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CEMETERY: MORE HUMAN, INTELLIGENT, AND SUSTAINABLE

CEMITÉRIO: MAIS HUMANO, INTELIGENTE E SUSTENTÁVEL

CEMENTERIO: MÁS HUMANO, INTELIGENTE Y SOSTENIBLE

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Armando L. Carvalho Agostini[1], Eduardo Moreira da Costa[2], Carlo Manfroi[3], Neri dos Santos[4], Ricardo Pereira[5]

ABSTRACT

This article discusses the main problems of traditional cemeteries in urban centers, including the lack of space due to population growth, environmental contamination from the use of toxic products in burials, public health issues arising from poor management and maintenance, and cultural and religious issues that make the grieving experience more challenging. The goal is to propose a new cemetery model integrated into urban planning that minimizes environmental impacts and offers a more humane experience for families and visitors, contributing to the sustainable development of cities. Additionally, this work highlights the importance of interdisciplinary research and partnerships between government, the private sector, and academia to develop this new cemetery paradigm. The method used was an integrative review on the subject. The article first addresses the current problems of traditional cemeteries; then, it introduces concepts of smart and sustainable cities that can be applied to cemeteries; and finally, it suggests the implementation of a new model for cemeteries, including the addition of green spaces, efficient use of water resources and solar energy, artificial intelligence-based monitoring systems, as well as virtual memorials and other innovations. Certainly, this innovative model has the potential to create a more humane and sustainable environment for urban cemeteries by integrating smart technologies and meeting the cultural and emotional needs of communities.

Keywords: Cemeteries. Smart Cities. Sustainability. Urban Problems. Urban Parks.

RESUMO

Este artigo discute os principais problemas dos cemitérios tradicionais em centros urbanos, incluindo a falta de espaço devido ao crescimento populacional, a contaminação ambiental decorrente do uso de produtos tóxicos nos sepultamentos, problemas de saúde pública provenientes da má gestão e manutenção, e questões culturais e religiosas que tornam a experiência do luto mais desafiadora. O objetivo é propor um novo modelo de cemitério integrado ao planejamento urbano que minimize os impactos ambientais e ofereça uma experiência mais humana para familiares e visitantes, contribuindo para o desenvolvimento

[1] Master's degree in Legal Sciences. Universidade Federal de Santa Catarina (UFSC). E-mail: alcagostini@gmail.com
[2] Dr. Universidade Federal de Santa Catarina (UFSC). E-mail: educostainovacao@gmail.com
[3] Master.'s degree Universidade Federal de Santa Catarina (UFSC). E-mail: carlo@qualedigital.com
[4] Dr. Universidade Federal de Santa Catarina (UFSC). E-mail: nerisantos@gmail.com
[5] Dr. Universidade Federal de Santa Catarina (UFSC). E-mail: rikardop@gmail.com

sustentável das cidades. Além disso, este trabalho destaca a importância da pesquisa interdisciplinar e de parcerias entre governo, setor privado e academia para o desenvolvimento desse novo paradigma de cemitério. O método utilizado foi uma revisão integrativa sobre o tema. O artigo inicialmente aborda os problemas atuais dos cemitérios tradicionais; em seguida, apresenta conceitos de cidades inteligentes e sustentáveis que podem ser aplicados aos cemitérios; e, por fim, sugere a implementação de um novo modelo de cemitério, incluindo a incorporação de áreas verdes, uso eficiente de recursos hídricos e energia solar, sistemas de monitoramento baseados em inteligência artificial, bem como memoriais virtuais e outras inovações. Certamente, esse modelo inovador tem o potencial de criar um ambiente mais humano e sustentável para os cemitérios urbanos ao integrar tecnologias inteligentes e atender às necessidades culturais e emocionais das comunidades.

Palavras-chave: Cemitérios. Cidades Inteligentes. Sustentabilidade. Problemas Urbanos. Parques Urbanos.

RESUMEN
Este artículo discute los principales problemas de los cementerios tradicionales en los centros urbanos, incluyendo la falta de espacio debido al crecimiento poblacional, la contaminación ambiental derivada del uso de productos tóxicos en los entierros, problemas de salud pública provenientes de una gestión y mantenimiento deficientes, y cuestiones culturales y religiosas que hacen más desafiante la experiencia del duelo. El objetivo es proponer un nuevo modelo de cementerio integrado a la planificación urbana que minimice los impactos ambientales y ofrezca una experiencia más humana para familiares y visitantes, contribuyendo al desarrollo sostenible de las ciudades. Además, este trabajo destaca la importancia de la investigación interdisciplinaria y de las alianzas entre el gobierno, el sector privado y la academia para el desarrollo de este nuevo paradigma de cementerio. El método utilizado fue una revisión integradora sobre el tema. El artículo primero aborda los problemas actuales de los cementerios tradicionales; luego, presenta conceptos de ciudades inteligentes y sostenibles que pueden aplicarse a los cementerios; y finalmente, sugiere la implementación de un nuevo modelo de cementerio, incluyendo la incorporación de áreas verdes, el uso eficiente de los recursos hídricos y de la energía solar, sistemas de monitoreo basados en inteligencia artificial, así como memoriales virtuales y otras innovaciones. Sin duda, este modelo innovador tiene el potencial de crear un entorno más humano y sostenible para los cementerios urbanos al integrar tecnologías inteligentes y atender las necesidades culturales y emocionales de las comunidades.

Palabras clave: Cementerios. Ciudades Inteligentes. Sostenibilidad. Problemas Urbanos. Parques Urbanos.

1 INTRODUCTION

It is not a recent issue that most cities face serious problems such as mobility, pollution, and informal settlements. Another concern involves traditional cemeteries, which, due to a lack of urban planning and a misguided development model, have exacerbated the situation in Brazilian municipalities. It is imperative that in the very near future, cities seek definitive solutions to address this pressing issue.

As [1] (p. 160) state, "Currently, we are experiencing a new moment of transformation in the way bodies are interred and in the methods of their disposal, triggered by population growth, urban expansion, and environmental contamination, the latter caused by byproducts of body decomposition."

In this present work, we intend to briefly address the main problems of traditional cemetery models in urban centers, which include: the lack of space, related to population growth and the limited availability of land for new graves; environmental pollution caused by cemeteries due to the use of embalming methods and burial techniques that can contaminate the soil with toxic substances, as well as groundwater contamination by pathogenic microorganisms resulting from body decomposition; public health problems that cemeteries can also cause through the spread of diseases and infections, especially if not properly maintained; the lack of maintenance that urban cemeteries often suffer from due to insufficient resources and personnel for their upkeep, which can lead to unsanitary and dangerous conditions; and finally, cultural and religious issues related to the burial of loved ones in traditional urban cemeteries, which can make the experience more difficult and traumatic for visitors.

The truth is that cemeteries have always been understudied and underdiscussed, and undoubtedly, they give rise to many other problems that certainly deserve investigation, from the economic devaluation of the surrounding land to public safety concerns.

Furthermore, the social relevance of these structures, which have also come under scrutiny due to declining visitation rates, changes in burial practices such as cremations, and questions about whether the space occupied by the cemetery is linked to a "perpetual care" obligation, often leads them to fall into disuse and abandonment [1].

After all, we are born, we grow, and we die... we are living beings, which is why cemeteries will always be useful and necessary. The challenge when addressing such a relevant topic is how we will transform the traditional cemetery model into a new model of cemeteries that are considered more humane, intelligent, and sustainable.

The research method employed is bibliographical and exploratory, based on a theoretical-conceptual perspective (literature reviews) on the subject.

Therefore, as the research objective, we aim to propose a model of urban, humanistic, and sustainable development to address the socio-environmental issues arising from the expansion of cities and urban agglomerations, guided by innovative factors for the implementation of human, intelligent, and sustainable cemeteries.

2 THEORETICAL FOUNDATION

2.1 CEMETERIES AND URBAN PROBLEMS

The truth is that the majority of traditional cemeteries, as currently designed with large graves, often create endless concrete mazes that people sometimes struggle to navigate when trying to locate the burial site of their loved ones. The lack of burial space is a recurring problem in crowded cemeteries in many Brazilian municipalities, but this is just the beginning.

Certainly, burial plots are limited and valuable. As a result, traditional cemeteries occupy a significant amount of space, which can be problematic in densely populated areas. In this context, the scarcity of land and extreme population density in Hong Kong are discussed by Yung and Chan as factors that create difficulties in accommodating new cemetery spaces in the city. Long-term planning becomes crucial in such scenarios [2].

The lack of burial space can limit cemetery expansion and eventually fill it up, forcing administrators to consider less desirable options, such as exhumation or the creation of new cemeteries in less suitable areas.

The concept of cemetery parks emerges as a way to reintegrate these spaces into the urban fabric of contemporary cities, overcoming the historical segregation of cemeteries [3].

Indeed, in large and medium-sized municipalities, the disorderly urbanization process is a common sight, with cemeteries often not integrated into the urban fabric, even in central areas, which can have various impacts, including emotional ones on the population.

In this regard, Lynch discusses the concepts of "legibility" and "imageability," that is, how easy it is for people to construct a clear mental image of the city and its elements. Lynch analyzes how cemeteries can be important elements in people's mental image of a particular city or neighborhood [4].

The author further explores the idea that cemeteries evoke a "vivid image" in people's minds, arousing emotions, memories, and meanings. This reinforces their unique power as distinctive elements in shaping the mental image of the city [4].

Thus, he classifies cemeteries as urban "landmarks," external reference points for the observer, which end up structuring their perception of the surroundings. Cemeteries often become landmarks due to their dimensions, symbolic importance, or simply visibility in the landscape [4].

Moreover, according to Lynch, some urban landmarks, such as squares and cemeteries, define "nodes" of activity and gatherings in the life of neighborhoods. In other words, they influence the flows and interactions of people in public spaces [4].

This makes urban planning and reorganization challenging, as there are still aspects related to property devaluation around cemeteries.

On the other hand, the importance of urban planning integrating the location and expansion of cemeteries in cities from the outset is emphasized. Neglecting this dimension leads to future problems [2].

Another focus is on public health problems, especially when cemeteries are not properly managed. For example, if bodies are not buried deep enough, animals can dig them up and spread diseases. Additionally, in some areas, cemeteries are prone to flooding, which can lead to water contamination, as was the case in Santa Catarina (Rain causes cemetery collapse, and mortuary chapels fall onto cars in the State of Santa Catarina/Brazil, 2022) [5].

Therefore, it is becoming increasingly difficult for municipal authorities to make decisions regarding urbanization in the face of constant and rapid population growth in urban centers, making a sustainable cemetery model essential.

Furthermore, the administrative and economic aspects cannot be ignored. The difficulty in maintaining cemeteries throughout Brazil must also be evaluated, as the costs associated with the maintenance and administration of traditional cemeteries can be significant.

Another point to consider is the issue of security. Many cemeteries today can be dangerous places, especially at night, which can be problematic for visitors and workers who need to access them. Additionally, there have been numerous cases of theft and vandalism reported in the media (Theft of crosses in Florianópolis cemetery becomes a police case) [6].

Jacobs highlights the concept of "eyes on the street" - the security provided by the informal presence and surveillance of residents, pedestrians, and users of public spaces. Better integrating cemeteries into adjacent areas could facilitate this community surveillance.

She emphasizes that the vitality of neighborhoods is associated with the sense of belonging and emotional attachment of local residents to public spaces. She ponders, "To what extent do a city's cemeteries evoke this attachment and constitute an emotional heritage of communities?" As a result, she believes that diversity of uses is essential to keep cities vibrant and safe. In this sense, there is a need to transform cemeteries into "living spaces" with various functions (culture, leisure), thus making these places more integrated and secure [7].

2.2 MORE HUMAN, INTELLIGENT, AND SUSTAINABLE CITIES

There is no doubt that municipal administrations must play a strategic role in seeking adequate solutions and responses to the local or global social challenges they face today. This is particularly challenging in the context of a post-pandemic crisis caused by Covid-19. Therefore, it is essential to seek efficiency in public management through public-private partnerships to address the issues related to traditional cemeteries, aiming for a new concept of a necropolis.

In this context, [8].draw attention to the strategic use of public contracts, which have a huge impact on the management of smart cities, as follows: "Government contracts and public procurement should include new agents and new formats to allow government products and services to be open source; this means incorporating elements of innovation focused on sustainability and inclusion into these procurement processes. Innovation contracts mean involving procurement departments in the procurement process to ensure that technologies (such as open-source software) can be obtained from reliable suppliers at lower costs and better quality, and that open standards and interoperability are implemented. Open-source software should be easily accessible to governments at all levels."

Therefore, it is necessary for the public administration to review the entirety of procurement processes to facilitate more efficient public spending, enabling innovation in both products and services and the profile of suppliers, with greater access to micro and small businesses.

For this reason, it is essential that the cities of the future do not develop according to the old paradigm of spatial segregation of everyday functions.

Regarding sustainability, the impact caused by the traditional burial process, which involves the use of wooden coffins, linings, pillows, and other accessories, can have a significant environmental impact. Additionally, many cemeteries lack infrastructure to collect and recycle generated waste.

Reference [9] says that to break with the traditional model, it is necessary to deconstruct the existing, rid oneself of concepts and prejudices, and seek a new path of innovation and sustainability. He asserts: "Inventions, innovations, technical, cultural, and ideological creations emerge and modify evolution. That is, they revolutionize it and henceforth make the principles of evolution evolve."

It is important to say that a "smart city" is one that utilizes human capital, creates new innovation ecosystems where work and wealth occur, promotes new forms of participation (governance), using technology as an enabler, while people are its actors. Furthermore, cities must be smarter and more efficient in solving the problems of rapid social urbanization [10].

Thus, as [10] put it, citizens are the driving force of change. Through their motivation and empowerment, significant challenges can be addressed, "not to change infrastructure or adopt new technologies, but to involve people in civic life."

Innovations and creations produce transgressions that can expand and potentiate trends, which can infiltrate the dominant trend and modify its orientation or replace it. In this sense, evolution, whether biological, sociological, or political, is never straightforward or regular. History does not project massively like the volume of a river. It germinates marginally and develops transgressively.

It is also essential to highlight the philosophical aspect that cemeteries can represent, demonstrating absolute equality among humans in their final resting place. Without economic, social, racial, religious, or any other distinctions; the absence of ostentation and questionable taste such as the construction of tombs and mausoleums. Creating an appropriate environment for moments of remembrance and longing, in a place that can be visited by children, eliminating the fear and trauma caused by conventional cemeteries; turning the burial ground into a beautiful natural garden, leveling everyone with green lawns simply identified by a granite headstone.

It is time to shift our attention to designing a better quality of life experience in our cities, as they should be flexible and responsive to the desires and needs of their citizens, using technology to assist us.

2.3 MORE HUMAN, INTELLIGENT, AND SUSTAINABLE CEMETERIES

Well then, the idea is to think about how to plan our future as a new society that has truly learned from the pandemic crisis and had the determination to address the world's situation in a holistic sense. In doing this planning, we need a new city - the city of the future, that is, "A More Human, Intelligent, and Sustainable City - CHIS" [10].

From a contemporary perspective, the model of a more human, intelligent, and sustainable cemetery must be urgently incorporated into cities to solve the complex problem described. To achieve this, it is necessary to transform in order to evolve.

By incorporating multiple uses and social functions, cemetery parks ensure more vitality, movement, security, and integration with urban life in the surroundings. These spaces also emphasize the landscape, contemplation, and biodiversity preservation aspects of cemeteries, bringing people closer to nature [3].

Furthermore, with a sustainable and ecological design, the suggested cemetery model will have a harmonious landscape with a predominance of nature, beauty, serenity, and respect,

suitable for moments of reflection. It is also distinguished by not allowing any type of construction above the surface in the burial area.

Thus, it includes open spaces, extensive tree canopies, and ground-level species, with a large garden featuring various species of wildflowers and endangered native trees.

In this sense, Juliane Queiroz discusses the transformation of traditional cemeteries into "cemetery parks," combining funeral use with leisure, culture, services, and nature contemplation [3].

Additionally, it incorporates water resource reuse, including rainwater; new sustainable lighting systems, such as solar energy capture through photovoltaic panels and LED lights; easy access to any point; outdoor benches, flower shops, snack bars, restaurants, modern restrooms, medical clinics, mortuary and ecumenical chapels, among other services.

Regarding solid waste, intelligent trash cans that notify when they need to be emptied or issue alerts (beeps) when the disposed material is not consistent with solid waste separation (plastics, glass, metal, organic material) are included.

Green areas will be suitable for walking or ecological trails, running tracks, and bike paths, all integrated and part of the concept of a smart cemetery. The cemetery will have a space with musical ambiance (Mother's Day, Father's Day, remembrance days, etc.), AI-based monitoring for visitor safety, a digital system with QR codes to locate the deceased's gravestone, directing visitors through maps to a virtual memorial with messages, images, and videos to remember their loved ones, all accessible via smartphones.

It is worth noting that, most of the time, technological solutions are not implemented due to high costs and accessibility issues. This justifies initiatives in ecosystems aimed at developing new technologies for the evolution of human, intelligent, and sustainable cemeteries in the context of smart cities.

As [8] rightly pointed out, "the Bahian intellectual who thought a lot about cities said: the world is made up not only of what already exists but also of what can effectively exist."

Regarding the concept of compact and vertical cemeteries, which can be explored in other urban contexts, it involves underground utilization and the better use of existing land to maximize capacity [2].

Thus, let's imagine a more human and intelligent cemetery permeated with sustainability, a space where people can breathe clean air, engage in their daily walking routine as if it were a park, with many native trees and green spaces.

This represents a different model from the current cemetery-park models, which still have a limited view of sustainability and innovation.

In the more human, intelligent, and sustainable cemetery, it will be possible to plant trees to honor loved ones, depositing their ashes to enrich the soil, as the biblical passage (Ecclesiastes 12:7 NLT) says, "from dust you came and to dust you will return."

For those who wish to be buried, the vertical burial method can be employed to occupy less space. Seeds can be released in capsules alongside eco-friendly coffins to grow trees that are on the brink of extinction. Consequently, we will have extensive green areas within urban areas.

In addition to these aspects, there will be psychological impacts associated with the implementation of intelligent cemeteries in vast green spaces, aiming to convey peace and tranquility to the location, and consequently, improve the acceptability of coexistence with urban proximity.

The conception of a new environmental education is necessary, based on a more humane and fraternal society, where everyone understands that we are part of cosmic dust and that we are only visitors on planet Earth.

Given the complexity of the problem involving religious aspects, it is necessary to understand that the proposed model of a more human and intelligent cemetery should continue to be a sacred place, and a sustainable religion should be fostered, respecting all beliefs.

It is also necessary to change cultural and religious paradigms about burials, making room for new options such as cremation, garden cemeteries, vertical columbariums, and it is essential to rethink rituals and traditions that may be crucial [2].

Furthermore, a new cemetery concept will bring interdisciplinary themes to the forefront, which must interact to make cities more human, intelligent, and sustainable, as [10] emphasizes: "Human intelligent cities propose the use of technology as a facilitator to connect and engage government and citizens, aiming to rebuild, recreate, and motivate urban communities, stimulating and supporting their collaborative activities, leading to an overall increase in social well-being."

To achieve this, the Table 1 below presents some results of theoretical references in the search for inspiration for an innovative model for a more human, intelligent, and sustainable scenario for urban cemeteries.

3 METHODOLOGICAL PROCEDURES

A methodology used for the present scientific work was an integrative literature review [11,12,13]. It is important to highlight that literature review is a fundamental first step in the

construction of scientific knowledge, as it is through this process that new theories emerge, and gaps and opportunities for research in a specific subject are recognized [13].

Therefore, the literature review process requires the development of a synthesis based on different topics, capable of creating a comprehensive understanding of knowledge. Additionally, it is worth noting that integrative reviews are the broadest type of review, as they allow for the simultaneous inclusion of both experimental and non-experimental research to gain a more comprehensive understanding of the phenomenon under investigation [11].

Reference [12] propose three stages for the integrative review: planning the review; conducting the review; and reporting and disseminating the review results.

Stage 1 - Planning the Review: The research began with identifying the need for the review and contextualizing the topic. The definition and contextualization of the theme delimits and particularizes its content, avoiding ambiguity that could lead to research focus deviation [13]. In the final phase of stage 1, the review protocol was constructed. The protocol is a plan that contributes to research objectivity through an explicit description of the steps followed [13].

Stage 2 - Conducting the Review: In this stage, the following were defined: search strategy; databases; time period; article languages; search terms; tools for data collection and organization; and inclusion and exclusion criteria. The search string ("cemeteries*" AND "urban problems" OR "urban planning AND "smart cities" AND "sustainability") underpinned searches in the Scopus database, which was selected for its broad document coverage. However, to increase reliability, the results were also cross-referenced with the Web of Science Core Collection and Ebsco to confirm the inclusion of all relevant studies. The search was performed by title, abstract, and keywords, resulting in a total of 272 results. In the databases, the following criteria for article inclusion and exclusion were applied: articles produced in the last 5 years (2018 to 2023), language: English, and document types: articles, totaling a pre-selection of 260 articles. In the next step, the title and abstract were read to identify adherence to the research topic and remove duplicate articles, thus selecting 21 articles for full reading. After reading, a synthesis matrix strategy was used for data extraction, which was used for the analysis and discussion of the results. The findings are included in Table 2. No discrepancies were found, confirming Scopus and Ebsco as the most comprehensive datasets. After several iterations and based on the research questions of the present study, the following search sequence was identified as the broadest and most effective for retrieving relevant articles.

Stage 3 - Reporting and Disseminating: The report was prepared based on the analysis and discussion of the results as presented below.

4 RESULTS AND DISCUSSION

This section presents the results obtained from the analysis and synthesis of the 21 articles related in Table I.

Table 1

Author	More humane, intelligent and sustainable cemeteries
[14]	An important consideration reported is about the location of cemeteries and their relative universality and permanence. Therefore, the issue of planning the location and design of cemeteries should be of special interest to the general public.
[15]	Public policies should ensure that legal standards are met in the construction of facilities to accommodate future burials, catering to all economic classes.
[16]	Article 25 of the Universal Declaration of Human Rights defines the right of everyone to "a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services." In this context, proper disposal can be interpreted as a necessary social service.
[17]	After recognizing the cultural, historical, and artistic importance of the cemetery, along with its natural value, "the main objective was to bring it back to public consciousness, introducing new forms of use. It's important to note that recreational and tourist use of

Author	More humane, intelligent and sustainable cemeteries
	cemeteries is partially interconnected because the green potential of a cemetery determines the interest in it (for example, visits for botanical value).
[18]	In Muslim cemeteries, for example, it is allowed to integrate cemeteries with recreational areas as long as their sanctity is preserved. There are limitations on recreational activities that can be conducted there, and only the area with severe land scarcity is authorized to do so.
[19]	The authors understand that there is an international body of evidence demonstrating the myriad roles of cemeteries beyond disposal and bodily remembrance. These roles include their value as recreational spaces similar to parks and for nature conservation.
[20]	Despite the purpose of cemeteries, it is necessary to consider that they often go beyond the need for a burial space to become a religious and sacred place for permanence and pilgrimage, as well as a place to demonstrate civic pride that also provides recreational amenities. Therefore, they have multiple social and political meanings, and their design holds significant cultural significance and provides insights into society and culture.
[21]	The author understands that gentrification and unaffordable property prices have led to

Author	More humane, intelligent and sustainable cemeteries
	issues such as urban expansion and the spread of informal settlements and slums in some cities. This is because those who cannot afford housing in certain areas opt for other forms of settlement that are considered relatively cheaper. This is especially true in cities where there is tangible evidence of resistance to adopting modern and technologically oriented solutions to address land scarcity in urban areas, which are seen as available in the contemporary notion of Smart Cities.
[22]	It is essential for society as a whole to understand sustainability as the primary alternative for production. Therefore, the resources taken from nature need to be used wisely. We can no longer consume just for the sake of consumption; a critical approach to our actions is necessary. In this way, it is crucial to comprehend the dimensions that sustainability presents in order to promote practices that are genuinely positive, including within cemeteries.
[23]	There are "green burial" sites where embalming is not allowed, and bodies are placed in coffins made of biodegradable materials such as willow or wrapped in a simple shroud.
[24]	The author explores some practical solutions that could be

Author	More humane, intelligent and sustainable cemeteries
	implemented to encourage green burials and how local governments can help make these greener options more accessible through permits, park fees, tax credits, mixed-use spaces, and the legalization of innovative options such as aquamation and human composting.
[25]	The author states that in the changing metropolitan landscape, cemeteries can become islands of biodiversity conservation. Due to their size, habitat heterogeneity, and continuity, cemeteries play a significant role in urban biodiversity conservation. Similarly, it's important to highlight that the educational and cultural value/role of cemeteries would be enhanced if special plants were "labeled" and animal habitats were marked. This would help promote the discovery and understanding of native and exotic plant and animal species.
[26]	For the authors, by establishing the provision of "safe, inclusive, and accessible green and public spaces" as a goal, Sustainable Development Goal 11, "Sustainable Cities and Communities," highlights the crucial role of green areas in environmental and socio-spatial justice in cities working towards sustainability.
[27]	For a long time, philosophical deliberations about the design of cemeteries

Author	More humane, intelligent and sustainable cemeteries
	suggested that they should be designed as parks or forested areas to promote contemplation of nature and direct thoughts towards death. Cemeteries are important for urban ecosystems.
[28]	Indeed, promoting the use of green urban cemeteries has great potential for citizens and a sustainable city
[29]	We can no longer overlook the importance of the contributions that urban forests make to cities and their inhabitants, highlighting the author's words that our urban forests face threats from issues such as rapid urbanization, climate change, and the spread of pests and diseases.

The aim of the synthesis was to identify themes that could address the question of what are the main problems of traditional cemeteries in urban centers. Data synthesis was operationalized with the assistance of thematic analysis proposed by [30]. Thematic analysis enabled the identification and coding of themes throughout the entire process of reading and analyzing the articles.

After the literature review, several differences were found regarding the cult of the dead, depending on each country and culture. However, what stands out are the numerous similarities in the problems faced by cemeteries in the studies presented.

Many of the issues raised in distant regions of the world resonate in the same way in our proposed study object, the cemeteries of Florianópolis. Among them, the lack of interest from public and private sectors in the final resting place of humans is particularly notable. In the debate between the city of the living and the city of the dead, the former is planned while the latter is ignored.

This attitude leads to the belief that the disposal of bodies of those who inhabit the Earth will occur naturally, as if a person, at the end of their life, would fall at the feet of a tree and decompose naturally into the earth.

The result of this literature review is clearly reflected in the problems that this lack of attention from authorities to the cemetery segment causes. The lack of attention is reflected in: cemeteries insufficient for the size of the population, overcrowded cemeteries, poorly maintained cemeteries, clandestine graves, difficulties in reconciling religion and human habitat for leisure, soil pollution from improper human disposal.

Throughout the world, there is a search for a more humane and sustainable model to enable the cemetery segment. New disposal possibilities, such as cremation, do not provide a solution to the problems raised. With the related problem of areas for new cemeteries, which are rare and increasingly limited green areas for the leisure of urban populations, could we solve both issues by transforming existing cemeteries into new green cemetery-parks?

This is the question we leave for possible new research and discussion.

Therefore, for a city to be more humane, it needs:

- Respect for Cultural and Religious Differences - The formation and administration of the cemetery should take into account the different religious beliefs and cultural traditions of the community; and
- Social Justice - It is important to ensure that the cemetery is accessible to all, regardless of socioeconomic status. Planning should include measures to prevent discrimination and ensure dignity in burial.

To be smarter:

- Integration of Recreation Areas - As seen in Muslim cemeteries, it is possible to integrate recreational areas without compromising the sanctity of the site. This may involve technology to keep areas separate or inform visitors; and
- Information Systems - An efficient management system that can be accessed digitally can facilitate the process of finding burial locations, understanding associated fees, and even visualizing genealogies.

To be sustainable, it needs:

- Eco-Friendly Burial - Implement areas where embalming is not allowed, and coffins are made of biodegradable materials, contributing to a smaller environmental impact;
- Ecosystem Preservation - The cemetery can be planned to preserve the local flora and fauna, acting as an urban green space, and finally,
- Resource Management - Use solar energy for site maintenance, rainwater harvesting systems for irrigation, among other energy efficiency measures.

These are just starting points and can be expanded with more research and detailed planning. The ultimate goal should be to create a space that honors the deceased, meets the needs of the living, and minimizes the impact on the planet.

5 FINAL REMARKS

We are witnessing an unprecedented digital expansion that has the potential to influence even the most traditional and entrenched aspects of urbanization, such as cemeteries. The sustainability of these places, in times of accelerated change, becomes an urgent issue.

In this new scenario, the reinvention of cemeteries plays a fundamental role in the creation of smart cities. The harmonious integration of cemeteries with the surrounding urban fabric is not only a matter of space but also an opportunity to create more humane and relevant environments that truly contribute to the quality of life of citizens.

Proposals for smart cemeteries emphasize a convergence between urban green spaces, citizens, environmental sustainability, and technological advancements. These are environments designed to promote sustainable coexistence, with projects that incorporate ecology and adaptive and responsive technological systems. The goal is collaborative urbanism that envisions not only a better quality of life but also a more dignified and harmonious transition towards the end of life. Ultimately, the challenge is to design cities and cemeteries that are for the living as well as for those who have departed, reflecting our capacity for adaptation, resilience, and humanity in the face of contemporary challenges.

Thus, the literature review has shown that traditional cemeteries face various problems, such as lack of space due to population growth, environmental contamination from the use of toxic products, public health issues due to poor management, among other concerns.

In this light, a new model of cemeteries integrated into urban planning has been proposed, based on the concepts of sustainability, smart cities, and urban parks. The suggested model features characteristics such as green areas, resource reuse, solar energy, AI-based monitoring systems, virtual memorials, among other innovations.

Certainly, the scope is to minimize environmental impacts, offer a more humane experience to visitors, and contribute to the sustainable development of cities by transforming traditional models into smart and sustainable cemeteries. The implementation of this new paradigm requires interdisciplinary research and partnerships between the government, private sector, and academia. There are opportunities to develop innovative technological solutions and integrate them into urban planning.

Therefore, this article emphasizes the importance of reviewing public procurement processes to facilitate the acquisition of sustainable technologies and the participation of new actors, such as startups and entrepreneurs.

In conclusion, a change in mindset and the incorporation of concepts such as sustainability, innovation, and respect for nature are necessary for cemeteries to become more humane and integrated spaces within cities.

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