Nordic Superblocks Fieldbook

Nordic superblocks as decarbonization catalysts (NSDC)

Compiled by NSDC project team representatives from Granlund, JIS-Automation, KONE, Skanska, Synocus, Tampere University, and Tietoevry. 2025

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Introduction

Finland aims to be the most interesting country in the world for investment and creating something new. To support this ambition the Finnish government promotes sustainable development in land use, construction, housing, and transport. There is also an intent to simplify and accelerate planning, permit, and appeal processes.

The Nordic Superblocks as Decarbonizing Catalysts (NSDC) is a development initiative sponsored by Business Finland through NextGenerationEU funding that shares these governmental ambitions. NSDC, launched by Skanska, KONE, Tietoevry, Granlund, Integrio (now JIS-Automation), Synocus, and Tampere University, and their partners, aims to accelerate the transition towards zero-emission buildings and carbon neutral living. One of the goals of the NSDC initiative has been to provide a new, integrated concept for sustainable urban planning and development as well as building life-cycle management.

The NSDC initiative started in 2023 and is expected to result in a continued effort by its partners to further enhance the understanding of how to integrate livability, affordability, and sustainability in urban development. The foundation of NSDC has been the concept of Nordic Superblocks, a concept that emerged during the early planning phase of the Hiedanranta area in Tampere in 2017.

The Nordic Superblock concept combines city-level integration of activities supporting the transformation to carbon neutrality with engagement of residents in collaborative practices and community approach to shape net-zero living. The operationalization of the Nordic Superblock concept utilizes digitalization and energy transition as means to introduce new city planning and building life-cycle management solutions.

This fieldbook is the result of action research, whereby the participating organizations have combined academic research with ongoing engagement in real-world projects and initiatives that deal with the topics of sustainable urban living. Four cases in Finland have formed the center of the research: the Hiedanranta development in Tampere, the Generations Block in Helsinki, Kangas in Jyväskylä, and Kotikatu365 offering housing services in Oulu and Kuopio.

As the NSDC research progressed, it was recognized that the original emphasis on a certain physical configuration of blocks, forming what could be called a superblock, was less important than the conceptual framing behind a building project. The concept also recognizes that a superblock, in principle, does not have to be constructed up-front, but the superblock approach can also be applied to guide the transition towards increased sustainability and livability in existing built environments. Based on these insights the Nordic Superblock concept has been defined, and its operationalization is outlined in this Fieldbook.

1 Operationalizing the Nordic Superblocks concept

The goal of the NSDC initiative has been to provide an integrated concept for sustainable urban planning and development as well as building life-cycle management. The concept should offer a systemic view on how we plan, execute, and maintain our living environment. This calls for shorter throughput times, cross-disciplinary collaboration, and continuous innovation to accelerate the transformation to net-zero living and develop new technologies, products, and services needed to achieve the goals. This requires an open, collaborative approach, whereby policy makers, city authorities, architects, researchers, and companies work together to systematically redefine and implement, through continuous experimentation, sustainable living.

The research questions that have guided the ambition to develop the systemic Nordic Superblock concept are as follows:

- How do we foster a **community-driven culture of city planning**, whereby policy makers, city authorities, developers, residents, researchers, and solution providers enable the iterative, fluid evolution of the master plan developed in the zoning process throughout the lifetime of the city district and secure that the construction project is commercially sound?
- How can we **engage residents more actively** in city planning, building projects, and continuous improvements of a neighborhood/district to enable a quicker transition to zero-emission and ensure that buildings remain affordable?
- How can we build, implement, and continuously improve the use of **digital platforms** to support the need for increased communication and engagement in the collaborative process supporting the reduction of the lifetime emissions of a city district?
- What kind of data collection, sharing, and management mechanisms and architectures are needed for the new **data-driven collaborative practices** connected to the concept of Nordic Superblocks?
- What kind of **new technologies, products, services**, and **space-sharing models** will be needed to support net-zero living when operating a superblock?
- How do we **assess the impact of new practices** to ensure continuous learning and innovation on both local and national levels?
- What new **multi-governance principles** will be needed to support the above ambitions?

The NSDC initiative took a dynamic and systemic view on sustainable life-cycle management of building environments, as illustrated in the following figure:

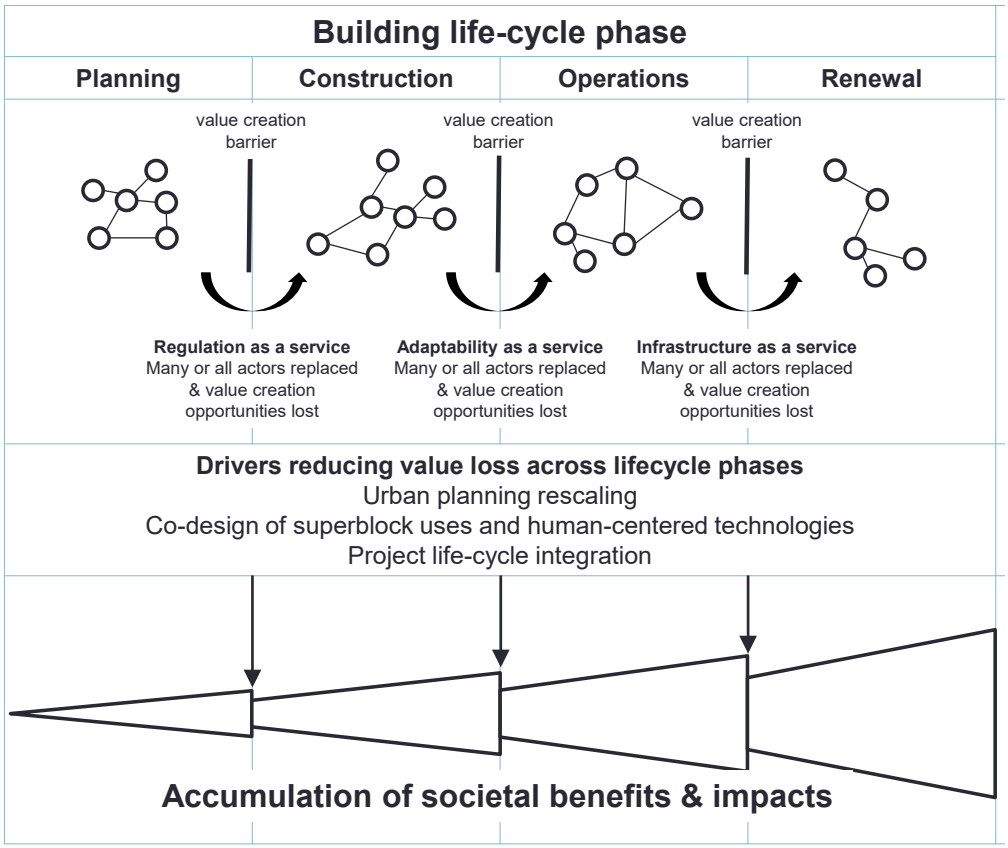


Figure 1. Sustainable building life-cycle management (source: Tampere University & Synocus)

The Nordic Superblock concept combines city-level integration of activities enabling the rapid transformation to carbon neutrality with engagement of developers and residents in collaborative practices to shape new net-zero living concepts. This idea of seeing cities as consisting of self-contained communities was first introduced by Ebenezer Howard in the late nineteenth century with the concept of the "Garden City", a compact urban grouping of 30,000 people[1]. His vision was to see city planning as cooperation. His Garden City represented a new socioeconomic form of cooperation[2] and the city was to be the ultimate orchestrator of the way city planning and stakeholder interests would be integrated.

Sustainability has made Howard's ideas highly relevant again, as he recognized that real communities grow when everyone holds a genuine and collective stake in the places where they live. Building on the idea of resident communities, superblocks aim to create more sustainable living environments. A superblock combines shared spaces in urban blocks and uses the streetscape for communal purposes. Inside a superblock, it is possible to advance the use of shared spaces such as communal libraries, laundry rooms, working spaces, kitchens, saunas and gyms on a bigger scale. Streetscapes can be used as an urban living room and for promoting

[1] Howard, E. (1898). *To-morrow: A Peaceful Path to Real Reform*. Swan Sonnenschein & Co.

[2] Richert, E. D., & Lapping, M. B. (1998). Ebenezer Howard and the garden city. *Journal of the American Planning Association*, *64*(2), 125-127.

sustainable modes of transportation like bicycling, creating a denser network of urban green spaces, and generating new services[3].

The Nordic Superblock concept rests on the following pillars:

- Livability, affordability, and sustainability are advanced using shared spaces and communal services. By creating mixed-use and lively urban areas, a novel scale of cooperation is brought into the planning discussion and urban life.
- The shared spaces and services, which are the cornerstones of the concept, both rely on and foster the growth of a community among the developers and residents of the area, creating shared ownership and a collective agenda within the neighborhood. The Nordic welfare society provides fertile ground for spearheading such development.
- In Nordic Superblocks, several blocks share the resources previously shared between residents of one building. Cooperation on this scale keeps plinths and streetscapes alive, and it helps residents acquire joint sustainable energy, urban green spaces, and blue solutions cost-efficiently.
- The cooperation provides a natural platform for co-creation among key stakeholders, engaging developers and contributing businesses in the development of the district and supporting services. The engagement of large companies in this development creates a fruitful platform for business growth on several levels, engaging SMEs as subcontractors and spurring grassroots activity.
- Nordic Superblocks serve the interests of cities that must reduce emissions to reach climate targets as well as increase visibility and competitiveness through efforts like the EU's 100 Climate-Neutral and Smart Cities mission. Nordic Superblocks also enhance the attractiveness of the city districts for potential residents.

The Nordic Superblock concept exhibits a strong community-driven ethos for the world of digitalization and decarbonization with community building at the center of sustainable urban living[4]. Urban planning, on its own, offers only a partial solution to the achievement of urban sustainability. Human behavioral patterns, traditions, attitudes, beliefs, and biases may be beyond the control of urban planning despite the best efforts of the planners. Yet, planning by itself is a necessary, but not sufficient, condition for the achievement of urban sustainability.

Nordic Superblocks integrate physical and digital development to support the reduction of the lifetime emissions of a city district. For the ambitious European 2030 decarbonization goals to be fulfilled there is a need to radically rethink public-private collaboration in the construction sector. One key area is how city planning can become more flexible, and how steps that previously have been carried out sequentially can be done in parallel. To address this topic, the principles for a new approach of collaborative urban planning are presented in Figure 2.

[3] Sjöblom, J., Kuoppa, J., Laine, M., & Alatalo, E. (2021). Crafting a planning issue with citizens in the context of planning competition: a case of 'Nordic Superblock'. *Journal of Urban Design*, 26(1), 117-131.

[4] Choguill, C. L. (2008). Developing sustainable neighbourhoods. *Habitat International*, *32*(1), 41-48.

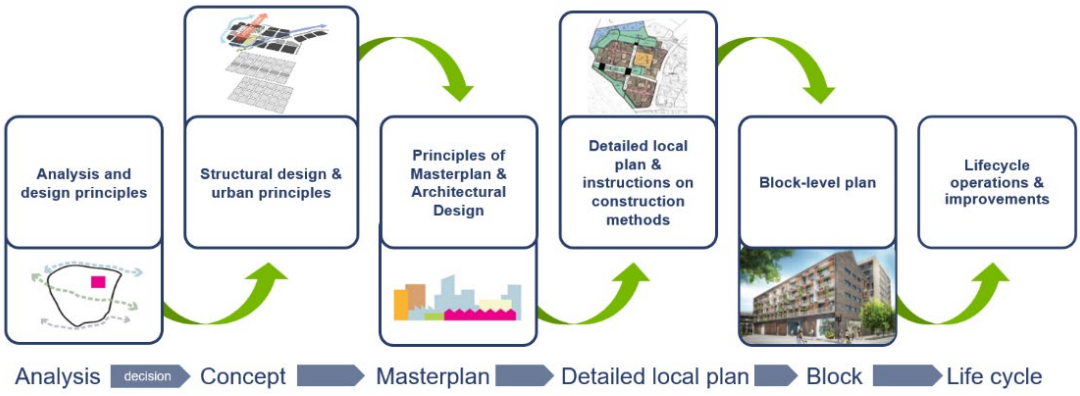


Figure 2. Collaborative urban planning (source: Skanska)

The idea of collaborative urban planning encourages all stakeholders and authorities to accelerate the transition to a more sustainable construction process. The ambition is for the building's life cycle climate impact to be reported and balanced with climate measures throughout the life cycle of the building. This includes everything from manufacturing and transportation of building components to construction processes, use and renewal of the building, and final handling. Collaborative city planning must learn during the process, wherein the participants jointly frame issues concerning the future, coordinate their actions in the present, and make sense of what they have learned in the past. This places pressure on both public and private leaders to provide direction for the collaboration. Collective intelligence must be used to enable the transformation towards carbon neutrality and more livable cities. This will call for new capabilities for collaborative urban planning enabling stronger integration across the building life cycle phases planning, construction, operations, and renewal.

The collaboration leading to the operationalization of the Nordic Superblocks concept has combined academic research with intensive communication and storytelling in real-world transformation processes. This has engaged external stakeholders in the research setting when investigating the planning, construction, operation, and renewal phases of a building life cycle and addressing the barriers between the different phases. Initially, there were no clearly predefined hypotheses, but the results emerged gradually as the understanding was deepened when new insights were gathered.

Based on the life cycle of an affordable, livable and sustainable built environment, we propose the following Nordic Superblock definition:

*A **Nordic Superblock** is a spatially delimited **built environment** integrating **physical** and **human** resources with the support of **digital** technologies to **create value for** the **Superblock community members** while simultaneously **influencing** its context to provide **societal value**.*

A Superblock is thus both a value creation platform, with its internal governance function, and a development platform, co-governed by its ecosystem partners. The stakeholders engaged in a Superblock provide continuity over the Superblock's lifecycle to remove value-creation barriers between development cycles and enhance the value of the accumulated collective experiences around the Superblock.

The operationalization of the Nordic Superblock concept is called the Nordic Superblock Canvas, depicted in Figure 3.

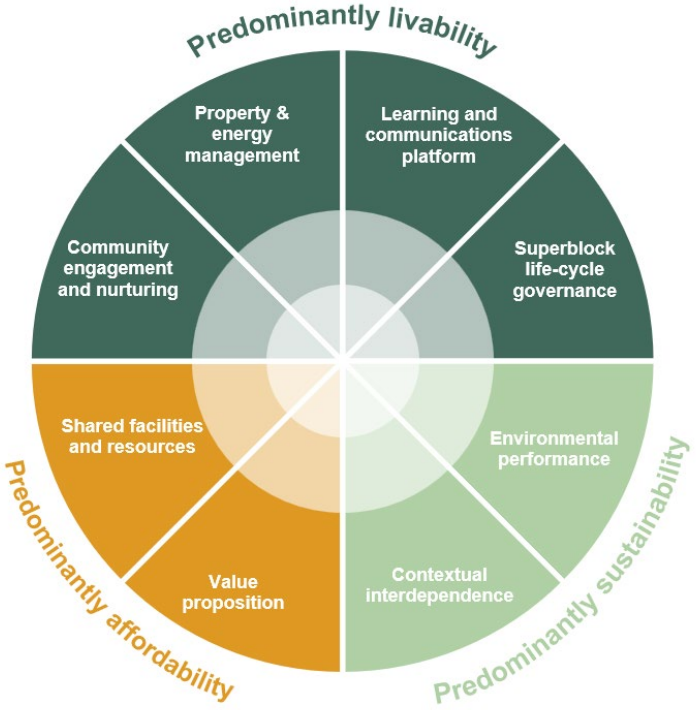


Figure 3. The Nordic Superblock Canvas (source: Synocus)

As illustrated in Figure 3, the Nordic Superblock consists of eight integrated value-creating modules which are continuously adapted to the specific context while maintaining the identity of the superblock as an integrated and dynamically evolving entity.

The first case in Tampere University's superblock research was the Hiedanranta development in the city of Tampere, where the City had a strategic partnership with Tampere University. As the construction of the first Hiedanranta superblock is just starting, our analysis has also included additional cases, which provide insights into the engagement of residents in the collaborative process: Kotikatu365 active in Oulu and Kuopio, Kangas in Jyväskylä, and the Generations Block in Helsinki. In addition, complementing benchmarking studies have been made with cities in Italy, Spain, and Germany.

The cases based upon which the Nordic Superblock Canvas has been developed represent two different approaches. The Hiedanranta and Kotikatu365 cases are platform-driven whereas the Generations Block is a community-driven case. Kangas in Jyväskylä has a platform foundation through its service provider, Kankaan Palvelu Oy, but does not have a single organization responsible for continuing operations after the construction phase ends. In the Hiedanranta and Kotikatu365 cases, one organization has overall responsibility for the development, and this organization intends to develop a portfolio of superblocks over time. Earlier research has suggested that a platform-driven approach is beneficial when handling the integration of project design, financing, plot acquisition, construction management, and continuous development[5].

The Hiedanranta development will comprise about 18 500 inhabitants and 6 000 jobs when completed in 2050. The publicly owned Hiedanranta development company uses Hiedanranta as a development platform for intelligent urban development, resource efficiency and the circular

[5] Lappalainen, I, Federley, M. (2020). Korttelimaiset asumisen konseptit. Yhdyskuntasuunnittelu 12 [2020] vol.58:4.

economy. This shall provide the inhabitants with a smooth daily life and improving their quality of life by offering an opportunity to lead a sustainable lifestyle providing shared spaces, functions and services. The Hiedanranta development will take place one superblock at a time. The construction of the North Blocks, comprising about 60 000 m^2 of living area with homes for some 1 200 residents, started in 2025.

Kotikatu365, as a company, takes care of project development and project management in the construction of residential areas based on its Kotikatu365 concept. Once an area is completed, the company oversees its development as service operator. Kotikatu365 emphasizes reasonable per-square-meter prices of the apartments, common spaces, and equipment and vehicles available for use by residents for a nominal monthly fee. Kotikatu365 operates two existing facilities in Lipporanta, Oulu and Hatsala, Kuopio. A third one has been announced in Peltola, Oulu, and Kotikatu365 is actively seeking further expansion.

The Generations Block in Helsinki builds on the concept of a multigenerational community. The Generations Block comprises 262 homes spread across three buildings, with Setlementtiasunnot, the Helsinki Region Student Housing Foundation HOAS, and AS Oy Hyväntoivonpuisto built by Asuntosäätiö as owners of respective buildings. The buildings are interconnected through a wheelchair-accessible corridor. The ground floor of the Setlementtiasunnot building is dedicated to shared spaces. The Generations Block aims to offer its residents the chance to form neighborly relationships and foster a sense of community and belonging, while also providing shared spaces and resources for common hobbies and interests.

Kangas represents a site comprising 36 ha of land that was previously a paper mill located only one kilometer from the central railway station. When fully developed by 2040, the Kangas area will comprise 5 500 residents and 2 100 jobs. One of the blocks in Kangas is a community-based, multi-generation block with 168 apartments for students and the elderly with equal access to shared spaces and courtyards implemented by the Senior Housing Association Jaso and the Central Finland Student Housing Foundation KOAS.

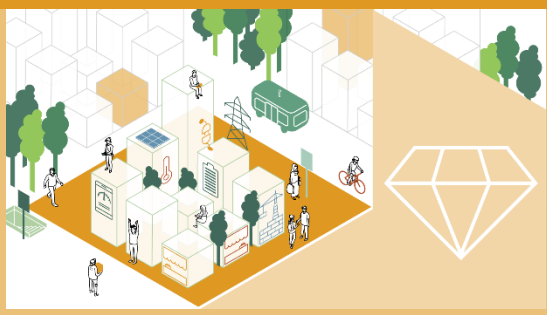
Based on the experiences gathered from the cases the more detailed content of the eight Superblock modules has been compiled and will be presented in the following.

2 The Nordic Superblock Canvas

2.1 Value proposition

We have identified the following key elements of the value proposition:

- **Location**
- **Identity (physical & social)**
- **Viability (scope & adaptability)**
- **Quality**
- **Economics (price, capital costs, operational costs, values retention)**



The location of a superblock has a strong influence on how it evolves. The four cases analyzed are quite different in this respect. Initially a research project, the Generations Block project took the opportunity to join the development of the Jätkäsaari district in Helsinki to implement the multigenerational block. The Kangas area in Jyväskylä used to host a paper mill, which ceased its operations in 2010. The Kangas development became a key initiative for the city management. The Kangas project is a resident-centric initiative, which is expected to go on until 2040. The Hiedanranta case is strongly integrated with the overall development of Tampere. The tramline, which began operations to Hiedanranta in the beginning of 2025, provides the foundation for positioning Hiedanranta as a showcase of urban development promoting sustainability and innovation. As a private project developer Kotikatu365 must negotiate with individual cities when acquiring suitable land areas that can be developed based on the Kotikatu365 concept. The commercial attractiveness of the location is thus highly relevant when making an investment decision.

The identity of a platform-driven superblock is strongly integrated with the strategic ambitions of the operator. The Hiedanranta master plan states that Hiedanranta serves as a development platform for smart urban development, various experiments, resource-efficiency and circular economy. The City of Tampere has provided the following vision to guide the development of Hiedanranta: i) city of the future – launch pad for new ideas, ii) versatile and full of experiences, iii) attractive future business environment, and iv) urban and green city by the lake. The goal is that the flexible and adaptable Hiedanranta constitutes a place where city dwellers, businesses and organizations come together to develop a living, diverse, and sustainable urban culture. There are three subareas of Hiedanranta, each with its own distinct identity: Hiedanranta Centre, Lake City, and Lielahti. The distinct identities are created through architecture, cultural elements, materials, temporary structures, historical elements, and special functions.

As part of the COR Group engaged in the health and well-being business, Kotikatu365 Oy makes use of the group's strong expertise in the well-being and digital sectors when providing living solutions, residential development and operation of services. Kotikatu365 thus leverages upon the capabilities of the group to develop Kotikatu365 into a growing business further strengthening the COR Group.

The Kangas development combines the ambitions of the City of Jyväskylä to make Kangas a leading example of resident-centric development, with the operational requirements of YIT and Skanska, which, together with the city, are the shareholders in Kankaan Palvelu Oy, the service company supporting the Kangas development.

The Generations Block was established as a project consortium with three principals: Setlementtiasunnot, a provider of affordable community-based rental homes, HOAS (the Foundation for Student Housing in the Helsinki Region) and Asuntosäätiö, a developer of owner-occupied homes. The original vision of a strong common identity was collectively shaped by the partners of the block development pilot project and was intended to be maintained by a community-nurturing service operator. However, after an initial test period of two years, residents of the Asuntosäätiö building withdrew from this agreement. Without the supportive work of the community manager, unfortunate lockdowns due to the pandemic happening shortly after, and resident fluctuation, the community spirit of the Generations Block watered down despite sharing common facilities.

Hiedanranta and Kotikatu365 provide guarantees for the continuation of their superblock services. In the case of Kotikatu365, the contractual arrangement is for a minimum of 15 years from when superblock operations commence. Hiedanranta has a shareholding agreement for the Hiedanranta service company (Hiedanrannan Palvelut Oy), which guarantees continuation of services until the city district is fully developed in the 2040s.

In the Generations Block, the lead partner is Setlementtiasunnot, the provider of settlement housing in Finland. Setlementtiasunnot has no obligations regarding services for the HOAS and Asuntosäätiö residents. In Kangas, the lead organization is the City of Jyväskylä, and operational responsibility is appointed to the service company Kankaan Palvelu Oy. However, the continuation of support once construction is complete remains open.

The challenges faced by the Generations Block development, and the uncertainty regarding continuous operations beyond completion of the construction phase in the Kangas area, suggest a benefit from having a dedicated superblock operator for the longer term. If the operator aims to develop a portfolio of superblocks there is an incentive to provide contractual guarantees to the partners joining the collaboration as the reference value of successful superblocks will support the launch of new ones.

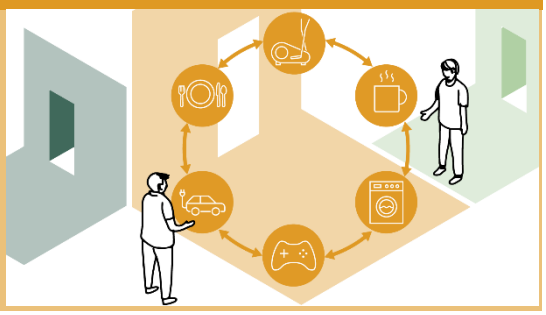
From a residential perspective, quality covers the construction process, the physical built environment, the services provided, and the communal living experience. An example of a built environment with a high quality-rating is Milano 2, situated 7 km from the Milan city-center. When established in the 1970s, Milano 2 was defined as offering a high-quality environment ideal for families and children, with plenty of green areas, schools, sport facilities, playgrounds, commerce, as well as leisure and recreation centers for social and cultural activities. Milano 2 has 6 000 residents and includes 2 600 living units. It has continued to maintain its attractiveness. One of its principal characteristics is the separation of the roads from pedestrian paths and bike lanes. This allows children to safely reach all of the public places, sport facilities, and schools.

The economics of a superblock are highly dependent on the target group. The superblocks analyzed here contain different target groups for the individual blocks forming the superblock. The Generations Block, for example, has three quite different target groups, which, retrospectively, were quite divergent in their expectations of how to bring the block forward. In the Kangas area a similar collaboration between the seniors and students at the Jaso-KOAS building is an interesting example of how a local superblock concept can evolve, as multigenerational living was not an explicit objective when the Kangas development started. Given its strong emphasis on high quality community spaces and community activity, Kotikatu365 is very dependent on the overall housing market in Finland and must pace its development with its cyclical development. This has slowed development during the downturn of the Finnish housing market. Hiedanranta, in turn, guides the development of the whole area through very detailed planning instructions, which are continuously updated based on feedback from developers to ensure that the developed properties will be both sustainable and price-competitive.

2.2 Shared facilities and resources

The shared facilities and resources comprise the following elements:

- **Spatial design**
- **Shared spaces and functions, including flexible design**
- **Sharing services and spaces with third parties**
- **Transport and mobility services**
- **Exercise and health services**



The superblock's physical integration with its environment requires intimate collaboration between the superblock partners and the city. Superblocks can be realized in many scales: from one block to nine blocks or more. The size of the Superblock should arise from the local spatial elements, such as where it is natural to have busy traffic streets, leaving inside the Superblock the calm and multiuse streetscapes. Designing a unit of several blocks at once and paying extra attention to sharing spaces between the users of the blocks, instead of between only one house, brings new tools to how to activate the plinth, and bring life to streetscape and yards. The Generations Block emphasizes using the garden as a communal area. Urban gardening is popular among its residents, allowing them to be active in the backyard. This is also one way to increase a sense of belonging among the residents. A similar approach is taken in Kangas, where the service company maintains high-quality communal yards, which also serve as meeting places, where families and groups can organize block parties. The yards have different themes and are designed to blend seamlessly with other public areas.

The shared spaces of a Kotikatu365 site include a gym, sauna facilities, a common living room and lobby, IT workstations, as well as a playroom for the kids and games for the youth. The guest room and the meeting and function rooms can also be booked for the residents' private use. In addition, the residents have access to a shared car as well as vehicles and tools to save costs and the environment.

The Generations Block provides residents with access to a common living room and kitchen, a gym, a stage for movies and performances, a laundry room with sewing space, a woodworking room, and a soundproof music room. In addition, there is a shared sauna in each Generations Block building. The design of the Generations Block emphasizes accessibility as 20 apartments are for disabled people. The shared spaces are all located on the ground floor of the Setlementtiasunnot building. The three Generations Block buildings are interconnected through a wide, open, and wheelchair-accessible corridor that joins all the shared spaces together and encourages the residents to meet and join in collective activities. The Jaso-KOAS building in Kangas also offers its residents shared spaces such as gym, laundry, spacious sauna, and lounge complex.

As a city district, Hiedanranta will make the factory complex in the middle of Hiedanranta the beating heart of the entire district. The main use of the factory, comprising some 25,000 m^2, will be as a center for culture and creative industries, as well as events and recreation. The factory and its surroundings already offer opportunities for new experiences and encounters. The factory will also provide some shared facilities for the Hiedanranta residents, such as storage space and a workshop. In addition, each superblock, starting from the North Blocks, will have block-level shared facilities for the residents such as a common living room, sauna, and guest rooms that can be rented.

According to the agreement the Hiedanranta service company will form with the housing companies, it will rent common facilities, manage their use, procure needed residential services, and enable communal activities. Following completion of the district, control of the service company transfers fully to the housing companies. The service company will take responsibility for:

- Renting the shared spaces from the individual housing companies and managing the operation of these spaces for the benefit of the residents.
- Renting guestrooms from the individual housing companies and managing the operation of the guestrooms for the benefit of the residents.
- Renting space for various residential activities and storage beyond normal use from the Hiedanranta factory and managing the operation of these premises for the benefit of the residents.
- Managing the use of shared equipment and tools, such as parcel lockers, shared tools, and hobby equipment for the benefit of the residents.
- Maintaining the common Hiedanranta website and portal providing an overview of available residential services and including the provision of environmental and building consumption data for the residents.
- Small-scale support for residential community activities.
- Acquisition of vehicles for the vehicle sharing service and providing parking for these vehicles.

For Hiedanranta, the basis for the traffic projection for 2040 is that the modal share of car traffic will decline from the 55% forecast that is based on current mobility habits to 37%, which is in line with the modal share of car traffic in the center of Tampere. The objective is for trips within the area to primarily be made on foot or by bicycle. Diverse and high-standard public transport services, together with pleasant, high-quality and attractive pedestrian and bicycle connections, will form a whole with travel chain nodes that offer effortless exchanges between the modes of travel. Providing residents with access to a shared car will also promote sustainable transportation in Hiedanranta. Car sharing is also a service Kotikatu365 offers its residents. The calm inner streets could also provide good testing platforms for automated traffic and maintenance.

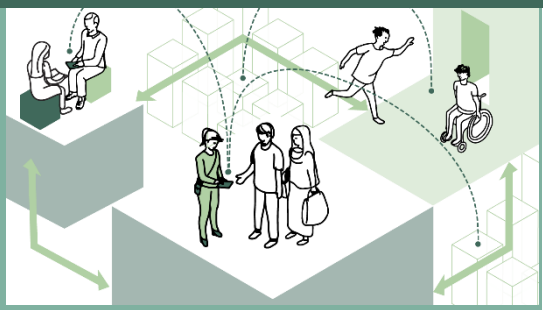
Providing superblock residents with easy access to third-party services is emphasized in all investigated cases. In Kangas, the residents in the Jaso-KOAS building have access to open community activities such as lectures, film screenings, and game nights while residents of the Jaso building are provided with communal health and wellbeing services such as visiting doctors, nurses, and physiotherapists. Kotikatu365 engages locally with the city to ensure that the residents are well integrated into the neighborhood. In Kuopio, Kotikatu365 has cooperation with Mustinlammen daycare center and Norlandia PujionUppee nursing home and in Oulu it cooperates with Touhula daycare center and Humana. Kotikatu365 also has partners offering its residents home cleaning, handyman services, as well as delivery of food. It also provides access to third party wellbeing services such as personal trainers, masseuses, and physiotherapists.

Kotikatu365's service contract explicitly states that Kotikatu365 will support tenant activities and take responsibility for organizing four larger common superblock events each year. In addition, the service coordinator of Kotikatu365 supports residents when they want to organize activities within the superblock. The service company in Kangas organizes three joint meetings annually for the residents that give them an opportunity to discuss how to further develop the community.

2.3 Community engagement and nurturing

We have identified the following key elements for community engagement and nurturing:

- **Community coordination**
- **Community board/local democracy**
- **Service coordinator**
- **Neighborhood engagement**
- **Community activation**



In Germany, superblocks have been established to create urban community areas with restricted traffic flow. These superblocks transform city streets into inclusive, people-centered spaces that promote everyday interaction, participation, and shared responsibility of outdoors living areas. They prioritize community-led design, where residents help shape and maintain public areas through urban gardening, art projects, and co-created installations. Initiatives like Berlin's Gräfekiez and Bellermannkiez involve neighbors in designing garden beds, organizing street festivals, and hosting events strengthening local identity and belonging. Pilot projects and temporary interventions (such as Munich's Summer Experiments) allow communities to test ideas collaboratively before permanent changes, helping build trust and reduce resistance. Advisory boards and local meetings ensure ongoing participation, while hybrid outreach methods - combining digital tools with in-person engagement - make inclusive activities more accessible. Through traffic calming, car-free zones, and reclaimed public spaces, German superblocks encourage socialization, child-friendly play areas, and greener environments. Together, these elements can advance social cohesion, shared ownership, and a renewed sense of neighborhood pride, making urban life more connected and resilient.

Kotikatu365 builds the community by engaging in the whole life cycle of the superblock. It takes full responsibility for the project development and project management in the construction of a Kotikatu365 residential area. Once the area is completed, Kotikatu365, as the service operator, oversees the development of the services with a long-term approach. Kotikatu365 ensures that the common spaces and the shared equipment are maintained in working order and selects service partners to provide domestic services for the residents. The lobby service offered by Kotikatu365 helps the residents in everyday matters and supports them in organizing joint activities, always with the principle that residents can freely choose whether or not to participate. The service coordinator can be reached via the Kotikatu365 service portal and twice a week also in person on location. The service portal of Kotikatu365 also provides a channel for the community of residents' to strengthen their communality by, for instance arranging and communicating on common activities, such as card game nights or seasonal events, on the common spaces.

When launching the Generations Block, it was positioned as a pioneer in multigenerational living. The first two years a community coordinator worked for 20 hours a week to engage the residents in common activities and introduce new residents to the possibilities of the block facilities. The Block also had its own website. However, over time, it turned out that none of the original founders, Setlementtiasunnot, HOAS, and Asuntosäätiö, had the ability to bring the collective superblock concept forward, with each founder deciding to focus on its own core community. The community coordinator activities were terminated and the website closed down.

It turned out that the original founders had somewhat different priorities regarding their expectations of the Generations Block. One element of Asuntosäätiö's values is uncomplicated

cooperation, and the complex task of integrating all the activities needed for a multigenerational superblock may have been seen as conflicting with this priority. HOAS's priority was to relieve the shortage of student housing in the capital area, but it did not have the ambition to become the operator of multigenerational superblocks. Setlementtiasunnot wanted to lead the way in community living but it did not insist on enforcing the concept for community coordination into the Generations Block.

When the resident owners of the Asuntosäätiö building were not prepared to financially support the costs of the community coordinator for the Generations Block after the 2-year pilot period, it was agreed that this service would no longer be available to the residents. However, the common affairs of the Generations Block are dealt with in the Generations Block committee consisting of one representative of each housing/building company. The residents themselves are organized in their own building committees: the rental buildings of HOAS and Setlementtiasunnot implement tenant democracy based on the Act on Joint Management of Rental Buildings and the residents of the Asuntosäätiö building (AS Oy Hyväntoivonpuisto) have a resident-owner board as organizational body. The members of these committees operate independently within their own building community, separately from the block committee.

The Kangas development is supported by a separate service organization, Kankaan Palvelu Oy, which was established in 2016 to ensure continuation of the development of the services offered in Kangas. The service organization is strongly guided by the City of Jyväskylä and actively supports various initiatives that will increase the attractiveness of the Kangas area, including art and culture events embedded in the building code as "percentage art".

The City of Tampere has identified two community categories when developing the Hiedanranta district: the developer community and the residential community. For the city and Hiedanrannan Kehitys Oy, the development company overseeing the development of Hiedanranta, the developer community provides complementary capabilities when developing the area. In this respect, the developers can be engaged as partners in an innovation ecosystem. The developer community helps to ensure the sustainable development of the area's properties and promotes the area's commercial appeal and attractiveness as a place to live.

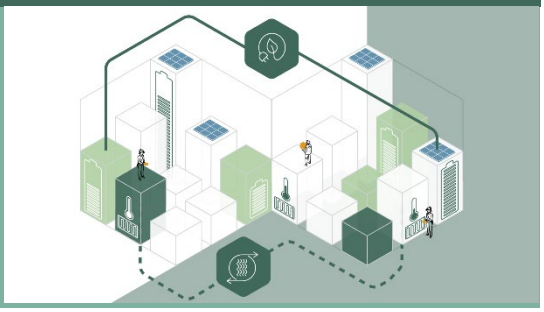
Regarding the residential community, Hiedanrannan Kehitys Oy wants the property owners to actively engage the users of the facilities to promote joint activities and strengthen the local engagement. Kotikatu365 has a similar interest in promoting the attractiveness of its residential areas and is therefore willing to oversee the development of the Kotikatu365 areas with a long-term approach.

The administrative framework of all four cases here analyzed is based on independent housing (As Oy) and real estate (KOY) companies as responsible for developing and operating the individual buildings. Democracy is established by giving these independent companies decision making rights regarding the operational issues which belong, by law, to the jurisdiction of such companies. In addition, these independent companies also have representation in the legal entity responsible for superblock level activities: Hiedanrannan Palvelut Oy, Kankaan Palvelu Oy, and in the case of Kotikatu365, the property company responsible for the shared spaces and services. The processes by which individuals are selected for the boards of the central legal entity vary across the cases.

2.4 Property and energy management

We have identified the following key elements of property and energy management:

- **Property management & maintenance**
- **Energy infrastructure**
- **Safety**
- **Renovation**
- **Proptech, IoT & other digital infrastructure**



Providing parking facilities for the superblock residents has resulted in the formation of a separate legal entity for the parking in the cases of Kotikatu365 and Hiedanranta while the parking operator in Kangas is an existing, city-owned parking operator Jyväs-Parkki Oy. The city building plan also dictates how parking arrangements are organized. The scale of parking facilities is determined by this plan and constructed to suit the requirements, with parking located in garages and limited on street sides in all three cases. The parking companies manage permits for residents and oversee short-term parking. The parking garages are constructed at differing paces to accommodate residents from the outset, e.g., Kotikatu365 Oulu, or, e.g., allow for iterative development, as in Hiedanranta.

In Kangas the service company is also responsible for waste management. By coordinating the waste handling the aim is to reach a more cost-effective, environmentally friendly, and safety-enhancing waste management solution through a regional deep waste collection management system. Regional deep collection means that the containers are strategically placed around the area so that no one's walk to the bins is too long. This also reduces the movement area of garbage trucks and the frequency of necessary collections.

The original energy vision of Hiedanranta is that the district will produce more energy than it consumes. The energy system must be considered at all phases of the block's lifecycle and should serve as a platform and development environment for new businesses. Smart energy networks and buildings should utilize the area's local energy production, enabling the provision of energy services to residents. The aim would be to maximize the utilization of geothermal heat and solar energy, in particular, through various energy storage systems and new contractual models, such as energy communities.

The Hiedanranta area is expected to constitute a platform and development environment that efficiently generates new business, establishing a unique example of the renewal of urban energy solutions on an international scale. Hiedanranta is an ideal platform for demonstratingsolutions that are scalable to the global market and related to the revolution in the energy business, with consideration of the energy efficiency and stricter energy management requirements of buildings. Construction is steered by emphasizing the life cycle impacts of the selected solutions as regards both emissions and costs.

The Hiedanranta sustainability objectives require good information technology connections. Various structures need to be considered in land use planning and the actual implementation planning, such as the increasing number of base stations, signal permeability and space reservations for data communication cables. A model will be developed for the collection, utilization and safe management of data, in addition to defining which instance is in charge of the information resource operations. In addition to the physical data communication infrastructure and data storage facilities, the operational model also includes various platforms and interfaces. The

surroundings of tram stops constitute important nodes at which various digital service hubs can naturally evolve.

Energy production, consumption, and storage systems form the superblock's energy system, which is connected to the wider energy network using market mechanisms. Advance information and status data are the control parameters of the superblock's energy system, enabling the use of market mechanisms. Connectivity and control systems are prerequisites for cooperation. The efficiency of energy systems is a competitive advantage for Finland in relation to other countries with similar climatic conditions.

The building energy systems both consume and produce energy. The wider energy production system of the city supplies energy to buildings. The energy production and consumption of the city and its buildings must be balanced. Nowadays, and increasingly in the future, the energy consumption of buildings can be balanced in relation to production situations. This requires shared data on the consumption and production situations of the buildings, as well as the ability of buildings to respond to changes. During the construction phase of buildings, maintenance phase requirements must be considered so that the energy system becomes an integral part of the superblock infrastructure.

The NSDC initiative has explored the potential of realizing energy communities. Transferring energy across property boundaries is not possible without a social actor (e.g., a local energy company). To transfer energy across property boundaries, an energy community must be established, or a local energy company must be involved. At the block level, energy transfer would require the establishment of a local energy company, similar to how local district heating plants were established in the past. Restrictions on energy transfer across property boundaries affect what energy infrastructure alternatives a superblock may have.

Energy consumption in buildings must be monitored continuously, and building systems must support consumption monitoring. The NDSC initiative piloted the use of advanced IoT monitoring solutions in a property at Konttilukinkatu 7, Tampere (KLK7) which consisted of 105 apartments. The results of this pilot suggest that it is particularly important to monitor consumption in systems where the building owner can influence consumption. For this reason, monitoring all tenants' equipment is not as essential for optimizing energy use as, for example, monitoring the electricity consumption of heat production or ventilation. However, there is likely to be consumption in the property that can be billed, for example, through an energy charge. Such monitoring systems become increasingly crucial with new limitations on maximum power consumption as well as in implementing consumption flexibility systems to reduce the cost of energy.

2.5 Learning and communications platform

We have identified the following key elements of the learning and communications platform:

- **Community communication**
- **Stakeholder platform**
- **Community engagement platform including digital information boards**
- **Educating community members and the rest of the ecosystem**
- **Skill sharing as a service**

The Hiedanranta approach focuses on two separate platforms. The residential platform engages the residential community in co-creating the best possible living experience in Hiedanranta. The developer platform supports Hiedanranta in finding new solutions for making Hiedanranta a leader in sustainability.

For the residential platform, Hiedanranta will provide the governance structure and the supporting digital infrastructure that enables the individual housing companies to define their own way of engaging their residents as learning partners. Hiedanrannan Kehitys Oy will provide an intranet serving the entire city district. Digital services will be developed alongside the physical amenities in support of a smart and sustainable lifestyle. Hiedanrannan Kehitys Oy seeks to have an open dialogue with the area's residents and actively listen to their wishes as regards their living environment.

In Kangas, the service company is responsible for Kangasverkko, a portal which provides information about events held in Kangas, waste management and the rules and instructions on how to use the common yards. The portal also offers a gallery of the different art pieces that can be found in Kangas.

Hiedanranta, Kotikatu365, and Kangas all have active web pages through which they communicate about themselves, both in Finnish and in English. In addition to this, Kotikatu365 and Kangas also maintain a separate, password-protected portal for the residents. Hiedanranta will also offer such a service once the first residents move in.

The Generations Block operates a "Kerro" application, administered by Setlementtiasunnot, which is used to manage reservations, deliver notifications, make inquiries, and share news with the neighborhood. The application also includes a document bank with information about the block house and the apartment (e.g., appliances, waste management, heating, surface materials, house safety, etc.) and a bulletin board for the residents. There are also information screens on stairways and in the community space where residents can use the Kerro application.

The City of Tampere expects Hiedanranta to take a pioneering role in carbon-neutral urban development and becoming a venue of international appeal. Kotikatu365 also has actively communicated its expectations that Finnish urban planning should take a more comprehensive view and look for ways to provide planning solutions for superblock-scale initiatives and not always engage developers in bidding competitions for single blocks.

In Hiedanranta, the aim is to create and further develop an innovation environment in which open and participatory processes support the genesis of a city district that is aligned with the vision. According to the Hiedanranta vision, the innovation activities can be motivated by, for instance, the generation of new innovative solutions for a sustainable and smart city district, the

construction of an attractive future business environment, and the formation of a diverse living environment that is full of experiences.

To become a leader in sustainability, Hiedanrannan Kehitys Oy carefully designed the plot competition for the North Block in such a way that the tenderers could contribute with their own specific expertise when bringing Hiedanranta forward.

The first plot competition was held in 2022, as a result of which the first two plots were reserved for the winning partners, who subsequently withdrew from the reservation due to the difficult situation on the market at that time. In this plot assignment competition, Hiedanrannan Kehitys Oy defined extensive and demanding criteria for all construction. The second plot assignment competition was arranged in the form of a concept competition. The aim was to encourage developers to find tools for sustainable, good living that would surpass the previously defined, already high criteria for construction in Hiedanranta. The themes of the concept competition were related to innovative housing, a circular economy, as well as decreasing the energy consumption and emissions of buildings and construction.

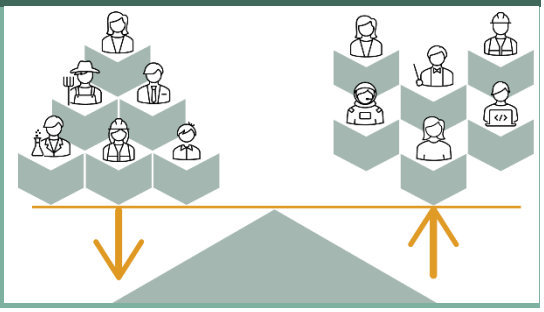
Central to all the building projects within the Hiedanranta area are the application of different innovative and new sustainability measures to reduce carbon emissions and contribute to the city's sustainability objectives. These measures include the use of low-carbon concrete and façade tiles, reuse of concrete elements that constitutes a radically new innovation in Finnish construction, different green energy solutions like solar panels, and optimization of the non-living areas that require heating. Green elements are also used to reduce the temperature fluctuations and increase the vitality of some areas. Furthermore, all building projects shall promote flexibility through apartments designed to be easily modifiable or allow for the removal of separating walls and foster a shared economy via various communal amenities like shared saunas, working spaces, laundry rooms, and rooftop gardens. These measures aiming at increased sustainability require in-depth collaboration and joint planning between the project actors in the early stages of the projects. This will be guided and controlled by Hiedanrannan Kehitys Oy.

Hiedanrannan Kehitys Oy also requires that the companies developing the plots engage in local collaboration by becoming shareholders in Hiedanrannan Palvelut Oy and forming a joint agreement with the other developers of the North Block. Once the communal ethos has been established among residents, the residents themselves are expected to proactively start sharing their experiences and skills with fellow residents. By encouraging and incentivizing individuals to be proactive in this way, the community should be strengthened. Such positive development has been observed in Kangas where active residents shape the way the community evolves.

2.6 Superblock life-cycle governance

We have identified the following key elements of superblock life-cycle governance:

- **Ensuring continuity**
- **Collaborative/flexible planning & development**
- **Superblock strategy and operation**
- **Cooperative management**
- **Governance principles & common rules**



The master plan of Hiedanranta states that superblocks form a platform for the long-term economic development of technological sustainability, pleasantness, and functional quality. The results implemented are local solutions that are based on a premise of synergy in terms of scale, integrated life-cycle-sustainable solutions, and the qualitative and financial benefits that are to be gained through collaboration. The parties of a superblock form a community that organizes acquisitions and uses the income from its operations to purchase services related to their maintenance for the included properties, housing companies, and the users of the facilities.

In Hiedanranta it is foreseen that the decision-making and statuses of ownership in the community will be arranged to enable the efficient supervision of owner and user interests in the business premises and apartments in the area. The task of a community formed by the parties of a superblock is to promote the attractiveness and sustainable development of the area's properties. The superblock community will oversee the establishing and maintenance of the area's streets and green areas. It can also manage the area's business and office premises, communal facilities for residents and possible joint-use resources, in addition to seeking means to promote the area's commercial appeal and attractiveness as a place to live. In the establishing phase, the infrastructure and facilities are designed in a way that supports the subsequent application of the good practices and technological solutions adopted in other superblocks.

In establishing Hiedanrannan Kehitys Oy as the guarantor of the above-mentioned vision and forming contractual relationships with the property developers through the full development of the whole area, the City of Tampere wants to ensure the longevity of the collaboration. In this respect, the organizational framework is established for at least the next 15 years, while the operational implementation of the vision can be flexibly adjusted based on how the external context evolves.

A similar philosophy has guided the development of Kangas, where the coordination takes place through the service company, Kankaan Palvelu Oy which has been strongly influenced by Arabianranta and its service company Arabian Palvelu Oy.

When the Arabianranta district was developed at the turn of the millennium, the City of Helsinki required that all developers in the Arabianranta project spend 1-2 percent of the project costs on works of art. This rule, the percentage principle, has been followed since the launch of the development of the area in 2000. Therefore, works of art are visible around the district. Part of the art works are owned by a joint service company, Arabian Palvelu Oy, which today is owned by the individual housing companies in the area. Arabian Palvelu is also responsible for the collective yards, parking lots and the Bokvillan clubhouse in Arabianranta. The collective yards are owned by all of Arabian Palvelu's housing companies and are therefore intended to be used jointly by the residents.

Kankaan Palvelu Oy has copied the percentage principle from Arabian Palvelu Oy. About one percent of the land sales revenue and construction costs are directed towards culture, art, and

events throughout the construction phase. This integrates art into the living area all around Kangas. Kankaan Palvelu Oy has also applied the concept of transferring all shareholding to the individual housing and property companies active in Kangas once the area is fully developed. This transfer of ownership has already taken place in Arabianranta, where the service company is now fully owned by the housing companies.

The investments made by Kankaan Palvelu Oy in the arts, but also in the waste management and digital infrastructures, have been financed through share subscription fees. The subscriptions are made by the real estate and housing companies in the area. There are four series of shares: common yards (B), waste management (C), portal (D), and percent culture (E). Additionally, the one percent culture receives funding from the city based on land sales in the area. The main source of funds for the service company have historically come from the land sales. However, in 2024 there were no revenues from land sales, which meant that the income was purely from the fees covering the operation of the yards, waste handling, and Kangasverkko. These fees are paid by the individual housing and real estate companies in proportion to the surface area of the respective company. As Kankaan Palvelut Oy is jointly owned by the City of Jyväskylä, YIT, and Skanska, the transfer of ownership at the conclusion of the construction phase will have to be negotiated among these partners in advance.

The bylaws of Kankaan Palvelu Oy illustrate the hierarchical structure of superblock governance. Every housing or real estate company developing a property in Kangas must become a shareholder in the service company but will not have any A-shares. The A-shares are in the hands of the founders: the City of Jyväskylä, YIT, and Skanska. A-shares are the only shares with voting rights. After the construction is completed, the founders will transfer their ownership of A-shares to the other shareholders.

In the Generations Block resident democracy is organized in each building separately by building committees. Additionally, there is a separate block committee. There have been discussions on how to better involve the residents' committees in the activities of the entire block, but the matter is still pending (fall 2025). The activity of the resident committees depends heavily on a few individuals, who may not necessarily have enough time to deal with the affairs of the entire block.

Milano 2, built in the 1970s, shows how good planning and local management can help people feel connected to their neighborhood. A key part of the Milano 2 neighborhood is the Comprensorio, a local organization that takes care of shared spaces like paths, playgrounds, and green areas. It works between building managers and the city, helping to keep the area clean, safe, and well-organized. The relationship between the Comprensorio and residents is guided by a formal agreement (Regolamento), signed by all property owners. Each of the 28 condominiums appoints a representative to form an Assembly, which meets yearly to elect committees that support and oversee the work of the Comprensorio. These include permanent working groups for greenery, maintenance, and security, which meet regularly to respond to the neighborhood’s needs. This structure also helps build a shared identity among residents, encouraging people to care for their surroundings and feel part of a larger community. Milano 2 shows how design and local management can work together to support a strong, healthy neighborhood, that fits well with Nordic superblock thinking.

2.7 Environmental performance

We have identified the following key elements of environmental performance:

- **Green spaces and carbon sinks**
- **Energy efficiency and passive design**
- **Biodiversity**
- **Sustainable construction**
- **Recycling**

Hiedanranta's rich green and blue structure, which amplifies valuable existing landscapes, improves the ecological and recreational connections through the area, and introduces a new series of public spaces. The network ensures that all residents have access to a larger green and blue area within a five-minute walking distance (300–400 meters). The urban stormwater system stores, redirects, and processes stormwater locally. The area's blue and green solutions create an active and high-performance network that plays a key role socially and ecologically within the development of the Hiedanranta district.

Cooperation between builders and research communities is needed to establish how energy-efficient, smart buildings can be implemented in Hiedanranta. The instructions should aim for energy-efficient planning, the identification of the energy production potential, as well as the provisions to be made for smart technology and two-way energy networks in terms of building services technology. As the objective is a carbon-neutral district, the impact of building materials must also be considered in the BREEAM Community emissions assessment.

When construction commenced, Hiedanrannan Kehitys Oy provided detailed instructions for how the environmental objectives should be met. The specification is summarized in the following table:

Technical requirements guiding construction
1.1 Air leakage rate*
1.2 Low-carbon concrete structures*
1.3 Service life of structures
1.4 Connecting main HVAC systems to centralized building automation
1.5 Connecting the building to the Hiedanranta data platform
1.6 Measurement of consumption data and potential energy production and storage
1.7 Measurement of temperature data and other potentially monitored conditions
1.8 Specific electrical power of the ventilation unit and water-circulating heating radiator*
1.9 Water-saving plumbing fixtures
1.10 Pressure level of the domestic water network
1.11 Apartment towel warmers
1.12 Outdoor lighting solutions for properties (Breeam Communities)
1.13 Acoustic quality level of indoor and outdoor spaces of a residential building (Breeam Communities)

Other requirements related to design and implementation
2.1 Environmental certificate for the building (Breeam Communities)
2.2 Calculating a building's carbon footprint
2.3 Low-emission construction site
2.4 Construction waste reduction and recycling (Breeam Communities)
2.5 Diverse housing distribution
2.6 Principles of joint arrangements between the implementation block and the planning block
2.7 Housing modification options (Breeam Communities)
2.8 Vegetation in the exterior spaces of a residential building (Breeam Communities)
2.9 Maintenance plan for courtyard areas (Breeam Communities)
2.10 Construction project information model
Requirements related to follow-up and reporting
3.1 Submitting a building energy certificate
3.2 Submission of building-specific consumption data
3.3 Submission of building-specific maintenance fee and occupancy data

Of the analyzed cases, Hiedanranta is the only one with a detailed specification for how the environmental requirements should be met. These considerations are also discussed in Kangas and Kotikatu365. This is an area which has been actively investigated by the NSDC initiative, e.g., relating to biodiversity. Biodiversity loss is increasingly recognized as a critical issue in the construction sector, with impacts arising not only from land use at building sites but also from the extraction and production of building materials. According to a case study conducted for a typical concrete-framed apartment building in Finland, it is demonstrated that climate change is the primary driver of biodiversity loss, accounting for over half of the total impact, followed by water stress. Land use and pollution play a smaller role. The greatest effects are observed on terrestrial and freshwater ecosystems, while marine impacts remain minor. Among building materials, concrete and reinforcing steel contribute most to climate change, water stress, and pollution impacts, whereas wood-based materials have the highest impact in the land use category. The overall biodiversity impact from material production is significantly greater than the direct effect of the land use at the building site itself. Effective ways to reduce biodiversity impacts in construction include minimizing greenhouse gas emissions from concrete and steel, optimizing material use, limiting the use of virgin materials and considering low-carbon alternatives. These findings highlight the importance of integrating comprehensive biodiversity assessment into all stages of construction projects and developing standardized methods for evaluating and mitigating impacts throughout the value chain.[6]

[6] Väliaho, Emma (2024) “Calculation of embodied biodiversity impacts of a building” https://lutpub.lut.fi/handle/10024/168434

2.8 Contextual interdependence

We have identified the following key elements of contextual interdependence:

- **Pioneering ambitions**
- **Contextual synergies**
- **Logistical infrastructure**
- **Reachability, accessibility and walkability**
- **Sustainable development principles**

The Hiedanranta master plan defined, in 2020, superblocks as "*areas spanning several ordinary city blocks, which form a platform for the long-term economic development of technological sustainability, pleasantness and functional quality*". The City of Tampere has a strong ambition to make Hiedanranta an international role model and is actively updating the Hiedanranta web site with material about the progress of the development.

When the Generations Block was taken into use it became a site which generated a great deal of international interest. It was featured on the web pages of international organizations such as the European Federation for Living, Housing Europe, the European Federation of Public, Cooperative, and Social Housing and Affordable Housing Activation, maintained by CSCAE Consejo Superior de los Colegios de Arquitectos de España. This shows that Finland can attract international interest suggesting that superblock experiences also have the potential to attract international attention. This could position Finland as a forerunner in new concepts for urban living and enhance the export potential for Finnish companies active in this area.

From the city district perspective, the most relevant areas where increased integration provide additional value in respect of sustainability are synergies relating to the transport, energy, and digital infrastructures as well as sharing the conceptual frameworks used by relevant stakeholders in their transformational efforts. All these elements of integration have also been identified as integral parts of the cases studied in the NSDC initiative. The Nordic Superblock concept helps to better understand how an integrative infrastructure can contribute to a more affordable, livable, and sustainable urban life. With the aspiration of creating more opportunities for encounters in the superblock, the plinth can be activated by bringing shared spaces to the daily routes of the people. To the calm inner parts of the Superblocks, new housing typologies can be introduced, where the residents of the first two floors have direct access to the street, with their own small gardens. This brings more presence of the people to the streetscape, as well as adds the experienced ownership, acting as a counter remedy to deserted plinths and streets so often seen in the newly constructed districts. Another way to activate the plinth is to think of flexible spatial typologies, where the first two floors can easily fit living, working and entrepreneurial activities. This supports the gradual development and adjustment of the street to become either more a business street, or housing street, with all kinds of variations of combined living and working in between. However, many legislations do not yet support these kinds of flexible housing typologies. The strategic spaces of the plinth can also be managed as one entity over a whole district, to ensure the possibility of balancing between the use rates of e.g. shared spaces and business spaces.

Hyperlocal services have been studied in NSDC as solutions for reducing the need for mobility and advancing proximity of everyday services in neighborhoods. Hyperlocal services refer to services that are offered at neighborhood scale. Usually, implementing these profitably requires

that they are staffless, which is enabled by intelligent building technologies, for example, for access control and service redemption.

Incentivizing citizens to use other forms of transport than private internal-combustion cars is also an important element of an integrated, more sustainable city district. The most impactful measure is the replacement of car travel with public transit, bicycling, or walking. Introducing car sharing and supporting electric vehicles can also reduce transport-related carbon emissions. The research in the NSDC initiative has provided new insights into the potential of such measures. The comparison of resident-driven and business-driven car sharing models showed that in resident-driven models, informality, trust, and shared responsibility help embed car sharing into everyday life and make it more resilient. In contrast, business-driven models relying on formal and outsourced services, may offer greater convenience but tend to remain on the margins of daily routines and are more susceptible to interruptions in service[7]. These findings indicate that shared mobility should be viewed not just as a technical solution, but as a socio-material practice where governance, community relationships, spatial context, and urban policy matters. This understanding opens up a discussion about how design and policy can better support a variety of shared mobility forms within housing environments. Ensuring that the city district is designed in such a way that it will smoothly and seamlessly integrate with the broader city transport network influences the attractiveness of the district for residents while also reducing carbon emissions.

[7] Santala, Saga-Sofia, Kirsikka Kaipainen, Markus Laine & Jouko Makkonen (forthcoming) Designing the shared mobility block: Socio-material lessons from community- versus business-driven residential car-sharing.

3 Life cycle management

The four cases used as the empirical foundation for the development of the Nordic Superblock Canvas also represent the trajectory of the Finnish approach to develop concepts to improve urban life in a multi-block context. We can see that this development has, on a national level, proceeded in three stages. The first stage was initiated by the development of Arabianranta at the millennium shift. Arabian Palvelu Oy is a superblock operator focusing on **facility management**. This model strongly inspired the formation of Kankaan Palvelu Oy, which also applied the percentage principle as its foundation.

The second phase of superblock development added community engagement to the repertoire of shared activities among blocks. Here, the Generations Block was a pioneer. This element was also retrospectively added in Kangas, through the collaboration between Jaso and KOAS, with a strong similarity to the Generations Block. Kotikatu365, established in 2013, also addressed the community dimension explicitly and was developing its own superblock concept by integrating the idea of shared facilities, community support and longevity into its concept, which was first implemented in Oulu. This type of superblock management emphasizes **community nurturing**. This is then an additional layer to the facility management activities provided by the operator.

The third phase emerged in the 2020s when sustainability became an increasingly important aspect of urban planning. Hiedanranta bundles facility management, community nurturing, and sustainable development into a more comprehensive superblock concept. This requires much broader engagement by the operator. In Hiedanranta the City of Tampere has guided the development through the three separate companies the city formed—Hiedanrannan Kehitys Oy, Hiedanrannan Palvelut Oy, and Hiedanrannan Pysäköinti Oy—to enable the long-term development of Hiedanranta into a showcase of sustainable urban living. In this case, the superblock operator, Hiedanrannan Kehitys Oy, must engage in what can be called **platform orchestration**.

The NSDC initiative's ambition was to identify different levels of engagement around superblock development. The three operating principles: facility management, community nurturing, and platform orchestration operationalize this ambition. It is relevant to note that the three levels correspond to the notions of affordability, livability, and sustainability. This suggests that, when developing a superblock from scratch, it is useful to consider these three levels as additive: shared facilities have a strong economic impact on the end result. By finding economic benefits from superblock-level facility management it is possible to expand the scope of shared activities and improve livability through community nurturing and still retain the affordability objectives. The sustainability layer, in turn, is most naturally guided by the city, as a superblock is part of the city infrastructure. By guiding superblock development through planning instructions, superblocks can contribute to sustainability objectives of the city.

The discussions with various stakeholders during the NSDC initiative have indicated the superblock principles can be applied in a modular fashion to any built environment. For example, during one workshop organized in Oodi, the central library in Helsinki, we learned a great deal about the contextual interdependence of a built environment. We have also seen that the principles can be applied when buildings are renovated.

In the following we provide an overview of how the superblock principles can be applied during the four phases of planning, construction, operation and renewal.

3.1 Planning

The starting point for a superblock initiative is to ensure continuity over the lifecycle of the built environment. If there is a clear superblock owner, such as the City of Tampere in Hiedanranta and Kotikatu365 in its projects in Oulu and Kuopio, the identity should be well aligned with the ambitions of the principal owner. At the same time, flexibility should remain for operational adjustments as new opportunities emerge, e.g., relating to energy efficiency or digital solutions. The level of ambition relating to sustainability and livability must be balanced against what is affordable for future residents and users.

If the identity can be well communicated and is also linked to the history of the area, the planning process should leverage upon the historical uniqueness when developing the value proposition. The Kangas area in Jyväskylä relates to the history of the paper mill. Hiedanranta will combine its cultural heritage and history with the current focus on promoting sustainability and innovation when crafting the identity. Kotikatu365 Oy, in turn, makes use of the group's strong expertise in the well-being and digital sectors when communicating its identity.

The experience from the cases behind this Fieldbook is that implementing sustainability requirements above what are enforced by law or can be economically justified is not easily translated into higher prices that would be accepted by average customers. This implies that if a city wants to establish environmental ambitions above minimum requirements for a project, this should be done through the planning instructions and be part of the bidding evaluation. The Hiedanranta development is an example of how this is done in practice. High sustainability ambitions require the shift from a forum of separate functions and processes towards a scheme of systematic development in a manner that increases the innovative impacts and participation, in addition to streamlining the activities from the point of view of all interest groups.

To what extent the superblock entity will provide support for community engagement must also be decided upfront. As our cases have shown, the facility management synergies e.g., shared saunas and other shared premises are naturally included in the planning instructions issued by the city. When extending the community engagement into services provided by paid personnel, which should be compensated for, the experiences are mixed. Kotikatu365 has been able to introduce a service level that seems to work quite well in Oulu and Kuopio. But all residents may not have the same expectations. If some of the residents rent apartments in the building as part of a renting scheme subsidized and regulated by the government, this may prohibit the formation of longer-term legal agreements ensuring compensation for community services.

The ambition levels regarding both sustainability and community support will affect the cost of both the construction and operations phase. Therefore, the value proposition must be defined, in detail, at the beginning of the planning phase. The higher the overall ambition is regarding sustainability and community nurturing, the greater the need to ensure that the services to be provided throughout the lifecycle of the built environment are contractually agreed in the planning phase. This is also visible in the way both Hiedanranta and Kotikatu365 contractually engage the development partners during the development phase and residents, users, and service providers during the operations phase.

Superblocks are built over time, and the duration of the construction phase of the whole superblock may be more than 10 years. This presents a challenge for the developer in respect of market fluctuations. The Finnish construction market has been quite depressed 2023-2025 meaning that superblock projects in this period often have had to adjust their schedules. To mitigate risks, we expect that the superblock market will be developed by larger operators that specialize in superblocks and will leverage upon development synergies across individual superblock projects by taking a portfolio approach. Hiedanranta and Kotikatu365 illustrate that both the public and the private sector can become such superblock operators.

The superblock scope represents a challenge for city planning, which normally organizes plot competitions for individual blocks, one at a time. If the city itself makes a strategic decision to develop a city district according to the superblock principles, as Tampere has done in Hiedanranta, a more comprehensive planning approach will naturally unfold. In other cases, where a private operator, such as Kotikatu365, aims to initiate superblock projects, finding city planners comfortable with this approach is a challenge. Here, the NSDC initiative and this fieldbook aims to increase the understanding of the potential of superblocks and lower the threshold for city planners to embark on superblock projects.

The lifecycle perspective calls on planners to consider the potential leveraging opportunities once the superblock is operational. Arabianranta and the Generations Block have shown that a successful new concept can rapidly attract international interest if actively promoted. If the initiative is intended to become an international showcase, this must also be included in the way the collaboration is organized. In the case of Hiedanranta, the City of Tampere should decide to what extent it aims to use Hiedanranta as a means to strengthen its international position as a pioneering smart and sustainable city. Ambitious international targets will also influence the selection of partners into the core group carrying the development efforts forward.

Operationally, the principles for spatial design and continued collaboration are the most critical decisions influencing how the superblock will evolve in the broader context. Using common areas such as yards and gardens to encourage spontaneous encounters and meetings is an important way to increase a sense of belonging among the residents. Shared spaces can either be located in one single building or distributed across the buildings of the superblock. As the superblock development may take over ten years, Kotikatu365 provides the shared facilities in the first constructed building to be able to offer the shared services from the outset. These facilities include a gym, sauna, a common living room and lobby, IT workstations, as well as a playroom for the kids and games for the youth. Hiedanranta will make its factory complex in the middle of Hiedanranta, comprising some 25 000 m^2, a center for culture and creative industries, as well as events and recreation. This will immediately create a common place for engagement in the district. Physical encounters are expected to inspire developers and residents to jointly bring forward a collective Hiedanranta spirit.

The energy system is a crucial point of consideration during the planning phase. The development of energy solutions can be guided by zoning regulations, land transfer conditions, and land transfer competition conditions. During the planning phase, sufficient space should be reserved for the energy system, including the energy center, geothermal wells, piping, and technical facilities in buildings, so that a block-level energy system can be implemented in the area. In order to enable the most efficient use of energy production and consumption in buildings, a local energy company can be involved to enable the use of infrastructure between properties. Cooperation between the municipal energy network and the properties to be built can also be enhanced with the support of real-time data transfer interfaces improving the possibilities for more advanced energy management.

3.2 Construction

To ensure the proper balance between affordability, livability, and sustainability, the superblock initiator(s) must adapt the final solution to the intended target groups. If the initiators do not continue as owners when the construction phase is completed, efforts should be made during the construction phase to confirm to residents how the continuation of the services will be ensured once the area is fully developed. This need has been identified in the Kangas area, even if the construction phase may continue for another ten years. If the ownership is cemented for the long term, as exemplified by Hiedanranta, ensuring smooth collaboration over decades will call for rather detailed planning and administrative guidelines. This may be perceived as overly bureaucratic by some stakeholders, but it is a necessary evil that must be handled.

The construction phase will also define how the energy and digital infrastructures of the superblock will evolve. The residential platform will engage the residential community in co-creating the best possible living experience in the superblock. The developer platform supports the ambitions for leadership in sustainability. In Hiedanranta the aim is to create a development environment that demonstrates new renewable energy solutions that are scalable to the global market and related to the revolution in the energy business, with consideration to the energy efficiency and stricter energy management requirements of buildings.

The sustainability objectives of a superblock also require good information technology connections. Various structures need to be considered in land use planning and the actual implementation planning. The collection, utilization, and safe management of data should cover both residential and developmental data. The physical data communication infrastructure and data storage facilities must also be established to enable the use of various platforms and interfaces.

Construction is steered by emphasizing the life cycle impacts of the selected solutions regarding both emissions and costs. The master plan provides the main guidelines for the way the collaboration will be established. However, the selection of development partners will also define to what extent it will be possible to form a collaboration platform for the long-term development of technological sustainability, pleasantness, and functional quality. The local solutions should be based on a premise of synergy in terms of scale, integrated life-cycle-sustainable solutions, and the qualitative and financial benefits that are to be gained through collaboration. To ensure scalability and international expansion, a city in charge of a superblock initiative must carefully consider how to engage selected companies as strategic development partners. The city alone will not have the capabilities needed for a significant international launch of new concepts and solutions being developed in the context of the superblock collaboration in the city.

The selected construction partners have a significant impact on the carbon emissions during the construction phase, both through the materials and the processes used during the construction phase. This is also an area where the superblock developer community should be seen as an enabler of knowledge accumulation, through which continuous collaboration should generate increasingly sustainable solutions. The proper alignment of the interests of the city, the companies, and participating research partners should speed up the learning and also increase the opportunities for the participating companies to scale up and transfer the learning and solutions to other projects.

When construction commenced, Hiedanranta provided detailed instructions for how cooperation between builders and research communities should be organized to ensure that the environmental objectives are met. These instructions aim for energy-efficient planning, the identification of the energy production potential, as well as the provisions to be made for smart technology and two-way energy networks in terms of building services technology. As the

objective is a carbon-neutral district, the impact of building materials must also be considered in the emissions assessment.

The role of residents during the construction phase is less visible in the cases primarily studied in the NSDC initiative. However, the researchers have had previous experiences from smaller scale construction projects that have succeeded in also engaging the future residents throughout the development process[8]. Such examples are the Elinkaarikortteli development in Tampere, the Annikki wooden town quarter in Tampere, and ARTE in Helsinki on a variety of aspects. These experiences show that residents can provide added value to construction projects based on the capabilities of the residents, and the professional allies they have. For superblock operators like Kotikatu365 and Hiedanranta, which gradually enlarge their superblock entity, the possibility to engage residents of the already finished blocks as well as potential residents is a resource pool that may provide additional value to future projects.

[8] Laine, M., Helamaa, A., Kuoppa, J., & Alatalo, E. (2020). Bricolage in Collaborative Housing in Finland: combining resources for alternative housing solutions. *Housing, Theory and Society*, 37(1), 101-117.

3.3 Operations

Clear ownership with the explicit intention to support the collaboration for the longer term provides a strong foundation for the operations phase. Hiedanranta and Kotikatu365 guarantee the continuation of their superblock services. Kotikatu365, has an agreement for a minimum of 15 years and Hiedanrannan Palvelut will continue to provide its services until the city district will be fully developed in the 2040s.

The decision-making and statuses of ownership of property must be organized to enable the efficient supervision of owner and user interests in the apartments and business premises in the area. This also promotes the attractiveness of the superblock. Both Hiedanranta and Kotikatu365 are willing to oversee the development of the superblock with a long-term approach. As the administrative framework according to Finnish legislation should be based on independent housing (As Oy) and real estate (KOY) companies, democracy is established by giving these independent companies decision making rights regarding the operational issues. In addition, these independent companies also have representation in the legal entity responsible for the superblock level activities.

The availability of various services is one of the main contributors to customer satisfaction in a superblock. Services such as visiting doctors, nurses, personal trainers, masseuses, physiotherapists, lectures, film screenings, home cleaning, handyman services, delivery of food and game nights are examples of services offered in the studied cases. It is also important that the residents are well integrated into the neighborhood.

The superblock operators normally also support tenant activities and take responsibility for regularly organizing some common superblock activities. The operation of parking facilities is also a responsibility of the superblock operator. The common solution for this is the establishing of a separate parking company, in which the residents have the possibility to either acquire shares and corresponding parking rights or the possibility to make a rental parking agreement.

The motivation to enhance energy efficiency is driven by a multitude of factors that collectively contribute to the sustainability and profitability of operations. One of the primary motivations is the significant cost savings associated with reduced energy consumption. Facilities that implement energy-efficient technologies and practices can see a marked decrease in their utility bills, which directly impacts their bottom line. This financial incentive is often a compelling reason for facility owners to invest in energy efficiency measures.

In addition to cost savings, there is a growing awareness of the environmental impact of energy consumption. As concerns about climate change and environmental degradation intensify, facility owners are increasingly motivated to reduce their carbon footprint. By improving energy efficiency, facilities can lower their greenhouse gas emissions, contributing to broader sustainability goals and helping to combat global warming. This commitment to environmental stewardship not only benefits the planet but also enhances the reputation of the facility and the organization behind it.

From a social perspective, homeowners are increasingly aware of the importance of sustainability and energy efficiency. Many families want to set a positive example for their children and their community. By adopting energy-efficient practices, they can demonstrate their commitment to responsible living and inspire others to follow suit. This sense of community and shared responsibility can foster a culture of sustainability that extends beyond individual households.

The energy management concept guides how the energy assets of the superblock are organized and foregrounds the benefits of energy flexibility and the potential financial benefits of participating in reserve markets. This concept may also include a virtual power plant and energy storage enabling the superblock to operate on energy markets.

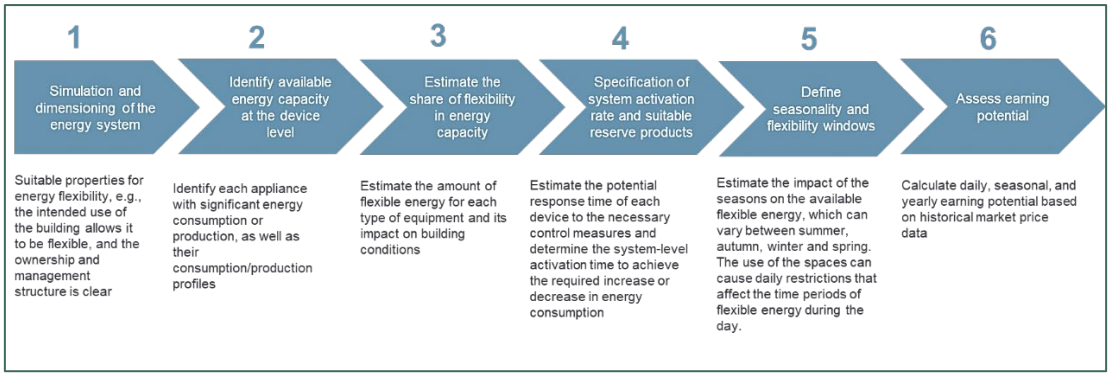


Figure 4. Assessment of a block's energy flexibility potential (source: Energy group)

Tampere has, over the last twenty years, embarked on a multitude of innovative city planning projects. The Tampere Rantatunneli, which was completed in 2016, received, in 2018, the IPMA Global Awards recognition as the world's best project in the mega-size project category based on strong performance in leadership, transparency, innovative risk management, ideas and innovations, systematic processes, and early integration. The project was not only completed six months ahead of schedule, but the quality and public image were also very good. Another international award was given to the Nokia Arena, the multifunctional indoor sports and entertainment venue in Tampere. It was awarded in the 'Human-Centered Smart City' category at the Smart City Gala in Seoul in 2024. The City of Tampere aims to make Hiedanranta another development case that gains international recognition. Leveraging upon its proven track record of excellence in project execution, the Hiedanranta initiative also has the potential to introduce a totally new perspective on the way to integrate affordability, livability, and sustainability in the operations of a superblock.

3.4 Renewal

The lifecycle of a superblock initiative continues beyond the operations phase of the current form. The owners of the superblock must consider what becomes of it once the first operations phase ends. The phases of the Nordic Superblock concept are best seen as a cycle in which a renewal phase is both the final stage of the superblock's current realization and the beginning of a next-generation superblock development. The renewal can have different priorities, such as wholescale redevelopment, renovation, or modernization depending on the context and the preferences of the present superblock owners.

The renewal phase is crucial in ensuring the built environment remains resilient, relevant, and valuable throughout its lifecycle. The Nordic Superblock concept is equally well suited to the development of new urban areas as it is to adaptation to the redevelopment of existing built environments. Infill construction, modernization, and the redevelopment of brownfield sites are a growing priority as there is a universal strive to reduce the energy consumption of existing buildings.

Renewal within the superblock should be seen as an ongoing, multifaceted process that ensures the long-term adaptability, sustainability, and relevance of the built environment. It can take several forms, but two main pathways can be identified in the renewal phase. Firstly, renewal may focus on integrating superblock features into pre-existing, older buildings or repurposing of brownfield sites and existing buildings, e.g., former industrial buildings such as those found in the Kangas area's redevelopment of an old paper mill. By retrofitting these structures, it is possible to introduce state-of-the-art solutions—such as energy-efficient systems, advanced data integrations, and smart infrastructures—thereby extending the service life of the buildings and aligning them with current sustainability and digitalization goals. Secondly, renewal may occur when an existing superblock enters a new phase after the original maintenance contract ends or upon a shift in ownership. In these cases, new operational frameworks can be implemented, which allow for the introduction of advanced technologies, sustainable practices, and flexible management models. This ongoing renewal process supports continuous adaptation to evolving environmental standards, urban development needs, and user expectations.

A crucial component of successful renewal is the cultivation of both community engagement and environmental progress. In many cases, this involves transforming established spaces—such as former industrial sites or aging residential complexes—into dynamic environments where community ties can be strengthened. Such transformations may include repurposing factories into mixed-use developments, or converting underutilized spaces into communal areas, co-working spaces, and green zones. These initiatives not only enhance the social value of the built environment but also support sustainable urban regeneration. Meaningful involvement of residents, local stakeholders, and partners is essential throughout this process.

To maximize the impact of renewal efforts, there is a need to integrate adaptable, digitalized, and low-carbon solutions which support energy efficiency and flexible management as well as improve livability. This includes continuous researching, prototyping, and scaling up of the use of new sustainable materials—such as recycled composites, low-emission concretes, and bio-based alternatives—in retrofitting. The renewal of existing buildings creates opportunities for modernizing the buildings to meet the needs of residents today. Here, elevators and modernized HVAC units play a central role. Integration of occupancy data through elevators and other sensors' data is increasingly being integrated into smart building platforms, enabling holistic building optimization also in existing buildings. Sophisticated analytics and AI-driven insights help facility managers dynamically adjust performance, optimize maintenance schedules, and minimize environmental impact across the entire building lifecycle.

Modernization is further advanced through the development of flexible, modular solutions that support phased upgrades with as little disruption as possible to daily activities. Phased modernization enables building owners to strategically plan improvements according to budget, occupancy, or technological advancements—minimizing downtime and ensuring continued functionality. Automation plays a key role in this context: by automating previously inefficient workflows through AI-based tools and digital solutions, significant reductions can be made in delivery lead times, lower operational costs, and enhance overall efficiency. Examples include predictive maintenance systems, automated resource management, and digital commissioning platforms.

The NSDC initiative could identify the above potential of the superblock approach based on the more generic discussions carried out in the project, even if none of the analyzed cases had yet engaged in activities of renewal. As the legislation for sustainability requirements on the built environment is continuously updated, the need to apply a lifecycle perspective to the management of the property becomes increasingly important. Here, the superblock understanding can provide guidance when considering the sustainability aspects of existing buildings.

As urban development must increasingly focus on the total carbon emissions of the built environment, this will also direct increased focus on the potential for carbon emission reduction among existing buildings. Finland is the most active European nation supporting the EU mission of 100 Climate-Neutral and Smart Cities by 2030 aiming to find cities that will inspire other cities to achieve this goal by 2050. Six cities represent Finland in this mission: Helsinki, Espoo, Tampere, Turku, Lahti, and Lappeenranta. This positions Finland to influence the broader European agenda of driving the green and digital transitions. Seeing superblocks as catalysts for decarbonization provides new insights on concrete measures for accelerating the needed systemic transformation. Insights on both the construction of greenfield superblocks and applying similar principles for the renewal and upgrading of the existing building stock provide these cities with the opportunity to make Finland a forerunner in this area.

4 Impact and recommendations

The aim of the NSDC initiative was to provide the foundation for continued collaboration also beyond the termination of the initial project. The results presented in the previous chapters have confirmed that the superblock is a relevant concept when integrating livability, affordability, and sustainability over the lifecycle of a built urban environment. Digitalization and the green transition are drivers making superblock ideas not only conceptually attractive, but also practically relevant.

We see that our results can have an impact in three different ways:

- The increased emphasis on environmental issues will force cities to change their planning process to make **sustainability** a higher priority in the future. Technologies and behaviors must change to meet future sustainability targets. Seeing a built environment as a provider of operational value in the present but also being an innovation platform able to renew itself provides city planners with a new perspective on how to reform its built environment management practices. Being able to share investments in systemic development efforts in a larger ecosystem is a key advantage of the superblock approach. The sustainability ambitions of built environments will, subsequently, be a key factor influencing the future potential of superblocks.
- Enhancing the experience of **livability** among residents in urban built environments places greater emphasis on community engagement. This calls for a broader perspective on managing the built environment as livability and community building must be integrated with affordability and sustainability. Here, digitalization offers the possibility to integrate physical and virtual community practices, which encourages operators to develop communication platforms that can be shared across multiple superblocks. This development will significantly increase the possibilities for enhanced community experiences with modest additional costs.
- More efficient use of shared facilities has significant potential to make the superblock more **affordable**. Through adaptive and innovative spatial design, the aim is to continuously exploit synergies both within the superblock and by smarter integration with the surrounding environment. This suggests that the modules of the superblock concept can be gradually taken into use during the building's lifetime and provide additional value in a modular way when new opportunities emerge. As the sustainability objectives represent a constantly moving target, the integration of spatial design and sustainability performance becomes a key success factor of a superblock.

The NSDC initiative has combined intensive interaction with ongoing superblock initiatives with analyses of previous efforts around multi-block scale urban development. This has revealed a gradual development of the Finnish approach to multi-block development, starting from the exploitation of comprehensive spatial design in Arabianranta, followed by complementary community nurturing in the Generations Block and Kotikatu365, and more recently further expanded by decarbonization requirements in Hiedanranta. The development trajectory formed by these cases helps in forming an understanding of the requirements of a successful superblock initiative, which depends on the balance between affordability and different levels of ambitions in respect of sustainability and community support. Thanks to its modular structure, the Nordic Superblock canvas provides flexibility when determining how to appropriately configure the superblock case by case.

One of the objectives of the NSDC initiative has been to identify three possible scenarios for Nordic Superblocks: minimum stack, medium stack, and full stack implementation of the superblock. This will help in guiding city planners when they consider the possibility of using the Nordic Superblock approach in a particular development case. The minimum stack will focus on the operational needs to ensure the technical functionality of the physical buildings and the supportive infrastructure of the superblock. The medium stack will encourage community building

within the superblock and also enable stronger interaction with the environment, e.g., related to spatial design and energy management supported by a common communication platform. The full stack provides the ability of platform orchestration to strengthen the innovativeness of the superblock to continuously improve livability and sustainability in an affordable way.

The cases analyzed in the NSDC initiative have provided rich material for the development of the three types of Nordic Superblock scenarios, which is illustrated in Figure 5.

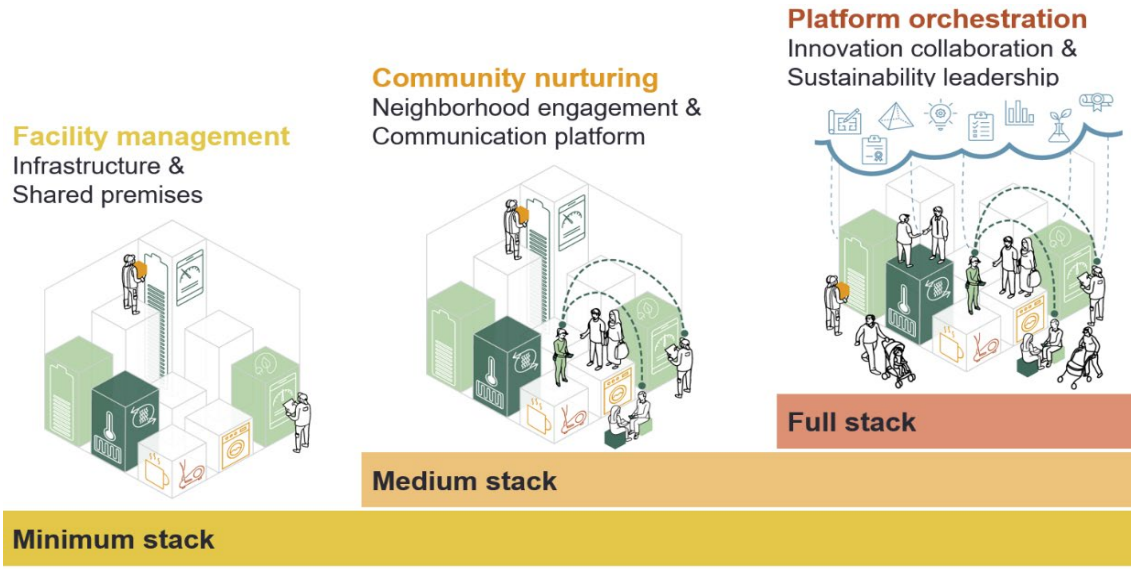
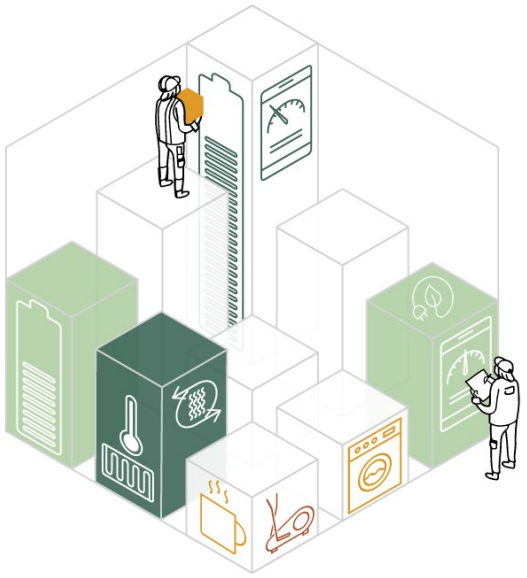


Figure 5. Scenarios for Nordic Superblock implementation

The core idea of the Nordic Superblock lies in shared resources, in the interest of maximizing value through space, functions, and services in a given economic and environmental setting. How this balance will be maintained during the lifecycle of the built environment must be agreed among those responsible for initiating the project. As the cases of Arabianranta and the Generations Block illustrate, one possibility is to avoid contractual agreements for the longer term, but allow the process to evolve, and adjust to changing conditions. However, if the intent is to ensure that the superblock has a more institutionalized stance on sustainability and communality, there is a need to agree upon these principles upfront when the superblock initiative is launched. This is the way Hiedanranta, Kangas, and Kotikatu365 have proceeded.

In the following, the characteristics of the three Nordic Superblock scenarios are described in more detail.

4.1 Facility management



Seeing built environments as enablers of increased collective engagement of citizens to make a city district more attractive and dynamic had its first significant appearance in Finland through the Arabianranta development in Helsinki. This project was guided by the “creative class” ideas of Richard Florida.

Arabianranta used to be the location of the one of the biggest porcelain companies in Europe. When the plant was shut down during the late 1970s, this resulted in physical and social degradation and separation of Arabianranta from the rest of the city. The turning point for Arabianranta was in the mid-1980s, when the Arabia factory building was rented by the University of Art and Design Helsinki (TaiK). TaiK and the City of Helsinki then agreed to transform the area and create a functionally mixed area, making use of its key characteristics: the presence of TaiK, a waterfront location and a strong history. Design was chosen as the central theme to embody the identity of the new Arabianranta. This was incorporated into its various functions: housing, education, industry, research, and innovation. A special purpose governance company, Art and Design City Helsinki (ADC), was formed in 1997 to guide the development. The City of Helsinki was the main shareholder. The Ministry of Trade and Industry, TaiK, and companies aiming to move into the area were additional shareholders. The vision for Arabianranta was formulated as follows: *Arabianranta is the leading centre of art and design in the Baltic Area, a centre organised around design and art, where education, production and consumption coincide*. The aim was to allow for the development of a distinctive and economically vibrant planned knowledge location where people could ‘live, work and play’. The role of ADC was to continuously monitor the development of the area and unite and moderate stakeholders with potentially different interests towards essential consensus building.

The crucial flagship in the initial ecosystem design was TaiK, which justified the emphasis on design. This strongly influenced the housing development in Arabianranta. Another important factor framing the development was the requirement for developers to invest 1–2 percent of the total construction costs in art works (e.g., sculptures and paintings). This became an integral part of the identity of Arabianranta. The common identity was further strengthened by making the gardens collectively owned and integrated into yards where the art projects were implemented and interaction was fostered. Arabianranta was also used as a living lab and e.g., pioneered the last-mile broadband optical fiber infrastructure across the entire district. The living lab also included the development of virtual platforms supported by ‘e-moderators’ to strengthen the sense of community in the area. This aimed to create a digitally enabled social infrastructure, leading some commentators to dub Arabianranta as the ‘Social Silicon Valley’.

When starting in the late 1990s, Arabianranta was one of the first large scale public–private partnerships for area-based redevelopment in Finland. Its focus was on combining knowledge and innovation activities with new and diverse living environments to attract new residents, companies, and students. The attention to the transformation of Arabianranta initially coincided with the peak of Nokia as a transformer of mobile telecommunications, and the ambitions of Nokia to also strengthen the social dimension of its mobile phone business. As Nokia withdrew from mobile phones and TaiK left Arabianranta, its role as an innovation hub has diminished.

Researchers at Erasmus University Rotterdam conducted a case study of the role of the City of Helsinki in the development of Arabianranta [9]. They concluded that the city had a facilitating and financing role and could also steer other actors due to its budgetary power in ADC. However, as ADC was wound up in 2016, it shows that the city had identified itself as an enabler and did not take the role of the ultimate owner and guarantor of continued development according to the initial vision. ADC initially had an important role as it enabled the implementation of the holistic concept of the area, but as the conditions changed, and Arabianranta lost some of its original dynamism, the city allowed market forces to dictate the future of the area. Aalto University's decision to concentrate all its key functions in Otaniemi led to TaiK withdrawing from Arabianranta and proved a radical restriction on the opportunities for the area to credibly realize its original vision. As TaiK disappeared as the flagship, anchor, and image builder of the area the legitimacy of Arabianranta as a center of 'art and design' vanished. The researchers in Rotterdam concluded that a city district must constantly adapt when aiming to be a frontrunner in urban development. This means e.g., investments in energy efficiency techniques and new ubiquitous IC technologies, interaction with other locations in the region and ensuring the cultural supply in the *area*.

This need for adaptability has shaped the evolution of both Arabianranta and the Generations Block, as they have had to adjust their direction due to the withdrawal of a critical collaboration partner. Neither of these cases, however, was initiated with the ambition of explicitly supporting the path towards climate neutrality.

As illustrated by the case of Arabianranta, cities traditionally approach the planning process by enabling, facilitating, and financially supporting collaborative initiatives that are expected to bring forth expected progress through market forces. However, market forces are not capable of addressing climate change in an appropriate way, and therefore the public sector must take a more active role when guiding the transformation needed. The way the City of Tampere has repositioned itself as the driver and orchestrator of the development of Hiedanranta shows that progressive cities can change their behavior, and that Finland may have a unique opportunity to become a forerunner in systemic urban transformation.

Whereas Arabianranta was developed around the idea of design as unifying theme and the Generations Bock was strongly anchored in intergenerational community building, the Nordic Superblock has a more generic foundation in its ambition to also accelerate decarbonization. As decarbonization is, globally, an integral part of the development agenda of the most progressive cities, scalable solutions resulting from superblock development will automatically be of interest for leading cities all over the world.

The Nordic Superblock concept combines the insights from Arabianranta regarding a clear unifying theme, and from the Generations Block in respect of nurturing residential communities, with the sustainability targets of Hiedanranta. This changes the dynamics of urban building management towards a need for stronger integration.

The energy consumption of buildings consists of heat and electricity. Cities vary in the degree to which their energy companies have progressed in making their energy production fossil-free. Still, fossil-free energy must also be produced and will have a negative environmental impact making energy efficiency a key objective in any sustainable city district. When moving to positive energy solutions, the proactiveness of individual residents should also be rewarded, here, e.g., energy communities are a new type of arrangement aiming in this direction. Contributing to the balancing

[9] van Tuijl, E., Carvalho, L., & van Haaren, J. (2013). Developing creative quarters in cities: Policy lessons from 'Art and Design City' Arabianranta, Helsinki. *Urban Research & Practice*, *6*(2), 211-218.

of the energy load can also provide additional revenues for a housing company, which should be considered when designing the facility and energy management solution for the superblock.

The NSDC energy concept integrates renewable and low-carbon solutions—such as energy recycling, ground source and air-to-water heat pumps, solar electricity, and low-temperature heating—to maximize energy efficiency, self-sufficiency, and sustainability within the superblock. Local energy flows, including waste heat from wastewater, commercial refrigeration, and building cooling, are recovered and redistributed via heat pumps, covering a significant share of annual heating demand and enabling surplus heat to be fed into the area network. Energy storage and demand response further enhance flexibility and resilience. This integrated system reduces lifecycle energy costs. Of the neighborhood-specific energy systems examined in the NSDC initiative, the most profitable option was a combination of energy recycling, geothermal energy, air-to-water heat pumps, and district heating as a peak and backup heat source. In this system, heat is distributed within the block via a low-temperature network. A superblock's investment in the development of its energy system is a possible option. However, this requires expertise and calls on the investor to take on a more involved, demanding role. A distributed energy system can be implemented separately either through a service company or an energy community to be established. The superblock operator may also take on this task.

The digital infrastructure of a city district was a main area of co-development in the early days of Arabianranta. As digitalization is increasingly influencing our daily lives, with cloud computing and AI being the latest disruptive forces, the superblock should also fully leverage upon the possibilities created by digitalization. Four different layers of digitally enabled superblock functions can be identified: the physical building information (energy, water, maintenance etc.), availability of and access to services (sauna, gym, rental equipment etc.), common development efforts (new buildings, new partnerships, new technologies etc.), and the overall framing of the superblock context (changes in the configuration of anchor tenants, significant changes in city plans, new regulations and incentives etc.). As individuals are increasingly living through their digital experiences and interactions, the provision of user-friendly digital architectures integrating the internal superblock needs with the external world is of increased importance.

The perhaps most significant change needed to accelerate the transition to more sustainable cities is the mindset shift that must take place to address the complexity of any significant transformative effort. As the transformations will require the participation of various stakeholders of different backgrounds and expertise, creating a common way of discussing and sharing insights is the first step towards better public-private collaboration in urban development. This would call for stronger conceptual integration, as the various themes must be simultaneously on the table to ensure that the systemic impact will be achieved. The Nordic Superblock Fieldbook is an attempt to contribute to this direction.

4.2 Community nurturing

Superblock development is supported by two types of communities: residential communities and developer communities. Whereas residential communities are in a key position when ensuring the longevity of the Superblock, the developer communities define, to a large extent, the room to maneuver for the residential community.

In the case of the Generations Block, the initial development was strongly guided by the vision of a strong multi-generational community guiding the superblock into the future. However, the developer community did not ensure the contractual guarantees for this vision to materialize in full, leading to a situation where the initial level of ambition had to be adjusted. Nevertheless, many of the communal elements prevail in the Generations Block.

Setlementtiasunnot is the key proponent of the community ethos in the Generations Block. There is shared space for spending time together, shared activities, and neighborly help. A multitude of opportunities are offered to the residents but there are no obligations to participate. Each resident can choose how to participate, and each neighborhood has its own unique form, shaped by the people who live there. Setlementtiasunnot encourages its residents to be active and influence the development of the living environment and participate in planning joint activities.

The Generations Block and other examples suggest that community engagement should, to a large extent, be left to the individuals and interest groups rather than the service operator. The progression of community nurturing depends on the interest of the residents and their preparedness to take an active role in promoting the community agenda. The superblock operator can support such individuals with, e.g., help in using the digital infrastructures, linking to third parties that residents want to engage with, and organizing joint events that will strengthen the identity of the superblock.

Maintaining the Hiedanranta website and portal providing an overview of available residential services and including the provision of environmental and building consumption data for the residents is an example of how digitalization can provide residents with increased understanding of common superblock issues. Thereby, the digital infrastructure and information sharing strongly integrates residential and developer communities. Superblock operators prioritize the development of digital support to the communities as this development can be scaled across individual superblocks. There are good experiences (e.g., Kotikatu365, Jaso) from complementing digital services with a community manager, who is available part-time on site near the shared spaces, introducing and helping people to learn to use digital services.

The systemic efforts needed for a superblock initiative to leverage upon its full potential require the engagement of complementary resources and capabilities. Two risks due to the lack of complementary partners can be identified. The first one relates to the scaling potential of the results. The second concerns ensuring the longevity of the initial vision.

The Western Harbor development in Malmö resulted in a highly innovative new city district, which became a sought-after location. However, the results were highly idiosyncratic for that particular area, including the overall spatial design, the energy infrastructure and the way the collaboration

was organized with the city mayor in a very central role. Subsequently, the City of Malmö could not replicate the success of the Western Harbor in other parts of the city, neither were there companies that could have taken solutions developed in Malmö and scale them up for international distribution. When recognizing these shortcomings, the Malmö city government established a commission to make Malmö more sustainable. In 2013, the Malmö Commission suggested, in its report, the creation and development of new knowledge alliances to enable continuous learning. Knowledge alliances consisting of partners with complementary capabilities should combine excellence and relevance and promote equal partnerships between stakeholders. Knowledge and learning should be linked to governance, management, involvement, and influence[10]. The key individuals of the Malmö commission visited Tampere in 2014, and their insights have also been considered in the Hiedanranta development. The term knowledge alliance has a similar function as the developer community identified as a critical part of the Nordic Superblock concept.

In their analysis of the Arabianranta development, the researchers at Erasmus University Rotterdam noticed that one of the shortcomings of the development was its dependence on key people who acted as 'gatekeepers', linking Helsinki and other knowledge sources worldwide (e.g., the first Living Lab experiences were supported by professors at TaiK who brought the concept from the United States). This made the concept hard to replicate in other places due to the highly personalized features of the emergent Arabianranta ecosystem. Similarly, the Generations Block was initiated through a research project, with a central role of the key people in this project, also affecting the possibilities for later institutionalization. Neither Arabianranta nor the Generations Block had any dedicated international company as a strategic partner, further reducing the incentives to actively include international commercialization as part of the development agenda.

In creating partnerships and scaling up, we can learn from the early years of the Barcelona Superblock. As a design idea the Barcelona Superblock is simple: restricting most of the traffic to the outskirts of nine blocks and thus creating new calm, green and multiuse public spaces from the former streets. However, to realize this idea in an already existing city with a diversity of interests and opinions is very demanding. To open the eyes of locals, the idea was realized for two weeks in one experiment, to concretely show what the city could be like if re-designed as Superblocks. The coalition organizing the experiment was large. There were more than 200 students and teachers from Barcelona's architecture schools, various neighborhood groups, other research and educational bodies, such as the Barcelona Institute for Global Health and local Fablab. Most importantly, during the experiment it was possible to raise also the concerns and counterarguments. This was supported by mediated open discussions at one of the crossroads of the experimental area, called the Parliament. The large and brave experiment caused local upheaval and went viral globally. Positive international attention contributed to the continuation of the experiments that found more institutionalized means of realization, the plan today being to re-do significant parts of the city as superblocks.

Realizing superblocks in Barcelona also has its tensions. The rising quality of living due to the added vegetation, calmness and multi-use space in the inner parts of the superblocks has resulted in rising housing prices, while there are also streets that now have more traffic and noise than before. Rising prices, in turn, are pushing former residents who can no longer afford to live

[10] Malmö. (2013). Malmö's path towards a sustainable future; health, welfare and justice. Commission for a socially sustainable Malmö. https://malmo.se/download/18.6c44cd5c1728328333211d32/1593519743583/malmo%CC%88kommisionen_rapport_engelsk_web.pdf.

there to move out of these areas. Another visible tension lies in the diminished role of the locals in designing and implementing superblocks, as it has become more the business of the city contractors, reflected in how people feel these new public spaces are their own.

In Hiedanranta the plot competition for the North Block was designed to allow the tenderers to contribute their own specific expertise when bringing Hiedanranta forward. This should support the ambitions of Hiedanranta to become a leader in sustainability. This aim has been to encourage developers to find tools for sustainable, good living that would surpass the previously defined, already high criteria for construction in Hiedanranta.

Once the superblock has residents, the expectation is that the residents will proactively share their experiences and skills with fellow residents, and engage with developers as the superblock construction phase will continue for years after the first residents have moved in. The next stage is when construction is completed. At this stage, the dynamics of the community will again change, as most of the companies engaged in the construction phase will no longer participate in the collaboration. This may also affect the role of the service company. In Arabianranta the ownership of the service company, Arabian Palvelu Oy has been transferred, and it is now directly owned by over 50 housing companies. Arabian Palvelu, today, has the responsibility for the collective yards, parking lots and the clubhouse, Bokvillan, in Arabianranta. However, Arabian Palvelu has no role in community nurturing. Collaboration among the residents is up to the individual housing companies to organize separately if so wished.

Previous research has proposed intelligent technologies acting in the roles that support the neighborhood community by facilitating social interaction, skill sharing, and the use of shared spaces, matching people, spaces and activities, and supporting positive behavior and commonly agreed rules in the community [11]. As a contribution of the NSDC initiative an initial design framework for advancing communality with intelligent technologies in Nordic Superblocks was developed [12]. The framework promotes co-design of intelligent technologies with and for the community, integrated collaboration between space and technology design, and iterative assessment of impacts on shared space, social interaction, and social ties. The framework considers design outcomes across three levels: micro-level (individual entities such as residents, groups, or specific technologies), macro-level (relationships and interactions between these entities), and meta-level (broader values, ethics, and societal impacts). The framework was applied during the NSDC initiative for citizen engagement study with young participants, who are the potential future residents of currently planned living areas and housing solutions, such as Nordic Superblock [13]. The study showed potential of the framework in participatory co-design of Nordic Superblocks and intelligent technologies in those.

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[11] Makkonen, J., Latikka, R., Kaukonen, L., Laine, M., & Väänänen, K. (2023). Advancing residents' use of shared spaces in Nordic superblocks with intelligent technologies. *AI & Society*, 38(3), 1167–1184. https://doi.org/10.1007/s00146-022-01604-x

[12] Makkonen, J., Kaipainen, Kirsikka, Laine, Markus, & Väänänen, Kaisa. (In press). Advancing neighbourhood communality with intelligent technologies in Nordic Superblocks. *Human-Building Interaction: The Nexus of Architecture, Building Science & Interaction Design.*

[13] Makkonen, J., Alatalo, E., & Väänänen, K. (2025). Designing future community-centric intelligent neighbourhood technologies with young people. In *Proceedings of the 24th International Conference on Mobile and Ubiquitous Multimedia (MUM '25)* (Enna, Italy, December 1–4, 2025). ACM. Forthcoming.

4.3 Platform orchestration

Finland wants to be a forerunner in decarbonization and cleantech innovation and the government has set the goal of Finland being carbon neutral by 2035. To support the transformation, the aim is to increase the RDI share of GDP from 3% to 4% by 2030. A broad range of innovation and industrial policies have been initiated to accelerate the intended transformation.

Framing urban development according to sustainability objectives implies that the individual district must be seen as an integral part of a larger system. Such multi-level perspectives are also increasingly influencing the European perspective on innovation collaboration. In this respect a city district initiative should, if possible, make positive contributions to the development of the city, region, nation, and the continent. The role of the city is here to ensure the right balance between grass-root actions and the contribution to high-level missions, such as the 100 Climate-Neutral and Smart Cities by 2030.

The Finnish Ministry of Economic Affairs and Employment (MEE) has established ecosystem agreements with leading Finnish cities. Building innovation ecosystems and developing city-led solutions based on a low-carbon and resource-wise use of digitalization and technological change should accelerate growth. The objective of the agreements is to intensify cooperation within networks, strengthen key competences and increase effectiveness. The ecosystem agreement between the MEE and Tampere has the development of the Hiedanranta area as one of its focus areas.

The analysis of the Hiedanranta development provides the basis for defining how Hiedanranta could become a pioneer of systemic urban transformation attracting international attention. Historically, some cities in the Nordic countries have successfully positioned themselves as leaders in urban development starting with Copenhagen and its Finger Plan, followed by Stockholm with Hammarby Sjöstad, and Malmö with the Western Harbor. One could recognize a potential for Finnish urban planning innovations to attract international attention based on the reception for the Generations Bock. Unfortunately, this case was a research project that did not become part of the strategic agenda of the City of Helsinki. The case of Hiedanranta is a different story, as this case has been strategically positioned as a key initiative in the ecosystem agreement between Tampere and the MEE.

The Tampere Tram began regular operation to Hiedanranta in the beginning of 2025. This contributes to making Hiedanranta a showcase of a systemic approach to drive sustainability. The City of Tampere has had a long-term vision for how to transform the city. This vision integrates new transport solutions with a more ambitious city planning approach to also accelerate the decarbonization of the built environment. This provides the context for Hiedanranta to be positioned as a strategic innovation platform for the City of Tampere.

The City of Tampere has worked with both researchers and companies to promote its sustainability strategy. In the ecosystem agreement formed with the MEE, it is stated that the chosen focus areas should promote decarbonization, strategic urban development initiatives (platforms), and exploit the latest know-how and technologies. These objectives have also guided

the development of Hiedanranta and provide the strategic positioning of Hiedanrannan Kehitys Oy.

The collaboration between the City of Tampere, Tampere University, and VTT has shaped the way the city has positioned itself as the co-orchestrator of the innovation collaboration activities in Hiedanranta. Whereas many innovation projects in Tampere are handled by Business Tampere, the economic development agency for the Tampere region, it is the City of Tampere that has sole responsibility for the Hiedanranta development.

Hiedanranta has the potential to become a springboard for innovation collaboration. This would relate to the next generation of public-private collaboration around urban built environments. The springboard would become a vehicle for international collaboration for the Tampere city management. This would also strengthen Hiedanranta as a frontrunner in sustainable development. Hereby, the city could actively promote itself as a leader in sustainable city planning, as have Stockholm and Malmö with the help of the Hammarby Sjöstad and Western Harbor city districts. Hiedanranta is of a similar size to these districts, as they all comprise 220-250 ha of land and have originally aimed at having 25 000 residents when the district is fully developed.

Making Hiedanranta a research and innovation platform for sustainable technologies and solutions is well aligned with the ambitions of Finland to be a global leader in cleantech. Hiedanranta could formalize the innovation platform with the preliminary name of Hiedanranta Research Center (HRC, tentative name) when positioning Hiedanranta as forerunner in the clean transformation. The HRC would then establish strong ties with leading companies and researchers that are prepared to engage in the development of the next generation solutions for sustainable urban living. As a springboard, the HRC will enable public-private collaboration to build capabilities needed to develop solutions that will accelerate the green transition.

The HRC would strengthen the collaboration culture for which Tampere already has been awarded through, e.g., the Rantatunneli and Nokia Arena. The HRC will build on these experiences and make Hiedanranta a showcase not only as a leader in sustainable urban design but also as a role model for public-private innovation collaboration. How the HRC would act as a springboard for sustainability and innovation is illustrated in Figure 5.

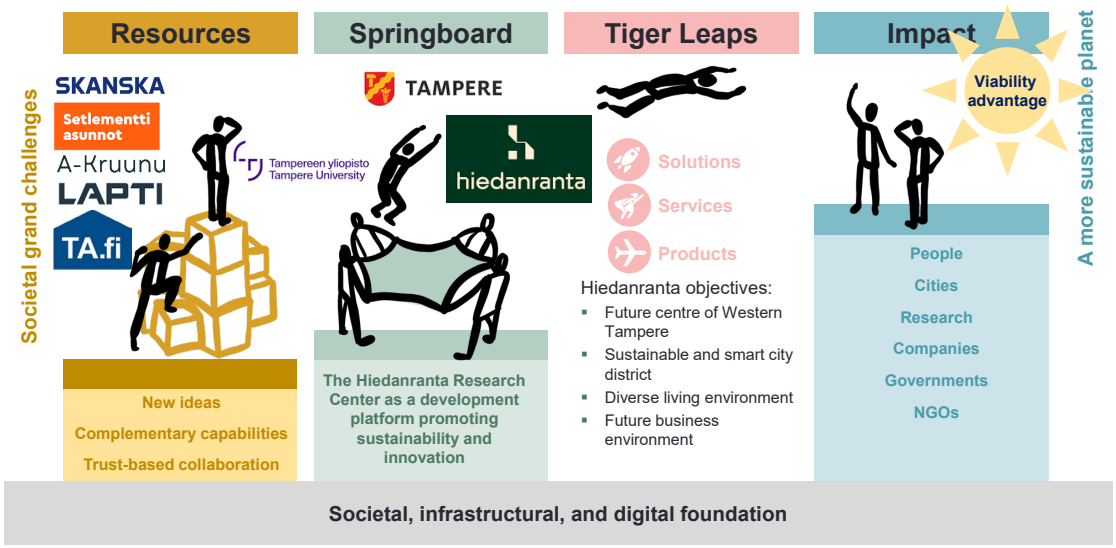

Figure 5. The Hiedanranta Research Center as a springboard for sustainability and innovation (based on the springboard concept introduced by Kosonen and Santalainen)

As evidenced by the agreement between the MEE and Tampere, the platform orchestration approach is conceptually an integral part of the way the Finnish innovation system aims to strengthen Finnish innovation collaboration. However, the operationalization of innovation ecosystems is still seeking the next best practices. Springboards address this by supporting the joint capability efforts needed to accelerate the development of new solutions for systemic transformations that will enhance our daily lives.

As successful transformations must unite the public and private sectors around a shared agenda, the Hiedanranta development provides the City of Tampere with the mandate to take the lead in accelerating the introduction of new solutions for urban sustainability. The first step in establishing the HRC would be to engage a core group of individuals sharing the desire to engage in a common undertaking to achieve something extraordinary. By emphasizing the long-term impact, the focus should be on capability building, ensuring that the collaboration will remain relevant to the partners also when the surrounding world changes. At the same time, the collaboration must be firmly connected to the realities of the present, so that participants can find synergies between their collaborative participation and the operational demands of their respective organizations.

The HRC would intensify innovation collaboration guided by the City of Tampere that would integrate the local collaboration into its own international activities as one of the 100 European 2030 mission cities. Through the Hiedanranta Research Center the City of Tampere would internationally frame and scale the Hiedanranta development based upon the concrete results of the innovation collaboration orchestrated by Hiedanrannan Kehitys Oy. These results will be locally integrated into the Hiedanranta community through the individual housing companies responsible for the operationalization of the Hiedanranta concept among its residents. The infrastructural integration ensuring the physical and digital foundation will support this guided by Hiedanrannan Palvelut Oy. The way the different layers support each other is illustrated in the figure below.

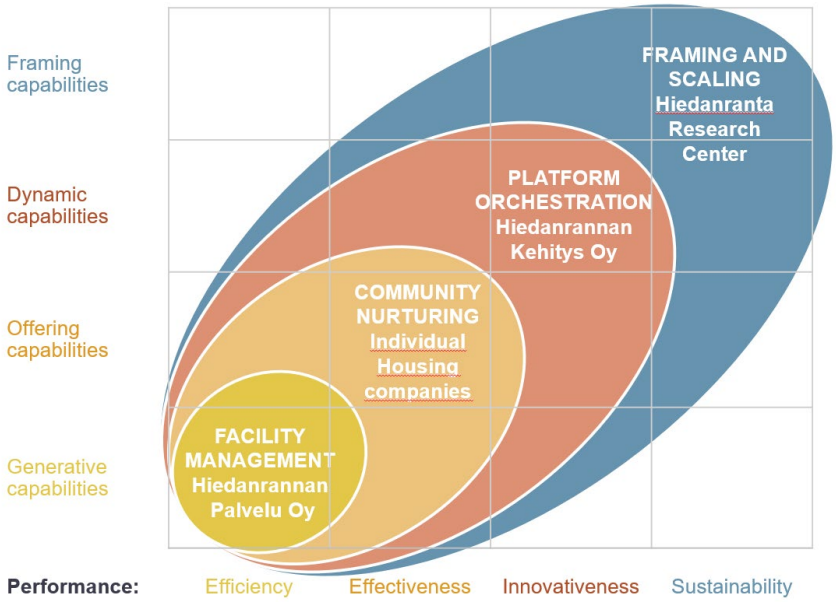

Figure 6. The multi-layered approach to the Hiedanranta development