

# From Monofunctional Commercial Districts into Multifunctional Urban Areas – Implementation of Sustainable Urban Practices

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**Abstract:** Rapid urbanization and population growth require new human-oriented adaptations in cities. Functional zoning, largely applied in the past century, has left current urban development with many difficulties, including space consumption and car dependency. The article examines a specific type of monofunctional land use – commercial areas, as they struggle the most with past planning mistakes. These spatially separated sites demand instant transformations in order to meet global urban challenges. With background information on the development process of commercial land uses and a literature review of existing sustainable approaches, the theoretical framework is created, with respect to economic, environmental, and social fields. Subsequently, the toolbox of good urban practices is being formed as a template for sustainable urban design followed by a discussion of potential implementation methods.

**Keywords:** commercial land use; monofunctional district; sustainable urban development; human-oriented approach

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## Introduction

Throughout the ages, the approach to spatial planning has changed significantly as for the need to create cities on a human scale. Actions for sustainable development in the urban landscape take different forms and scopes of area and theme (Szumigala et al., 2021). The sustainable urban development has its roots in economic and rapid population growth after World War II. Since then, human relations with the natural environment have gradually deteriorated, resulting in simultaneously people damaging the Earth, and the biosphere harming Earth inhabitants as an effect of human activity (Kenworthy, 2021). As stated in the United Nations report for world urbanization prospects, “the share of the world’s population living in urban areas is expected to reach 60% by 2030” (2019), and by 2050 even two-thirds will be urban. Therefore, to improve their livability, cities need to be developed more sustainably and tackle global urban issues in the economic, environmental, and social fields.

In order to provide quality urban areas, cities as a whole require well-connected, dense, and diverse districts that could provide spaces simultaneously for living, working, and leisure. However, a particular pattern – commercial land use – marks a difficulty to adapt. These highly monofunctional districts, dominated mainly by broadly scattered magazines or high-rise offices, pose a lot of problems to successful sustainable implementation. Densely occupied during working hours, becomes deserted in the evening, with an abandoned and

uninviting atmosphere. Moreover, automobile-oriented planning has left these areas separated from others and lacking human scale, contributing to the distortion of planning decisions in transport planning (Litman, Colman, 2001). This article aims to understand the reason behind this situation and find the existing examples of successful sustainable transformations of commercial land uses that could be used as catalysts for other emerging areas. To comprehend the existing urban condition of commercial land uses, the development process must be first analysed. Not only does it help to understand the urban fabric, but it also indicates the growth tendencies and potential challenges related to it. The three urban planning phases, presented below, have the most relevant consequences on these monofunctional patterns lacking human approaches and sustainable practices.

## From industrial to functional city

The walking city urban form, marked by high density, mixed-use, and organic structure (Kenworthy, 2021a), characterized cities until the era of industrialization. It was the first phase of urban development trends since 1800. Urban fabric, as it is perceived today, developed significantly since the second half of the 19<sup>th</sup> century, when agriculture was relegated to the background in favor of industry. Based on diverse factors, such as large area availability and low land prices (Kuder, 2001), manufacturing was settled in the first phase on the outskirts of the core cities. Additionally, with new workplace opportunities, intense urbanization occurred, with people moving from rural to city areas, leading to fast and uncontrolled growth. Further urban challenges, including increasing accommodation demand and guarantee of living-working short distance, led to spatial proximity between production facilities and residential buildings (Häußermann et al., 2008), simultaneously contributing to the increasing pollution in districts due to the nearby location of heavy industrial facilities.

In response to these issues, a new approach was evaluated to separate conflicted uses at the turn of the 19<sup>th</sup> and 20<sup>th</sup> centuries. The relocation of industrial structures to the cities' surroundings was possible due to the invention of the transport system, which initiated the process of radial growth along communication arteries (Schröteler-von Brandt, 2014). Moreover, the infrastructure development, such as water provision, sewage pipes, and electricity cables, improved rapidly in suburbs, resulting in faster-growing surrounding communities than in core cities. According to Schröteler-von Brandt, not only citizens were interested in moving to healthier outdoor areas, but also industrial companies aimed to relocate to the suburbs due to conflicts of uses and higher land prices in city centres (2014). The gradual decentralization process and clear separation of home and workplace contributed to the beginning of functional segregation. In 1933, during International Congress for Modern Architecture, the Charter of Athens was established in response to the poor living conditions of the industrialized population, aiming "to dissolve the coexistence of residential and commercial uses and relied on a strict spatial separation of the functions of living, working, and recreation" (Roost et al., 2021).

In consequence, the functional city was a dominant urban development throughout the 20<sup>th</sup> century. From 1950, business and service uses were concentrated in cities, while suburban housing estates and industrial areas developed on peripheries (Roost et al., 2021). For functionally structured cities, the traffic arteries set the importance of linking the individual functions units with each other and initiated the implementation of inner-city freeways. Thus, enforced commuting by, preferably, private transport mode between the workplace and home simultaneously indicates car-oriented planning. Moreover, large housing settlements recorded an increase in height and density (Peterek, 2021a) with healthier living conditions, yet creating enormous 'no-man' landscapes. The small-scale urban model of living and working combination, as characterized cities until the era of industrialization (Yucelen, 2020), could not be implemented in these functionally ordered settlements. Commercial and industrial workplaces had gradually disappeared from the cityscape, which can be witnessed in the present day in many European cities.

## Postmodernism changes

At the turn of the 20<sup>th</sup> and 21<sup>st</sup> centuries, technical progress as well as globalization gained the importance of economic structural change. Human labour in remaining production was gradually replaced by a mechanism, along with flexible network economies and decentralized corporate structures gaining significance (Häußermann

et al, 2008). Since the city's inception, they have been subject to human intervention at every level of activity – in other words, they have been designed, especially the industrial ones (Cuthbert, 2007). The industry economic sector was transforming toward a service-oriented society, which can be roughly divided into two areas aiming at different consumers: consumption-oriented and company-oriented service. As explained by Häußermann, Läßle, and Siebel, "while company-oriented services are delivered to companies and therefore are part of industrial production, consumption-oriented services are intended for consumption by the final consumer" (2008). Both types are mutually related and, therefore, dependent on a close cooperation network leading to high-density placement within the same urban area.

At the same time, a noticeable change in lifestyle and qualifications triggered further growth in the service sector. In comparison to an industrial society characterized by invariant working hours, there was a boost in the individualization of the service-oriented society that owed more flexible working hours and spare time for leisure, leading to a new demand for cultural, gastronomic, economic, and tourist services (Thuy, 1994). Accordingly, such a lifestyle required a higher degree of mobility with "more and more people living in one place, working in another, doing their shopping there (...), and going to a museum in yet another place" (Cuadra, 2002). The new manifestation of desire for the city with increasing employees' preference for urban locations has changed individuals' perception of cities as a centre of a new life. Having this in mind, companies started to relocate their facilities where they could expect an above-average availability of a well-trained workforce (Siedentop, 2008). As a result, the rising importance of mixed-use emerged, accompanied by the need to reduce the distance between home and workplace. The arrangement of these, in the beginning, completely separate functions have been modified significantly over the years.

## New directions of 21<sup>st</sup>-century

Studies show that office life as it is known today might come to an end with digitalization onwards (Münchner Kreis and Bertelsmann Stiftung, 2020). The possibility of a home office work style has received an additional boost with the COVID pandemic outcome in 2020. To protect public health and curb the transmission of the virus, citizens were urged to stay at home and avoid social interaction. As stated in the article published by McKinsey & Company, "leaders will use the lessons from this large-scale work-from-home experiment to reimagine how work is done and what role offices should play" (Boland et al., 2020). Given this example, it is assumed that further buffering of clear working and living separation will occur. Additionally, soft urban location factors, such as cityscape, design quality, vegetation, and recreational offers, are gaining importance both for companies as well as employees (Hüttenhain and Mayer-Dukart, 2010). Not only can they have a significant impact on the hard location factor of commercial sites, but also can positively or negatively influence job performance.

The 20<sup>th</sup>-century course left commercial areas with monofunctional development, spatial separation from other uses, and enormous space consumption. The data shows that the proportions of functionally-diverse neighbourhoods have shrunk from 90% to around 10% in the latest century (Feldtkeller, 2006). The simplicity of architectural design, as well as the lack of accessibility to these commercial sites by all transport modes, required decisive changes. Additionally, commercial areas are not designed for pedestrians and bicycle commute with confusing structures and a lack of orientation generated by large-scale halls and spacious traffic areas (Roost et al., 2021). However, the reversal trend is now appearing with the growing importance of smaller-company sizes and providing special proximity of various uses with commercial facilities. The emerging question arises: what are the potential approaches for transforming these monofunctional commercial areas into multifunctional districts for everyone?

## Literature review

The rapid urbanization process, which can be observed since 1950' (United Nations, 2019), requires immediate, shared urban vision and policies. As stated in WHO Report, "cities face a range of wider challenges relating to the goal of achieving sustainable development including, to name but few, air pollution, environmental degradation, growing inequalities within the population, threats to economic growth and affordability of housing"

(2017). Research to date indicates that most interventions representing the dominant cultures of sustainable urban design and architecture support the prevailing eco-modernism (De Castro Mazarro et. Al. 2023). Taking that into consideration, it is important to ensure a sustainable approach to urban development and redevelopment of already existing sites. Accordingly, monofunctional commercial land uses can be transformed in a more sustainable way with respect to the three main fields: economic, environmental, and social. Presented below principles with reference to existing commercial development examples are summarized in discussion as a toolbox, to set an example for other urban projects.

## Economic Field

The economic dimension contributes to the sustainable growth of the city. There is very strong evidence between urban development and the level of GDP, especially regarding the use of automobile transport (Kenworthy, 2021b). The urban fabric is a highly dependent aspect of reducing enforced traffic costs. By creating districts of short distance, citizens could satisfy their needs within walking distance, thus reducing the need to invest in traffic and health-related infrastructure. Urban plans very often promote intensification and alternatives to car use and thus adhere to the principles of smart growth and sustainable development (Filion, Kramer, 2012). In order to serve the economic security of the location and meet the new requirements of global changes, commercial living can be transformed by a mix of functions, the inclusion of residential areas, and a decrease in car-oriented planning.

Commercial land use type struggles with functional isolation induced by 20<sup>th</sup>-century principles, as mentioned in previous paragraphs. With the new sustainable, interdisciplinary, and human-oriented approach to urban development, the potential integration of mixed-use within these areas could be an excellent solution for spatial proximity of living and working. Ensuring horizontal as well as vertical mix uses contributes to the full citizen's enjoyment of urban life at a walking pace when being attracted by active ground floors and soft edges. Moreover, a diverse mix of residential, institutional, commercial, and light industrial functions within walking distance reduces the need to travel, leading to districts of short distances. Consequently, citizens can "satisfy all needs of everyday life within the boundaries of the districts itself" (Peterek, 2010).

Furthermore, the shift from high industrial to light industrial combined with services allows for reducing space requirements as well as decreasing emission production, thus, enabling functional diversity. Small-scale facilities can be new domain structures in contrast to the big manufacturers of the chimney industry period. However, the decrease has also resulted in parts of the industry being organized now horizontally e.g. production halls (Spath, 2012), therefore demanding more area consumption. This issue might be fixed by small-scale mixing within the buildings introduced by differentiation in the distribution of floor functions: besides commercial floors, further can be reserved for living, cultural facilities, or gastronomy (Bauer and Lentjes, 2014). Not only does it contribute to productive job integration, but it also reduces enforced mobility by car between different services, while minimizing environmental degradation.

An excellent example of introducing a mix of functions into a highly monofunctional commercial area can be observed in Dreispitz located in Basel, Switzerland. With increasing housing demand and the need for creating inclusive spaces, this previously domain business and industrial area required a change into a more multifunctional form. The municipality of Münchenstein Basel district came to a decision to preserve business functions in the core of the Dreispitz while introducing residential uses, cultural facilities, and services in the surroundings, contributing simultaneously to the development of a mixed-use quarter (CMS, 2015). In the centre, municipalities applied a more compact structure by achieving densification: on the ground floors of multi-store buildings – commercial use was located, and the remaining services were on the upper ones. Additionally, functional connectivity was created, linking surroundings' mixed-uses with neighbouring areas, ensuring at the same time home-work proximity. Good accessibility to Dreispitz, provided by well-design transport infrastructure, enabled an inclusive development strategy.

Nowadays, with the ongoing rapid urbanization and expansion of Earth's inhabitants, commercial land use should be subsequently designed with the inclusion of residential areas. As stated in the United Nations report for world urbanization prospects, "the share of the world's population living in urban areas is expected to reach 60% by 2030" (2019), and by 2050 even two-thirds will be urban. For this reason, there is a need to

redevelop existing commercial areas with regard to providing living space, simultaneously reducing housing pressure. The first attempts have been made by Germany, as they introduce a new land use type *Urbanen Gebiets* (Eng. Urban Areas), which enables a more diverse mix and increased building density. As a result, “a higher proportion of residential space can be created with a non-disturbing business i.e. in the ground floor zone” (Roost et al., 2021).

One of the new *Urbanen Gebiets* land use types was implemented in *Lyoner Quartier* located in Frankfurt am Main, Germany. When the vacancy rate of the *Niederrad* district reached 30% in 2007 (BBSR, 2017), the municipalities of the city decided to transform this monofunctional office area into a modern living-working district. With the implementation of around three thousand new residential units supplemented by a mix of functions, *Lyon Quarter* formed an inviting atmosphere for its inhabitants. Newly developed residential space was created more efficiently by densification and reconstruction of already existing buildings, and guarantee of services on the ground floors. As a result, citizens are getting attracted by active facades and are able to enjoy the neighbourhood at a walking pace instead of moving by automobile transport. The large-scale structures were further revitalized into a vertical mix of functions offering a better orientation and access on foot, thus increasing pedestrian and cyclist flow (Roost, 2015). Moreover, the area was designed to link higher density with quality open-public spaces and implementation of well-design urban furniture, contributing to vibrant public realms. The approaches applied in *Lyoner Quartier* can set an example of well-achieved integration of residential areas into commercial land use.

In accordance with *Kansas City Transit-Oriented Development Policy* “increasing transit options is seen as a good economic development tool as well as a means to increase accessibility and mobility” (2017). By shaping urban form around public transit stops, including subways, trams, and buses, surrounded by high-density development, a commercial district can provide a good communication network and reduce enforced commuting by car, simultaneously creating unique walking opportunities. Ensuring well-design urban furniture, high quality, and unobstructed pedestrian footpaths with active facades encourage citizens to enjoy the place rather than quickly pass through it. Functional diversity combined with higher density promotes environmental-friendly transport, which “represents an essential ingredient to improve cities’ livability and reduce the externalities of car-oriented urban development” (Angiello, 2021). Moreover, investing in connective, continuous, and physically segregated cycle lanes with smooth surfaces is the essential implementation for a comfortable ride and to ensure safety for cyclists.

An effective tool for reducing car dependency was proposed by *Gehl Architects* in Bern, Switzerland. Under the pilot project *Pop-upBern*, the potential of one street was observed and taken into a reconsideration of uses. *Zeughausgasse*, located within the inner city, had already been a very walkable area with active ground floors. However, the street permits automobile transport, including cars and delivery vehicles, for which the parking places are located along the *Zeughausgasse*, leading to narrowing-down sidewalks and a lack of space for public seating or benches. As stated by *Svarre and Müller*, “this contributed to *Zeughausgasse* feeling like a street to ‘pass through’ rather than a place to linger or stick around” (2019). Within two months, some parking places were transformed into non-privatized parklets to allow pedestrians to seat and leisure. The significant effects showed up, with an increase of 75% in the number of people staying and a rise to 31% in the number frequencies of people revisiting the street (*Svarre & Müller*, 2019). Not only did the changes attract younger users, but also enabled more diverse activities and created a positive perception of the street. The presented example can be efficiently implemented in dense commercial areas. Transforming parking places into public space contribute to a more lively and vibrant perception of the place and enables pedestrians to enjoy the street life, simultaneously creating a better street environment.

An important role in public transportation is played by the subway (e.g., in *Barcelona*), relieving the city of a significant number of cars and providing opportunities for rapid movement (*Kocki, Kwiatkowski*, 2016). Another innovative idea conducted by municipalities of *Seattle* was implemented in *Greenwood Business District*, USA. The *Bicycle Master Plan*, submitted by the *Seattle Department of Transportation* in 2007, initially came against objections from the local business community. The proposal contained 582 miles (almost 1000 kilometres) of bicycle facilities, including 161 miles (259 km) adjacent to retail land use, thus the removal of parking places and implementing a road diet – reducing the amount of traffic lanes – in favour of bicycle lines. Therethrough, companies were concerned about the economic consequence linked to customers’ access to storefronts, with the confidence, that a decrease in automobile-oriented development, thereby a reduction in car parking, means

fewer customers. However, the research conducted by Rowe, showed that “the loss of automobile travel lanes and parking spots, and the addition of bicycle lanes did not have a negative impact on the Greenwood Business District” (2013). Companies situated on roads, where bicycle lanes were implemented, performed similar incomes to neighbourhood-wide retail sales. Moreover, a significant enhancement in safety for bicycles and pedestrians was noticed, leading to an increase in non-motorized commuters. Ensuring physically segregated cycle lanes and unobstructed pedestrian footpaths encouraged people to choose mobility-friendly transport over automobile one.

## Environmental Field

Nowadays, cities tend to neglect the urban ecosystem, which compounds citizens’ quality of life and leads to many environmental impacts on the urban fabric (Martin et al., 2018). In the current age of urbanization, the cities regions are the most responsible for the increase in global warming, with heated buildings and greenhouse gases produced by vehicles (BMZ, 2022). The small-in-scale, but significant changes for tackling climate change effects have to be initiated within the boundaries of districts. By transforming monofunctional commercial areas, an environmental approach must be ensured through, for example, green and blue infrastructure implementation as well as energy efficiency solutions.

Planning for urban greenery is an important part of climate change interventions, not to mention an integral part of making a city more liveable. Successful green spaces provide aesthetic qualities, adequate park maintenance, and practical features such as outdoor gyms or water fountains (WHO, 2017). Rainwater collection and ecological building materials conduce to sustainable management and improve ecologic performance. As stated by Kenworthy, “sustainable water management involves channeling the rainwater falling on the site through green swales that also act as a green open space network through the development” (2016). Efficient green spaces, tree alleys, and linear or pocket parks help to increase the vitality, activity, and comfort of the citizens and can be easily implemented in commercial areas. Assurance of continuity and connectivity of the green outdoors creates a functional network of good walking and cycling opportunities. Moreover, a cooling effect can be achieved by planting green strips (with flowers or bushes) along streets, creating tree-lined routes, and seeding grass on trackways. As stated by Sharifi and Boland, “extended outdoor thermal comfort in heat resilient public spaces promotes outdoor activities, public life, and health” (2018).

The studies were conducted by the Gehl Architects on reducing air pollution through urban design. Under the Cleaner Air Network project, they measured air quality in Copenhagen by launching cars equipped with sensors. Mapping the outcomes and facilities, that are most at risk, including children’s playgrounds and kindergartens, enabled researchers to identify which areas require urban interventions. One of these interventions was “the removal of on-street parking in the specific areas associated with high levels of hyperlocal air pollution and the introduction of a green buffer as a pollution barrier” (Gehl Architects, 2019). Adding green elements, including trees, flower plants, and grass, among others, enhances district aesthetics and provides shade, ensuring walking comfort during the heat. In the remaining areas, traffic calming was applied to reduce car exhaust fumes. Moreover, widening sidewalks and introducing new bicycle lanes encouraged citizens to choose environmental-friendly transport modes.

The environmental approach was also proposed by municipalities of Waldau-West district in Kassel, Germany, with introducing a circular economy in 2013, as the main model for this commercial area. As a result, there was a need to redevelop the district in a more sustainable way with climate protection-related objectives. An increasing value through greening was emphasized, defending that not only it creates a positive image of the commercial area but also contributes significantly to reducing environmental pollution. Moreover, green areas improved the local microclimate and ensured pleasant ambient temperatures, simultaneously creating natural design elements (BBSR, 2019). The planting campaign led to the free-of-charge distribution of flower seeds, promoting urban flowering, and the implementation of more trees along the main streets. On top of that, the emerging issue of insufficient accessibility by public transport was reconsidered, with the provision of new bus lines and ensuring of bicycle tracks, thus, boosting environmental solutions. The environmental approach developed in Kassel has resulted in involving companies to create a green commercial location, with respect

to nature. Cities should be environmentally safe, i.e. they should have safeguards for the flow of resources, infrastructure and ecological services (Hodson, Marvin, 2009).

The opportunity to combine production into urban structures has improved with the decarbonization of industries and the conceivable switch from fossil fuels to renewable energies (Roost et al., 2021). Low-emission management can be further provided by ecological building materials and the introduction of vegetation between dense production facilities. Planning for urban greenery is an important part of climate change interventions, and contributes to reducing air pollution. On top of that, greening within commercial areas would help to cool the microclimate and avoid the urban heat island effect (Schiller & Kenworthy, 2018). By aiming for small-scale commercial structures, thereby providing additional urban space, green fields, and public realms can be included within the cityscape.

The climate change intervention took place in the commercial area of Dorstfeld West in Dortmund, Germany. The area developed on a former colliery and struggled with a high level of air pollution and noise related to fossil-based economy and automobile-oriented transportation. The new environmental program, proposed in 2011, included increasing energy efficiency through building modernization (BBSR, 2019) with the use of ecological building materials conducing to sustainable management and ecologic performance improvement. Moreover, photovoltaic panels were introduced to many structures as a substitution for fossil energy-based supply. By implementing green rooftops, the absorption of pollutants and carbon dioxide was achieved, simultaneously cooling the microclimate. In addition, municipalities managed to reduce car dependence and promote a mobility-friendly approach with an improvement of public transport as well as providing new cycle paths. These environmental changes highly contribute to a positive perception of Dorstfeld West and provide the new possibility of further transformation and integration of commercial land use into a multifunctional urban fabric.

## Social Field

There is no city without inhabitants. As mentioned by Gehl, cities are for people, and it is necessary to ensure urban development in the relevant order: life, space, and then buildings (2010). Traditional walking city forms were based on city life and social interaction. From the XXI century onwards, there is a tendency to prioritize high-rise structures deprived of human scale and provision of the public realm. With the segregation of functions, the inclusion of all can not exist. That is why there is importance to bringing social life into monofunctional commercial districts by ensuring adequate principles of a human scale and integration of all people.

Human scale means liveable, enjoyable, and inviting space provided by soft edges and active ground floors, adjust to walking speed. The mixture of opportunities to stay, talk, or exercise allows people to choose from many activities of the pedestrian landscape. There is a need to integrate people within high-density neighbourhoods rather than separate them in highly car-dependent suburbs. Urban furniture and landscaping elements attract people's attention and contribute to lively public spaces. Furthermore, the backbone of a successful pedestrian zone is to guarantee safety. Clear separation between public and private spaces as well as continuous people flow leads to situations when there are always "eyes on the street – the kind of involved neighbourhood surveillance of public space" (Jacobs, 1961).

Even in the world's busiest neighbourhoods, as in New York City, a human scale can be implemented. Gehl Architects decided to rethink the urban future of the East Midtown business district of Manhattan, USA, and give a voice to the citizens. By using a people-first approach, plenty of workshops, meetings, and discussions with local inhabitants took place in order to understand the human importance of the existing commercial site. As a result, the Gehl Architects developed "streetscape strategies and projects visualizing what new street designs and their benefits for people at street level could look like" (Gehl Architects, 2013). With the implementation of human scale designs, such as colourful plants, active urban furniture, and comfortable seating, people's positive cityscape perception at a walking pace is guaranteed. They achieved the main goal: to create a place for people within the East Midtown business district, with small in size but significant transformations.

The commercial areas should be developed to ensure social integration within compact, dense and liveable districts offering "as much as possible facilities for everyday life (...) in close relation to each other" (Peterek, 2021b). There is a need to avoid very isolated remote suburbs, mainly caused by automobile development, leading to segregation and anti-social behaviour. In addition, an inclusive urban concept that welcomes everyone

and goes around people's needs and values provides further integration. As stated by Gehl, to achieve social sustainability for cities, "attempts must reach far beyond physical structure" (Gehl, 2010). The guarantee of equal rights and "participation of all marginalized groups (...) by improving the governance, market efficiently and supporting the well-being of all" (Günther, 2021) contributes a lot to social inclusion. By establishing working groups, public relations, social and cultural networks, and activities, the social responsibility and identity of the city can be created (Peterek, 2021b).

The first attempts at such integrations have been implemented in the Herzbergstraße commercial area in Berlin, Germany. The aim was to "profile the area as a business location, to activate local companies and to ensure a balanced moderation of the different user interests as a contribution to securing and developing the commercial location Herzbergstraße" (BBSR, 2019). In order to do so, the communication and network had to be guaranteed. All stakeholders, such as company owners, administration, politicians, and businessmen were extensively involved in studies to determine relevant issues, projects, and measures. The actor-oriented approach was formed by numerous meetings and discussions involving all interested parties to develop a common vision. As a result, a transparent exchange of information and improvement in communication between the administration and the company was achieved. Moreover, Herzbergstraße created a common image by introducing a logo and shared brand leading to increased public attention.

## Discussion

Sustainable development is an all-in-one combination of the economic, environmental, and social dimensions. The three components are required to be well connected, consistent, and complement each other to create an efficiently-functioned urban fabric. With the effective implementation of good practices, a transformation of monofunctional commercial districts into multifunctional urban areas can result in improved urban sustainability. All principles, discussed in detail above, are summarized in the toolbox and presented in table below to set an example for others (Table 1).

The effective implementation of good urban practices requires the cooperation of municipalities, companies, and inhabitants ensuring clear dialogue and a common vision. It can be provided by participatory process, in the way of workshops, debates, or field trips, involving public engagement and leading to a consensus. However, the adaptivity of concepts is highly dependent on business owners and their willingness to transform areas in a more sustainable way, thus, reducing some of their privatized sites. It is of great importance to convince them of the economic, environmental, and social benefits of sustainable transformations. Reducing car-oriented development and monofunctional land use must come from their initiative. Thus, identifying the existing situation and sharing the expectations has to stand as the first phase to implement sustainable practices. Compilation of site analyses, documentation, and surveys helps to understand the current urban condition. Additionally, by conducting surveys, the find-outs can be collected regarding attitudes and reactions toward sustainable procedures.

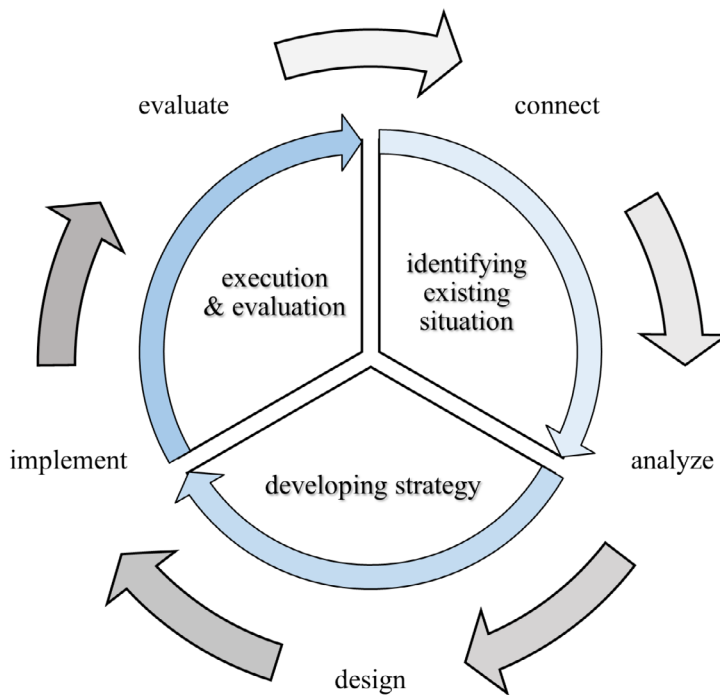
A further approach requires developing a common strategy. The successful transformation can be guaranteed by implementing small-in-scale but significant urban practices. Nevertheless, the process has to be conducted gradually, with a transition from predominantly car-oriented to human-oriented development. The strategies execution can be then roughly divided into immediate, mid-term, and long-term, by identifying the prioritized areas of development and those which can be postponed. Furthermore, the strategic plan can cover sustainable principles as design guidelines for architects to create sufficient places for all. It is important that these plans remain coherent and well-connected to large-scale strategic plans of cities or regions, in which transformations take place. Linking functional, environmental, and transportation corridors not only would increase diversification in these monofunctional districts but also provide more purposes to visit.



**Table 1.** Toolbox of good sustainable practices for transforming monofunctional commercial districts source: own elaboration based on literature review

Economic field	Environmental field	Social Field
<p><b>Mix of functions</b></p> <ul style="list-style-type: none"> <li>■ horizontal and vertical mix uses</li> <li>■ functional connectivity</li> <li>■ small-scale mixing within the buildings</li> <li>■ active ground floors</li> <li>■ districts of short distances</li> <li>■ small-scale facilities</li> <li>■ densification of functions</li> <li>■ well-design urban furniture</li> </ul> <p><b>Inclusion of residential areas</b></p> <ul style="list-style-type: none"> <li>■ new land use type Urbanen Gebiets</li> <li>■ increased building density</li> <li>■ spatial proximity of living and working</li> <li>■ reconstruction of already existing buildings</li> </ul> <p><b>Decrease in car-oriented planning</b></p> <ul style="list-style-type: none"> <li>■ well-design public transport</li> <li>■ high-density development around transit stops</li> <li>■ reduce in parking places (parklets)</li> <li>■ dense network of walking and cycling</li> <li>■ unobstructed pedestrian footpaths</li> <li>■ connective, continuous, and physically segregated cycles lanes</li> <li>■ road diet and traffic calming</li> </ul>	<p><b>Green and blue infrastructure</b></p> <ul style="list-style-type: none"> <li>■ aesthetic qualities, adequate maintenance, practical features of green spaces</li> <li>■ collection</li> <li>■ tree alleys, linear or pocket parks for vitality, activity, and comfort</li> <li>■ continuity and connectivity of the green outdoors</li> <li>■ green buffer as a pollution barrier provide shade</li> <li>■ adding green elements</li> <li>■ environmental-friendly transport modes</li> <li>■ planting campaign</li> </ul> <p><b>Energy efficiency</b></p> <ul style="list-style-type: none"> <li>■ switch from fossil fuels to renewable energies</li> <li>■ cool the microclimate and avoid heat island</li> <li>■ photovoltaic panels</li> <li>■ green rooftops</li> <li>■ ecological building materials</li> <li>■ buildings modernization</li> </ul>	<p><b>Human scale</b></p> <ul style="list-style-type: none"> <li>■ livable, enjoyable, and inviting places mixture of opportunities to stay, talk, or exercise</li> <li>■ urban furniture and landscaping elements</li> <li>■ active ground floors and soft edges adjust to walking speed</li> <li>■ safety guarantee</li> <li>■ clear separation between public and private space</li> <li>■ continuous people flow</li> <li>■ colorful plants, active urban furniture and comfortable seating</li> </ul> <p><b>People integration</b></p> <ul style="list-style-type: none"> <li>■ social integration within compact, dense and livable districts</li> <li>■ needs and values establishment guarantee of equal rights</li> <li>■ participations of all groups working groups, public relations, social and cultural networks</li> <li>■ social inclusion</li> <li>■ community network</li> <li>■ common vision</li> <li>■ transparent exchange of information</li> </ul>

The third and final step to the successful transformation of a monofunctional commercial land use concern the implementation of sustainable practices and evaluation process. Although implementation costs can be high at the beginning, they should gradually pay off due to e.g. energy sufficiency. As mentioned before, the execution of the urban project should be spread over time, followed by constant reporting and analyses of the results. Therefore, the transformation process can be evaluated and improved for further urban development, creating a closed cycle of sustainable practices implementations, presented in Figure 1. As stated by Law, Az-zali, and Conejos, “planning has always been a future-oriented activity, dedicated to long-term change” (2021).



**Fig. 1.** A closed cycle of sustainable urban practices implementation

## Conclusions

The future of monofunctional commercial areas is determined by raising awareness of this urban issue. It concerns the majority of cities and can be successfully transformed to develop efficient land-use patterns characterized by easy household-workplace commuting and improvement of overall city dwellers' life. Through this article, the existing examples of such transformations have been discussed and analysed. They emerged with positive results and gave hope for further human-oriented approaches. The produced toolbox of good, urban practices can be easily applied to any monofunctional commercial land use. Therefore, even in a dense and compact existing urban fabric, there is a possibility to implement new residential sites, reduce car dependency, and boost environmental solutions by implementing small-in-scale but significant sustainable practices. Besides, like any urban methodology, it must have some mechanism for validation and be critically learned and applied (Marshall, 2012). With rapid urbanization and the continuous growth of the population, the sustainable approach is gaining importance, offering a unique opportunity for tackling this urban concern in economic, environmental, and social dimensions. Consistent with the 2030 Agenda for Sustainable Development delivered by the United Nations, "cities are places where new solutions can have a significant impact and show the path towards a more liveable, healthy, safe and sustainable world for all" (WHO, 2017).

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