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Essay. Diploma 2024

HUMANIZING FORMER INDUSTRY: BALANCING ACTS IN INDUSTRIAL PARKS BASED ON A NON-EXTRACTIVE APPROACH

Transforming former industrial spaces into vibrant, dynamic districts is a symbol of modern urban development. This essay explores the intricate relationships between human integration, architecture, and space in these conditions. Taking a social science approach, we aim to shed light on how these spaces evolve, impact daily life, and reflect the interaction between society and the built environment.

1. **Soviet poster of the period of industrialization**. 1920s -1930s. Inscription on the poster: *"By correct organization of labor we will free collective farmers to work in socialist industry. We will give millions of workers to the front of industrialization."*

Part 1: Introduction

Former industrial territories often undergo significant transformations. To understand the evolution of these spaces, we can employ contrasting theoretical approaches that provide deeper insights into the complex process of reprofiling industrial landscapes.

The conflict theory, proposed by scholars such as Marx and Engels, illuminates power struggles and inequalities that arise during the reconstruction of former industrial zones. It underscores the tension among various stakeholders - developers, local authorities, and the existing community. For instance, the gentrification of former industrial areas often leads to clashes between long-time residents and newcomers, revealing underlying social conflicts [1].

In contrast to this, the prism of structural functionalism, supported by sociologists such as Durkheim, emphasizes how these spaces take on new functions and roles within the community. Former factories and warehouses can transform into art galleries, creative studios, or residential lofts, contributing to a sense of community and cultural vibrancy. Particularly noteworthy is the potential for their conversion into innovative industrial parks, serving as contemporary drivers of territorial and economic development. This perspective highlights the adaptability of industrial spaces and their potential for a positive contribution to urban life.

The industry has been and continues to be a driver of development in emerging and middle-income regions, contributing to economic strengthening and the expansion of international relations. The leap humanity took from the 18th to the 20th century, later termed "industrialization," is impossible and meaningless in the same form in our time. This is due to the progress achieved through the creation of what modern economists refer to as "environmental negative externalities" - uncompensated consequences of production and consumption affecting collective resources [2]. However, excluding industry and production for regions in need of development, especially post-war territories, is also not feasible. This is why the non-extractive approach serves as a tool that can help with the "reprocessing of waste" from the past, working with them on a local scale and not expanding the environmental footprint. Additionally, as individuals, people act on a local scale, but the collective actions of humans (especially efficiently organized and motivated by what is often referred to as "hegemonic ambitions") can produce a measurable effect at higher levels, ultimately - globally.

"All that the Earth in her dark womb conceals, Time shall dig up and drag to open Light." - Aristotle [3].

Non-extractive architecture, or simply design without depletion, is a new direction in architecture broadly encompassing buildings, infrastructure, and urban planning. This approach can be considered both provocative and timely, oriented towards

rethinking the balance between the built and natural environment, the role of technology and policy in future material economies, and the architect's responsibility as an agent of transformation.

Pioneers in describing such an approach can be attributed to Space Caviar—a research and design studio operating at the intersection of design, technology, politics, and public life. Founded in 2013 by Joseph Grima and Tamar Shafrir, the studio employs architectural design, exhibitions, publications, letters, and films to explore and document contemporary ways of living and the spatial distribution of social and political practices.

Joseph Grima states the following: *"Simply put, it is nothing more than an approach to the designed environment that takes full responsibility for its actions and whose viability is not contingent on externalizing consequences elsewhere—whether that 'elsewhere' is remote in time or space. It is not necessarily equivalent to a planetary moratorium on resource extraction—and ultimately, it is probably not the call architects are best equipped for, let alone receptive to—but he genuinely views reckless depletion of finite resources as unsustainable and proposes alternatives to what is overlooked elsewhere. He is not calling for living with fewer expenses but questions whether growth as an end in itself leads to prosperity. He does not look back with nostalgia but wonders if increasing the quantity of technologies is always the answer. He certainly challenges the 21st-century cult of the star architect inherited from European modernism and firmly rejects the foundation of social and ecological exploitation on which it is built. In short, the endgame is non-extractive"* [4].

Non-extractive architecture, in other words, is architecture grounded in care: for people, resources, materials, the environment, and civilization itself, with incredibly broad temporal frameworks that it implies.

Part 2: Interaction of Humans with Industrial Spaces

Examining the temporal aspect allows us to understand how former industrial spaces evolve over time and why. Historical analysis plays a crucial role in revealing the factors that led to their initial industrialization, subsequent decline, and ultimately, restructuring.

The first industrial revolution, which began in England in the 18th century, accelerated the socio-economic transition from traditional development to industrialization. However, it took humanity not just a century, but several, to establish large and technologically advanced industries. Moreover, as we know, the timelines and rates of industrialization varied across different countries. While East Asia became successful by the end of the 20th century, the Soviet Union completed

what was initiated by the Russian Empire in the 1930s, and France industrialized in the 1920s, it was logically England in the mid-19th century that became the pioneer.

This is why the cornerstone of industrial parks is often considered to be the United Kingdom, a country where factory production spread, and the first industrial zones were established. It's worth noting that the early factory districts emerged somewhat haphazardly, but their later manifestations represented an organized effort, following a specific urban planning and regional concept. In international technological history, the first industrial park is commonly recognized as Trafford Park, established by entrepreneur Ernest Terah Hooley in 1896 on 10 hectares of land near Manchester. Initially, the park's area was used for leasing, and later for selling spaces to industrial enterprises [5]. However, by the end of the 19th and early 20th centuries, the prototype of modern industrial parks had not gained widespread popularity, as architects of that time were focused on comprehending and creating the "aesthetic integrity" of buildings.

Architects of the nineteenth century sought a "new style" or an architectural form that would appropriately express the character of their time. However, by the end of the 19th century, as noted by Harry Mallgrave, stylistic debates had come to an end without reaching a consensus on their pressing issues or agreeing on a form that would be representative of the "modern era" [6]. Most participants in the debates firmly supported the idea that a new form could only emerge through innovative use of new materials for construction purposes. Thus, it can be said that "rationalization" became the new "modus operandi" for the nineteenth century.

In the second half of the 19th century, one of the opponents of this approach, who considered the "wonders of recent times, called factories," unworthy of architectural discussion, was the German architect and theorist Heinrich Hübsch. In 1847, he exclaimed in horror: *"Instead of monumental churches, the architectural prototype will be smooth industrial halls made of cast iron, painted in shiny fashionable colors and adorned with pseudo-monumental, dazzling brilliance of mirrors and velvet curtains with golden fringe, attracting the hautevolee"* (fr = often ironic: high [chosen] society, nobility) [7].

The reason why Hübsch disapproves of industrial buildings is almost evident: facades with large mirrors, such as windows, and halls, as spaces within industrial buildings, stem from the constructive possibilities of iron, which is the physical embodiment of the direction of thought he opposed.

Throughout the nineteenth century, large, empty, and unpainted, and thus pseudo-monumental, industrial buildings loomed over "proper architecture"; the same large, empty, and decorated museums, libraries, schools, churches, and fair buildings. The only difference was that the latter represented a new but immediately socially accepted cultural idea, while the former represented an emerging socio-economic

idea, the relations of which were yet to be formulated with culture. Nevertheless, the social culture associated with these buildings and their architectural expressiveness were rejected as deserving attention throughout the nineteenth century. Regardless of whether leading architectural theorists praised or rejected their appearance, industrial buildings were designed and constructed in increasing numbers [8].

The active development of industry by the early 20th century and the resulting high demand for industrial buildings, as well as the discovery of the new material "reinforced concrete," influenced the aesthetics of the Modern Movement in architecture. It's worth noting that Western modernists (W. Gropius, Le Corbusier, Mies van der Rohe, and others) were not the only ones impressed by industrial buildings; Russian industrial structures constitute one of the influences on modernism introduced into architecture by Russian constructivists (Melnikov K., Ginzburg M., the Vesnin brothers, and others).

Mies argued that *"we do not know forms, only problems of construction. Form is not the goal but the result of our work" and explained that "Technology is much more than a method. It is a whole world in itself. As a method, it surpasses almost all engineering; there, technology reveals its true nature. [...] Where technology reaches its real fulfillment, it turns into architecture"* [9].

At the turn of the 20th century, when large European metropolises had already formed, two lines of architects emerged. Some were interested in programmatic issues but were driven by a desire to improve the quality of life and working conditions for all due to the rapidly growing urban population. Among them were Le Corbusier, the teachers of the Bauhaus (Hannes Meyer, Gropius, Muftezius, Ude, Van der Broek) [10], and others. It was their considerations regarding sufficient daylight, air, residential and working space that were widely published and interpreted in terms of architects' involvement in addressing current social issues. On the other hand, there were self-proclaimed functionalists, adherents of the idea of modernism that "form is the end product of programmatic research," which later became equated with the "functionalism" of the 1950s. Following the construction of architectural works immediately after World War II based on the principles of CIAM for urban planning, pre-war rationalization schemes, and housing standardization, as well as the emergence of postmodern architecture, the equation "modernism = functionalism" acquired negative connotations that persist to this day [8].

Like their predecessors of the nineteenth century, twentieth-century theorists dismissed "modern" industrial buildings in their architectural-historical significance due to their "purely utilitarian function," unlike buildings with a "high" cultural purpose, such as theaters. With their approach to industrial buildings, these theorists demonstrated that despite their modernist concern with social issues related to architecture (especially well-represented in Pevsner's "An Outline of European

Architecture" in terms of factories), they failed to avoid their own traditionally trained art historian's perspective, drawing a distinction between high and low art and considering only high art worthy of artistic evaluation.

As with any other historical building fulfilling a high cultural function, industrial buildings are simply either good or bad within the framework of their own aesthetic principles [8]. Stanford Anderson, advocating for "an integral understanding of architecture, including function," asserted in his 1987 work: *They* [these architects] *built places that 'make a world' for those who inhabit it. [...] Their buildings tell stories, but not just any stories, different from others, amusing, ironic, or marketable. Right or wrong, not grim, but rather with a full recognition of the possibilities and joys of both life and architecture, they set out to find how architecture could serve people, conforming to their time and culture. To do what they did, complicating both with function and fantasy. [...] in their works, the mentioned architects sought to create places that supported contemporary fantasy"* [11].

Something similar was described a year earlier, in 1986, by Michel Foucault, who attempted to study various spaces and their relationships. He formulated the concept of "heterotopia" - a kind of simultaneously mythical and real challenge to the space in which we live. It is based on the well-known concept of "utopia" - a mirror, a place without a place, the representation of society in its perfect form, or a society turned upside down, but in any case, the representation of a fundamentally unreal space [12].

Therefore, when in the first half of the 20th century society was ready to embrace the mass formation of new economic districts consisting of various enterprises, and improving the quality of human life became a trend among architects and urban planners, the first regulated industrial parks emerged. They were based on the philosophy of integrating various functions (production, services, recreation, and education) into an industrial zone with a predominant focus on industrial production and high economic turnover and employment.

Industrial parks, motivated by regional policy concepts, were created in crisis zones in the United Kingdom in the 1930s; by 1960, there were 46 of them. The first innovative industrial areas appeared in cities such as Letchworth and Welwyn. The expansion of new garden cities was primarily motivated by the need to restructure residential development and alleviate the congested London conurbation (for example, the construction of the new town of Milton Keynes). For the UK, such areas meant the preservation of industry within Albion. In those days, industrial parks varied in character and size; they ranged from parks covering a few acres with little or no equipment to huge parks sprawling over hundreds of acres equipped with technical and social infrastructure, built by the park owner. They shared a common

feature: the territory was planned in advance, and individual producers had to follow the plan.

Before World War II, industrial parks were constructed in the United Kingdom and the United States. Starting in the 1970s, science parks began actively developing in Western Europe and the rest of the world. It's worth noting that in the Soviet Union, the prototype of industrial parks was the first Soviet science town established in 1946, based on the city of Sarov (later Arzamas-16) [5].

Industrial parks have gone through several stages of development, and we can talk about different generations of industrial parks. Characteristically, the first-generation industrial parks, built in the 1970s, were characterized by assembly halls and warehouses, as well as relatively simplified architecture. The administrative buildings occupied only 10-15 percent of the park's total area during this period. From 1975 to 1985, industrial parks where offices were used by companies involved in science, technology, and business occupied much larger areas. A distinctive feature of second-generation industrial parks was their more complex architecture. From the second half of the 1980s, third-generation industrial parks were built; they were characterized by flexible land use, expanded available services, increased administrative staff, and more space for IT-oriented offices. Fourth-generation industrial parks, which began to emerge from the mid-1990s, were characterized by administrative buildings and a wide range of services. Companies located in these parks used advanced technologies, and warehouse spaces were typically located outside the park itself. The importance of recreational areas connected to the park, used by those working in them, increased. Since the second half of the 1990s, industrial parks have become part of an international network of collaborating parks.

The main goals of modern industrial parks include [13]:

- Ensuring accessibility and sustainable management of water and sanitation for all.

- Promoting inclusive and sustainable economic growth, full and productive employment, and decent work for all.

- Creating sustainable infrastructure, fostering inclusive and sustainable industrialization and innovation.

- Making cities and human settlements open, safe, resilient, and sustainable.

- Ensuring sustainable consumption and production models.

- Taking urgent action to combat climate change and its impacts.

The choice of location for an industrial park is a crucial stage in the design process, influencing industry fit, demand, cost, and overall success. When selecting a suitable location, factors such as:

- Investor interest, economic activity, clustering, proximity to suppliers, skilled labor, logistics, and economic efficiency are important.

- Compliance with national and local zoning plans, requirements, and classifications.

- Development costs, depending on topography and accessibility.

- Transportation accessibility, communication, proximity to social infrastructure.

- Avoidance of vulnerable environmental and cultural areas, nature protection.

- Sustainable development strategies, including choosing an energy-efficient location.

- Maximizing access to sustainable sources of energy, water, transportation, and other services.

- Reconstruction of developed areas.

- Involving stakeholders and addressing local community issues should be considered.

Industrial parks are typically situated near transportation hubs, especially where multiple modes of transportation exist [14]. Similarly, a viable nearby market for products and services available in the industrial park is usually crucial for the successful establishment and operation of park enterprises and the long-term commercial viability of the industrial park, unless the activities are primarily export-oriented. However, labor-intensive industries often attract areas with low wages, while capital-intensive industries typically draw areas with a skilled and well-trained workforce. Moreover, the distribution of the workforce by skill levels usually depends on the quality of schools and the availability of vocational training programs [14].

The guiding principles for science and technology parks, prepared by the European Commission [15], highlight important parameters for the development of such parks. This includes proximity to knowledge bases, transport accessibility, space for growth, potential for greenery, and landscape design.

To initiate the development of an industrial park, the selection of a site considering its phased loading is necessary. The size of the site depends on the planned number of enterprises and infrastructure requirements. The project should account for construction stages, ensuring infrastructure investments align with market needs. Park development may take several decades, emphasizing basic infrastructure and phased construction of industrial facilities.

It is always advantageous for an industrial park to have different zones for various types of industrial and non-industrial activities. Interconnectivity between industrial, residential (e.g., multi-format housing for workers, hotels, guesthouses, etc.),

commercial, administrative, social, and recreational zones is recommended within. The scale and intensity of each usage scenario for these zones significantly impact the final project [13].

Thoughtful zoning should encourage industrial symbiosis for the use of materials, technical water, and by-products of energy. Bicycle paths and/or networks of electric light rail transport, as well as electric vehicles as an option, would be preferable to reduce dependence on internal combustion engine vehicles for short-distance travel. Separating polluting and non-polluting activities is another sensible zoning practice. Social and commercial facilities are needed to provide necessary amenities for the working population of the industrial park and its visitors. Ensuring safety and creating a comfortable environment for people residing in and around the industrial park is particularly important.

The commonly accepted definition of an industrial park is "a piece of land developed and divided into plots according to a comprehensive plan with the provision of roads, transport, and communal services, sometimes also with shared amenities, for use by a group of manufacturers" [16].

As we can see, at its core, it is a business system functioning with the aim of satisfying economic policies or the financial stability of the state or specific stakeholders. However, it often lacks a soul "on paper" and does little to address the cultural aspect in such an environment. Nevertheless, at present, we have an industrial environment that facilitates work within it, exerting a positive rather than detrimental impact on human health. Achieving the same but now for the environment around us (as one might infer from observations of architectural trends and overall crises on our planet) becomes the next stage in the development of these spaces.

Therefore, expanding the territories of cities, the places where we live, while leaving behind abandoned plots or even entire districts, is impossible to ignore. It is senseless to consume new land resources when there is a gray trail of "unprocessed waste" behind us. Moreover, integrating industrial environments into the established surroundings will help create a symbiosis between cultural space and useful space, between leisure space and workspace.

In light of this, without delving into the types of industrial parks and their levels, of which there are numerous, it is worth mentioning that there are generally two significant classes [5]:

- Greenfield – a territorial-spatial complex, entirely developed on free land ("from scratch").

- Brownfield – a territorial-spatial complex formed on developed plots, often with "industrial archaeology" in the form of existing buildings, engineering networks, and transportation infrastructure.

It is important to understand that structural issues typically are not the cause for buildings reaching the end of their lifespan; rather, the change in the building's initial purpose makes the existing structure unsuitable for new roles and functions [17]. Buildings are durable goods with a useful life that can reach 100 years or more, and renovating buildings can extend their use with various advantages, such as leveraging existing urban infrastructure (without the need to develop new sites) with lower costs and less residual formation compared to completely new construction [18].

Therefore, we can assume that Brownfield is a more effective tool in transforming our surrounding environment. Of course, I do not want to suggest that we should oppose Greenfield simply to conserve as much land resources as possible. No! In certain situations, both classes manifest themselves differently, but the current era may be primarily an era of spaces, as described by Michel Foucault.

He [Michel Foucault] believes that we are at a moment when our perception of the world is not so much like a long life unfolding in time, but rather like a network that connects points and intersects with its own thread. And that structuralism does not actually imply a denial of time; it assumes a certain way of dealing with what we call time and what we call history [12].

Starting from the era of Galileo and his discovery that the Earth is not flat but revolves around the Sun, an infinite expanse of space unfolded before humanity, leading to the dissolution of the medieval sense of place in favor of space. In other words, from the 17th century onwards, localization was replaced by expansion. Indeed, it can be said that the industrialization of the past century was something similar—a push towards expansion.

Today, we witness that expansion has given rise to numerous nodes of connections, sections defined by the relationship between elements. Industry, as a sphere in itself, is the same system of connections, consisting of nodes, in its early manifestations referred to as factories. This system cannot exist without humans and is equally integrated into the human environment—another system. Furthermore, we can understand the importance of a connection node in modern technical work; similarly crucial is the "spatial node."

In a more concrete context, the issue of demography becomes relevant. It is not merely a question of whether there will be enough space in the world for people—which is certainly important—but also about determining what kinds of close relationships, what forms of storage, distribution, labeling, and classification of human elements should be considered in this situation to achieve the set goal. Our

era is a period in which space takes the form of relationships between different places.

That is why initiatives for reconstruction are often shaped by government policies and local economic conditions [19].

Foucault introduces the concept of "governmentality" as the "way of governing people's behavior." In the context of governmentality, attention is directed not directly to people's practices but rather to what precedes those practices—their behavior. On the political level, Foucault describes governmentality as a paradox of politics whose goal is the elimination of politics itself [20]. This method of governance involves the interaction of individual freedoms with state bureaucracy, with initiatives promoting individual freedoms emanating precisely from that bureaucracy.

Since the early 1990s, the term "management" has been widely used in urban studies to characterize new entrepreneurial, procedural, project-based, multi-level, and large-scale forms of city management. However, the concept of governmentality emphasizes that this informal, inclusive, decentralized, and participatory management model is not simply reduced to "expanding responsibilities" and "increasing freedom," as often associated with the term "management."

Within governmentality, the concept of planning relates to the renewed role of the state and public administration: *"Planning […] is the practice of shaping human conduct and acts by material and discursive means. […] Planning […] is not only about developing control and steering of processes, but also of shaping the public discourse, its schemes of signification, ways of communication, and on what to communicate about. It is also a matter of dispersing discursive and political power and making interests powerless through tactics, strategies, situations or unchangeable political end-goals"* [21].

During the Soviet period, monocities were a distinct type of settlements created around large industrial enterprises or complexes that served as "city-forming enterprises." The concept of Soviet industrial settlements completely rejected the garden city doctrine, primarily because it was based on self-organization of the population. In the realities of that time, the implementation of a labor mobilization and military mobilization model of population management was required. Monocities were the offspring of the Soviet political system of the 1930s and its industrial, economic, socio-managerial, and command-administrative structures to fulfill the role of centers for production, technology, and simultaneously administrative-territorial "regions." In the 1970s, they fulfilled the function of key elements forming group systems of settlements (agglomerations). The system of a centrally planned economy within the frameworks of programs developed by ministries for the development of industry, transport, and energy determined the

destiny of monosettlements. The hierarchical system of administrative-territorial management did not allow the emergence of any self-government bodies. This led to the loss of both the population of monocities and the country as a whole [22].

However, this does not mean that industrial spaces under state management are unviable and their time is determined by the fortress of the political system itself. Similar to chess, where each piece performs its function and has its own importance in different situations, the same applies to industry. In times of crisis and the need for societal consolidation, the development of an efficient economy, and full control over the social aspects of human life, state-managed industrial parks will be effective and bring more benefits to the economy in a shorter period than privately-managed industrial parks, which involve numerous intermediaries and are more dependent on market conditions and the policies of the countries in whose legal field they operate. However, the latter are more flexible, simpler, and quicker to adapt to changes in public consciousness and needs. In the end, it is not so crucial whether the management is based on the state or private entities but rather how open and socially oriented the development planning turns out to be during the lifecycle of production.

The Suzhou Industrial Park (SIP) [23], construction of which began with the approval of the State Council in 1994 in the Chinese city of Suzhou. It is the first government cooperation project between China and Singapore. Covering an administrative area of 27,800 hectares, it is home to 1.19 million people, including 807,800 permanent residents. SIP is recognized as an important window for China's reforms and openness, a successful model of international cooperation for joint exploration of foreign markets, the creation of an internationalized corridor, and the construction of bilateral open platforms. It is also the first open innovative comprehensive experimental area in China. After 25 years of development, it has transformed into a high-tech and environmentally friendly industrial zone, consisting of thousands of enterprises and innovative startups focused on information and communication technologies, medical equipment manufacturing, cloud computing, artificial intelligence, etc. In the next stage of its evolution, the park is ready to become a center for new industries, following the concept of "One Zone, Two Centers."

Planners do not seek to interfere with the unstructured nature of "cultural production"; however, within the framework of planning the transformation of outdated industrial spaces, the term "culture" takes on a dual meaning: as an ideal and as an element of diversity. The application of "culture" to revitalize outdated industrial space is based on emphasizing culture as a factor of diversity and the belief that "culture" is capable of generating social, economic, and spatial distinctions.

Cultural influences also leave a significant mark on the transformation of former industrial spaces. The emergence of the creative class, attracted by the unique character and accessibility of these areas, has stimulated efforts to revitalize them.

Additionally, the pursuit of sustainable urban development and the reimagining of existing infrastructure have gained relevance in recent years, further impacting the evolution of these spaces.

In general, cultural and production clusters share a common intention – to stand outside the state system (if they are not governed by the state system, of course), to be independent of its constraints, values, and mutable structures. For instance, the term "independent space" is often used in the self-description of Fabrica de Pensule (FdP), a space that emerged as a result of the commodification of culture, economic growth, and the need for densification in the central part of Cluj-Napoca, Romania, through the transformation of former industrial facilities.

The existence of alternative space for ten years has contributed to several changes in local cultural life, transforming from a physical space into a resource for a culture-oriented city development strategy [24]. Emphasizing cultural diversity as an ideal to strive for has become a particular method of argumentation, evident in various strategic and policy documents.

For instance, in the Agenda for the 21st Century on Culture adopted in 2004 by "United Cities and Local Governments," an international association of municipalities, the following is highlighted: *"Cultural diversity is the main heritage of humanity. It is the product of thousands of years of history, the fruit of the collective contribution of all peoples through their languages, imaginations, technologies, practices and creations. Culture takes on different forms […] Cultural diversity […] is one of the essential elements in the transformation of urban and social reality"* [25].

UNESCO makes a similar statement about cultural diversity, considering it as *"a means to achieve a more satisfactory intellectual, emotional, moral, and spiritual existence"* [26].

The same approach is reflected in the strategic political documents of Helsinki: *"Interculturalism goes beyond equal opportunities and respect for existing differences. Cities need to develop policies which priorities funding for projects where different cultures intersect, 'contaminate' each other and hybridise. City governments should promote cross-fertilization across all boundaries, between "majority" and "minorities", "dominant" and "sub" cultures, localities, classes, faiths, disciplines and genres"* [27].

In these statements, the main idea is to support "diversity" among cultures. Here, culture is not presented as an ideal to strive for, or as a description of current differences in the anthropological sense. Instead, cultural diversity and the differences themselves are positioned as values to aspire to.

Part 3: Economic Viability versus Preservation of Cultural Heritage

Integration into reimagined industrial spaces is influenced by numerous contextual factors. Understanding how national, local, and global contexts shape the experience in these areas provides a comprehensive insight into the integration process.

At the national level, government policies and economic trends significantly impact the fate of former industrial spaces. For example, countries emphasizing the preservation of cultural heritage may prefer the adaptive use of historical industrial buildings, preserving their architectural and cultural significance. Conversely, states focused on rapid economic development may favor large-scale redevelopment projects, transforming these areas into modern industrial zones with various functions, including high-density urban areas.

An industrial park is characterized by a unified concept, a unique and distinctive configuration, the selection of production units, and comprehensive territory servicing. This is based on the integration of various functions such as research, production, and education within a specific industrial sphere.

Former Director-General of the United Nations Industrial Development Organization (UNIDO), Li Yong, addressing the agenda for sustainable development until 2030, emphasized the need to create sustainable infrastructure, promote inclusive and sustainable industrialization, and foster innovation with interconnections to support the achievement of other sustainable development goals. To accomplish this objective, adequate infrastructure development is required, capable of supporting investments in priority sectors of member states and overcoming limitations associated with conducting business in the economy [13].

Modern inclusive and sustainable industrial parks keep pace with the times and innovations. In addition to a high level of industrialization and technological development, they are capable of ensuring high productivity, stimulating innovation, promoting investments and social integration, as well as environmental protection. They represent a feasible, innovative, and comprehensive intervention that can be used to support countries, especially developing and middle-income countries.

No country or region in the world has ever achieved a decent standard of living for its citizens without a reliable industrial sector. The growth of the manufacturing sector is essential for creating jobs, as it absorbs excess labor from agriculture and other traditional sectors, especially considering the urbanization trend prevalent in developing countries.

Thus, the primary rationale for creating an industrial park is to allow "industry to settle and develop in a specific location that is planned and improved for this purpose" [28].

Playing a central role in socio-economic transformations, industrial parks can serve as a testbed for economic reforms, new policies, and approaches in a geographically concentrated pilot zone. Interestingly, they can provide an opportunity to reduce production costs through shared infrastructure and systems, as well as enhance the efficiency of material, water, and energy use, including waste recycling, water resource management, and resource recovery [13]. Eco-industrial parks can further reduce pollution and waste by employing pollution prevention, renewable energy sources, industrial symbiosis, and other methods and environmental management technologies.

The shift towards eco-industrial parks has been gaining popularity in recent years. They are capable of decoupling economic growth from inefficient use of the environment and resources to achieve broader social goals. In both developing countries and those with transitional economies, EIPs offer significant opportunities to improve efficiency and make a positive contribution to socio-economic development at local and national levels.

The future of industrial parks is shaped by several important emerging trends [13]:

- Competition for foreign direct investment: Since the early 1990s, the number of industrial parks worldwide has sharply increased. According to the International Labour Organization (ILO) database, three out of every four countries have at least one industrial park. Therefore, maintaining competitiveness amid internal and global competition will remain a relevant issue for industrial parks. In the future, industrial parks are likely to feature higher-quality infrastructure, superior services, and additional amenities, as competing parks strive to best meet the needs of enterprises.

- Integration of industrial parks into a broader urban context: Industrial parks were traditionally built outside cities due to lower land costs, the desire to avoid zoning incompatibilities with residential and commercial areas, and the opportunity to more effectively manage certain external environmental factors. However, with rapid urbanization worldwide, cities are expanding in all directions, causing industrial parks and their boundaries to converge and even blur. These forms of urban development necessitate that industrial park development policies increasingly consider the consequences and impact of urban agglomerations, their characteristics, and their requirements for sustainable development, and begin incorporating these factors into their design and management approaches.

- Business models for "green growth" and resource-efficient "closed-loop economies": There is currently significant attention on combining green growth with spatial planning initiatives. Additionally, to mitigate environmental impact and ensure productivity in the face of resource scarcity, governments and enterprises seek to enhance resource efficiency and implement cleaner production methods. In

the emerging "closed-loop economy," everything possible is reused, recycled, or used as an energy source, with disposal being the last resort.

- Digital transformation, Industry 4.0 technologies: Digitization opens opportunities for enterprises that actively embrace this trend and make efforts to keep pace with the productivity gains that digital technologies, web applications, enterprise resource planning (ERP), robotics, and artificial intelligence can bring.

At the local level, the direction of transformations is often shaped by community involvement and grassroots initiatives. Local communities may advocate for the preservation of industrial heritage, leading to the creation of cultural centers within these spaces.

Within axiology, it is impossible to make the assertion that culture is "important for something." Culture is not considered as a separate subsystem of society; rather, it embodies the ideals of society itself. Anthropological understanding of culture implies the diversity of cultures. However, different cultures may claim normativity, assert their values, and come into conflict with each other.

Horkheimer and Adorno [29] express the idea that the term "culture" itself involves the process of identification, cataloging, and classification, leading to the incorporation of culture into the realm of management. In this regard, as mentioned earlier, in administrative practice, culture is often used as a tool to achieve specific administrative goals.

Richard Florida puts forward several archetypal statements about cultural diversity, for example, *"Diversity plays a central and crucial role in attracting [...] human capital [...] diversity is important to regional economic performance [...] diversity plays a key role in the attraction and retention of the kinds of talent required to support high-technology industry and generate regional growth"* [30].

On the contrary, projects led by developers may prioritize profit and large-scale commercialization, potentially leading to the displacement of long-time residents and a change in the social structure of the area [31]. Global influences, such as the globalization of culture and trade, also impact the integration of people in former industrial spaces. The homogenization of urban aesthetics and the spread of global consumer culture can create a sense of incongruity in these areas, where authenticity and local identity are diluted in favor of international trends.

In light of this, let us compare the Zollverein Coal Mine in the Ruhr region of Germany [32] with the city of Mariupol in Ukraine, particularly the Azovstal Metallurgical Plant, which ceased operations in March 2022 when it became a battleground, resulting in the destruction of the massive facility [33].

In 1847, entrepreneur and industrial pioneer Franz Haniel opened the first coal mine in northern Essen. While the first year saw the extraction of 13,000 tons of coal in

1851, by 1890, this figure had grown to one million tons. The reserves of rich coal in northern Essen were substantial, leading to the construction of three additional facilities, totaling eight mines in all.

Who among the miners in the Ruhr region could have imagined four decades ago that the largest coal mining plant in Europe would be abruptly closed several years later, in 1986? In 2001, it was declared a UNESCO World Heritage Site.

It was one of the few mines that attracted many workers; rather, it was largely an automated conveyor system where coal was extracted from the depths in unprecedented quantities, then sorted and washed before being processed for use in nearby steel furnaces. Compared to traditional mines, there were not as many people working here. There were no crowds of miners gathering at the factory gates, in the toilets, or at the cash registers. Machines predominated here. The allure of the complex machinery world of the coal mining industry can still be felt today during visits or tours, but much more importantly, there is a thriving cultural life blossoming around the exemplary, well-preserved technical facilities.

The white cube, designed by the Japanese company SANAA Architects, has become a recognized landmark. On the company's campus, several headquarters have been built. For example, Ruhrkohle AG erected a modern office building with a green roof and, perhaps, the most beautiful garage in Germany, designed by Kadawittfeld Architects. Moreover, the adjacent coking plant, connected by bridge conveyors resembling a giant toaster one kilometer long for coke production, is now a tourist attraction. In winter, there is an ice rink, in summer, a pool, and year-round, you can visit the spokeless Ferris wheel. All of this makes the rusty ruins a favorite place for locals and tourists alike. The site hosts theatrical performances, concerts, festivals like the Ruhrtriennale, and many other events. Urban planning and architectural improvements continue. Zollverein is a landmark on the European Route of Industrial Heritage and part of an extensive cycling route through the Ruhr region. The coking plant has also undergone further enhancement by the young architectural firm NEW from Cologne.

The decision to build Azovstal was made in Moscow in February 1930. At that time, Mariupol already had a large metallurgical enterprise - the Ilyich Metallurgical Plant. However, the country, recovering from the Civil War, faced a constant shortage of metal, leading to the decision to construct a new plant. The director of the Ilyich Plant, Yakov Gugel, insisted on building it in Mariupol because the city had many skilled metallurgists, and there was a well-developed railway network.

This was the era of the first five-year plan—an epic time when Ukraine saw the launch of "Zaporizhstal," "Krivorozhstal," DniproHES, the Kharkiv Tractor Plant, and many other enterprises built to the highest global standards. In a few years, the Ukrainian SSR transformed into the largest industrial center in Eastern Europe.

However, Azovstal stood out even among these achievements because it implemented a range of advanced innovative technologies.

The Vatican City has an area of less than 0.5 square kilometers, Monaco covers 2 square kilometers. This means that both could fit within the Azovstal plant's territory, with space left for half of Geneva. The plant covers 11 square kilometers, with 41 workshops and an additional 80 auxiliary buildings. The largest, the blast furnace shop, features five furnaces and a total area of 8,000 square meters. Azovstal even has its own seaport [34]. The massive complex is surrounded by social infrastructure, including residential quarters, hospitals, schools, kindergartens, a cinema, and a stadium. Workers enjoyed free recreation in health resorts on the Azov and Black Seas.

At present, local authorities are considering the idea of creating an industrial park, industrial technology park, eco-park, and a transport and logistics center on the premises of the Azovstal plant. Such a "reboot" of the industrial zone represents a promising initiative to preserve the city's key production.

Similarly to Zollverein, Azovstal holds a significant place among global landmarks in the history of technology. There is a dilemma regarding the future of the plant. On the one hand, a complete restoration of the enterprise to its pre-war state seems unlikely due to the extent of destruction, and the question arises whether it is worth it. The plant also does not meet environmental requirements, and there have been proposals in 1980s to dismantle the facility entirely and build a resort area in its place, considering harmful emissions into the city and the sea. On the other hand, a dubious economic perspective of clearing the territory, recycling hundreds of thousands of tons of metal, and erecting an entirely new architecture from scratch to align with global trends, which may not reflect the spirit of the place. All of this occurs in the context of post-war recovery, with all its associated problems. The conflict of interests between economic efficiency and preserving historical heritage vividly manifests itself in the case of Azovstal, posing a pressing issue for countries with inefficient or developing economies possessing numerous industrial objects. Therefore, non-extractive architecture can be a valuable tool in resolving such conflicts.

We know that to some extent, modernity is built on the foundation laid by the Roman Empire. The "perfect machine" that dominated strategic supremacy for centuries in any struggle—be it the pursuit of military power, technological progress, scientific knowledge, medical services, market competitiveness, or simply material prosperity. However, every machine requires fuel. It was the despotic attitude toward the environment, the expansion of social and ecological resources, that became one of the reasons for the collapse of the Roman civilization, which was a pioneer in the ideology where nature was regarded as a "gift."

Can we not discern a similarity with contemporary realities? The successor of the once Soviet Union is drowning in its own problems fueled by previously accumulated issues, immersed in war, social inequality, poverty, the degradation of various institutions, and, more lamentably, society. History is cyclical, implying that just like a century ago, a fresh perspective is needed on the current situation.

Non-extractive architecture helps to question the fundamental innovations of capitalism described by Karl William Kapp (an American-German economist, a pioneer in ecological economics, who once defined the modern economy as a system of "unpaid costs" [35]): *"Innovation consisted in subtracting many of the inevitable long-term costs, caused by super-efficient mechanized transformation of the environment, by moving them 'somewhere else' in time or space."* For capitalism to function, it relies on the systematic creation and justification of what sociologist Jason W. Moore defines as "Cheap Nature," which will ultimately lead to "cheap architecture": *"We can see a long history of capitalist mechanization: next-century sugar mills, eighteenth-century steam engines, Fordist assembly lines—as a precondition at every step of appropriating cheap nature"* [36].

"Cheap architecture" refers to the products of the industrialized construction sector. It's important not to confuse this definition with the category of simply poorly constructed buildings. Cheap architecture entails something different – the practice of construction that does not take into account the social and economic costs of its production, ignoring (whether out of laziness or simply dishonesty) the external effects it generates as a byproduct of its existence. Today, after six centuries of the development of an incredibly efficient planetary extraction machine – i.e., the "market" – there is very little architecture [4].

Part 4: Architectural Solutions for Improving Working Conditions

Anthropology provides a valuable framework for understanding the complex process of human placemaking in former industrial spaces. Ethnographic research and participant observation can offer deeper insights into the lived experiences, cultural expressions, and social interactions within these environments.

Through ethnography, anthropologists can engage with residents, artists, entrepreneurs, and other stakeholders to uncover unique stories and perspectives that shape these spaces. This qualitative approach to research can reveal challenges and opportunities associated with integration, as well as the cultural richness that emerges in former industrial landscapes.

Participatory observation allows researchers to immerse themselves in the everyday life of these places, documenting rituals, behaviors, and practices that define their character. By studying how people navigate, use, and adapt these spaces,

anthropologists can provide valuable insights into how individuals both shape and are shaped by the built environment.

A cursory glance at the surrounding social, political, and economic landscape is sufficient to understand that public sentiments are beginning to grasp both the true scale of existing problems and their consequences. Crises caused by climate change, inequality, social injustice, poverty, armed conflicts, and uneven access to resources lead to social decline and losses in both material and human resources. If it was previously clear to us that the development of modern industrial technoparks in areas with a destructive or broken economy (which is particularly relevant for Ukraine, especially its eastern part) could contribute to rapid economic growth and improvement of the environment, now it is worth exploring whether architecture alone can address the issue of working conditions in industrial spaces, contributing to social growth, and whether the assumption, largely axiomatic for the current social, economic, and political order—that prosperity "here" is achievable only at the expense of damage inflicted "elsewhere"—is desirable or even acceptable.

In posing this question, it is important to understand that architecture itself cannot and should not attempt to provide an answer to it. However, this does not mean that architecture is exempt from participating in the future material economy, which, as Grim argues [4], is necessary to sustain life on this planet. It is precisely architecture, as a discipline with a historical tendency toward self-isolation, that has played a role in the detrimental actions that have made this question so urgent. Even a casual observation of the facts on the ground is enough to understand that if the goal is survival, let alone prosperity, past practices can no longer serve as a viable model for future policies.

In primitive societies, there is a concept known as Michel Foucault's "crisis heterotopia." This means that there are special places that are privileged, sacred, or forbidden, designated for individuals who, in relation to society and the human environment, exist in a state of crisis [12].

This led us to think that industrial spaces serve as something similar to the concept of "crisis heterotopia" for individuals living in the post-industrial era who have no understanding of people working in "forbidden places." This becomes especially noticeable in countries where traditionally the state manages the production. In such cases, workers become a vulnerable social link, often dependent on the state of affairs in the country. For example, during the socialist revolution of 1917 in the Russian Empire, the expression "factories to the workers, land to the peasants" emerged, signifying the elevation of the working class above the bourgeoisie and the increased prestige of working professions in the USSR and socialist bloc countries. However, by suppressing one class in favor of another, it led to the collapse of a large country, leaving an undoubtedly negative impact on post-Soviet cities and society. The overall economic decline of the region, starting in the second half of

the 1980s, made it impossible to maintain the environment in good condition, especially industrial areas. This resulted in a period of "denial" for the next generation, as mentioned earlier, leading to the destruction of social institutions, an increase in crime, and all the challenges we continue to face today.

From the moment people lose confidence in the existence of a soul or the possibility of the body coming to life, perhaps it is worth paying more attention to a lifeless body, which ultimately becomes the only evidence of our existence in the world.

Thus, we want to say, what if, in reality, for the restoration of industrial territories and the organization of decent working conditions for them, architecture in the classical sense is a secondary tool? More precisely, undoubtedly an important tool, but no less important than rethinking the space itself. After all, everything related to the immediate working conditions on-site has been sufficiently described by modernist architects, as discussed in the historical section of this work. They shaped the fundamental vision of buildings, including factories; the rest is refined quite selectively through the development of technologies and activities in various sectors of human society or by current fashion trends.

Based on the above, we became interested in the 5 principles of heterotopias highlighted by Michel Foucault [12], which are crucial for understanding the restructuring of industrial spaces and creating industrial parks based on a non-extractive approach. This could lead to the improvement of working conditions:

1. The first principle is that there is practically no culture in the world that could not create heterotopias. They can be divided into two main categories – crisis and deviation. For example, old age is a crisis but also a deviation in our society, where idleness is a kind of deviation.

2. The second principle is that as society evolves, it can make existing heterotopias function entirely differently. Foucault uses the example of European cemeteries and their tomb hierarchy, which became known as the cult of the dead when civilization became "atheistic."

3. The third principle involves the juxtaposition of several spaces, several places that are incompatible in one real place. An example is the gardens in the East. A garden is the smallest part of the world and then the entirety of the world. A garden is a carpet on which the whole world comes to embody its symbolic perfection, and the carpet is a kind of garden capable of moving in space.

4. The fourth principle is that heterotopia comes into full operation when people experience a kind of absolute break with their traditional time. It is the desire to gather everything, create a kind of common archive, unite all eras, forms, and tastes in one place.

5. <u>The fifth principle</u> is that heterotopias always imply a system of opening and closing, simultaneously isolating and making them penetrable. Some require permission and specific gestures to enter, creating an illusion of accessibility, while in reality, entry is excluded. For instance, the famous bedrooms on large farms in Brazil and other regions of South America had entrance doors that did not open into the family's central room. Each visitor or traveler had the right to open this door, enter the bedroom, and spend the night. The guest, however, could never access the family's living quarters; they were exclusively in transit, not invited.

Heterotopias serve a specific function in relation to all other spaces. This function oscillates between two extreme poles. Firstly, their task may be to create a space of illusions, representing every real space and all its places where human life is divided as even more illusory. Alternatively, their role may consist of creating another, alternative real space, one that is just as perfect, carefully thought out, and well-organized, compared to our disorderly, poorly structured, and mixed-up space.

The line of thought that mentioned, especially the example of bedrooms in Brazil, seems highly relevant to industrial spaces and their potential architectural and spatial planning, as well as integration into the overall structure of a city or the human environment. The existence of two opposites that seemingly could not coexist but, thanks to their illusory nature, gives rise to an alternative space (between private and public, between familial and social, between cultural and utilitarian, between leisure and work, etc.) that is neutral and inclusive. In this space, different people can interact without excluding one another, contributing to the development of human civilization in its classical understanding.

As Moore noted, new civilizations do not form because of a Big Bang. They develop gradually, overturning outdated behavioral models and anachronistic practices as they adapt to historical conditions [36]. Therefore, it is reasonable to assume that civilizational changes will inevitably occur because there is no other viable alternative for resolving the multiplying, interrelated crises except adaptation or extinction, and adaptation is not insurmountable.

Architecture of reuse contributes to reducing the pressure on new land, preserving embodied energy in existing building materials, saving on the use of new materials, reducing the environmental impact of producing and transporting new materials, and ultimately generating less waste compared to entirely new construction. In combination with social sciences and anthropology, it also preserves history and tradition, fostering stronger communicative ties between people and generations, and enhancing overall public education. As a generalized example of this approach, consider the preservation and reinterpretation of Mussolini's fascist architecture by contemporary Italians. An apolitical aesthetic perspective, such as the inscription "Nessuno ha il diritto di obbedire" (it ="No one has the right to obey") on the facade of the former Casa del Fascio di Bolzano, contributes to maintaining this historical

layer of Italian history without creating ruptures. By leveraging the properties offered by the non-extractive approach, it is possible to significantly improve the physical appearance of cities, with a particular focus on post-Soviet cities, and qualitatively enhance their utilization.

Our cities are undoubtedly beautiful and rich in history, carrying the spirit of countless generations, creating a sense of comfort and the feeling of being at home. Unfortunately, many details go unnoticed, buried under the weight of a large amount of so-called "cheap architecture" and the architecture of a single individual – the "star architect" phenomenon of the late 20th to early 21st century. That is why an increasing number of people find cities, especially historical ones, attractive, where there is predominantly a local human scale and "cleanliness of space," relative to larger cities.

In the "RIBA Journal," Cedric Price expressed his views on social ailments, stating, *"the full value of architecture will become increasingly apparent when architecture moves from curative to preventative action"* [37]. Based on his words, we can assume that the changes we should initiate in the application of the non-extractive approach are nothing other than treatment, with subsequent prevention.

Part 5: Conclusion

In conclusion, the evolution of former industrial territories is a complex process that can be understood by applying various theoretical approaches. Conflict theory, inspired by Marx and Engels, emphasizes the social tensions that arise during the reimagining of industrial zones, highlighting conflicts between different stakeholders. On the other hand, structural functionalism, supported by Durkheim, focuses on the new functions and roles that these spaces can assume in society, emphasizing their potential for cultural development and community cohesion.

The transformation of industrial landscapes not only resolves conflicts but also provides an opportunity for them to become centers of cultural activity, hubs of innovation, and drivers of economic development. The non-extractive design approach opens a new perspective on the role of architecture in balance with the environment and resources. This approach requires a rethinking of the architect's role and emphasizes responsibility for the future, where nature and culture intertwine.

Industrial parks, intervening in the economic and financial spheres, also have a positive impact on human health and the environment. Modern industrial parks strive for sustainable development, emphasizing accessibility, inclusive growth, and addressing climate change. Interacting with knowledge bases, they play a key role in the development of industrial zones. Their utilization and zoning are crucial for

successful industrial symbiosis. The integration of industrial environments into urban settings becomes a key factor in forming a symbiosis between culture and utilitarian space. With Foucault's perspective, governance is considered as an influence on people's behavior, especially in politics, and as a paradox with the aim of eliminating politics. Industrial parks can serve as examples of successful combinations of state governance and individual freedoms. The evolution of industrial environments, from governance to cultural diversity, contributes to economic efficiency, socio-cultural development, and improvement of the urban environment. Cultural diversity becomes not only an ideal but also a value that promotes more dynamic development and diverse urban spaces.

The future of former industrial spaces depends on national policies and economic strategies. Industrial parks play a crucial role in achieving sustainable development, demanding attention to ecology and social aspects. A look into the future reveals several key trends, such as competition for investments, integration into the urban environment, "green growth," and digital transformation. Local communities have a significant say in the transformation of industrial zones and the preservation of cultural heritage. An analysis of cultural influences and axiology emphasizes that cultural aspects may cause conflicts, but in administrative practice, culture can be used as a tool to achieve administrative goals, influencing territorial development management.

Global influences, such as the globalization of culture, impact former industrial zones, creating challenges for preserving authenticity and local identity. Developer-led projects may prioritize profit, potentially altering the social structure of the area. Overall, successful transformation requires a balanced approach, considering the interests of local communities, commerce, and global influences. The application of non-extractive architecture becomes an essential tool for creating sustainable and socially significant areas of development.

Public issues, including climate change and social injustice, are pressing challenges that demand attention. In turn, the development of industrial technoparks represents a potential path to improving the situation. However, the question arises as to whether architecture alone can address the issues related to the quality of work and social growth. Architecture, influencing the economy and the environment, faces the negative consequences of historical self-isolation. However, a reconsideration of architectural concepts can play a key role in creating sustainable working conditions and preventing social decline.

Historical experience shows that the oppression of one class in favor of another can lead to negative consequences for society. The analysis of Michel Foucault's heterotopias raises the question of modern industrial spaces associated with "forbidden places" and the need to reconsider them. This reconsideration must take into account social, economic, and political factors, seeking balanced solutions and

avoiding harm in some areas at the expense of benefits in others. The analysis of Michel Foucault's heterotopia principles helps understand the role of these concepts in transforming industrial spaces into industrial parks through a non-extractive approach. Diversity, variability, the juxtaposition of spaces, the collection of time, and the system of opening and closing are essential. Applying these principles in architecture can contribute to the creation of harmonious and socially significant industrial spaces. The non-extractive approach is an effective tool for sustainable urban development, supporting material reuse, preserving history, and considering socio-cultural aspects. Simultaneously, preserving historical heritage and socio-cultural value through architectural solutions contributes to the formation of new sustainable and inspiring urban spaces.

2. Photo by Ryan Koopmans & Alice Wexell

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