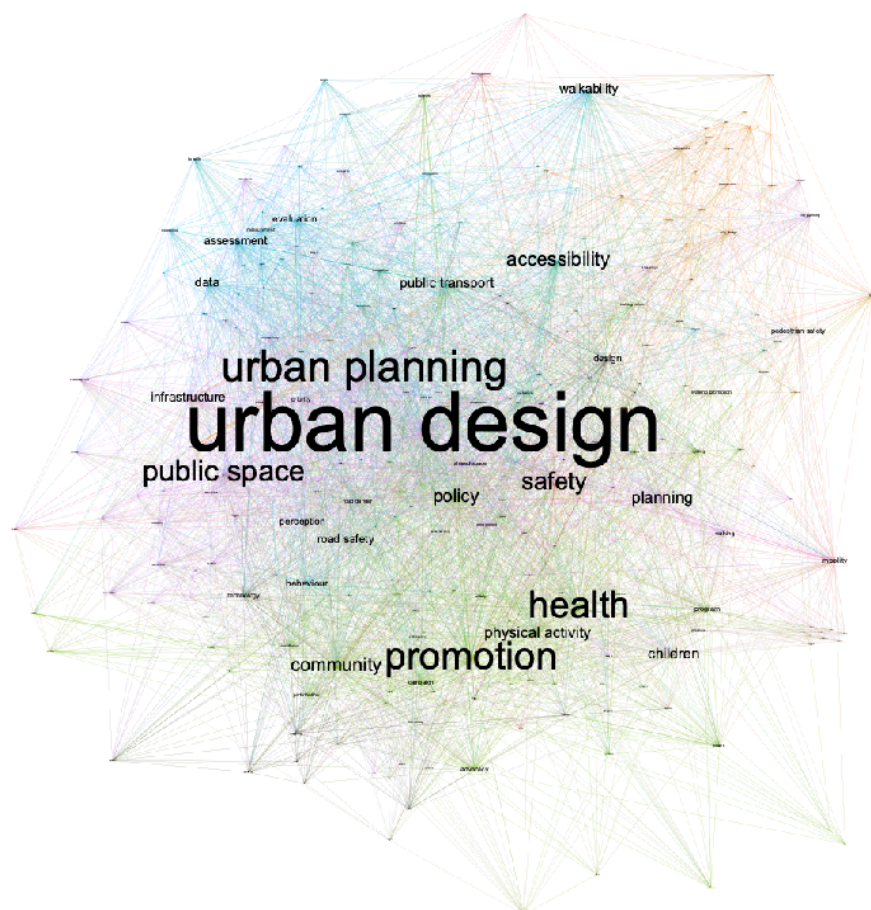
Figure 3.1 Network Analysis Visualisation of Item Keywords & Themes

3.1 **Planning for Walking** as a Mode of Transport

<u>Main Keywords</u> (in order of frequency):
urban design, urban planning, public space, infrastructure, city planning, urban form, street design, architecture, pedestrianisation, transport, land use, traffic management, sustainable transport, pedestrian mobility, emissions, climate change, smart city, shared spaces, mobility systems integration.

The **Planning for Walking** theme is the central thematic grouping for the collection of library articles concerned with transport. This theme contains the most important, most frequently-occurring, keywords and those with the <u>strongest connections to other themes</u>. It contains the two main keywords around which the database is organised: **urban design** and **urban planning**. It is the theme most concerned with walking as an engineering or design concern, as a consideration within **traffic management** and the design of **transport systems**, **streets** and **public space**. In essence, this could be considered the theme of "walkability", albeit it is not universally named as such.

A key academic text in this theme is Cepolina and Tyler's paper *Understanding Capacity Drop for designing pedestrian environments* at Walk21 2005 in Zurich, which was a collaboration between the University of Pisa and University College London, and which aimed to introduce "*a more sophisticated understanding of the capacity drop phenomenon for the benefit of designers of street environments to help them construct a more pedestrian-friendly environment*". This article is notable because, unlike most items in the database, it has a citation count (of 37) on Google Scholar, the web search engine for scholarly literature. Similarly, *Research on pedestrian traffic flow in the Netherlands* by Daamen and Hoogendoorn presented at Walk21 2003 in Portland has a citation count of 35 on Google Scholar, and is cited in a range of literature concerned with wayfinding, mapping and information tools for pedestrians.

The absence of a 'persistent identifier' for Walk21 material means that items in the Library are generally not indexed by academic literature search engines. Thus, there are anomalous situations whereby Walk21 presentations by established academics such as Professor Billie Giles-Corti, who has a citation count of over 37,000 in Google Scholar, do not appear in academic search engines. For example, Professor Giles-Corti's presentation "*Is urban design policy the answer to achieving walkable cities?*" from the Walk21 Calgary conference in 2017 is not indexed in Google Scholar.

This is also true of very influential work by practitioners which is absent from academic search engines. An example of this is the Global Designing Cities Initiative's Global Street Design Guide presented by Skye Duncan in her "*Changing Streets to Change the World*" presentation at Walk21 Hong Kong in 2016.

Planning for Walking has been a consistent theme of Walk21 from Jan Gehl's London 2000 presentation on *Liveable Cities* which explored the difference between *"cities designed for low (walking) speeds and those designed for high (motorised) speeds"* through Tolley et al's paper on *Does Density Matter? The role of density in creating walkable neighbourhoods* which examined the health case for making cities walkable at Walk21 Sydney in 2014, to the presentation at Walk 2019 in Rotterdam by Dimitra Kanellopoulou of the École Nationale Supérieure d'Architecture Paris-Malaquais on *Learning from the Medina. On smartness and walkability of historical nuclei in Moroccan imperial cities*.

As the principal coordinating theme, it also reflects the increasing attention paid - by academics, policymakers and practitioners alike - to the role walking can play in the fight against **climate change**, including the reduction of **emissions**, as a more **sustainable** mode of **transport**. Examples of this work can be found in the contributions by organisations like Green Communities and Sustrans in the Library, such as *Connect2 the Future: Building new active travel opportunities across the UK* presented by Andy Wistow at Walk21 Barcelona in 2008.

As this review is looking retrospectively at the Library as a whole over 20 years of conferences, it is less sensitive to the dynamic nature of changing themes and to the assessment of future themes. However, it is clear that the

relationship between **Walking as a Mode of Transport** and broader political conversations around **sustainability** and **climate change** are becoming more prominent in recent years, and likely to become even more relevant and urgent in the future.

Illustrative Texts in the Walk21 Library :

- Cepolina and Tyler. *Understanding Capacity Drop for designing pedestrian environments.*

- Daamen and Hoogendoorn. *Research on pedestrian traffic flow in the Netherlands*

- Jan Gehl. *Liveable Cities.*

- *Dimitra Kanellopoulou Learning from the Medina. On smartness and walkability of historical nuclei in Moroccan imperial cities*

- *Tolley et al. Does Density Matter? The role of density in creating walkable neighbourhoods.*

- *Andy Wistow. Connect2 the Future: Building new active travel opportunities across the UK*

3.2 **Promoting Walking** as a Mode of Transport

Main Keywords (in order of frequency):
promotion, health, physical activity, advocacy, campaigning, consultation, partnerships, education, active transport, stakeholders, governance, community involvement, workshop, events, capacity building, alternative transportation, walking groups, health impacts, wellbeing, promotion strategies, citizenship empowerment, civic engagement, youth engagement.

The **Promoting Walking** theme is another central thematic grouping for the database, containing the third and fourth most frequently-occurring keywords (**promotion** and **health**), both of which are coordinated with many other activities and keywords, particularly in **advocacy** and **campaigning** around **active transport**.

Walk21 contributions under this theme have evolved since the earliest Walk21 conferences from an initial concern with walking - primarily for leisure - as an intervention in **physical health** and **mental health** policy to the subsequent focus on walking's role within broader transport policy, which includes acknowledging the positive **health impacts** derived from modal shift to walking.

Nonetheless, this is the theme most concerned with the work of walking advocacy, addressing the 'how' of walking advocacy through consideration of different examples of **consultation, engagement** and **partnerships**, differing types of intervention (**social marketing**, **workshops**, **partnerships**, **community involvement**) and engagement with diverse stakeholder groups (**senior citizens**, **walking groups**, **teenagers**). From a transport perspective, advocacy and engagement strategies are critical to achieving transport policy targets in modal shift, and to walking's success generally as a travel mode. As such, advocacy is a political issue. Duane Burtt's *Helping Councils to Help Walking* from Walk21 2014 in Sydney provides guidance for local authorities and central government in this area.

A particularly prolific author in this regard is Jacky Kennedy of Green Communities whose contributions to the database include presentations on: *Canadian walk to school initiatives: a comparison of two provincial programs* (Copenhagen, 2004); *The IWALK Club: Re-Creating a Culture of Walking, One Step at a Time* (2005, Zurich); *Children's Mobility, Health and Happiness* (2010, The Hague)*;* and others. Jacky Kennedy's contributions also illustrate the volume of work and stocks of knowledge contained in the database that is currently inaccessible to academic literature search engines.

The keywords associated with the **Promoting Walking** theme also include individual city names (e.g. **Bogota**, **Perth**, **Portland**, etc) reflecting the strong representation of items with a *local* case study and geographically-specific policy impact focus. An example of this is *Nuestra Voz en la Ciclovía: A Citizen Science Approach to the study of Open Streets in Bogota* by Gonzalez et al , a consortium involving the Universidad de los Andes, Bogota, which was presented at the Walk21 Bogota conference in 2018.

The engineering and design focus of the **Planning for Walking** theme is replaced by **public health** and **psychology** dimensions. Again, as items included in the **Planning for Walking** theme reflects the increasing attention paid to the role walking can play in the fight against **climate change, city liveability and road safety**, so the **Promoting Walking** theme stresses the benefits of an increasing role for **Walking as a Mode of Transport** to **wellbeing** and **physical health.**

Illustrative Texts in the Walk21 Library :

- Gonzalez et al. *Nuestra Voz en la Ciclovía: A Citizen Science Approach to the study of Open Streets in Bogota*

- Jackie Kennedy. *Canadian walk to school initiatives: a comparison of two provincial programs.*

- Jackie Kennedy. *Children's Mobility, Health and Happiness.*

3.3 **Measuring Walking** as a Mode of Transport

<u>**Main Keywords**</u> (in order of frequency):
data, assessment, evaluation, behaviour, measurement, benefits, data collection, tracking, pedestrian needs, data analysis, modelling, statistics, GPS, standards, surveys, analysis, counting, GIS, study/studies, mode choice/modal choice, validation, travel patterns, impact, motivation to choose walking, rmobile phone data, pedestrian flow, economics, quantification, project evaluation, external partners, population study.

While the theme of **Measuring Walking** necessarily cuts across topic areas, the principle of **measurement** and the development of **standards** around the techniques used to measure walking has been a long-standing concern of the Walk21 organisation since its inception. This justifies its selection as a theme in its own right, particularly when we consider the importance of having robust **data** that allows walking to be reliably compared with other modes of transport. For example, Ben Hook's "*Making pedestrians count by counting them*" at Walk21 Sydney in 2014 looks at using wi-fi signals to help with the measurement of pedestrian footfall.

The University of Leeds team of Kelly et al presented *Techniques for Assessing the Walkability of the Pedestrian Environment* at Walk21 2007 in Toronoto, which discusses the results of a UK research project designed to increase understanding of the factors which influence levels of walking.

The publications in this theme include Walk21's emphasis on measurement. Its **International Walking Standard** on the treatment of walking in travel surveys was adopted at the Walk21 conference in Vienna in 2015, following the commitment made at the Walk21 conference in Melbourne in 2006 to "*establish a set of international guidelines for the collection, analysis and dissemination of quantitative and qualitative techniques for measuring walking.*" The stated aims of the International Walking Standard are to: "i) *raise the profile of walking, ii) demonstrate the crucial role of good mobility data, (iii) improve accuracy and consistency of data collection for all modes and (iv) to allow for comparisons between cities and countries*"

As above, a considerable amount of relevant literature produced by Walk21 comes from activity motivated by activity at their conferences. For example, dedicated **Measuring Walking** workshops have been held in conjunction with the following Walk21 conferences: *Toronto (2007), Barcelona (2008), New York (2009), The Hague (2010), Munich (2013), Sydney (2014), Vienna(2015), Calgary (2017), Bogotá (2018)* and *Rotterdam (2019)*. Participation in this group has expanded and embraced academics, practitioners and advocates from around the globe with over 40 different countries represented.

The steering group of the **Measuring Walking Group** that includes Daniel Sauter, Tim Pharoah, Miles Tight, Ryan Martinson and Martin Wedderburn are some of the most heavily represented authors in the Walk21 Library and have published widely outside the Walk21 conference, including a 2008 volume on *Measuring Walking. Towards Internationally Standardised Monitoring Methods of Walking and Public Space* from the Proceedings of the 8th International Conference on Survey Methods in Transport.

It is worth noting that this *Measuring Walking* volume appears on Google Scholar under a number of different references, each with different citation counts, highlighting the issues that can arise when publications do not have a 'persistent identifier', including difficulties with access. Again, this is an issue for many important Walk21 contributions to the topic of Walking as a Mode of Transport.

Illustrative Texts in the Walk21 Library :

- Ben Hook. *Making pedestrians count by counting them.*
- Kelly et al. *Techniques for Assessing the Walkability of the Pedestrian Environment*
- Sauter et al. *Measuring Walking. Towards Internationally Standardised Monitoring Methods of Walking and Public Space.*
- Walk21. *Pedestrians' Quality Needs. Final Report of the COST project 358.*
- Walk21. *International Walking Standard.*

3.4 **Enabling Walking** as a Mode of Transport

Main Keywords (in order of frequency):

design, technology, wayfinding, barriers, maps, information, vision, app, navigation, signal system, fear of crime, wearable tech, green areas, typology, social skills, walking trails, legibility, safe neighbourhoods, destination availability, urban mobility options, walkscore model, increased safety, perceptions, complex intersections, symbols, city image, walkable districts.

In contrast to the building design focus of the main **Planning for Walking** theme, the **Enabling Walking** theme examines how the social, interpretive nature of streets as transport space should be reflected in their **design**. Thus, under this theme, the social contexts and environments in which walking takes place are considered in greater detail than the traditional mechanical approach to **complex intersections** and crossings. Stephan Bluel's presentation at the Walk21 2005 conference in Zurich presented a case study of plans by the Department of Urban Development at the City of Zurich to explore its "*Plan Lumière - a lighting concept for Zürich*", which would attempt to improve orientation, **navigation** and **perceptions** of safety through lighting design.

The focus of this theme includes exploring the environmental and personal **barriers** to walkability, which may be social or psychosocial, such as **perceptions** around **fear of crime, safe neighbourhoods** or **social isolation** and designing around these barriers. This was the topic of the work by Foster et al (University of Western Australia) at Walk21 Melbourne in 2006 which addressed *Perceptions of crime-related safety in suburban neighbourhoods* and explored "*what aspects of safety are most correlated with decisions to walk, and highlight the influence of suburban design … residents' perceptions of safety.*"

The theme also recognises how walkable cities can be achieved through means other than urban and transport planning strategies, including innovation in **technology**, such as **wearable tech** and other **navigation** tools. Innovation outside transport planning modelling could include improvements to the **legibility** of streets through greater emphasis on **wayfinding** and **maps**.

Ahmadzadeh et al's (Hong Kong, 2016) case study of the Tehran Eco Passage project "*Creating a cohesive multi-functional public space and promoting walkability*" explored how **wayfinding** might encourage more walking and also suggested that **wayfinding** might provide better "*value for money*" than expenditure on infrastructure.

The key text for this particular theme is the presentation "*Legible London. Developing a Single Walking Wayfinding System for London*" by Adrian Bell at Walk21 Toronto in 2007. It applied a set of intuitive design principles to remedy the "*confusing, inconsistent and unreliable system of guidance*" that inhibited the consideration of **Walking as a Mode of Transport** in London city. The principles behind Legible London were subsequently used to deliver the **wayfinding** system for the 2012 Olympic and Paralympic Games in London, and thereafter Legible London has been a reference piece for aspiring walkable cities internationally.

Illustrative Texts in the Walk21 Library :

- Ahmadzadeh et al. *Creating a cohesive multi-functional public space and promoting walkability.*

- Adrian Bell. *Legible London. Developing a Single Walking Wayfinding System for London.*

- Foster et al. *Perceptions of crime-related safety in suburban neighbourhoods.*

3.5 Developing Policies for Walking as a Mode of Transport

Main Keywords (in order of frequency):

walkable city creation, history, city transformation, innovation to walkability, learning, government policy, development plan, urbanism, pedestrian local policy, planning policies, city reorganisation, street culture, urban revitalisation, community activities, thinking planning map, administration, national implementation, mobility planning, tactical urbanism, urban model, political decision making.

The **Developing Policies for Walking** theme speaks to the policymaking and governmental emphasis of many of the items contained in the Walk21 Library. As detailed in the summary statistics presented earlier, Walk21 conference participants are a diverse group, including academics but also practitioners and policymakers in government. This is reflected in this theme.

The research items contained within this theme are as concerned with **political decision-making** and **government policy** at the highest level as they are with the **administration** and **management** of specific transport **planning policies**. This broader considerations include aspects of planning such as building political support.

This was the focus of two papers presented by Giuliano Mingardo of Erasmus University, Rotterdam two papers at Walk21 in Rotterdam 2019, making the economic case for Walking as a Mode of Transport: *Slow Traffic Urban Retail- A comparative analysis of 8 EU cities* and *The importance of pedestrians for Urban Retail*, the latter of which examined "*how to convince retailers and politicians*" of the benefits of walkable cities.

The difficulty of building political consensus for Walking as a Mode of Transport was addressed in a similar vein in 2014 in Sydney by Cathy Oke, then of the City of Melbourne and now of Melbourne School of Design, in her presentation *Share our Streets: Getting walking into the political agenda* which discussed a specific case-study to build popular political support for changes to the road user hierarchy.

Other papers within this theme examine the extent to which practitioners fail to account for political consideration in designing for the public realm, such as Vladimira Silhankova's (University of Brno) *Public spaces in the urban planning process*, presented at the Walk21 conference in Copenhagen in 2004, which attempts to fill this gap in urban planning practice.

Illustrative Texts in the Walk21 Library :

- Giuliano Mingardo. *The importance of pedestrians for Urban Retail.*

- Cathy Oke. *Share our Streets: Getting walking into the political agenda.*

- Vladimira Silhankova. *Public spaces in the urban planning process.*

3.6 Making Walking Accessible and Safe as a Mode of Transport

<u>Main Keywords</u> (in order of frequency):
safety, mobility, disability, road accidents, special needs, accident awareness, disadvantaged communities, slipping, gated communities, risk perception, traffic accidents, driver distraction, driver failure, LATAM, maintenance, safety risks; litigation, transport accessibility, restricted walkers.

The **Making Walking Accessible** and **Safe** theme is concerned with ensuring that all citizens, including those with **mobility challenges** and **special needs**, such as functional limitations, have the opportunity to enjoy well-kept streets and paths without fear of **hazard** or for their **safety**. This is a theme taken up by a number of presentations in the database, from government officials, practitioners rather than academics, with the takeaway that the future of **Walking as a Mode of Transport** depends on transport accessibility.

Berry Den Brinker of VU University Amsterdam explored the need for architects "*to reckon with the visual needs*" of low-vision people in his 2010 paper *The IDED-method to improve the design of the Railway station Houten* presented at The Hague Walk21 conference. In fact, this theme was particularly heavily represented in the 2010 Hague conference. Havik et al explored the *Accessibility of Shared Space areas for visually impaired people* concluding that "*the Shared Space concept is a potential disadvantage, if not a danger, for this specific group*".

This theme is also concerned with the inequity faced by **disadvantaged** communities, including areas of the Global South, such as **LATAM**, for whom the majority of their transport is conducted on foot, and for whom the pedestrian walking environment is crucial to accessing work, education, healthcare or food. Arévalo et al's (Barcelona, 2008) *The human right to walk: An experience in Pasto - Colombia* explores how seemingly small public realm interventions, such as the Sunday closing of streets to vehicular traffic has "*generated significant changes in physical activity and wellbeing among citizens*" and enhancing the "*citizen's point of view towards their right to walk and different uses of public space*" in Pasto, Colombia.

The experience of **disadvantaged communities** is also the focus of Barnett et al's (2010, The Hague) *Walking for everyone: Getting socially excluded communities back on their feet* which presents a case study of a UK-based *(*Ramblers Get Walking Keep Walking) 12-week facilitated walking programmes supporting and encouraging everyday walking, aimed at supporting grassroots organisations working in the areas of black and minority ethnic communities, mental health, families and community development.

The issue of **safety** is explored through analysis of risks created by poor walking environments (slippery road, slopes, surfaces, etc) and danger created by other other road users through **traffic accidents, driver distraction**, and **driver failure**, for example. Laura Sandt's University of North Carolina presentation, at Walk21 2008 in Barcelona, *Tools and Practices for Improving Pedestrian Safety: Resources from the US* describes a number of guides and programmes that can be used effectively to make safety improvements.

Another example is Lauren Marchetti and Charlie Zegeer's presentation at Walk21 Vienna in 2015 "Innovative Worldwide Strategies for Promoting Safer Walking as Part of a 'Vision Zero' Approach", which presents a comprehensive review of techniques used globally to promote safety for pedestrians. A final example of this theme is Rob McInerney's presentation on the International Road Assessment Programme's *Minimum 3-star for Pedestrians* policy, which also identified the <u>economic</u> savings ("*saving a life, saving millions*") associated with safer roads and safer walking for pedestrians.

<u>Il</u>lustrative Texts in the Walk21 Library :

- Arévalo et al. *The human right to walk: An experience in Pasto - Colombia*

- Barnett et al. *Walking for everyone: Getting socially excluded communities back on their feet.*

- Berry Den Brinker. *The IDED-method to improve the design of the Railway station Houten.*

- Havik et al. *Accessibility of Shared Space areas for visually impaired people*

- *Marchetti and Zegeer. "Innovative Worldwide Strategies for Promoting Safer Walking as Part of a 'Vision Zero' Approach"*

- Laura Sandt. *Tools and Practices for Improving Pedestrian Safety: Resources from the US*
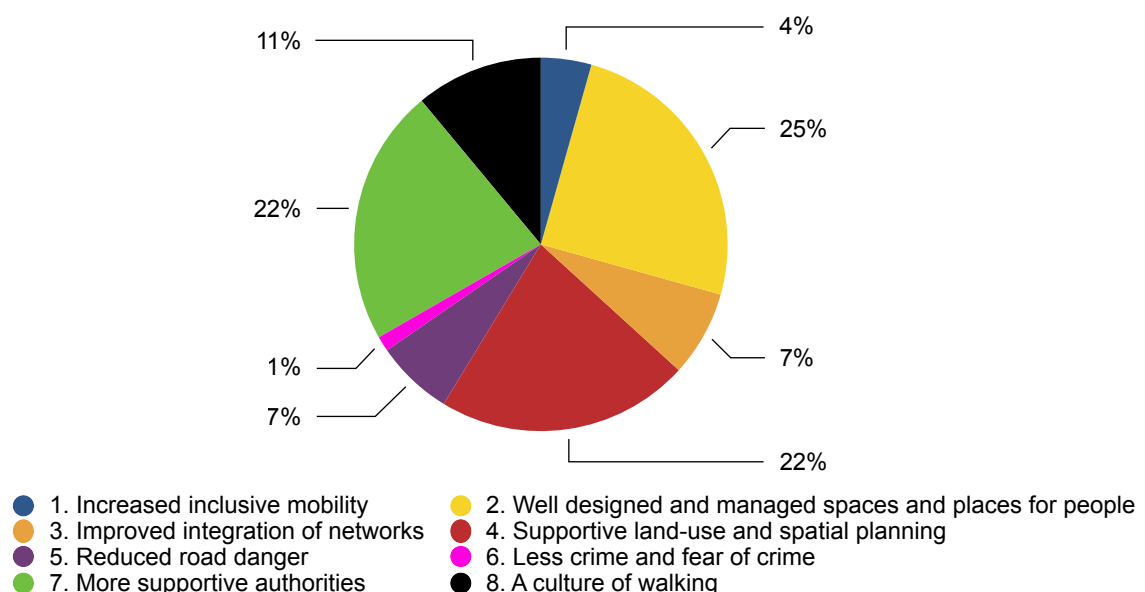
4. STRATEGIC ALIGNMENT

This short chapter presents an overview of the general policy alignment of the material contained in the Walk21 Library with two specific policy frameworks that are of particular relevance to the theme of **Walking as a Mode of Transport**: The **International Charter for Walking** and the United Nations' **Sustainable Development Goals**.

4.1 Strategic Alignment with Walk21's International Charter for Walking

Walk21's **International Charter for Walking** is a common policy reference for cities, organisations, neighbourhood groups and individuals who wish to encourage more everyday walking and greater walkability. The Charter may be signed by any individual, organisation, authority or neighbourhood group who support its vision and strategic principles regardless of their formal position and ability to independently progress their implementation.

The chart below and table overleaf show the degree to which the Charter Principles are addressed by the items in the Walk21 Library , as well as the commonality between academic items and the database as a whole.

1657 items in the database were coded by **Walk21 Charter Principle**, generating a total of 2,458 Principle codes, reflecting a large number of items that addressed multiple Principles. The Charter Principles that were reflected most heavily in the library database overall were: *2. Well designed and managed spaces and places for people*, *7. More supportive authorities*, and *4. Supportive land-use and spatial planning*.

Pie chart data labels: 4%, 25%, 7%, 22%, 7%, 1%, 22%, 11%

Legend:
- 1. Increased inclusive mobility
- 2. Well designed and managed spaces and places for people
- 3. Improved integration of networks
- 4. Supportive land-use and spatial planning
- 5. Reduced road danger
- 6. Less crime and fear of crime
- 7. More supportive authorities
- 8. A culture of walking

Figure 4.1.1 Charter Principles in Overall Database

The distribution of Charter Principles reflected in the academic items is displayed below.

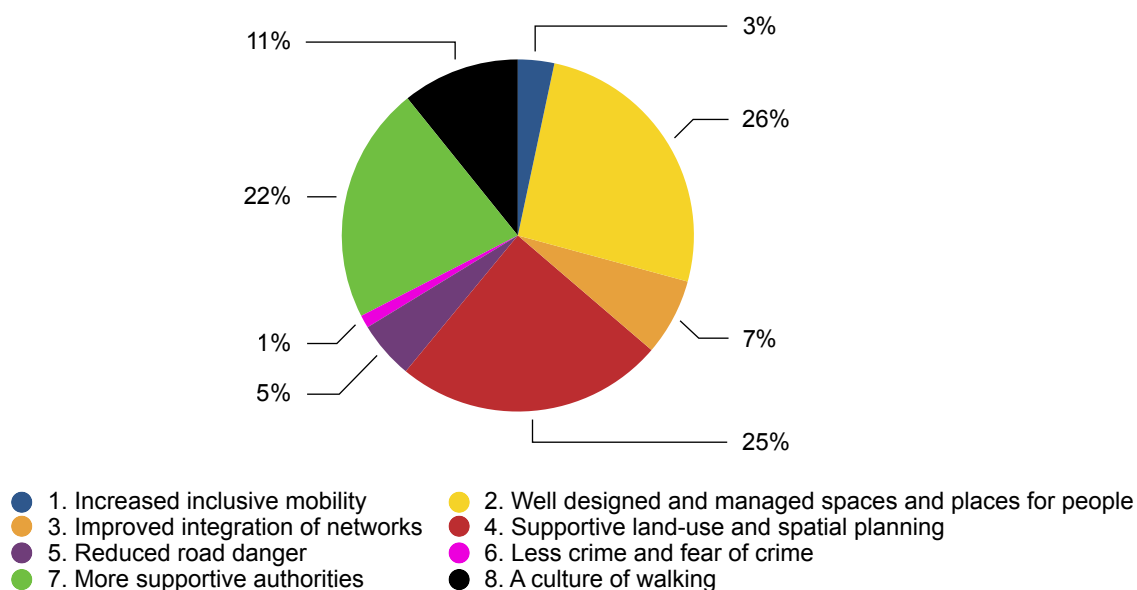**Figure 4.1.2 Charter Principles in Academic Items**

331 academic items in the database were coded by **Walk21 Charter Principles** generating a total of 512 Principle codes, reflecting a large number of items that addressed multiple Charter Principles. The Charter Principles that featured most frequently in the academic items were the same as those in the overall database, with *2. Well designed and managed spaces and places for people* the most popular code.

One small difference between the academic items and the overall database is slightly more emphasis on the Charter *Principle 4. Supportive land-use and spatial planning* than *7. More supportive authorities* in the academic items.

Principle 7 More Supportive Authorities encapsulates a few individual items that have emerged in the themes and keywords discussed elsewhere, including **data**, **strategies** and **pilots**. This reflects the higher volume of material in the Overall Database, which captures case studies and policy work to a greater degree than the Academic items.

4.2 Strategic Alignment with the United Nations' Sustainable Development (SDGs)

A walking agenda can contribute to the United Nations' 2030 Agenda for Sustainable Development. This is evidenced by the degree to which walking underpins many of the UN's Sustainable Development Goals, particularly *Goal 3: Ensure healthy lives and promote well-being for all at all ages, Goal 9: Build resilient infrastructure, promote sustainable industrialisation and foster innovation* and *Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable*.

This analysis was restricted to consideration of the Library's alignment with seven targets of particular relevance. The selection of targets was based on the Walk21 statement "*Where is Walking in the UN Sustainable Development Goals?*"[3], published in 2017, which outlines how the SDGs can be used as a framework to ensure walking's role in creating a more sustainable future.

Other SDGs that are also relevant to **Walking as a Mode of Transport**, but not considered here, include **SDG 1** ("No Poverty" - e.g. walking as primary form of transport for many in Global South), **SDG 5** ("Gender Equality" e.g. women's participation in walking as transport) and **SDG 13** ("Climate Action" - e.g. walking as zero-carbon transport) and, as noted in the thematic analysis, the relationship between **Walking as a Mode of Transport** and broader political conversations around sustainability and climate change are likely to become more urgent in the future.

The targets were:

Goal 3. Ensure healthy lives and promote well-being for all at all ages

- **Target 3.4** By 2030, reduce by one-third pre-mature mortality from non-communicable diseases (NCDs) through prevention and treatment, and promote mental health and wellbeing.

- **Target 3.6** By 2030, halve global deaths and injuries from road traffic accidents.

Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation

- **Target 9.1** Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human wellbeing, with a focus on affordable and equitable access for all.

Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable

- **Target 11.2** By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.

- **Target 11.3** By 2030, enhance inclusive and sustainable urbanisation and capacities for participatory, integrated and sustainable human settlement planning and management in all countries.

- **Target 11.6** By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality, municipal and other waste management.

- **Target 11.7** By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, particularly for women and children, older persons and persons with disabilities.

Figure 5.2.1 Language used in 2000-2009 abstracts and 2010-2019 abstracts compared

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[3] https://www.smartcitiesdive.com/ex/sustainablecitiescollective/where-walking-un-sustainable-development-goals/1073491/

3.4 By 2030, reduce by one-third pre-mature mortality from non-communicable diseases (NCDs).
3.6 By 2030, halve global deaths and injuries from road traffic accidents.
9.1 Develop sustainable and resilient infrastructure, with a focus on affordable and equitable access.
11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all.
11.3 By 2030, enhance inclusive and sustainable urbanisation in all countries.
11.6 By 2030, reduce the adverse per capita environmental impact of cities.
11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces.

Figure 4.2 Alignment with UN SDGs

1,304 items in the overall database were coded by UN Sustainable Development Goals (SDGs) generating a total of 2,538 codes, reflecting a large number of items that addressed multiple SDGs. 263 **academic** items in the database were coded by UN Sustainable Development Goals (SDGs) generating a total of 512 codes. As illustrated by Figure 4.2, there is a strong level of consistency between the alignment of the academic items and the Library overall.

For both the overall database and the academic items, the SDGs that were addressed most frequently were the same. The most frequently addressed were **Target 11.3** (*By 2030, enhance inclusive and sustainable urbanisation and capacities for participatory, integrated and sustainable human settlement planning and management in all countries*) and **Target 11.7** (*By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, particularly for women and children, older persons and persons with disabilities*). A number of Walk21 conference items addressing these targets are referenced in the thematic analysis presented in Chapter 3.

Figure 5.2.2 Keywords used in 2000-2009 abstracts and 2010-2019 abstracts compared

5. CONTEXTUAL APPRAISAL

This section of the report examines the shifting trends, through analysis of focus, methods and keywords used in the Walk21 Library , as well as the language used in the presentation and paper abstracts.
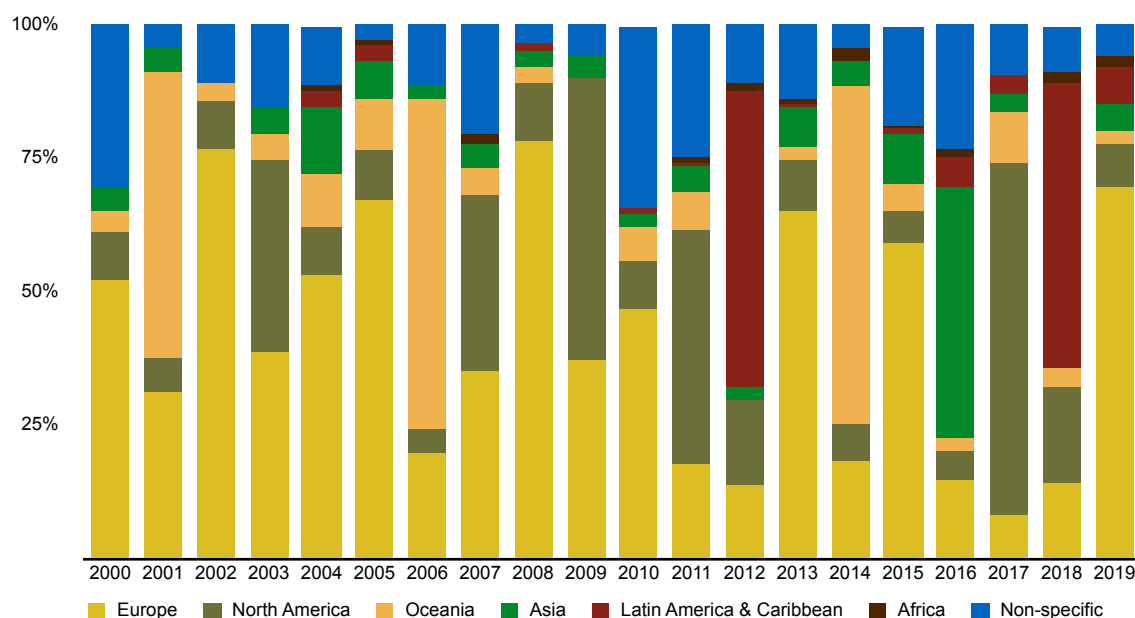
Table 5.1 Walk21 Library Items by Geographic Focus and Year

Figure 5.2.3 Topics of 2000-2009 items and 2010-2019 items compared

Year	Walk21 Host City	Region		Year	Walk21 Host City	Region
2000	London	Europe		2011	Vancouver	North America
2001	Perth	Oceania		2012	Mexico City	Latin America
2002	San Sebatian	Europe		2013	Munich	Europe
2003	Portland	North America		2014	Sydney	Oceania
2004	Copenhagen	Europe		2015	Vienna	Europe
2005	Zurich	Europe		2016	Hong Kong	Asia
2006	Melbourne	Oceania		2017	Calgary	North America
2007	Toronto	North America		2018	Bogota	Latin America
2008	Barcelona	Europe		2019	Rotterdam	Europe
2009	New York	North America		2020/21	Seoul	Asia
2010	The Hague	Europe				

Table 5.1 Walk21 Conference host locations by year and region

At first glance, looking at trends between individual years, it is difficult to ascertain any reliable changes, particularly with regard to Geographic Focus, which tends to reflect the venue in which the conference is hosted. Also, because of the highly variable volume from year to year (e.g. 107 at Walk21 Melbourne in 2006 followed by 62 at Walk21 Toronto in 2007, 148 at Walk21 Munich in 2013 followed at 43 in Walk21 Sydney in 2014) and the relatively low volume overall, it would be difficult to highlight any reliable statistical trends in terms of focus or method.

Instead, it was agreed to compare the text of abstracts from the first 10 years (2000-09) of the Walk21 conference with abstracts from the second 10 years (2010-19) and extract various features for comparison and visualisation.

5.1.1 Corpus Analysis

This section briefly outlines a summary analysis of the language used in the abstracts contained in the Walk21 Library , comparing the language used in the abstracts from the first 10 years (2000-09) of the Walk21 conference with that contained in abstracts from the second 10 years (2010-19), as well as comparison of keywords used in both collections.

5.2.1 Visualising the Difference - Language

As with the examples presented in Chapter 2, this graph below visualises the difference in relative frequency between the language used in the abstracts from the first 10 years of Walk21 (i.e. conferences held between the year 2000 and 2009) and those from 2010 to 2019.
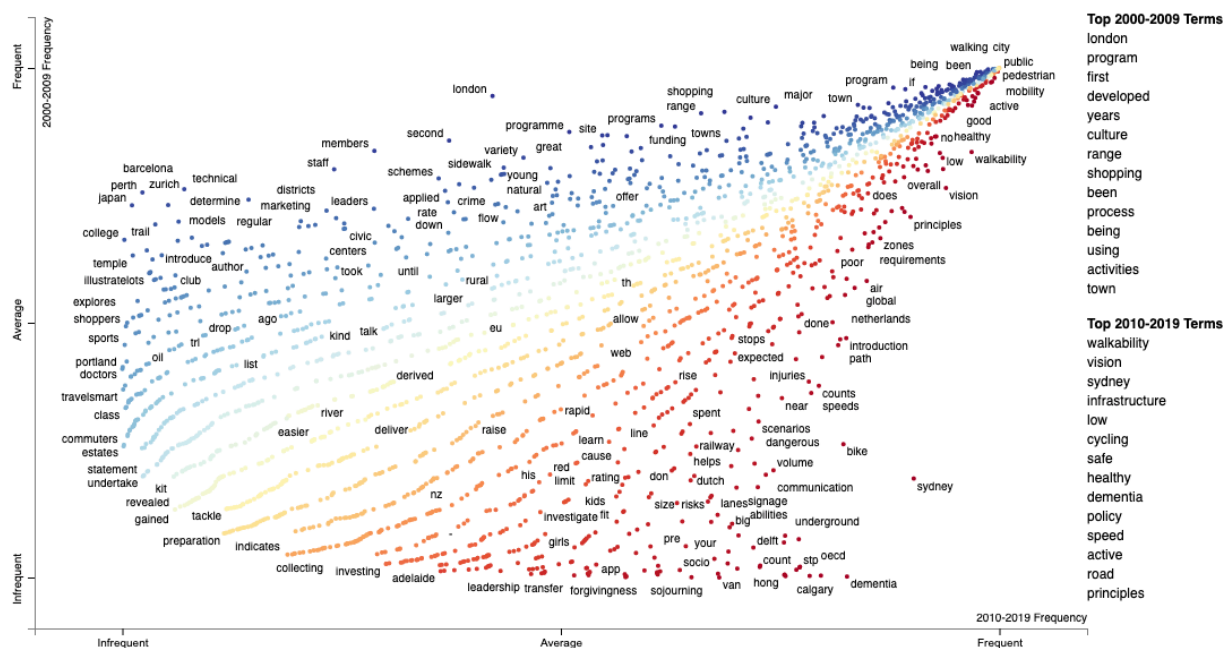
As before, the terms in the top right corner of the plots are those that have a high frequency in both collections (e.g. *mobility, infrastructure, streets*), the terms in the bottom right coroner of the plots are those that appear frequently in the 2010-2019 abstracts, but *relatively* less frequently in the 2000-09 abstracts (e.g. *communication, scenarios, barrier, oecd, Delft*), and those in the top left are those that appear frequently in the 2000-09 abstracts, but less frequently in the 2010-2019 abstracts (e.g. *trail, technical, schemes, models*).

In terms of meaningful differences, the columns on the right of the graph show the most distinctive terms, relatively, for each collection of abstracts. What we might suggest is that the distinctive terms for the 2010-2019 abstracts suggest a more ambitious, developed agenda coming from Walk21, indicated by terms like *vision*, *principles* and

policy. This might reflect the more evolved research agenda that had been developed by this time at Walk21, and the increasing maturity of walking research, more generally.

In summary, this analysis suggests that the early period of Walk21 conferences was more concerned with creating an architecture through which the promotion of walking could be advanced, identifying the components, such as measurement frameworks and data collection protocols, necessary for the pursuit of its evolved walking research agenda. Again, comparison of collections of the 2000-2009 keywords and the 2010-19 keywords may make their differences clearer - and the changing agenda - clearer.

5.2.2 Visualising the Difference - Keywords

The comparison of keywords allows us to draw stronger inferences about the changing agenda at Walk21. For example, there are a number of repeated terms, or slight variations of them, identified as distinctive 2000-2009 keywords. These include: *behaviour/behaviour change, physical/physical activity, sustainable/sustainable mobility,* and *danger/road danger*. There is an emphasis on walking and the individual as walker, and on walking as discrete from or separate to other modes, perhaps reflecting the starting point at early conferences to carve out a specific focus on the activity of walking and those who engaged in it.

If we compare these to the 2010-2019 keywords, there is a very different emphasis in the *relatively* distinctive keywords of later years. The distinctive keywords of later years indicate a movement towards connecting walking to a broader **transport** agenda (e.g. *transportation, transit, authorities*), and more attention to the nature of that engagement (e.g. *inclusion, integration, connectivity, accessibility*) and the evidence required (e.g. *data collection, data analysis, tracking*). As with the broader language comparison, this may reflect a more mature, more evolved research agenda and confidence to go beyond the individual.

5.2.3 Visualising the Difference - Topics

As in Chapter 2, the ten topics generated were: *accessibility, campaign, data, government, health, planning, safety, transport* and *walkability.*

As before, the top right corner is those terms that are both shared by the two collections. And, again, encouragingly, *transport* is the most frequently-occurring topic overall. However, apart from the emphasis on *health* in 2000-09 abstracts moving towards *safety* in the 2010-2019 abstracts, there is little difference between the two. As suggested above, in the analysis of the language and keywords, the difference may be one of method and evolution more than topic.

However, the key difference in terms of topics is the profile of *walkability*, the most distinctive topic of the 2010-2019 abstracts and the least distinctive topic of the 2000-2009 collection. The emergence of the *walkability* concept as the topic of the last 10 years is perhaps a reflection of the maturing, developing research and policy agenda around walking, more generally.

The starkness of this increased focus on *walkability* also demonstrates how language evolves in any given topic, as it does throughout the Walk21 collection. While a number of topics that might be expected to feature more prominently, such as *accessibility, economics, gender, climate,* are yet to become established as thematic areas in their own right, particularly when taking the 20 years of the conference as a whole, we know that the language in many of these areas has changed over time.

Accessibility has evolved from a focus on disabled access to an emphasis on the accessibility generally of public transport, for example, through catchment analysis. Similarly, '*climate*' is - relatively recently - emerging as a companion keyword to items concerned with '*sustainability*' and similar environmental issues.

6. CONCLUSIONS AND RECOMMENDATIONS

This chapter summarises the key conclusions of the report and presents some recommendations, based on the review of material in the Library, for future research into **Walking as a Mode of Transport**.

6.1 Key Findings

6.1.1 A Shared Vision

Despite the broad variety of contributors to the Walk21 Library, there is considerable consistency between the various stakeholder types in terms of theme and focus. Both academics and practitioners engage comprehensively with the topic of **Walking as a Mode of Transport**, albeit from slightly different perspectives.

Nonetheless, there are subtle, but meaningful, differences between the academic items and those of practitioners and policymakers, reflecting their respective focuses and audiences. Academic items are typically more concerned with *method* and *measurement* than the practice- or policy-focused items*,* which are typically more concerned with *promotion* and *communication*)

Above all, the Walk21 Conferences reveal a distinct combination of perspectives that might be missed through focusing on traditional academic literature or practitioners' perspectives alone, a combination that is generated by an international movement of practitioners, policymakers and researchers dedicated to the study of walking, and who share a commitment to contribute their specific skills to bring about systematic change and improve walking.

The volume of contributions over the twenty years is a useful corrective to the absence of transport research devoted to walking identified by Heather Allen's recent report for VREF *Walking and cycling gaps in transport research - an international overview*.

6.1.2 An Evolution in Understanding

While the themes and focus of the Walk21 material remain consistent, they are not static. Looking at the changes in the Walk21 presentations between the first 10 years of the conference and the last 10 years, there has been shift in the nature of contribution to the conference that reflects the event's evolution.

Specifically, the conference series has evolved from one supporting a nascent community pursuing a novel transport research programme, as well as knowledge sharing, both academic and practical, around a specific mode of travel, to one that is now contributing to the development of appropriate provision for walking within active and sustainable transport agendas.

In terms of contributions to the database, the emphasis has shifted from an initial focus on developing an agenda for the role of walking in transport policy, and a focus on advocacy and policy for walking as discrete from or separate to other modes, towards closer engagement to the broader **transport** agenda through the development of standardised data collection procedures and measurement protocols for walking.

6.1.3 A Need for Balance

The broad variety of contributors to the Walk21 Library, in terms of stakeholder type, is noted above. However, the analysis of the database shows that there is significantly less variety in terms of the geographic focus of the items, particularly the academic ones.

Overwhelmingly, research focused on Europe and North America dominates the database, and even more so the academic literature. While there have been a number of conferences in Australia, as well as representation in Asia, the Global South is substantially underrepresented. Again, this supports the Heather Allen's recent report for VREF *Walking and cycling gaps in transport research - an international overview*. Nonetheless, Walk21's commitment to its mission of global advocacy is evidenced by two Global South conferences in the last decade, in Mexico City (2012) and Bogota (2018).

Methodologically, the library is dominated by quantitative research. While quantitative and experimental research can help generate robust and generalisable knowledge, evidence that is derived from unrepresentative data is likely to perpetuate and embed existing geographic inequalities.

Similarly, qualitative research is often used in the study of phenomena, environments and experiences that we understand less well and this may be more suited to assist the development of data collection and measurement protocols that are not derived from European, North American or other high-income environments.

This includes case studies from the Global South, examples of which are contained in the Library's collection from Walk21 Bogota in 2018, that can help generate solutions and applications that are informed by international understanding of principles and processes, but contextually-sensitive and locally relevant.

Moving forward, any research agenda will need to support work aimed at mitigating these geographic and methodological disparities.

6.1.4 A Need for Inclusion

In addition to an uneven geographic focus, there are a number of thematic areas that are relatively underrepresented in the Walk21 Library . These include the issue of *gender*, also identified as a research in VREF report *Walking and cycling gaps in transport research - an international overview*.

The issue of *accessibility* as relating to transport users with *disabilities* is unevenly represented in the Library. While mobility and visual impairments are addressed to some degree, other impairments, such hearing impairments, are not. Additionally, as noted previously, the *accessibility* keyword used to code Library items has evolved to denote concerns with *accessibility* broadly construed in transport terms, i.e. general provision of walking infrastructure, permeability, and access to public transport.

Other issues that are addressed in the Library, but not yet established as thematic areas in their own right, include walking's contribution to *climate change* policy considerations and *economics*, particularly the financial impact and benefits of providing for walking in transport policy.

Despite these relative absences, Walk21's domain expertise and breadth means it is uniquely positioned to address these gaps in terms of any future research programme for **Walking as a Mode of Transport**.

6.2 Recommendations

6.2.1 Mind the Gaps: Addressing Emerging Research Priorities

As noted in the report, this review of the Walk21 Library provides a static summary of what has been a constantly evolving field since the very first conference. From its early pioneering work shaping and promoting walking's contribution to the broader transport policy agenda, the conference series has always been responsive to changing external conditions, as reflected in its alignment with global policy frameworks, such as the UN's SDGs.

What is less obvious from this static summary is the changing agenda around transport that walking research must respond to, to secure its position and profile in political arenas. In particular, the issues of climate change, zero-carbon travel and the economic impact of sustainability have, in a matter of years, become critical to any consideration of transport policy. To maintain its visibility in transport policy globally, and to promote the value of its contribution to the areas noted above, walking research must be in a position to rapidly respond to dynamically changing policy environments.

This is largely a question of economics, and capacity building. It is recommended that VREF examine ways in which agile funding and support mechanisms, such as rolling research calls, can be put in place to support researchers to respond rapidly to policy needs, COVID-19 rapid research fundings stream may provide a model in this regard.

6.2.2 More Capacity Building: Making Walk21 Knowledge Accessible

As noted above, one of the strengths of the Walk21 Conferences is that they give voice to a specific perspective on **Walking as a Mode of Transport**, a perspective that is generated by the exchange of knowledge between academics, practitioners and policymakers, and one that is largely unavailable to standard academic conferences.

However, because the material also lacks some of the standard forms of persistent identification that exists in academic publishing - e.g. a Digital Object Identifier (DOI) - the knowledge presented at Walk21 is not typically discoverable through traditional research literature databases like Scopus or Web of Science.

While the online Library offers access to Walk21 materials, it remains the case that the collection will generally not be found through a traditional literature search. As such, it is less amenable to citation, which further restricts its reach. It is also difficult to calculate the impact of individual items in conventional terms.

Given the importance of citation, and demonstration of the impact of publications, to academic careers, particularly for early-career researchers and academics in precarious employment, this may act as a disincentive to engagement with the existing knowledge base or to future conferences. As such, support is required for Walk21 to disseminate its knowledge more effectively so that research on **Walking as a Mode of Transport** from historical and future conferences can be found and cited more easily by contributors, as well as academics, practitioners and policymakers unfamiliar with the Walk21 series.

This could be achieved initially through the publication of an academic output, summarising conclusions and narrative themes of conferences, which could be used as a template for future events. This could include specifically selected papers or presentations, providing participants with the opportunity to generate academic scholarship and recognition from their participation at Walk21, as well as making important work easier to find in academic databases.

6.2.3 Geographical Equity: Addressing Balance and Inclusion

Research pertaining to the Global South experience is underrepresented in both the Walk21 database, and, as per VREF's *Walking and cycling gaps in transport research*, the broader academic literature too. This has consequences, for example, in the development of data collection and measurement protocols, or other knowledge, claiming to be universal or generalisable, and not simply reflecting European or North American environments. While European and North American audiences are increasingly concerned with modal <u>shifts</u> to walking and other forms of active travel, those in areas of the Global South where walking is the dominant means of transport, will be working in a policy environment where mode <u>retention</u> is the more appropriate consideration.

Walk21 conferences also produce a large volume of non-academic policy and practitioner knowledge generated that remains largely inaccessible to wider academic circles; including policy, and both quantitative and qualitative case studies that would contribute to existing academic evidence. These also represent a gap in the academic literature.

In both cases, Walk21's profile and standing would suggest it is well-placed to address these shortcomings in the academic literature on **Walking as a Mode of Transport**. One mechanism of delivery might include Walk21's newly inaugurated Africa Network for Walking and Cycling. This group started its work in 2021 as a collaborative place for organisations and experts working to make the life of people who walk and cycle in African countries safer and more comfortable. (One of the African Network's ambitions is to host a Walk21 conference, which would be a significant milestone in the series. Taking Walk21 into Asia and Latin America enabled global south walking research to be made more visible and stimulated new studies).

Achieving **Geographical Equity** necessarily involves **capacity building** in underrepresented areas. As such, it is recommended that support mechanisms, in the form of additional training or financial aid, be developed that might allow those working in under-represented geographic areas, particularly the Global South, as well as policymakers, practitioners and non-academic stakeholders, to develop their Walk21 work for dissemination in either a dedicated Walk21 publication, or in other conventional academic venues. Walk21's 4-regional network strategic model (Americas, Asia-Pacific, Europe and Africa) may provide a mechanism through which this recommendation can be delivered.

6.2.4 Knowledge into Action: Supporting Policy Effectiveness

As acknowledged throughout this report, one of Walk21's unique characteristics, and arguably why the conference series continues to be popular, is that academics are woven with practitioners and advocates. This stimulates an exchange of ideas and potentially applied learning at national and local levels. During the last 20 years 103 countries have developed a **policy** for **Walking as a Mode of Transport.** This represents 50% of countries globally however 44% of the countries with a walking policy are high income, 48% middle income and only 8% low income. Further research is required to understand what, if any, evidence base underpins this policy and to what extent knowledge is being applied effectively.

The huge global demand for safe places to walk, in response to the **COVID-19 pandemic** highlights the need for new research that evaluates the effectiveness of existing policy to global emergencies. The fast growing interest in walking, as a solution to the global **climate emergency** at national and subnational levels is another opportunity for VREF to underpin policy with relevant and accessible knowledge. Walk21 is well placed to coordinate this new research into effective policies which has the exciting potential to steer future national commitments to **nationally determined contributions to green house gas reductions**.