IMPROVING ACCESSIBILITY, INCLUSIVENESS AND CO-BENEFITS OF PUBLIC SPACES IN EURO-MEDITERRANEAN CITIES: A SOFT STRATEGY APPROACH AND THE CASE OF KALLITHEA (ATTIKI)

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Abstract
A compact city, emphasising mixed land use, low environmental footprint, safe, high-quality, inclusive urban environment, opportunities for its inhabitants, and attractiveness to visitors, employees and investors, tends to prevail as a highly sustainable urban model. Sustainable mobility, coupled with principles of accessibility and inclusiveness, are fundamental elements of urban planning and design, while the "15-minute city" recent concept, aims to reshape urban sectors.

Sufficient availability of public space plays a crucial role to the achievability of the aforementioned urban model. Nevertheless, where public space quantity is in lack, as in several Euro-Mediterranean cities, like Athens Metropolitan Area (AMA), innovative urban strategies and design excellence can be a feasible strategy against this deficiency, complementing the dispersal of relevant routine projects, which often have little impact on urban quality.

In this context, designing connections between crucial focal points, by seeking, combining and leveraging local opportunities and limitations, could establish priorities for implementing sustainable accessible and inclusive design principles and create synergies that offer broad co-benefits.

A relevant example is the proposal to connect three nationwide range institutions for blind people in Kallithea, an inner city district with moderate pedestrian accessibility and low, disabled persons' (PRM) accessibility, by creating a footpath, aligned with the principles of "15-minute city" idea, environmental and multisensory design and in combination with a variety of evolving and future urban projects in the district (mainly (a) a municipal/city project seeking to ameliorate walkability and cyclability of city shopping and cultural centre, (b) the nearby SNFCC foundation and (c) future extension of metro L1 to the district).

This project proposition seeks to create synergies providing a broader diversity of quality services, not only to blind persons, but to a large spectre of local people, promoting overall sustainability and prosperity of Kallithea and of its future evolution.

Key words: *Athens Metropolitan Area, Blind pedestrians, Euro-Mediterranean cities, Inclusiveness, Kallithea, Multisensory urban design, Urban accessibility.*

1.Introduction: Reclaiming the walkable city

In the realm of urban development, the prevailing analyses underscore a direct relationship between a city's sustainability and its levels of quality of life and prosperity (Bieri, 2013). This correlation finds a strong acknowledgement and backing from both the UN (UN-Habitat III, 2016) and the EU (Commission of the European Communities, 1990), prompting ambitious and efficient city administrations to adopt strategies aimed at sustainable urban development (Bobolos, 2016).

In this topic, a model of compact city, with mixed uses and social diversity, guided by principles of design excellence, social well-being and environmental responsibility (Rogers et al, 2002), is also championed by international bodies like the UN (Global Cities Research Institute, 2015), OECD (Matsumoto, 2012), and the EU (Haase et al, 2012 and Partnership on Sustainable Use of Land and NBS, 2018). Of course, the more compact a city is and the more mixed are its functions, its complexity increases, necessitating more efficient configuration, design and governance, to effectively mitigate the potential impacts of density; therefore, design excellence is a prime value in contemporary urban design (URBACT, 2015) as a precondition in order to regain the attractivity of compact city for residents, visitors, professionals and investments.

This model carries several benefits in favour of urban sustainability: it can restrict urban sprawl, which is driving to a gradual transformation of countryside and farmland into quasi-urban regions that is neither rational nor sustainable, as it continuously increases (a) the needs for infrastructures, for motorised mobility, for energy, and (b) the greenhouse gases and environmental pollution. Moreover, it is largely accepted that compact cities, are important places for human/social interaction/cooperation and coherence, as also, crucial cores in post-industrial economies, integral to a country's participation in global economic growth (Bobolos, 2016).

However, the compact urban environment, in order to promote sustainability and prosperity, needs an appropriately designed, attractive and vibrant public space that acts as a connective tissue, supporting interaction, socialisation, solidarity, security and local business, as Jane Jacobs (Jacobs, 1992) and Jan Gehl (Chiaradia, 2022) had already since the early sixties discovered.

Such ideas expanded and strengthened, both at the micro- and macro-scale levels of urban space (CORDIS, 2018), since the nineties, along with the emergence of sustainability issues (Congress for the New Urbanism, 1999 and Commission of the European Communities, 1990).

Thus, for to be prosperous, a city *must have a generous and well-designed street pattern*, namely streets and public spaces promoting walking, cycling and transit trips that are not only more cost-effective and environmentally friendly, but also advance important social goals (United Nations Human Settlements Programme 2013, 2013).

Particularly, walking and other soft mobility ways, like cycling, carry several benefits: contribute to the creation of a vibrant public space (Lusher et al, 2008) reduce demand for motorised traffic and its negative impact, involve zero emissions of greenhouse gases, pollutants or noise, impose no travel costs, provide a means of physical exercise promoting health, allow flexibility in route selection, offer a multi-sensory travel experience, facilitate opportunities for interaction and socialisation, enhance inclusion in the local community, giving a stronger sense of community and encourage a preference for local trade (consumption) and local employment.

In the basis of the aforementioned ideas, since the sixties, urban planning and urban design -a new then, lower level of public space configuration- were starting to focus in the refurbishment of compact city sectors, by enlarging pedestrians' space and restricting

motorised traffic. The creation of pedestrian street networks, mostly in historic cores is the most common urban planning answer, along with the experimental implementation of the idea of car-free cities.

Copenhagen was the first city, and a successful innovative paradigm, where a long-term urban revitalisation strategy (1962-1996) of an historic city-core district, was implemented, with the gradual, pedestrianisation of selected commercial streets connecting several strategic points of this sector, while maintaining a moderate motorised access to the rest of the area. Configuration and implementation of this project, was conducted through an incremental and adaptive, step by step logic, including in-depth analysis and evaluation of objective and subjective data in every phase (Chiaradia, 2022).

Maintaining a moderate car mobility is more and more considered as a positive element for urban space accessibility and vibrancy as (a) depriving of car use some categories of city users, leads to serious inequalities (Raibaud, 2015 and Kyvelou et al, 2021) and (b) full absence of car traffic from urban space, mainly during the evening and night, provokes insecurity and decreases space vibrancy. Moreover, absolute restriction of cars, from several areas is not practical, especially in residential and mixed-use neighbourhoods, given the widespread of car ownership and even, the shortage of closed parking lots in many inner compact cities. Developments, especially in the motorised mobility technologies, creating expectations to deliver dwellers from car ownership, are promising, but still distant (Bobolos, 2020 and Kyvelou et al, 2021).

Manchester (U.K.) was among the first cities adopting the strategy of sharing pedestrian space with moderate motorised traffic (RUDI, 1999) in order to reinforce evening and night vibrancy and security in regenerated core-city sector.

A more recent conception, the “15-minute city” (Cutieru, 2021), a strategy adopted initially by Paris, is proposing to reshape urban sectors in order to give any dweller, access on foot or by bicycle to all important functions and services in a maximum of 15 minutes. This idea is focusing to the target (the sustainable urban mobility) than to the means and methods, suggesting a flexibility about the regulation of motorised and soft traffic (on foot, by cycling etc) to achieve this target.

Thus, since the early sixties, a new wave of thinking, highlighted urban mobility as a core issue of urban sustainability and deployed an evolving diversity of ideas to promote pedestrian and soft mobility to supplant motorised one. Since then, this wave is inspiring many successful implementations in the field of urban planning and design and today in its diversity of ideas, is a literally universal point of view in urban thinking.

2. Methodology

The specific study included an in-depth literature review related to the primary objectives including research on statistical and administrative data. Additionally, maps and aerial photographs were collected and used, complemented by field investigations.

Furthermore, we identified local and temporal opportunities to encourage potential synergies. Utilizing the above, we developed a novel project plan that directly addressed our project goals. Lastly, we thoroughly outlined all limitations of the proposed project, paving the way for improvements and future research.

3. Analysis

3.1. Design for all

The increase in pedestrian space has not only quantitative, but also a strong qualitative dimension: The principles of accessibility and inclusiveness, advocate the design of every

public space in a way that take into consideration the needs of all users (ages, gender, economic status, ability of mobility etc.), including persons with reduced mobility (PRM): disabled, blind, elderly and people with temporarily reduced mobility (pregnant, injured, infants and their escorts). According to *United Nations Convention on the Rights of Persons with Disabilities* "*Universal Design is understood as the design of products, environments, programs and services that can be utilized by all persons, to the greatest extent, without needing adaptation or specialized design*" (UCLG Congress, 2019).

Mobility obstacles, prevent PRM people from going out, for social, shopping and recreational activities (Bergier et al, 2010). Exclusion from mobility, socialisation and public space activities is a deprivation of the "right to the city", i.e. to urban life and all its aspects (Lefebvre, 2000). Especially those with some form of permanent reduced mobility, are vulnerable to marginalisation (Shen et al, 2023); hence their exclusion from public space is tantamount to equally permanent social exclusion, and it has a negative impact to their personal well-being; the value of improving urban mobility of PRMs is significantly higher than its measurable dimension (e.g. the number of trips), both on a personal and social level; thus, promoting their accessibility in public space, leads to strengthen their social inclusion and activity (Stanley et al, 2010) e.g. by enhancing their social life, their access to the labour market etc. (Banet and Stypułkowska, 2018).

Correspondingly, the social exclusion of people implies the deprivation of society from their potential social contribution, while society is favoured from their contribution, as its active members. Besides, the potential contribution of persons with some form of permanent reduced mobility is much more important in the concept of post-industrial economy of knowledge and creativity, as development and wealth are based on talents, innovative ideas and advanced knowledge. Under this condition, everyone's contribution by new ideas and creativity is potentially valuable, thus every form of social discrimination or exclusion is counter-productive.

Finally, better accessibility of PRMs in public space concerns either major and increasing social groups living in compact city sectors (elder people, disabled), or groups that compact cities need to retain or to attract (young couples with babies etc.), in purpose to promote their social diversity and vibrancy.

Thus, adapting public space in order to facilitate mobility of PRMs is an integral part of design excellence, needed to revitalise compact city sectors, by making them attractive for dwellers, visitors, professionals and investments.

3.2. Focusing to the visually impaired people

Walking has an important share in blind people's independent mobility. According to research works (Liu et al, 2019 and Bona Frazila and Zukhruf, 2018), amid visually impaired persons, an important share prefer to reach their destinations on foot. This is understandable, at least for short trips, as finding and using a taxi can be costly, difficult and time consuming, while using public transport lacks flexibility and can be confusing. Walking is also a main human need, for the open-air experience and for socialisation.

For blind persons, the meaning of a "short trip" in terms of time can be estimated by matching it to a "short trip" for clear-sighted people, in the range of 15 min and the equivalent of length walking a clear-sighted person.

Figure 1: Calculation table of "short trip" time for blind persons:

Walker	Usual / average walking speed	Distance to cover	Time for 1000 m of distance
Clear-sighted	1.31 m/sec	1000 m	1000m/1.31m/sec = 763sec/60 = ~13 min
Blind persons	0.72 m/sec	1000 m	1000m/0,72m/sec = 1389sec/60 = ~23 min

By the above calculations (fig. 1), it can be alleged that, a "short trip" for a blind person - to walk for 1000 m- does not exceed an average of 23 min.

The travels of visually impaired people, tend to have clear purpose, concerning primarily to disabled service centres and to urban parks, but also to service facilities as health services and restaurants (Liu et al, 2019 and Krahn et al, 2015). Thus, such paths should be reconfigured by priority, in order to ease blind people's walkability.

The promotion of walking for blind people, assumes a proper configuration of public space, as visually impaired persons have a special kind of reduced mobility (PRM) due to the barriers they face in the perception of space. Main public space design principles for visually impaired, are as follow:

- Sidewalks' and other pedestrian paths' width is an important element for their walkability, especially in a concept of design for all, as sidewalks have to completely service a diversity of persons with full and reduced mobility. Hence widening sidewalks especially in historical, compact city etc. districts should be a priority.
- Walking through street crossings, is for visually impaired people, much more difficult and risky than for clear-sighted people. Street crossings with two or more lanes are further confusing and dangerous to cross (Ashmead et al, 2005 and Banet and Stypułkowska, 2018). Hence ensuring easy and safe street crossings, is a priority when designing pedestrian paths to promote on foot mobility for blind people.
- Design, construction and maintenance excellence is critical, in order to ensure walkability for all pedestrians and even more for blind people and other PRMs. It is not useful to determine an average walkability in any walking path, as small localised design or/and construction deficiencies and mistakes can seriously affect its walkability (Campisi et al, 2021 and Shen et al, 2023) even by completely hindering its accessibility. Standards and instructions for the configuration of PRMs' accessibility of sidewalks and other pedestrian paths, are to be carefully respected in the stages of conception/design, construction and maintenance. Such complete technical standards' books, fruits of integral research work, e.g. the "*Tactile Walking Surface Indicators in the United States and Internationally"* (Bentzen et al, 2021), or the "*Global Street Design Guide"* (Global Designing Cities Initiative, 2016), can help local administrations in urban design, nevertheless, there is a need to have institutional validity in national/local regulations.
- High technology spectacular progress can play an increasingly important role to improve PRMs independent and safe mobility (Hine and Nooralahiyan, 1998). There are many and increasingly multiplying high technology navigation tools for visually impaired people (combining GPS, sensors, smartphones and relevant tools and software) that could be used to enhance their mobility conditions (El-taher et al, 2021).

3.3. Sustainable urban design in Euro-Mediterranean cities

The challenges, particularly pronounced in compact areas (inner-city) of Euro-Mediterranean cities, are closely tied to a severe shortage of public spaces resulting from the prevailing modes of urban development. In the economically unstable regions of south-eastern Europe, where industrial growth was lacking, governments, including Greece, pursued a policy of

promoting urban smallholding to stimulate construction activity, economic growth, and social stability (Bobolos, 2016). The inner-city zones of Athens and other major Greek cities exemplify this approach, characterised by small building blocks and an abundance of narrow streets (Oikonomou, 2016). This urban landscape laid the groundwork for widespread post-war reconstruction in Athens and subsequently in other Greek cities, marked by high-rise buildings, high rates of exploitation, frequent violations of construction regulations, and minimal open space in private plots.

The allocation of public space primarily to streets and the absence of free spaces within private plots have resulted in a critical deficiency of public areas to meet the needs of residents and other urban users. This manifests in narrow or virtually non-existent sidewalks, congested on-street parking, a lack of tree-lined and green spaces, and insufficient areas for activities such as cycling, jogging, and relaxation. This urban structure has led to congestion, pollution, poor cleanliness, and noise-related issues. Furthermore, the scarcity of free and public spaces significantly impacts the quality of life, particularly in Mediterranean cities where outdoor activities predominate due to climatic conditions. Consequently, the prevalence of such conditions in the inner-city areas of Euro-Mediterranean cities has spurred a continuous migration of dynamic strata to the suburbs, accelerating urban degradation and affecting the lower strata that either remain or replace the declining population (Bobolos, 2020).

According to the aforenoted, Euro-Mediterranean cities, dispose most of the preconditions which allow cities to obtain a vibrant public space (*mixed primary uses to maintain a sufficient flow of people, a majority of short street blocks, various kinds of type, use, condition and age of buildings and sufficiently dense population*) (Jacobs, 1992).

Nevertheless, several Euro-Mediterranean cities like Athens, are missing the crucial element, i.e. sufficient public space for sidewalks and other types of public space e.g. parks, where the urban vibrancy could be developed.

In principle, city authorities have to ensure sufficient and accessible space for pedestrians' traffic. Moreover, such environment must be spacious, in purpose to encourage walking, socialisation and vibrancy of sidewalks and other public spaces.

However, lack of available public space, thwarts local authorities' efforts to widely improve sidewalks' walkability and their accessibility for PRMs. The major obstacles to increase public space for pedestrians are the increasing pressure for on-street car parking in combination to the narrowness of most streets.

Routine projects, like sidewalks maintenance and refurbishment often have little, or even negative impact on urban quality: e.g. tactile pavement for guiding walking direction for visually impaired persons may be destabilising, when walking on it (Pluijter et al, 2015), so it may be rather dangerous than helpful, when applied in narrow sidewalks. A similar research (prof. I. S. Papadopoulos, 2004), found that new, tactile pavements for guiding walking direction for visually impaired constructed in most sidewalks in Athens, are difficult to use by blind people and dangerous for all pedestrians (Bobolos, 2016).

Thus, in several compact urban districts (inner-city) of Euro-Mediterranean cities, the prospects for a general increase of public space for walking and soft mobility means are poor, unless, at least on-street parking is strongly restricted. However, this is not practical for now, especially in neighbourhoods embedding residential character.

In this context, several city strategies, in purpose to support urban sustainability by the promotion of walking and soft mobility, tend to adopt programmes and projects focusing on specialised objectives (e.g. attractivity for visitors and investments) and to targeted crucial spots or paths (e.g. shopping districts) of the city. This approach, is an attempt to overcome the objective inability of a generalised improvement of space for pedestrians in compact sectors of cities like Euro-Mediterranean ones, by setting priorities in line to the local

strategies.

Examples of such urban strategies in Athens Metropolitan Area (AMA) are:

- The programme "*Walkable Athens*" (NTUA-Research Committee, 2023), (Walkable Athens-Ψηφιακόπαρατηρητήριο, 2023). Thisis a joint research project by the City of Athens and the National Technical University of Athens, consisting to a strategy seeking to promote walking mobility in the city. The main goal of this programme, is to assist in the configuration of "*a new and specialised spatial strategy that will encourage walking and support pedestrians*" (NTUA-Research Committee, 2023); it is based on the in-depth analysis and evaluation of objective and subjective data of several neighbourhoods, in order to record and elaborate the conditions of pedestrian mobility in Athens, through a specialised scientific observatory, using several means (sensors, interviews etc.).

  The programme contains (a) major horizontal objectives in order to promote a behaviour change of city users in favour of walking and (b) thematic objectives encouraging walking to school, to work, promoting walking for PRM, for shopping and entertainment to parks, to visit the city as tourist. Initial in-depth research, will define several targeted projects, such as cultural paths, green paths, shopping, entertainment paths, accessibility for PRM, parklets, playgrounds, dog parks, a new information system for public space etc.
- The project for "*Bioclimatic urban regeneration of integration and interconnection of SNFCC with the open trade centre of the city (municipality) of Kallithea*" (ΔήμοςΚαλλιθέας, 2023).

  This project is dominated by the goal of promoting walkability, in order to increase attractivity and vibrancy of city shopping-centre and enrich its diversity, by connecting it to new and important cultural services (SNFCC); its configuration is also inspired by the 15-minute city concept.

  The project, already in implementation phase, combines two objectives, focusing on to upgrade pedestrians' mobility: (a) to redesign the sidewalks of selected streets of the shopping-centre broader district of the city of Kallithea, in favour of pedestrians and (b) the connection on foot, of the city-centre with the Stavros Niarchos Foundation Cultural Centre (SNFCC). The project includes facilities for PRMs (tactile lanes, smart crossings), cycling lanes, new treelines and greenery, modern LED lighting system and urban equipment.

3.4. Case study: an urban design proposition for visually impaired persons in the City of Kallithea

In the following, a case study is expounded, in the form of an urban design project proposition, focusing on the promotion of visually impaired persons' urban mobility in a compact, inner city district (Kallithea) of a Euro-Mediterranean metropolis, the Athens Metropolitan Area (AMA). More specifically, it is proposed a soft design action, namely the pursuing of the objective by the minimum modifications to the public space status and function, along with design quality and excellence and in combination with seeking for opportunities of synergies that could maximise and broaden the expected results.

In a sustainability concept, this approach is expected to maximise the positive reception of the project and its social and economic benefits, while minimising negative reactions and risks of serious conception and implementation mistakes.

The City of Kallithea, is a large (~100.000 inhabitants) and densely populated (255 inhabitants/ha) municipality of AMA (ΕλληνικήΣτατιστικήΑρχή, 2023). The city is dominated by residential uses. Urban form traits of Kallithea fit in general to the description of this paper for Euro-Mediterranean cities (part 4). A research paper about a tangent and

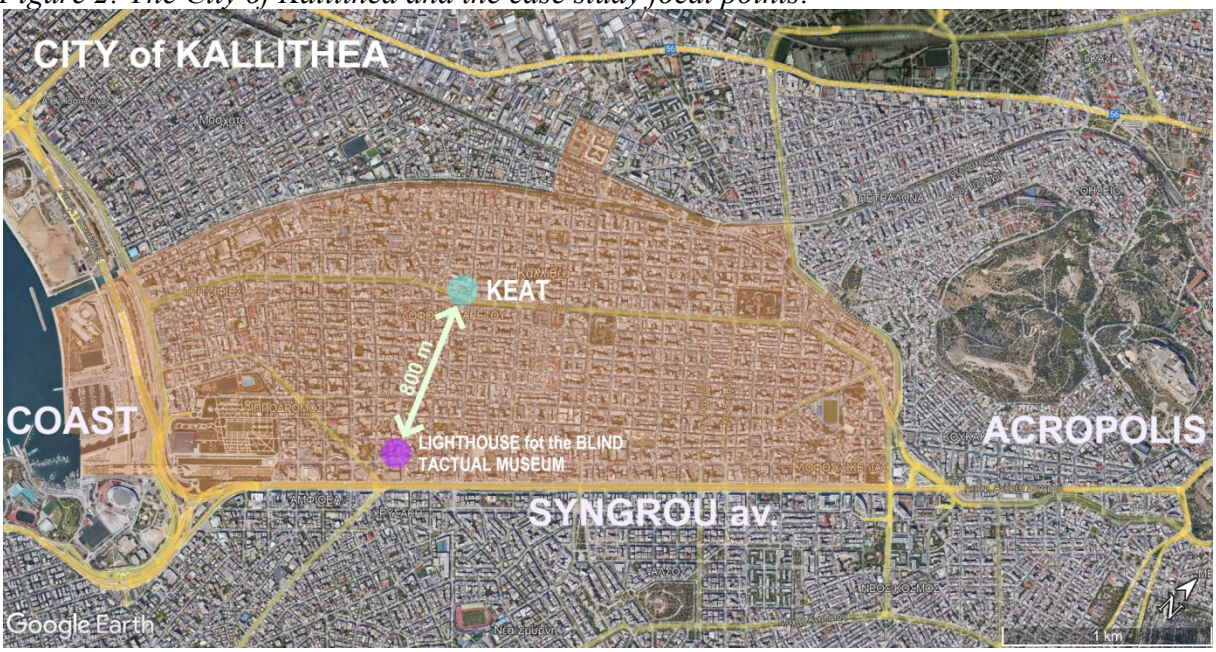
similar district of Kallithea (Mitropoulos et al, 2023) identifies "*lack of a continuous accessible walking network, illegal parking of cars, absence of off-road parking spaces, absence of safe pedestrian crossings and lack of infrastructure for people with disabilities*",characterising overall accessibilityas"*moderate*"namely by a performance that indicates "*to local authorities that they should implement measures and rehabilitate existing infrastructure features to improve accessibility*".

The motivation for this project proposition is the creation of a good, on foot physical connection, between three important institutions for visually impaired persons of national range, located at Kallithea and providing a large diversity of services:

- The *Centre for Education and Rehabilitation for the Blind* (*KEAT*, 210, El. Venizelou av.)[10]: Dept. of Infant, Supporting Lessons-Tutorials for Secondary Education, Computer Science Department and ECDL, Physical Education and Sport Activities, Orientation-Mobility and Daily Living Skills, Teaching Braille-Braille Certification, Library, Printing House, Music and Workshop of Special Visual Material.
- The *Lighthouse for the Blind of Greece* (17, Athinas str.)[11]: Social Service Dept., Braille and Talking Books Library Dept., Braille Printing Dept., several Production Units Depts.
- The *Tactual Museum* of the *Lighthouse for the Blind of Greece* (198, Doïranis str)[12], unique in Greece and one of rare of its kind, worldwide.

The*Lighthouse for the Blind of Greece* and the *Tactual Museum* are located in tangent plots, while the *Centre for Education and Rehabilitation for the Blind (KEAT)* is located in a straight distance of less than 800 m of them (fig. 2).

Figure 2: The City of Kallithea and the case study focal points:



A key utility of an easy physical connection between the three institutions, for their users, namely the visually impaired, is obvious, given the diversity and richness of the specialized services they offer. The distance between them is convenient for connecting on foot, besides, there is no public transport connection either. However, approaching them on foot, given the

[10]*Centre for Education and Rehabilitation for the Blind.* Available: https://keat.gr/?lang=en# accessed: 18-12-2023
[11]*Lighthouse for the Blind of Greece.* Available: https://fte.gr/en/ accessed: 18-12-2023
[12]*Tactual Museum*: Available: https://tactualmuseum.gr/en/ accessed: 18-12-2023

conditions of the surrounding public space, already described above, is not easy, often even for people with clear vision.

To achieve this goal a methodology is followed, as below (4 steps):

- Step A - Specifying the objective of the proposed project:

Hence, there is a need to define a path, through the street pattern of the district, in order to create a walkable connection between the three institutions offering full and safe accessibility and walkability to blind people.

- Step B - Detecting opportunities creating potential synergies, along with the project:

There are actually, two major projects for the City of Kallithea (fig. 3), offering opportunities of synergies:

  - The already mentioned, city (municipal) project for "*Bioclimatic urban regeneration of integration and interconnection of SNFCC with the open trade centre of the Kallithea Municipality*", by now in implementation phase.
  - The project for a new branch of the metro line 1, with two stations in the district: *Lofos Philaretou,* next to KEAT and *SNCCF* in the namesake culture centre (Web Portal - Elliniko Metro A.E., 2023).

Figure 3: The case study area (in light green) and the City footpath network project (in light blue):

The municipal project, already mentioned, is focusing to promote accessibility of pedestrians and PRMs thus apparently, it has similar goals with the project proposed by this paper. In addition, its path network is deployed on the zone of the potential paths (to select the proposed path) between the three institutions for the blind (fig. 3). This opportunity creates two synergies: the potentiality of designing the proposed path in order to partially coincide with the path network of the municipal project, in order to restrict the works and costs for the proposed path. In addition, most important is that the partial coincidence of the two paths, will give to the users of the proposed path, namely visually impaired persons an easy access to the municipal paths' network of the shopping centre of Kallithea and to SNFCC. Simultaneously, the proposed path will create a connection of the municipal path network (shopping centre) with the future metro station *Lofos Philaretou.* Moreover, it is alleged that the metro stations and their connection with the municipal path network and the proposed path, could promote

the accessibility, the popularity and the social value of the three institutions for visually impaired persons.

- Step C - Detecting limitations of the proposed project:

Given that the urban pattern surrounding the institutions for blind persons is dominated by residential and mixed uses, an absolute restriction of cars, on the selected streets in order to form the proposed path, is not practical, as already explained. Thus, the option to create a pedestrianised path, linking the three institutions for visually impaired persons, is not eligible. Hence, the proposed path should be composed by a set of streets, shared by pedestrians and vehicles, while maintaining the highest standards for PRMs accessibility. Even if the selection of the proposed path excluded for practical reasons, from the beginning, the option of an exclusively pedestrianised way, the maintenance of a moderate car mobility in the proposed path, is expected to be a positive element for urban space accessibility and vibrancy, as already explained.

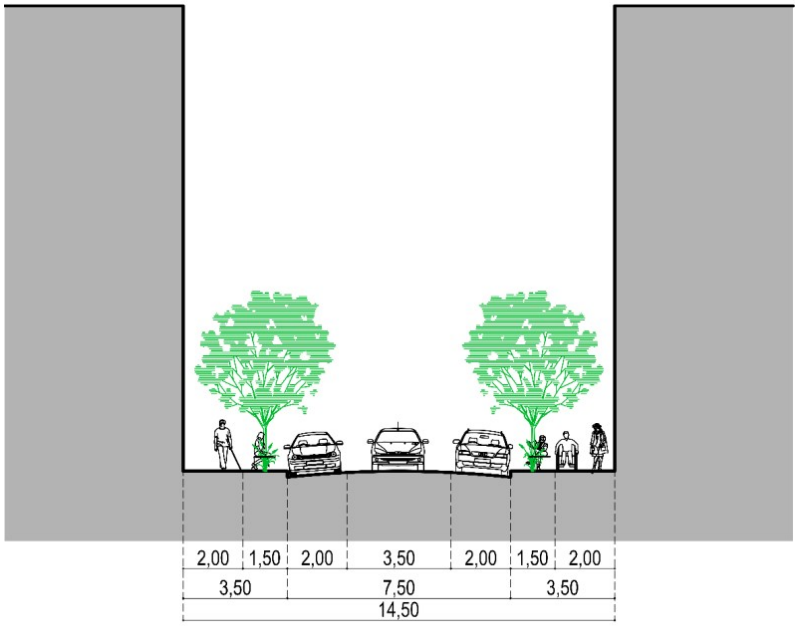
- Step D - Assembling the proposed path:

The proposed path should be assembled by a set of successive streets, selected by the following criteria:

  - As argued, the proposed path should partially coincide with the city (municipal) path network, thus at least one of its component streets, will be required to have this attribute.
  - Streets for assembling the proposed path must be selected among those servicing local traffic needs, so that any modification in their geometry will not displace their surplus load of traffic or parking to the neighbouring streets pattern.
  - A tiring and discouraging path must be avoided, thus it must not exceed a length of ~1000m in order to be adapted to the 15-minute city concept. Besides the street ground should be the less steep possible.
  - It is important to select streets offering options for relax intervals, like gardens, pocket parks, cafés, restaurants, as also for elementary shopping needs, as pharmacies and groceries.
  - The appropriate streets, for assembling the proposed path, must have a sufficient width, so to maintain the option of sidewalks widening, while maintaining local motorised traffic accessibility and on street parking (fig. 4). Following optimum international standards[13], streets should have a width $\geq$ ~14.5m (sidewalk 3.5m+parking 2m+ traffic lane 3.5m+ parking 2m+sidewalk 3.5m).
  - As already argued, design excellence and high construction quality are the only sustainable option in AEC projects in general and a necessary condition for the accessibility and walkability of blind people and other PRMs to the public space. Thus, a careful conception of the entire path (sidewalks, crossings and intermediate rest areas) according to optimum international standards for PRM accessibility is crucial to obtain its usability. Lifecycle assessment and a committed systematic maintenance of the footpath are also critical for a sustainable and successful project over time.

[13] e.g.: *Global Street Design Guide* (Global Design Cities Initiative, 2016) or *Streetscape Guidance* (Hodges, 2022).

Figure 4: Optimal configuration for a street of 14m - 15m width:



The evaluation of eligible streets in order to select the components of the proposed path was held in line to above referred criteria, by combining in situ observation and the consideration of maps and photos, as the number of eligible streets is not important. More demanding methods of evaluation, e.g. in case of numerous street to evaluate could draw inspiration by relevant literature (Mitropoulos et al, 2023).

Figure 5: The proposed footpath (in green) and the city footpath network (in light blue):

Figure 6: The proposed footpath design and documentation table:

No	Street	Between streets		Total street width (m)	Need for sidewalks widening	Sidewalks width (m)	Traffic lanes + on-street parking width (m)	Route length (m)	Points of interest
1	**Doïranis** (two lanes street)	Solonos	Athinas	20	**COINCIDENCE with City/Municipal path network project**	4+3	13 (2+9+2)	40	• Connection to SNFCC and future Metro station (via Doïranis str) • **Tactual Museum** • Bus stop: 10, E90, 910
2	**Athinas** (single lane street)	Doïranis	Sokratous	15	**No**	3.5+3.5	8 (2+4+2)	55	• **Lighthouse for the Blind of Greece** • **Tactual Museum** • Bus stop: 910
		Sokratous	Irakleous	15	**No**	3.5+3.5	8 (2+4+2)	110	• Café
		Irakleous	Dimosthenous	15	**No**	3.5+3.5	8 (2+4+2)	90	• Restaurant + open air (garden) • Sport centre (planned)
3	**Dimosthenous** (two lanes street)	Athinas	Perikleous	20	**COINCIDENCE with City/Municipal path network project**	4+4	12 (2+8+2)	200	• Shopping street (Dimosthenous str) • Connection to shopping centre streets network • Bus stop: 910
4	**Perikleous** (single lane street)	Dimosthenous	Andromachis	15	**Yes**	from: 2.7+2.7 to: 3.75+3.75	from: 9.6 (2+4.6+2) to: 7.5 (2+3.5+2)	80	-
		Andromachis	Sophokleous	14.5	**Yes**	from: 2.7+2.7 to: 3.5+3.5	from: 9.1 (2+4.1+2) to: 7.5 (2+3.5+2)	70	• Pharmacy
		Sophokleous	Kilkis	14	**Yes**	from: 2.5+1.5 to: 3.25+3.25	from: 10 (2+4+4) to: 7.5 (2+3.5+2)	75	• Garden+playground (34, Perikleous str.)
		Kilkis	Xenophontos	15	**Yes**	from: 1.75+1.75 to: 3.75+3.75	from: 11.5 (2+5.5+4) to: 7.5 (2+3.5+2)	70	• Pocket park (37, Perikleous str.)
		Xenophontos	Platonos	15	**Yes**	from: 1.85+1.85 to: 3.75+3.75	from: 11.3 (2+5.3+4) to: 7.5 (2+3.5+2)	75	-
		Platonos	Metamorphoseos	15	**Yes**	from: 2+2 to: 3.75+3.75	from: 11 (2+5+4) to: 7.5 (2+3.5+2)	75	• Garden/square (64, Perikleous str.) • Cafés, Pharmacy, Super market etc
		Metamorphoseos	El. Venizelou (Thiseos)	15	**Yes**	from: 2+2 to: 3.75+3.75	from: 11 (2+5+4) to: 7.5 (2+3.5+2)	60/140	• **Centre for Education and Rehabilitation for the Blind (KEAT)** • Bus stop: 1, 5, 040 • Future Metro station (El. Venizelou av.)

Street widths documentation: http://gis.epoleodomia.gov.gr/v11/#/23.7015/37.9504/17

The proposed path (fig. 5 and 6) has a length of 1000 m and it is assembled by four sections (numbered from 1 to 4).

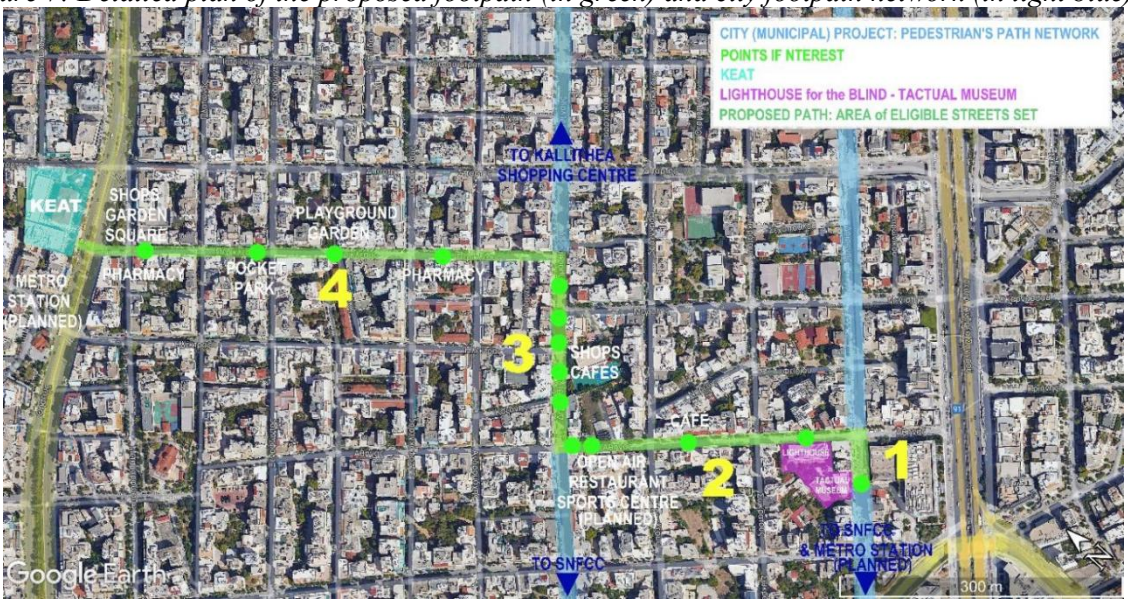
Sections 1 and 3, are wide, two lane streets coinciding with the city (municipal) paths network a project feature giving a double benefit (a) of cutting costs, as it reduces the length of the proposed path 24% and (b) of interlinking the proposed path with the city (municipal) path complex, in a way that would feed each other with pedestrians to create a first walkable web, that would potentially be, incrementally expandable to other city destinations.

As sections 1, 2 and 3, dispose the necessary sidewalk width, no widening of sidewalks is proposed.

Section 4, although it disposes the total width to cover the standard set by this proposition, it has relatively narrow sidewalks, in need of widening.

Sidewalks of all sections should be redesigned in line of design excellence and durability, in purpose to become full accessible to blind and other PRM people and of course to all other pedestrians. Pedestrian's crossings will have to be carefully designed, in order to offer full security, easiness of use minimum delays. Special smart equipment should be installed for facilitate visually impaired peoples' crossing. In any case, the proposed path and the city path network should be designed by common standards and systems for PRM facilities.

Figure 7: Detailed plan of the proposed footpath (in green) and city footpath network (in light blue):



3.5. Expected benefits of the proposed project:

The analysis-conception procedure resulted to the configuration of a project proposition aiming to create a walkable path, interconnecting the 3 institutions fully accessible by blind people. By the implementation it is expected a diversity of benefits verifying the initial hypothesis (fig. 6 and 7).

- The main expected benefit of the proposed project is the promotion of blind people's mobility:
  - Among the three important institutions of Kallithea, for their education, cultural and professional creativity, livelihood etc, briefly for their personal development, in order to have the opportunity for a decent and independent life.
  - Towards the shopping centre of Kallithea and the SNFCC, the coastal zone, through the connection of the proposed path with the municipal path network.
  - Towards other destinations in AMA, via several bus-stop along to the proposed path (1, 5, 10, 040, E90, 910) as via the planned metro stations in the proposed path and through the connection of the municipal path network.
  - Towards any destination, mobility leads to socialisation, experiences, knowledge. In addition, mobility on foot is promoting good body and mental health. These gains it is expected that could also benefit, in similar ways, every PRM living or visiting Kallithea.
- All people in the district could have access to the proposed walkable path and a direct walkable connexion to the future metro station Lofos Philaretou (El. Venizelou av.)
- Along the proposed path, the widening of sidewalks could allow the planting of big trees and of greenery, resulting to a positive impact on the image of the city, and its environmental quality, benefiting the summer microclimate, the urban fauna (birds) and enriching the sensorial landscape (auditory, olfactory, tactile).
- By taking part of the municipal paths network of Kallithea, the proposed path could contribute to the foundation of an incrementally spreading walkable web, driving further the city towards a sustainable and innovative future.
- Finally, the proposed path could contribute to the promotion of a reputation of Kallithea as a walkable city, friendly to PRMs that could bring benefits of prestige and attractiveness, in the field of city branding. Furthermore, in the field of city pride, the proposed path could contribute to the enhancement of residents' commitment, as an urban configuration triggered by the lack of accessibility for PRM, would strongly signal design priorities and the concern of the local government for pedestrians and dwellers.

4. Conclusions and discussion

The objectives of this research are to investigate are (a) the feasibility of creation of a pedestrian physical connection, between three important institutions, that would provide a broader diversity of services to blind persons and (b) the validity of the hypothesis that seeking, combining and leveraging local opportunities and limitations, could simultaneously create synergies, adding further benefits to blind people -the users of the 3 Institutions- and to broader categories of people, as well to the overall sustainability of Kallithea urban character and of its future evolvement.

In purpose to support urban sustainability, a flexible strategy of soft urban projects, in the logic of targeted improvements of urban space, appears to be an appropriate option for the compact inner-city districts of Euro-Mediterranean cities like Athens.

Starting from an issue and taking advantage of opportunities, limitations and occasions

can create synergies increasing, even multiply expected benefits and creating more responses.

Inserting elements of multisensory design (acoustic, olfactory, tactile) creating stimuli, either to make a more pleasant ambience of the path, or/and to support guiding towards different directions. This part of project could be experimental, flexible and long term, in purpose to create new knowledge, useful in urban design innovation.

The inability of a wide improvement of urban space for pedestrians and soft mobility in compact cities where public space is in lack suggest that a wide range of ideas remain to be examined in every case whether they are applicable. E.g. ideas like mega blocks are needed to be explored whether they could be useful to make Euro-Mediterranean cities more walkable and more sustainable.

A city strategy of incremental reconfiguration of pedestrian's space in purpose to promote walking and PRM accessibility, would lead to a spreading walkable network, transforming to a web through urban space; for blind people' orientation this could be confusing. Creating different hierarchised levels of tactile lanes, for residential neighbourhoods, shopping areas, special paths for public and health services etc. is an innovative answer to this question (Liu et al, 2019); however, its incremental implementation on the public space, would premise, a well prepared directional plan.

Finally, this proposition is a first approach to an objective, letting unchecked assumptions, hence the following actions would be held to finalise its configuration:

- A joint consultancy with the administrations and the visually impaired users of the three institutions in order to enrich and finalise the configuration of the proposed project.
- A traffic survey in order to detect the real impact of the project to the traffic condition of the district.
- A substantial public briefing and consultancy procedure, in purpose to take into consideration local ideas and opinions and to obtain dwellers favourable acceptance and cooperation.

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Conflicts interest

The authors declare no conflict of interest.

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