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*Research Paper*

# Walkability in policymaking: from a conceptual framework into policy integration

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## Abstract

*Walkability is widely understood as a quality of an urban built environment favouring walking. The concept of Walkability was disseminated over the last three decades through multidisciplinary studies that boosted walking as a critical aspect of promoting healthy cities and active travel behaviours. For this reason, Walkability acquires a common interest in fostering Liveability, Environment, and Health policies. However, some divergence remains about how to operationalize Walkability, which presumes some complexity impacting its implementation.*

*Notably, Walkability holding a broad spectrum would sit at the centre of a transversal and longitudinal intertwined policy network. This way, a walkability conceptualization suggests it still evolves towards an intersectoral planning context, answering how to implement it. This work intends to present a theoretical approach to the Walkability concept implicit in the post-modern debates, orienting towards an explicit evolution of concepts and their application in policy documents, intentions, and actions. Thus, this work suggests that the Walkability conceptual debates' evolution is incorporated into multi-sectoral policymaking.*

*Afterwards, using Lisbon as a case study, the analysis examines how the relevant policy documents incorporate the concepts that favour Walkability implementation in Lisbon. The work points to a chronologic evolution of the research approach through the last 30 years of dissemination. There is also evidence of a time transition from the incorporation of Walkability concepts implicit into policy documents and its explicit implementation. In the same way, the theoretical components that construct Walkability conceptualization are incorporated implicitly and explicitly in policy documents, indicating that Walkability is being implemented through the multi-sectoral integration of public policies.*

## Keywords

*Walkability; Conceptual framework; Policymaking; Policy integration; Lisbon.*

## 1. Introduction

The walkability definition has been disseminated over the last 30 years as an urban quality promoted through a set of built environment attributes favourable for pedestrian-friendly conditions (Lo, 2009; Moura, Cambra and Gonçalves, 2017; Dovey and Pafka, 2020; Lawrence D. Frank *et al.*, 2021). The walkability notion urges implicit in the critical debate mostly in reaction to the predominant car-dependent urban planning model that disfavors the city's proximity and human dimension.

The critique on the hegemonic urban planning model is endorsed through a shift in Public Health Paradigm (WHO, 1986), unveiling the focus on the influence of the quality of the urban environment on a



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community's health. In addition, the emergent notion of Sustainable Development (UN, 1987) included cities in the concept of the "Commons" (Ostrom, 2008), proposing ecological aspirations for a collective urban future.

The urban paradigm critique reaction that arouses in the post-modernism late 20th century has fostered research works integrating urban and transport planning with socio-economic, environmental, health, and quality of life indicators (Torode, 1998; Booth, Pinkston and Poston, 2005; Frank and Engelke, 2005; Cerin, Leslie and Owen, 2009; Marshall, Brauer and Frank, 2009). In this vision, Pedestrian-friendly neighborhoods and Transit-oriented cities are set up as means to achieve sustainable and healthy city goals. In this context, Walkability would emerge implicitly in these postmodernist concepts.

In the same vein, the promotion of Walkability arouses multisectoral interests, encompassing Environment, Energy Efficiency, Climate Change mitigation, Urban Economics, and Public Health around sustainable governance. Accordingly, this paper intends to present the conceptual framework of Walkability as a central element for public policy integration (Stead and Meijers, 2009).

The first section presents a conceptual framework evolution through the literature review. The literature review emphasizes the chronologic approach through three different phases – 1) Walkability Genesis; 2) Walkability as an Index, and 3) Walkability as an integration policymaking component.

The work foundation proposes the Walkability Genealogy ascending implicitly from the postmodernist city critique. The literature review suggests that Walkability has gradually gotten explicitly in the research as a measurement result of pedestrian-built environments and, recently, as a policy element.

Finally, the work presents the Walkability concept consolidating from implicit to explicit over 30 years of scientific production. We aim to examine whether the knowledge created from different concepts and factors impacting Walkability would be incorporated into public policies in Lisbon, Portugal.

## 2. Walkability Conceptual framework evolution - a Literature Review

### 2.1. Phase I - Regeneration of pedestrian-oriented neighborhoods in the contemporary city

The postmodernist critique of the late 20th-century city paradigm fostered discourses, manifestos, theories reflections on regenerating the walkable urban fabrics (Newman and Kenworthy, 1999; 2015). Therefore, the debates refer to "Streets liveliness" (Jacobs, 1961; 2009) and "The Right to the City" (Lefebvre, 1968; 2012) evoking the public space and communities' experiences.

Furthermore, the notion of "eye-level street space" (Gehl, 1971; 2017) dates back to the idea of the "In-between space" concept proposed by Aldo Van-Eik (Farhady and Nam, 2009). The concepts above-mentioned presume pedestrian accessibility and mixed land use at the street ground level, promoting a public-private transition in the sidewalk (Farhady and Nam, 2009). Nowadays, these concepts fall under the notion of multimodal "Shared Spaces" (Monderman, 1990) and "Complete Streets" (Herrmann-Lunecke, Mora and Sagaris, 2020), with an emphasis on pedestrian security facing car traffic.

This overview advocates for pedestrian-oriented city designs (Southworth, 2005). The pedestrian city dimension becomes part of the theoretical reflection, under the influence of Sustainable Development and Public Health, in reaction to the car-centric city model. The Sustainable Development notion opens the way for the Walkability genesis implicit in the New Urbanism postulates. The New Urbanism Charter (1996) promoted the principles of Pedestrian-Oriented Neighborhoods, also re-read in Transport-Oriented-Development (TOD) (Renne and Appleyard, 2019).

Calthorpe (1993) defines TOD as "a mixed-use community within an average 2,000-foot walking distance of a transit stop and a core commercial area" (Calthorpe, 1993, p. 56). In other words, TOD involves a mix

of land use, with commercial activities at the street level and accessible to public spaces, configuring a pedestrian-friendly environment (Lamour et al., 2019; Vale, 2015).

Given the literature review, we infer that TOD' conceptual elements are the ones proposed in the postmodern debates. Nevertheless, the concepts are incorporated in New Urbanism discourse, *per se* reflecting the debate over Walkable Communities with access to the public transport system.

Following the context, recent works also include the Walkability concept implicit element of TOD and New Urbanism (Lamour, Morelli and Marins, 2019). Therefore, Walkability is implicitly in pedestrian-friendly Neighborhood values linked to TOD, falling under the overcoming of car dependency (Newman and Kenworthy, 2015).

Following this discussion, the World Health Organization (WHO) endorses the debate on Walkable Neighborhoods, associating it with Public Health as a product of individuals' experience in the urban environment. The health approach incorporates the influences of the built environment, employability, and housing with social, economic, and cultural factors in community contexts (L.J. Duhl & A.K. Sanchez, 1999).

Consequently, the scientific fields of Health and Physical Activity base their scientific studies on neighborhoods and communities, identifying the relationship between the urban micro-scale spatial attributes with the travel behaviour and inhabitants' health conditions (Torode, 1998; Frank, Andresen and Schmid, 2004)(Torode, 1998; Frank and Engelke, 2005). Thus, Walkability principles implicit in the Urbanism discussions acquire greater prominence, explicitly, and interdisciplinary value in Health and Sustainable Development fields (Marshall, Brauer and Frank, 2009; Giles-Corti *et al.*, 2016).

### **2.1. Phase II –Walkability explicit as an Index - Research approaches**

Overcoming the genesis debates and getting into the scientific approach, we remark that the notion of pedestrian neighborhoods presents operational importance for methodologies to investigate community health. Thus, neighborhoods will configure themselves as samples for methods models that have been proposed to link spatial attributes with the pedestrian socio economic and health indicators (Moudon *et al.*, 2016).

The literature review points to the term Walkability still timidly explicit in publications between 1990 and 2000. However, many types of research present audit instruments of the urban built environment indicating a relationship between spatial attributes and pedestrian travels in the neighborhoods (Moudon and Lee, 2003; Clifton, Livi Smith and Rodriguez, 2007; Moura, Cambra and Gonçalves, 2017).

We highlight the Travel Demand Model- 3Ds, whose 3Ds attributes impact pedestrian travel - Density, Diversity of land use, and Design (Cervero and Kockelman, 1997). The 3D model is one of the first references to relate the presence of the variables with pedestrian behaviour, reducing car dependence (*ibidem*).

From a complementary perspective, the Behavioral Model of Environment (BME) emphasizes the Origin-Destination path, which is associated with pedestrian behaviour (Lee and Moudon, 2006; Vale, Saraiva and Pereira, 2015). Even if the Walkability concept does not appear as the central theme, the variables in Travel Demand 3Ds' and BME models impact the pedestrian-built environment.

The literature review points out Bradshaw (Bradshaw, 1993) contribution as the first explicit definition of Walkability. Bradshaw defines *Walkability* as an urban quality associated with an index composed of metrics assigned to the pedestrian-friendly neighborhood environment (Bradshaw, 1993).

Following the chronologic literature review, the terminology "Walkability" stands out mainly in quantitative analyses. Since 2000, diverse methodologies have identified metrics focused on physical attributes of walkable space, relating them to inhabitants' social, economic, and health indicators (Moudon and Lee, 2003; Frank and Engelke, 2005; Cerin *et al.*, 2006). Most of the researchers indicate the relationship between "Walkability" or "Walkable Places" or "Walking" with Preventive Health and Physical Activity. (Leslie *et al.*, 2005; L D Frank *et al.*, 2021).

In this context, walking travels consists of physical activity in daily commuting (Saelens *et al.*, 2003; Dyck *et al.*, 2010), which interests Preventive Health (Cerin *et al.*, 2006). Through the Health and Physical Activity lens, measuring pedestrian urban attributes contributed to corroborating Walkability impact on residents' quality of life indicators (Frank *et al.*, 2010).

It is worth mentioning the emphasis approach in measuring the urban components. In this category, we mention the Walkability Index and the Walk Score (Brownson *et al.*, 2010; Lawrence D. Frank *et al.*, 2021) and the 5Ds' and 6Ds' methods evolved from the Travel-demand 3Ds' (Ewing and Cervero, 2010).

Although most Walkability indexes evolve from the physical elements of the built space, the concept transcends quantitative metrics. In due course, the idea is rooted in pedestrian-friendly neighborhoods to reinforce the individual's perception of the route.

The achievement of Walkability implies pedestrians recognizing the environment as walkable. Given this reasoning, some authors incorporate studies on pedestrian behaviour and, then, assume that pedestrian perception involves subjective factors concerning socio-economic, geographical, and cultural nature (Adkins *et al.*, 2017).

In parallel, an alternative approach based on the London Pedestrian Strategy developed by the London Planning Advisory Committee Transport for London (TfL) has evolved, proposing five components - 5Cs' (Gardner *et al.*, 1996) to provide five conditions to promote a pedestrian-friendly environment: Connectivity; Convenience; Convivial; Comfort; Conspicuity.

From the same understanding, Ewing (2009) states that pedestrian behaviour involves individual choices given the conditions of the route. Following this, the IAAPE model (Moura, Cambra and Gonçalves, 2017) complements the 5Cs' with two conditions variables - Coexistence and Commitment - (Gardner *et al.*, 1996; Moura *et al.*, 2017). Coexistence presupposes the organization of the various modes of transport on the road to ensure pedestrian road safety. The Commitment variable involves government and civil society engagement. Therefore, the above-mentioned models suggest that walking conditions impacting on pedestrian behaviour are the basis of Walkability.

Jeff Speck (2012) also reinforces pedestrian perception as one of the elements that confer walking conditions. Speck's Walkability theory (2012) establishes four simultaneous main conditions for walking to be a stimulating activity. From the pedestrian perspective, the walkable route should be worthwhile, safe, comfortable, and enjoyable (Speck, 2012).

Therefore, the definition of walkability becomes explicit and crystallized in the different methods. The studies converge on the consensus of the definition corresponding to the extent of the built environment that favours walking (Vale, Saraiva and Pereira, 2015; Iroz-Elardo, Adkins and Ingram, 2021; Fonseca *et al.*, 2022). However, the various methodologies diverge on the variables conferring Walkability and point out eventual contradictions and abstractions (Clifton, Livi Smith and Rodriguez, 2007; Maghelal and Capp, 2011; Dovey and Pafka, 2020; Tobin *et al.*, 2022).

In Sum, quantitative approaches have contributed to consolidating the definition of Walkability due to a combination of elements of the urban spatial environment. Moreover, the measurable methods proved

the interdisciplinary relationship between a walkable built environment and the urban community's health and quality of life indicators (Cerin *et al.*, 2006; Zuniga-Teran *et al.*, 2017; Lawrence D. Frank *et al.*, 2021).

It is reasonable to understand the readiness of the scientific community to produce measurable indicators to promote valid interlocution between urban and transport policies with multidisciplinary studies. On the other hand, different localities' cultural, societal, and geographical aspects determine the power given to contextual factors promoting walkability (Adkins *et al.*, 2017).

The recent literature acknowledges that the Walkability concept lacks operationality due to its complex nature (Dovey and Pafka, 2020; Shields *et al.*, 2021a; Tobin *et al.*, 2022). This statement reflects on contextual aspects of Walkability varying with the territorial, socio-cultural, local government, and political scenarios.

However, scientific approaches have also evolved towards a holistic understanding of the qualitative and complex variables influencing Walkability, concerning mobility culture change, mainly in favour of pedestrians (Ewing, 2009).

This conceptual framework points to the challenge of the Walkability indexes operationalization (Dovey and Pafka, 2020). The literature review indicates that Walkability as an index contributes to data production, a support planning tool. The studies suggest that local actors and policymaking should decide which attributes impact Walkability locally (Boulangue *et al.*, 2018).

In Sum, most recent literature suggests a shift in the research lines, pointing to the Walkability conceptual redefinition (Dovey and Pafka, 2020; Shields *et al.*, 2021b; Tobin *et al.*, 2022). We suggest a tendency in the research literature to recover the Walkability conceptual elements in order to interpret whether they are inserted as policy indicators in multisectoral integrated governance (Sallis *et al.*, 2016).

### Phase III- Walkability as a Policy integration element

The conceptual framework discussion leads to the question of the challenge of implementing Walkability. The Walkability indexes approaches culminate in difficulty in identifying a pattern model for measuring it. This fact highlights the challenge of promoting the key-planning instruments for Walkability.

The framework promotion of Walkability presumes conditions of the built environment associated with the mobility cultures of the inhabitants. In addition, local governance, economic, and cultural scenarios influence the planning process and policymaking. Thus, the implementation of policies for Walkability faces complex interactions of contextual factors and actors (Bozovic *et al.*, 2021). For this reason, understanding Walkability promotion through the public policies lens requires a deep qualitative approach to the complexity inherent to the concept.

A relevant part of the literature review consolidates the definition as a measurement of the attributes of urban space (fig.1). In the policy approach, the walkability attributes would be promoted through urban design strategies and interventions set up in public policies locally and regionally (Giles-Corti *et al.*, 2022). Therefore, the Walkability index methods would have an important role in monitoring and evaluating Walkability as urban policies combination output.

In turn, Walkability indexes adjusted to local contexts produce measurable data indicators supporting multisectoral policymaking. In this context, the measurable magnitude of Walkability is also a tool for planning. The data-driven approaches add to the planning perspective the importance of measures in the foundation support of the priorities for decision-makers (Boulangue *et al.*, 2018; Giles-Corti *et al.*, 2022; Lowe *et al.*, 2022).

On another spectrum, Walkability presents itself as an input element for Livability, Sociability, Sustainability, Quality of life, and Health (Forsyth, 2015; Shields *et al.*, 2021a). This dimension promotes the broader debate on the intersectional benefits of Walkability (Claris and Scopelliti, 2016; Cañas Sanz and Attard, 2021).

Therefore, policies address Walkability by its positive impacts, as a *proxy* for Healthy and Sustainable city planning and designing (Forsyth, 2015). This view supports the insertion of Walkability as a transversal element in different public policies.

Both perspectives promote a third approach to Walkability at the center of a causal dynamic (figure 1) in public policies. In this circumstance, the Walkability concept could be considered a "composite" of theoretical elements incorporated into urban policies. Simultaneously, it is a component embedded in multi-sectoral public policies as a specific objective or goal (figure.1). The dynamic favours the intersectoral and multilevel governance arrangements.

The present conceptual framework illustrates the knowledge evolution around the Walkability concept (figure 2). The recent approach culminates in Walkability as an element for Public Policies integration design, which is the conceptual base of this research.

This reflection implies looking at Walkability through the prism of policy implementation design, directing to the effectiveness of policy discourses into actions. This point leads to funding and budgetary concerns, requiring multisectoral and multilevel governance arrangements. This research examines Walkability as common denominator for public policies, being implemented through themes that acquire greater emergency, political and budgetary capital for policymaking.

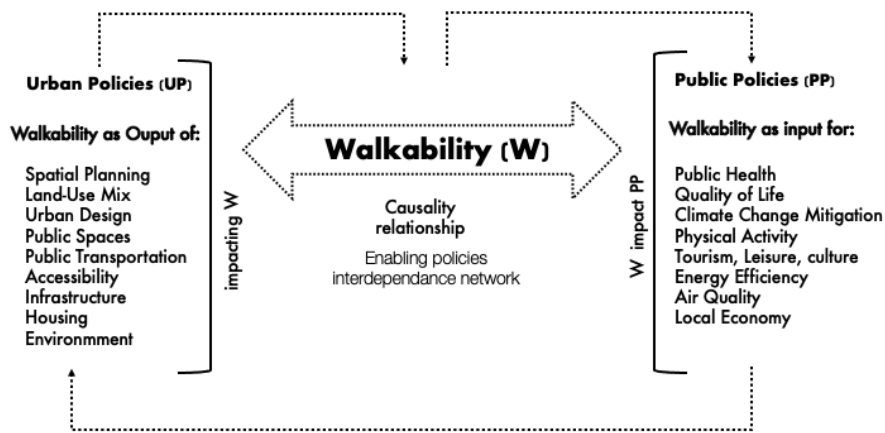


Figure 1. Walkability as an element for Policy integration. Source: Authors



Dimension	Tags	Cronologic Conceptual Framework Overview																																																																
		Time/ Ano 1960 -2020																																																																
		60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	...
IMPLICIT	Urbanism debates Pós-modernos	Lynch, 1960 In-between spaces, 1962 Jacobs, 1961 Cullen, 1968 Jan Gehl, 1971 Levebvre, 1968 New Urbanism, 1996 Neo-traditionalismo, 1990 Monderman, 1990 Moreno, 2016																																																																
	Urban Planning and Transport	Lerner-BRT, 1974 1st New Tramways Urban insertions France Carlthorpe-TOD, 1996 Cervero et al.1997																																																																
	Urbanization-automobile dependence	Harvey, 1999 Newman et al.,1999 Massey, 2005																																																																
	Sustenaible Development	Densenvolvimento Sustentável-NU, 1987																																																																
	Health	WHO New Public Health paradigm, 1986 Giles-Corti et al,2016																																																																
EXPLICIT	Pedestrian Community and neighbourhood	New Urbanism, 1993 -Pedestrian-friendly neighbourhood																																																																
	Walkability a "composite" index	Sarkar (1993) Bradshaw, 1993 Khisty-PM, 1994 Kim, 1994 Gardner et al., 1996 Portland-PEF Portland-PPV/1998 Portland PDI, 1998 Portland-PP, 1998 Ewing, 1999 Moudon- PIP / PI, 2001 Moudon et al., 2003 Pikora-SPACES Frank, et al., 2005 Frank, et al., 2010 Brownson, 2010 Irvine-Minnesota Inventory, 2006 Clifton, et al., 2006 Moura et al., 2017 Ewing, 2009 Ewing, 2010 Brownson, 2010																																																																
	Walkability as an element policy integration	Forsyth et al., 2015 Jeff Speck, 2012 Dovey et al, 2020 Tobin et al., 2022 Giles-Corti et al,2022 Lowe et al., 2022 Boeing et al., 2022 Boulangier, 2018 -Walkability PSS Buttazzoni et al., 2018 Canas et al., 2021																																																																

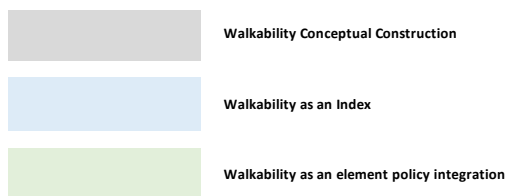


Figure 2. Literature Review: Walkability Chronologic Framework. Source: Authors

### 3. Policies integration promoting Walkability in Lisbon: preliminary results

A content review is proposed to identify checklist criteria in the policy document. The policy review was adapted from evidence-informed planning research suggesting thematic indicators criteria occurring in strategic excerpts of multilevel urban policy documents text (Lowe *et al.*, 2019, 2022). For this research, the criteria are based on the conceptual elements from the Walkability chronologic conceptual framework. The conceptualization pointed to three Walkability conceptual dimensions guiding the knowledge evolution toward policymaking (figure 2).

This content analysis is the first step of a discourse analysis over walkability implementation through Lisbon policies integration. The content review shows up evidence of Walkability conceptual elements in narrative

discourses. However, the discourse does not imply imperatively Walkability effectiveness once factors such as funding resources affect the establishment of targets for actions and measures.

This concern requires innovative governance designs favouring local action implementations and investments. The present paper focuses on the Integrated European public policies governance impacting Lisbon. The conceptual framework found how the policy documents incorporate the conceptual elements into policy discourses for Walkability implementation from 2000 to 2020.

Once Walkability is a recent definition, it is rarely explicit in the documents. There is evidence of its implementation through some emergent policy priority themes. This way, actions for Walkability are inserted as input for achieving a central priority thematic goal.

From 2000 to 2006, in the context of the operational program for Lisbon and Tagus River Region (POR LVT), under the influence of the III CSF, we identified (figure 3): Axe 1: Strengthen the Quality of Life and Local Development, Measure 1.1. Accessibility and Equipment; Measure 1.5 - Specific Actions for Territorial Enhancement (ERDF) Urban Regeneration and Metropolitan territories; Axe 2, Measures 2.1 - City Qualification and Metropolitan Redevelopment. Axe 3.1 - Environment - Sustainable development of regional environmental systems. Both Axis focus on Public equipment accessibility, road safety infrastructure social and urban public space rehabilitation (CCDR-LVT - Comissão de Coodenação e Desenvolvimento Regional Lisboa e Vale do Tejo, 2007).

Therefore, from 2000 to 2006, Walkability, still implicit, is concretized timidly through actions and investments for Lisbon's urban fabric regeneration, local development, and Quality of life. The content identified suggests that the Walkability implicit is an element of human-centred planning.

From 2006 to 2013, the National Strategic Reference Framework (NSRF) established investment funds for actions involving "Public space rehabilitation" and "Sustainable Mobility"(Portugal, 2010; Observatório do QREN, 2012). We highlight the Boa Vista Eco-Neighborhood program, in which the emphasis was Energy Efficiency associated with public space rehabilitation (figure 3). The eco-neighborhood program includes interventions for pedestrian accessibility, proximity, and local economy as inputs for facing the community ageing process and pedestrian security routes. Therefore, these dynamic highlights the dimension of Walkability as an element for public policy strategies facing social issues and improving Quality of life(CMLisboa, 2022).

From 2014 to 2020, the Portugal 2020 partnership agreement included a multilevel and intersectoral governance model. The agreement established priority intervention axes for the Lisbon region through European Structural Funds. Two priority investment axis regarding Walkability indirectly – Axis 3: Low carbon economy transition; and Axis 8: Sustainable Urban Development (Lisboa, 2014; AD&C: Agência para a Coesão e Desenvolvimento *et al.*, 2018).

Portugal 2020 set the conditions for local governments to apply for project funding. A more detailed review of this agreement identified a multilevel policy design that promoted interactions through investment priority axes. Two instruments are prerequisites for funding access: the Strategic Plan for Sustainable Urban Development (PEDU) and a Sustainable Urban Mobility Action Plan (PAMUS). The PAMUS is a metropolitan plan that establishes the operation targets for each municipality of the metropolitan area.

During the last operational period, Walkability was enhanced mostly inserted with Low-Carbon Economy and Carbon Neutrality. Actions and measures for adapting the road infrastructure for cycling and pedestrian are input strategies for reducing pollution emissions, climate change mitigation and improving air quality in Lisbon.



		Operations impacting Walkability				Comparticipação fundo €			
Partnership Agreement	Regional Operational Program	Operation in Lisbon Municipality	Code (ERDF)	Strategic Goal - Investment priority axe	Co-participation fund	Partial total - for theme	Total for Axe		
CSF III- 2000 - 2006	POR LVT	Public Equipment-Sport Equipment Rehabilitation	1.1-006/AML	Measure 1.1. Accessibility and Equipment	1 626 150,59 €	1 626 150,59 €	11 433 031,24 €		
		Road safety infrastructure - "Radial de Benfelig-Nô Buraca ao Eixo N/S Campolide-prot.net. IC19"	1.1-006		4 698 676,19 €				
		Road safety infrastructure - Construção do Túnel do Rego e Rede Rodoviária de Acesso	1.1-043/AML		1 781 372,14 €				
		Road safety infrastructure - Construção do Desnívelamento AV. Infante D. Henrique c/ Marechal Gomes da Costa	1.1-044/AML		2 786 249,95 €				
		Road safety infrastructure - "Reabilitação do Viaduto da Rua Ramalho Ortigão"	1.1-056/AML		540 582,37 €				
		Road safety infrastructure - Radial de Benfelig - Ligação Nô daBuraca ao Eixo N/S - Profundamento natural do IC 19	1.6/007		599 081,06 €	599 081,06 €			
		Public Spaces Rehab-Rehabilitation of the Public Space in Lolos Locality	1.2-018/AML		1 795 672,41 €	1 795 672,41 €		1 795 672,41 €	
		-	-		-	13 827 784,71 €		- €	
		-	-		-	-		-	
		-	-		-	-		-	
NRSF- 2007 - 2013	POR Lisboa	Public Spaces Rehab-Reconversão do Espaço Público, Infra-Estruturas e Ambiente Urbano, com vista à Sustentabilidade Ambiental	LISBOA-02-0741-FEDER-000778	Axe 2 - Territorial Sustainability	2 500 000,00 €	8 940 408,09 €	9 587 270,62 €		
		Public Spaces Rehab-Requalificação do Espaço Público do Alto de Santa Catarina	LISBOA-02-0741-FEDER-001100		592 034,20 €				
		Public Spaces Rehab-Requalificação do espaço público na zona envolvente ao Elevador da Bica	LISBOA-02-0741-FEDER-001098		757 921,09 €				
		Public Spaces-Requalificação do Largo Rafael Bordalo Pinheiro	LISBOA-02-0741-FEDER-001099		113 081,51 €				
		Public Spaces Rehab - Operação Integrada Ribeira das Naus/Terreiro do Paço	LISBOA-02-0741-FEDER-000705		4 977 371,29 €				
		Sustainable Mobility - Mobilidade Territorial - Percursos e corredores cicláveis e pedonais	LISBOA-02-0650-FEDER-001206		646 862,53 €			646 862,53 €	
		Public Spaces Rehab - Refuncionalização e reabilitação do Quarteirão dos Lagares para criação do Centro de Inovação da Mouraria	LISBOA-03-0841-FEDER-000495		-			No information found	No information found
		Public Spaces Rehab - Requalificação do Espaço Público	LISBOA-03-0841-FEDER-000500		-			-	-
		Public Spaces Rehab - Melhoria das Acessibilidades no Bairro Horizonte - Requalificação do Espaço Público	LISBOA-08-4943-FEDER-000053		93 582,72 €			Axe 8 - Sustainable Urban Development	771 953,96 €
		Public Spaces Rehab - Requalificação do Espaço Público da Encosta do Lavrado	LISBOA-08-4943-FEDER-000051		61 075,23 €				
Public Spaces Rehab - Requalificação do Espaço Público - Paço da Rainha	LISBOA-08-2316-FEDER-54	617 296,01 €							
Transport Accessibility -Promoção da Acessibilidade Multimodal Inclusive nos Interfaces de Lisboa: Gare do Oriente, Campo Grande e Colégio Militar	LISBOA-08-1406-FEDER-000087	200 000,00 €	200 000,00 €						
Road Infrastructure accessibility - PAMUS- Arruamento entre a Estrada da Pontinha e a Av. Prof. Francisco Gama Caeiro	Lisboa-06-2016-08	255 754,82 €	255 754,82 €						
Sustainable Mobility infrastructure - PAMUS- Corredor de passagem ciclo-pedonal sobre a Calçada de Carriche	Lisboa-06-2016-08	311 436,60 €	Axe 6.5-Transition to a Low Carbon Economy	3 078 898,66 €					
Sustainable Mobility infrastructure - PAMUS- Corredor Estruturante Vale de Alcântara - Ligações Cicláveis - Unidade da Passagem Inferior à Via Férrea	Lisboa-06-2016-08	803 061,13 €							
Sustainable Mobility infrastructure - PAMUS- Corredor Estruturante Vale de Alcântara - Unidade de Projeto - viaduto ciclopedonal de ligação do Aqueduto à Calçada da Quintinha/Calçada do Baltazar	Lisboa-06-2016-08 - FEDER	627 315,20 €			2 823 143,84 €				
Sustainable Mobility infrastructure - PAMUS- Corredor ciclo pedonal Estruturante Vale de Alcântara - Unidade de Projeto do Bairro da Liberdade	Lisboa-06-2016-08 - FEDER	296 165,57 €							
Sustainable Mobility infrastructure - PAMUS- Corredor ciclo pedonal Estruturante Vale de Alcântara - Unidade de Projeto da Quinta Bela Flor	Lisboa-06-2016-08 - FEDER	543 532,74 €							
Sustainable Mobility infrastructure - Corredor ciclo pedonal Estruturante Vale de Alcântara - Unidade de Projeto da Estação de Campolide	Lisboa-06-2016-08 - FEDER	241 632,60 €							

Figure 3: Priority Investment Axis impacting Walkability – timeline. Source: Authors.

It is important to look at the chronologic evolution of the operations promoting Walkability (Figure 3). The first period is characterized by a strong operation investment for road infrastructure in the logic of car use. Even if pedestrian safety is promoted indirectly, achieving a pedestrian-friendly environment is not a goal. From the second period from 2007 to 2013, the public spaces rehabilitations became relevant. Finally, in the last period operation program, many actions favouring the active mobility infrastructure were included in the Low Carbon economy transition.

However, the investment actions still focus on adapting the road infrastructure for cyclists and pedestrians. A lack of efforts to promote change in mobility behaviour remains insufficient to combat excessive car use. The policies still focus on the physical attributes of the road and streets that are measurable and potentially easy to be concretized and perceived by the population.

On the other hand, the measures that positively impact walking behaviour should restrict car traffic and parking (stick instruments); improve public transport services and enhance proximity life (carrots instruments). These measures and interventions involve political decisions and participatory public debates that are difficult to be measured and targeted.

Finally, the present conceptualization contributes to the knowledge creation evolution around the Walkability conceptualization into policymaking. Nevertheless, implementing actions contributing to Walkability through the European/ state member partnership agreement follows the aspiration of local actors to select the strategic line of investments. This fact points to the symbiotic interface between knowledge produced and policymakers' role in placing values in the policymaking process of cities.

#### 4. Final Discussions: A learning process from conceptualization into policymaking

This approach points to the chronological evolution of Knowledge promoting Walkability into policies (figure 1). The conceptual evolution shows, in the first period, theoretical and societal ideas are promoting Walkability implicitly. In turn, for the second phase, those conceptual ideas enhance research data through Walkability quantitative methods, identifying an interdisciplinary relation in science fields (Figure1).

The interdisciplinary nature of Walkability leads to evidence of cross-cutting governance around its implementation. In the context of public policy, the knowledge promoting Walkability has been embedded implicitly or explicitly in different governance themes.

This chronological work suggests that data and interdisciplinary ideas dimensions of Walkability have been gradually incorporated into the actors' arguments for policymaking. The knowledge used as arguments depends primarily on the actors' *ethos* (Mourato, 2011). The actor's *ethos* reflects the practice of the values in planning environments (Mourato, 2011) manifested in debate, ideas, and scientific data informing policies.

From one perspective, the quantitative approach to Walkability contributed to validating the interdisciplinary nature of the concept. The chronological conceptualization indicates a learning process into knowledge creation (Mourato, 2011b) that begins with conceptual genesis, moving on to the production of data from quantitative approaches, which in turn are used to inform public policy.

In other words, research knowledge is only one implementation process input. However, evidence-informed planning suggests that research has a relevant and persuasive role in communication. Once there is an intricate relationship between academic and professional practice, we examine how the knowledge promoted in research is transposed to policy documents (Lowe *et al.*, 2019).

By this approach, the promotion of Walkability will involve local urban and social aspects plus governmental, economic, social, and cultural scenarios that influence the planning process and formulation of public policies. Local and contextual factors influence walkability policymaking. Thus, the Lisbon process requires a deep qualitative approach to the complexity inherent to the actors' interactions around the learning process inherent in incorporating the walkability concept into public policies.

Finally, this work focuses on finding evidence of Walkability conceptual elements in multisectoral policy governance impacting Walkability in Lisbon in different periods. The conceptual framework highlights knowledge production from three conceptual dimensions – Theoretical, Measure and Policy. On the policy evolution approach, multisectoral and multilevel policy framework indicates the main themes incorporated



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as priority interventions in Lisbon. Those themes show evidence of impacts on Walkability, and in turn, it is promoted indirectly. Futures questions direct to understanding the values of the local actors set up in the policymaking process. This way, it would be possible to understand the local and cultural planning aspect influencing walkability promotion in Lisbon.

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