

# PUBLIC SPACES FOR COMMUNITY CAMPUSES AND UNIVERSITIES

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# Assessing the optimality and designing the transformation of universities campus using the 15 Minutes University & City model. A study case: the Polytechnic University of Cartagena

*Ricardo Alvira\**,  
*Marichela Sepe\*\**

## *Introduction*

The current European model of university campuses has been shaped over the last two and a half millennia, with architectural examples from at least the 4th century BC. After the discontinuity caused by the fall of the Roman Empire<sup>1</sup>, the rebirth of institutions dedicated to knowledge from the early Middle Ages took place firstly under the shelter provided by the mini-cities of the monasteries, and later in the framework of the emerging urban centers (Navascués, 1993; Campos, 2000; Bonet, 2002).

First under the name of Studies and then as Universities, they have co-evolved with the rest of the city and society (Zillich, 2018). The multiple facets of this coevolution, which implies a strong bidirectional relationship, have had different manifestations throughout history, ranging from dimensions of use and sharing of space; pro-

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<sup>1</sup> However, in non-Christian Europe, institutions dedicated to knowledge continued, adopting other forms or spaces, such as the mosques, madrasas and libraries of the Caliphate of Cordoba (Bonet, 2002).

viding the necessary environment for study (seclusion and protection); the training of professionals for local needs; symbolic and political functions, among others.

From the urban ensembles of buildings facing inner courtyards in the Middle Ages and Renaissance; through the state universities and polytechnic schools of the 19th century located in palatial buildings open to main avenues and public squares or gardens; then the generalization of “island” campuses located outside cities in the 20th century; and more recently to the regeneration of obsolete industrial or military areas in the interior of cities through the return of some universities (Navascués, 1993; Hall, 1997; Campos, 2000). They all represent different and specific physical responses to this co-evolution.

By the end of the twentieth century, there was a growing recognition that universities: have increasing social and economic importance and physical presence in cities; they are long-lived institutions, whose urban forms are expected to be persistent over time; and tend to grow over time (Larkham, 2000). Moreover, in recent decades, it has been brought to the front: 1) the impact of the university on the geographic area and local community, from which it frequently receives public funding and resources, and to which it must seek to compensate fostering mutual benefit<sup>2</sup> (Goddard, 2018; Russo et al., 2007); and 2) the need that universities, as emblems and drivers of innovation, stand step ahead as example to move forward urban sustainability (Hebbert, 2018).

To achieve the above, integrated governance models have been proposed, for example, the “triple helix” which considers that the private sector and the local community are also stakeholders in university planning, whose needs must also be taken into account in the processes to achieve an optimal synergistic and symbiotic design (Russo et al., 2007).

While it becomes evident that many policy aspects are to be considered when reviewing university-city relationships this paper focuses on the physical aspects. Urban sustainability<sup>3</sup> requires uni-

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<sup>2</sup> Universities have often become a source of income, replacing the former industry as a source for the local economy (Russo et al. 2007).

<sup>3</sup> After the 2010s several sustainability models for urban design have been proposed and applied to university campuses. For a detailed compilation of design measures

iversity campuses to be integrated within the global urban system, which in turn requires a holistic design of the university to achieve two goals: 1) there is substantial integration between city and university, 2) the university is still perceived as an entity, and not as a set of buildings dispersed across a non-academic setting.

Our main hypothesis is that universities' transformations can achieve the above by maximizing compliance with the 15-minute city model (15MC) criteria when both separately considering non-academic users and academic users. We try to prove our point by revising the evolution and planned transformation of a Spanish university: Universidad Politécnica de Cartagena.

In the next section of the paper, relevant arguments about both the design of university campuses and their relationship with the city are introduced. Building on these arguments, a model of sustainable relationship between the university and the city is proposed, as an adaptation of the 15MC model, the 15 Minutes University and City model, 15MUC. Then, we review the current state of the Polytechnic University of Cartagena campus and expected transformations according to the Plan Director approved in 2010. Finally, the article concludes by assessing the validity of this approach model, and making several recommendations to be taken into account in the processes of transformation of university campuses.

### *Latest approaches to university campuses design in European countries. Integration and sustainability*

Parallel to a search for greater international presence of universities, which serves them to attract international students and talent, and gives them prestige at the local level, a trend seeking greater local integration has been particularly noticeable in the last 20 years. Relationships have been intensified, and the benefit brought to the local community has aimed to be increased and made more visible, especially since most universities receive local public funding (Goddard, 2018).

Among the benefits that universities bring to local societies, emphasis is placed on: the formation and geographic anchoring of new professionals; fitted to the local economy and industry; the interaction with local business and technological companies; the vitality university students and researchers bring to the locality; the creation of local stable employment –with low exposure to economic cycles- (Den Heijer & Curvelo, 2018; Goddard, 2018). In addition to socio-economic issues, the physical configuration of campuses is being revised. Universities, traditionally cloistered facilities are opening up to cities by designing facilities that can be used by the rest of the inhabitants, opening and integrating their network of public spaces and traffic with that of the rest of the city (Hebbert, 2018; Goddard, 2018; Zillich, 2018)<sup>4</sup>.

Besides, other perspectives converge to sustain these changes. The first is the negative perception of island campuses expressed by many students, who allude to their over-specialization, isolation from the city and lack of a sense of place/community (Hebbert, 2018). The second is the perception that in the prospect of climate change, universities as places of innovation have to stand out in the advance towards urban sustainability. Third, there is an extended perception that the frontiers of science are no longer rigid and that creativity emerges in the intersection of the disciplines; innovation is a process which benefits from contact between the different and the exchange of ideas, which requires promoting designs that foster the mixing of different people and functions (DenHeijer & Curvelo, 2018; Hebbert, 2018).

As Hebbert (2018) points out, in the knowledge society-economy the conventional boundaries between campus and city have been torn down transforming the university campus from a “defensive security-driven enclave into an extrovert partner, regenerating its urban setting through spatial connectivity and practical collaboration”<sup>5</sup>.

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<sup>4</sup> Moreover, there is a dimension of desirability on the part of the academic community (students, researchers...) and the perception that an attractive city, along with the integration of students into the local community, contributes to their subsequent permanence in the city, thus fostering talent retention and, consequently, socioeconomic sustainability (Russo et al., 2007).

<sup>5</sup> However, there are tensions and unresolved questions about how to achieve this. In some ways, “the cloistered semi-heterogeneity of universities may conflict with the non-cloistered heterogeneity of cities” (Goddard, 2018).

Several measures have been proposed to accomplish these campus transformations, which can be grouped into three scales (Hebert, 2018) adding sustainability as a fourth transversal dimension:

DESIGN ELEMENTS FOR NEW CAMPUSES OR TRANSFORMATION OF EXISTING ONES (1)	
SCALE	SUSTAINABILITY
CAMPUS CITY	<p>Perimeter barriers are eliminated:</p> <ul style="list-style-type: none"> <li>- The open spaces and streets of the university are connected to the city network of public spaces and streets</li> <li>- Interior streets are connected to exterior streets</li> <li>- Pedestrian walkways; light streetcars, and express bike paths, cross the campus.</li> <li>- Possibility of leasing facilities to external users to provide funding to the university.</li> </ul> <p>Mix of uses (attracting non-academic users) to avoid emptying at night and during non-teaching periods:</p> <ul style="list-style-type: none"> <li>- Non-academic residential buildings intermingle with (or approach) the university buildings;</li> <li>- Academic residences do not form a student district but are distributed throughout some areas of the city.</li> <li>- Mixed-use buildings on the edges with services oriented to both the university community and outside citizens.</li> </ul> <p style="text-align: center;">Metabolism approaches.</p>
CAMPUS	<p>Campuses are designed aiming to form structured urban ensembles.</p> <p>Design criteria are drafted by each university to achieve urban quality:</p> <ul style="list-style-type: none"> <li>- Buildings are connected and their size is limited to create adequate "urban scenes", seeking the creation of a sense of place.</li> <li>- The public spaces, tree-lined streets and squares, receive a name and are delimited by buildings with "active" facades.</li> </ul> <p>Density, compactness and complexity are increased.</p> <p>Incorporation of biodiversity and urban agriculture.</p>

BUILDING	Block building design criteria are adopted, and the buildings advance to the edge of the plots.	
	A mix of horizontal and vertical uses is integrated.	Low carbon buildings.
	“Active façades” are designed.	
	Courtyards and gardens are designed.	
<hr/> Source: Authors’ compilation from Hebbert, 2018, with some additions from Bindels, 2007; Russo et al., 2007, Zillich, 2018, DenHeijer & Curvelo, 2018. <hr/>		

From the above list, it follows that, although island campuses located outside cities are also transforming<sup>6</sup>, campuses embedded in the city show more advantages, allowing for a symbiosis between region and campus (Hebbert, 2018). They can integrate into the city’s network of spaces and functions; have many opportunities to collaborate with the municipality or third parties; and have the city’s inhabitants as potential users to provide density to their campuses (Den Heijer & Curvelo, 2018)<sup>7</sup>. Furthermore, as the population concentrates on cities, the integrated university-and-city design implies a more efficient use of an increasingly scarce resource: built and open spaces.

Many of the above measures have been incorporated into the 15-Minute City model, which we review below, proposing a list of measures that specifically can be applied to universities integrated campuses.

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<sup>6</sup> Specifically, through increased build-out; the mixing of uses (e.g. student housing, cultural facilities, research centers, etc.), and the redesign of buildings and public spaces for place-making (Den Heijer & Curvelo, 2018)

<sup>7</sup> “The boundary between the university and the city should be at least porous, at best non-existent: ‘in a healthy knowledge society the university becomes the city and the city becomes the university’ (Sasaki 2007 cited in Hebbert 2018). However, Den Heijer & Curvelo (2018) warn that integration into the city limits the possibilities for campus growth or space, and blurs its identity, which can affect the sense of community.

## *A 15-Minute University - City model*

The concept of the “15-minute city,” developed by Carlos Moreno (2020), proposes a transformative urban model in which residents can access essential functions—housing, employment, education, healthcare, retail, and leisure—within a 15-minute walk or bicycle ride from their home (Sepe, 2023). This model marks a paradigm shift from conventional land-use planning to an approach centered on planning urban life. It advocates for compact, polycentric, and inclusive urban forms where spatial and temporal accessibility underpin social, economic, and ecological resilience.

Central to the 15-minute city is the reconfiguration of urban time and space. As Moreno argues, urban planning must be reoriented toward slower, human-scaled spatial structures that enable proximity and multifunctionality. Rather than segregating land uses, the city must adopt a mixed-use, decentralized morphology where public spaces are multifunctional and accessible, and where urban life unfolds through rhythms attuned to everyday needs rather than motorized commutes. This vision promotes active mobility—primarily walking and cycling—reducing car dependency and enhancing quality of life through spatial proximity (Moreno, 2024).

Within this framework, *university campuses* represent a pivotal node in the polycentric configuration of the city. As hubs of education, research, innovation, culture, and public space, campuses are uniquely positioned to act as multifunctional anchors within 15-minute urban units. When integrated into the surrounding urban fabric rather than isolated as mono-functional enclaves, campuses can contribute to urban proximity by providing not only academic functions but also shared services such as coworking spaces, health and wellness centers, green areas, libraries, event venues, and cultural programming. This reimagining positions the campus as an accessible civic space, embedded in the local neighborhood and serving both the student population and the wider community.

This proximity-oriented reconfiguration of campuses aligns with key principles of the 15-minute city: it reduces commuting times, supports a balanced work-life dynamic, and allows for overlapping of uses within single infrastructures. For example, lecture halls may double as cultural venues in the evening, university courtyards can

serve as public squares, and sports facilities may open to residents outside academic hours. Such flexibility enables a higher utilization rate of urban resources and reinforces social inclusion.

The implementation of these changes requires a systemic revision of urban governance instruments. Zoning codes, development guidelines, and institutional frameworks must be adapted to support mixed-use urban campuses and their integration into neighborhood systems. Policies must facilitate open access to certain campus spaces, encourage partnerships between universities and municipalities, and promote joint management models that reflect shared urban responsibilities.

The incorporation of campuses into 15-minute city strategies also intersects with broader themes of sustainability and climate adaptation. University grounds can act as urban green lungs, contributing to biodiversity corridors, water management through green-blue infrastructure, and local climate regulation. The presence of vegetation, permeable surfaces, and shaded areas within and around campuses reinforces the ecological performance of dense urban environments.

Infrastructurally, the integration of campuses within walking and cycling networks is critical. Ensuring barrier-free access to and from surrounding neighborhoods enhances not only physical connectivity but also the symbolic openness of the academic institution to the city. In this sense, the campus functions as both destination and connective tissue—a space of transition and transformation that embodies the shift from “mobility by necessity” to “mobility by choice” (Moreno, 2020).

Digital technologies further support this vision by enabling flexible, participatory, and data-informed service delivery. Smart campus platforms, for instance, can coordinate shared mobility systems, optimize energy consumption, facilitate remote learning and working, and promote digital cultural participation. As engines of innovation, universities can thus model the digital and ecological transitions underpinning the 15-minute city.

Case studies such as Barcelona’s superblocs (supermanzanas) exemplify the feasibility of proximity-based urban restructuring. Through the reorganization of 400 x 400-meter street grids, vehicle traffic is reduced and pedestrian and bicycle accessibility is prior-

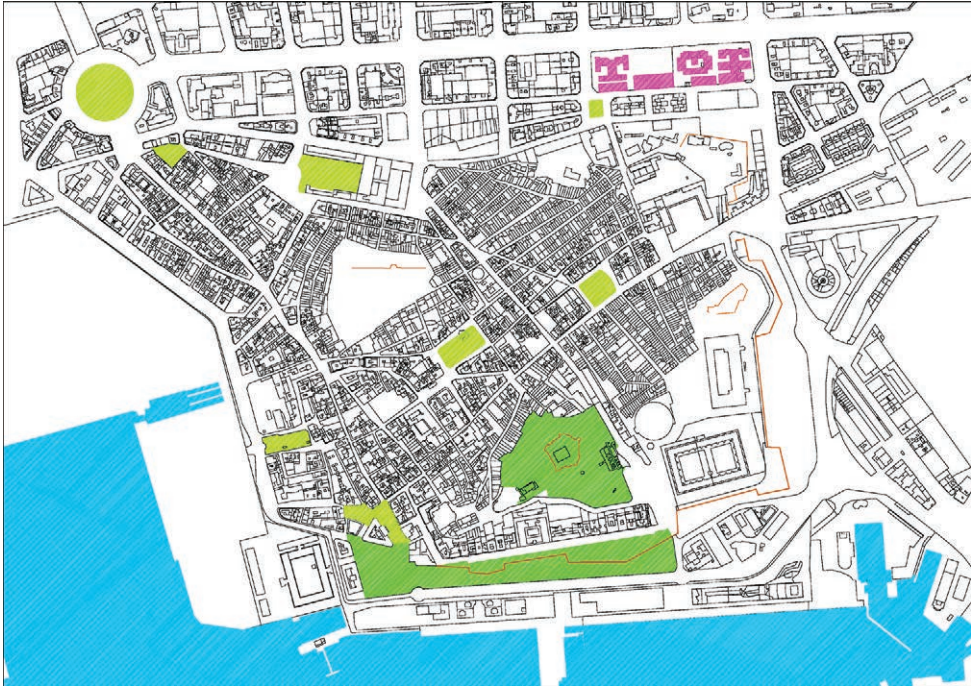
itized. These interventions create space for social interaction, cultural expression, and ecological functions within formerly car-dominated environments (Ajuntament de Barcelona, 2013). In similar ways, university campuses—when reconceptualized as open, adaptive, and multifunctional urban systems—can embody and operationalize the vision of proximity-driven, sustainable cities.

Finally, the 15-minute city is not merely a spatial strategy, but a comprehensive redefinition of urban living. By positioning university campuses as integral elements of local urban ecosystems, this model can harness their full potential to contribute to proximity, equity, sustainability, and participation. Through spatial integration, functional flexibility, and community engagement, campuses can serve as exemplary nodes in the transition toward a more humane, resilient, and inclusive urban future.

### *A case study: the Polytechnic University of Cartagena Campus*

The city of Cartagena in Spain, founded by the Carthaginians in 227 BC and later conquered by Rome, has been a key military fortress, naval, mining and industrial center. Located by the Mediterranean Sea, since the mid-20th century, cultural and beach tourism has gained importance. Specialized education emerged in the 19th century to meet the needs of mining (1865), industry (1901) and business (1921). After several temporary locations, in 1972, a permanent headquarters was established on a 21,000 m<sup>2</sup> plot of land next to the Paseo de Alfonso XIII.

In 1998, the Polytechnic University of Cartagena (UPCT) was created. The master plan, designed by Utoplan-Pablo Campos in 1999, proposed a university fully integrated into the city, taking advantage of several historic buildings -former military or civic facilities in disuse- deeply rooted in the urban memory of Cartagena, which were retrofitted to house academic functions. This intervention served to regenerate the historic center, creating accessible spaces, connected to the urban fabric and -visually- open to the Mediterranean, improving pedestrian mobility and the quality of the environment. Building on an inclusive planning approach, public spaces were designed to ensure universal accessibility. This way, the university's new open spaces and roads helped to reduce the

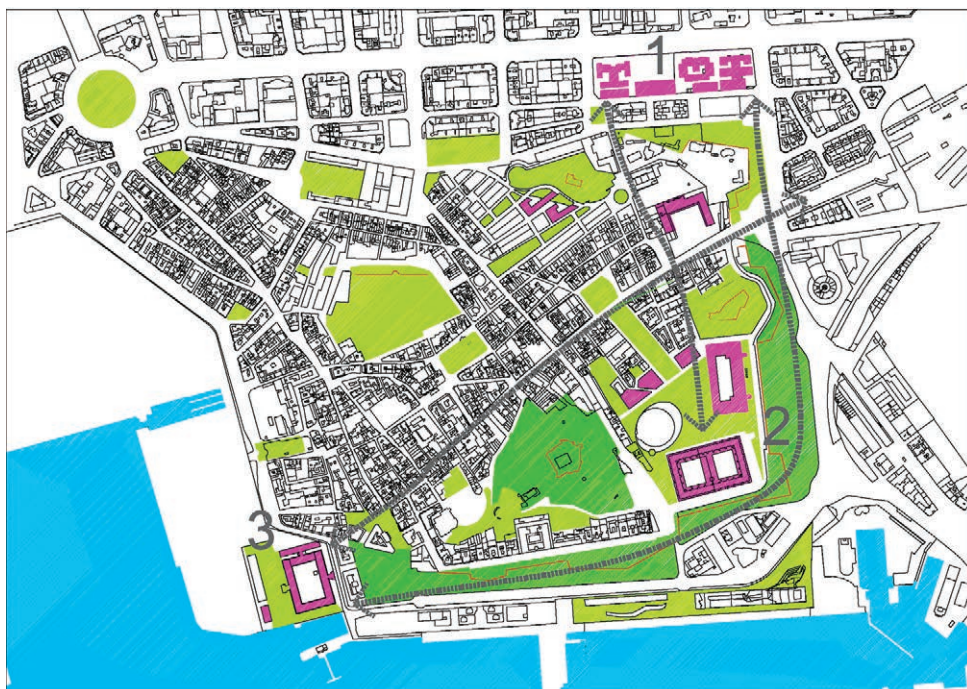


**Figure 1 -**  
*Historic Center of Cartagena. State before the Plan Especial de Ordenación y Protección del Conjunto Histórico. Buildings used for education are coloured in pink. Local public spaces are coloured in light green, and city-wide public spaces are coloured in dark green.*

city's previous shortcomings and enhanced pedestrian mobility<sup>8</sup>.

The integration of the UPCT aimed to encourage social and generational diversity through a polycentric scheme, with initially two, and later three, teaching nuclei; one on the outer edge, and the other two on the inner edge, of the historic center, with the Rectorate standing approx. in the middle of the two main nuclei, slightly displaced east from the historical city center. Due to the reduced dimension of the old town, this distribution implied approx. one km on each side, encouraging pedestrian movement of the university community through the rest of the city, with culture as a connecting link. In addition, the opening of the campus has promoted cultural and recreational programs, strengthening the relationship between the university and the city, while many students required facilities (recreational, shops, copies, etc...) locate intermingled through the urban fabric.

<sup>8</sup> The revision of the Master Plan in 2010 by the Martin Lejarraga studio, author of several interesting university building remodeling projects, greatly continues the first Master Plan, with some greater emphasis on university identity and promoting active mobility.



On the other hand, integration of the university into the city implies any urban transformation impacts the university. Actions such as: the creation of a park around the wall of Carlos III, which is widely used by the university community but also in municipal celebrations; a peripheral ring for pedestrians and cyclists around the historic center; and the enhancement of the five hills of Cartagena (Cerro del Molinete, Cerro de la Concepción, Monte Sacro, Cerro de San José, and Cerro de Despeñaperros), are strengthening the network of public spaces and local identity. The interconnection of these accessible spaces is shaping an urban network based on proximity, approaching the 15MC concept.

Additionally, at the city level sustainable mobility has been promoted by reducing motorized traffic within the old town through a superblocks inspired design (RE-ALlocate) and promoting active transportation, also by shading the public space with textile elements inspired by the historical heritage (Tesserae), contributing to environmental quality and urban integration.

The result is that the urban ensemble formed by the city-university approaches the 15-Minute City, paradigm, achieving that residents

**Figure 2 -**  
*Historic Center of Cartagena. Expected future state. The 2000 UPCT Master Plan encouraged a north-south axis, connecting the old Alfonso XIII Campus (1) with a new Muralla del Mar campus (2). Later, the CIM building was incorporated forming thus a third mini-campus (3) next to the Arsenal, generating some polycentrism. Noteworthy, this last building houses university and non-university use.*

can access essential services -education, culture, green spaces and leisure- within 15 minutes on foot or by bicycle, to a much greater extent than if either of the two were analyzed as if they were independent units.

This example of integrating the university into the city shows how architecture and planning can address contemporary challenges of sustainability, proximity and inclusion<sup>9</sup>, generating a symbiosis in which the spaces and facilities of the university and the city complement each other, and that through appropriate urban design, the university can be a key agent in the construction of the 15-Minute City.

## *Conclusions*

Historically, university campuses have undergone various transformations - from secluded monastic origins to peripheral "island" campuses - reflecting shifting paradigms in urban and educational planning. In the 21st century, in European countries this trajectory is increasingly moving towards reintegration within the city, a movement that is supported from a variety of perspectives. In this context, the application to both the city and university of the 15-Minute City model is proposed.

From this perspective, the case of the Polytechnic University of Cartagena (UPCT) illustrates the important potential of the 15-Minute City (15MC) model when applied to university campuses, both as physical spaces and as social institutions integrated into the urban fabric. The 1999 Master Plan for the UPCT campus anticipated many of the principles of 15MC. The project's goals - to enhance walkability, ensure functional diversity, recover historical infrastructure, and foster socio-spatial integration - demonstrate a deliberate orientation towards proximity and human-scale urbanism.

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<sup>9</sup> However, the renovation of the center has also been criticized because it has led to the displacement of many vulnerable inhabitants (Guiard, 2021), and because improvements to the public space have been concentrated in the area around the main street (west part of the city), where most historical buildings are located and higher income inhabitants reside (García et al., 2022), orienting the city towards cruise ship tourism, which, however, has allowed to reactivate local economic activity after the crisis of the industrial model at the end of the twentieth century.

The campus is no longer conceived as an isolated enclave for academic elites but as a multifunctional space accessible to all urban users. The implementation of public green spaces, pedestrian circuits, and adaptive reuse strategies has created synergies between academic and non-academic communities. Moreover, by restoring and reactivating emblematic sites within Cartagena's historic core, creating a link with the sea, and accommodating some non-academic uses in its buildings, the university not only preserves the architectural and urban heritage but also contributes to the city's urban metabolism, strengthening cultural identity and public life.

The case of the UPCT shows the potential of locating the university in the city center, as a catalyst for neighborhood regeneration and urban sustainability. Noteworthy, its recent creation in 1998 with a development process interrupted by the 2008 recession means its implementation process is still incomplete. It is in this sense that the study of the new transformations, some of them pending, such as the action on the bullring-Roman amphitheater and adjacent area, through the 15MUC model, can also serve to optimize the result, both for the university and for the city.

More broadly, the example reviewed shows that universities can play a central role in fostering resilient and multifunctional urban systems. They act as nodes of knowledge production and social interaction, support the emergence of dynamic public realms, and contribute to the creation of compact and livable neighborhoods. In this context, the 15-minute city model offers a compelling framework not only for improving the accessibility and environmental performance of university campuses but also for redefining their civic mission in the 21st century, pointing toward a new integrated vision of urban and academic life.

To fully realize this vision, universities and local governments must continue to engage in co-governance processes that involve a wide range of stakeholders. Planning regulations must be restructured to allow functional hybridity and adaptive reuse, and financial models should support shared maintenance of public assets. Only through such collaborative frameworks can the 15-Minute University-City become a replicable and scalable model of sustainable urban transformation.

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This volume explores the growing significance of open public spaces within university campuses—spaces that go far beyond their functional role to become essential arenas for social interaction, informal learning, well-being, and urban integration. Rooted in the research projects LOVE Sapienza and NARRATES both founded by Sapienza Università di Roma, and enriched by contributions from a 2025 international conference at DICEA-Sapienza University of Rome, this book provides guiding principles for designing open spaces that promote inclusion, health, and sustainability—on campus and beyond. Far from being passive backdrops, these environments shape the daily experiences of students, researchers, faculty, and visitors, offering settings that foster connection, creativity, and community. The book presents a critical reflection on how well-designed open spaces contribute to the quality of campus life and their evolving role as urban microcosms. It also examines how campuses can serve as active agents in urban regeneration and resilience, addressing environmental challenges through sustainable and adaptive design solutions. Structured around three interconnected themes—Campus and Public Spaces, Campus and University Communities, and Campus and the City—the volume gathers international best practices, offering an insightful tool for students, academics, designers, administrators, and urban thinkers.

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*in copertina*

Copenhagen: detail of the Søndre Campus (photo by Marichela Sepe)

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