



RESEARCH ARTICLE

Healthy, inclusive, and sustainable metropolises: New strategies for transdisciplinary dialogues in Munich, Germany

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Published online: 20 November 2023

Abstract

According to the United Nations, within the next decades approximately 70% of the world's population will become urban citizens. This massive immigration results in urbanization trends of the outskirts and furthermore neighboring districts merge with the urban space, presenting enormous environmental, ecological, health-related, and social challenges to the regions and their citizens. Politics will have to face these issues, but so far, the urban planning and environmental oriented interdependencies are not notably considered and on a municipal level essential resources are disregarded. Within the timeframe of three years (2020-2022), the Munich University of Applied Sciences assessed in a collaborative process the urban potentials of a metropolitan district and developed health-promoting and sustainable building and open space structures for the year 2050. Therefore health, participation, urbanity, and sustainability issues were interlinked and integrated in the urban development process. The research project is based on an inter- and transdisciplinary approach, which furthermore includes different stakeholders from economy, politics, and the civil society.

Keywords: social and health inequalities, urban neighborhoods, health promotion, socio-spatial inequalities, Quintuple-Helix-Approach, co-creation

INTRODUCTION

In the city of future life quality is at the core of urban districts. Dense architecture opens various opportunities: urban living, quality of public space, attractive residential environment, attractive local supply for the everyday needs, close links between habitation and public space, spacious common area and open space, as well as a broad network of the inhabitants through short distances. Urban districts of the future city will be smart districts and therefore be pioneers in urban life quality. Thereby all dimensions of sustainability (environmental, economic, and social sustainability) are treated equally.

Densification will have negative impacts on other areas and not everybody will benefit from the urban progression (Foster et al., 2023). Buildings and urban space typologies from the garden city movement or the modern era change typologically and fundamentally in terms of how they are

set in relation to open space through the densification. Due to decreasing capacity on account of the population growth, the physical access to public infrastructure (health, infrastructure, supply, etc.) suffers and life quality threatens to decline.

All over the world, the average life expectancy among poor people is comparatively low. This objective fact is known since the 1970s and is discussed as the "social gradient of quality of life, morbidity and mortality" (Marmot & Wilkinson, 2005). Besides self-imposed behavior patterns such as consumption of tobacco, alcoholism, physical activity, and nutrition, also inequalities at the place of residence, at the workplace, at local social networks, as well as in municipal preventive and health promotion measures, contribute to the disadvantage of certain population groups. Also, there are already known impacts of environmental influences on (mental) health (Zhao et al., 2020).

So far measures to redress social inequalities solely make progress among those, who actively devote attention to their health (Janssen et al., 2012). Future cities ought to be organized so as health-related strains at the place of residence and at the workplace are mitigated, local social networking is promoted, and a healthy lifestyle is enabled. Those correlations are under discussion for quite some time among pertinent health sciences known under the name of "environmental justice" (Bolte et al., 2011).

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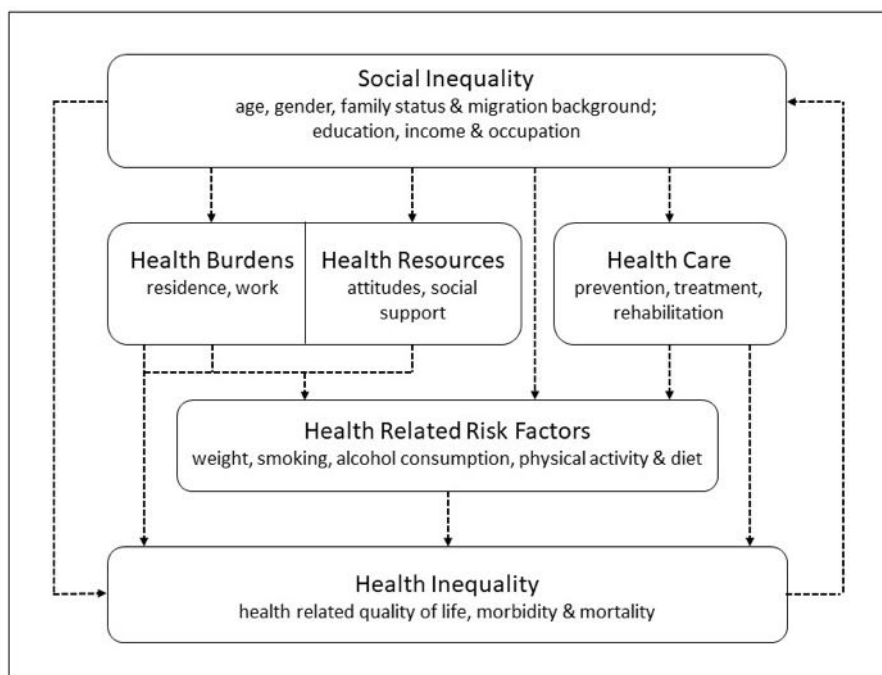


Fig 1 A complete recursive model of social and health inequality (Janssen et al., 2012)

This model assumes, that the use of medical services is influenced by social aspects and therefore can have an effect whether prevention measures are made use of or not (Janssen et al., 2014). This circumstance, in turn, can lead to the fact that certain population groups are more likely to be affected by risk factors (such as obesity, smoking, unhealthy alcohol consumption, lack of physical activity or malnutrition). This again has a direct impact on the chance of taking ill with certain diseases. Further on, gender, education or other social factors have an impact on which burdens are exposed at the residence or the working space and which resources are provided in terms of social networks (Roth, 2020). Likewise, there is a correlation between income, residential area, expenses on prevention measures and nutrition (Geigl et al., 2022). A low income leads to more unhealthy housing conditions (air pollution, traffic noise, green areas), poorer medical care (inadequate specialist care, time for treatment, miscommunication) and poor nutrition (lack of healthy shopping opportunities). All of this results in direct or indirect consequences for the chance of falling ill, the handling of illness and therefore for shorter or longer life expectancy, especially among the elderly population (Geigl et al., 2023).

The average life expectancy is one of the core indicators for the health status of a society. In Bavaria, the average life expectancy is above the German average (Kuhn, 2019). This positive result is affected by the fact, that Bavaria is a typical host country and records high numbers of in- and outflow (Statistisches Bundesamt, 2014). This applies mostly to young and qualified people which recognize professional opportunities in the economically strong regions. Therefore, the good economic position results in a good health-related situation among the migrant population, which is called the "Healthy-Migrant-Effect" (Kirch, 2008).

Due to the positive economic development, a tremendous population growth is predicted for the metropolitan region of Munich, and it will become a hotspot for many of the global trends and their consequences. The flow of people leaving and entering the urban area, leads to

increasing inequalities, and directly affects the urban space (i.e. changing income distribution) (Modai-Snir & van Ham, 2018). According to recent forecasts, until 2040 the Bavarian state capital's population will increase by more than 250.000 residents (Referat für Stadtplanung und Bauordnung, LH München, 2021) and must face major challenges such as, secure and clean energy generation, sustainable mobility concepts, health and inclusion in the demographic change, impacts of digitization and scarcity of living and commercial spaces.

Currently various initiatives focus on the knowledge and technology transfer and emphasize the Third Mission of the scientific system. The Third Mission resembles the closer interlinking of universities with society and describes the third field of responsibility besides teaching and research (Burawoy, 2011). But to successfully accomplish the mission, two key aspects of transfer conception must change: the range of parties involved and the mechanisms of the participants.

In 2017, an academic entity with a broad spectrum of specialist knowledge founded an innovation network and research hub with the aim of establishing interdisciplinary cooperations among partners from science, economy, civil society, and politics in the metropolitan region of Munich. A joint generation of knowledge replaces a biased knowledge creation with downstream transfer efforts and competences as well as interests of all parties are included. Besides various divisions, the innovation network covers the subject area "Health and Participation", combining the goals "Good Health and Well-Being" (goal 3) and "Sustainable Cities and Communities" (goal 11) of the UN-Agenda 2030 for sustainable development. In the course of this, the focus is not only on economic development, but also on a physical and sustainable transformation and therefore adds a Fourth Mission to its scope of action (Trencher et al., 2014). It pursues to promote participatory health (integrating all stakeholders) and to develop, as well as implement a dialogical, co-creation innovation format, which helps to

sound the interface between health promotion and environmental protection.

Within the scope of a research, the innovation network collaborated with the faculties of architecture and applied social sciences to assess new strategies for local and demand-oriented solutions for urban developments. Core issues of the project referred to the maintenance of life quality in urban settings, urban health promotion, participation of all social groups in urban development, reduction measures for social and health inequalities, growth of shared and unsealed urban spaces, as well as the increase of non-motorized traffic.

The project focused on new methodical approaches of knowledge transfer to attain more relevant and accepted results for all user groups and to identify synergies and common approaches. As a testing ground, the neighborhood Westkreuz was chosen and functioned as a reference area. However the work is transferable to other metropolitan districts.

MATERIAL AND METHODS

Methodological Approaches

The Triple-Helix-Model is an innovative system that combines the knowledge of science, government, and industry (Etzkowitz & Leydesdorff, 2000). In the case of this research project, an academic entity undertakes the task of shaping the needed transition of knowledge generation, sharing and implementation and embodies a hub for education, knowledge production and innovation. In the course of this, the research hub draws upon its results of research projects on dynamic innovation processes, which show new aspects for successful research and technology

transfer between networks. The extension of the Triple-Helix-Model by a fourth helix, the public, is described as the Quadruple-Helix-Approach (Yawson, 2009). The research work, which is discussed in this article, introduces a further helix, the environment, to the methodology and therefore is based on the Quintuple-Helix-Model (Carayannis & Campbell, 2010).

Core of the participatory research project is Co-Creation. It describes the collaborative defining and overcoming of challenges to which different parties of society actively dedicate themselves. Thereby all participants have specific experience, expertise, and perspectives as well as networks. All things considered, every player benefits from the range of knowledge and contacts, collectively promotes the problem-solving process, and takes part in the definition and solution of a problem. Co-Creation is based on the principle of equality, an "open-source mentality" and creating a win-win-situation for all parties, despite possible different objectives (Vandael et al., 2018). The first project stage of a Co-Creation-Process is dedicated to the definition of the significant research issues and goals, and the development of a conceptual as well as methodical framework. In the second phase, the implementation stage, solution-oriented knowledge is generated (Kurzahls et al., 2022).

Throughout the process, the method of Design Thinking (Rustler, 2018) (Hester & Kempkens, 2013) played a role for the development of new ideas and to solve specific problems and defiances. This approach assumes, that issues are better addressed when people of different disciplines collaborate in an environment which fosters creativity, when they jointly formulate questions, consider the needs and motivations of others, and finally develop concepts which are repeatedly reviewed.

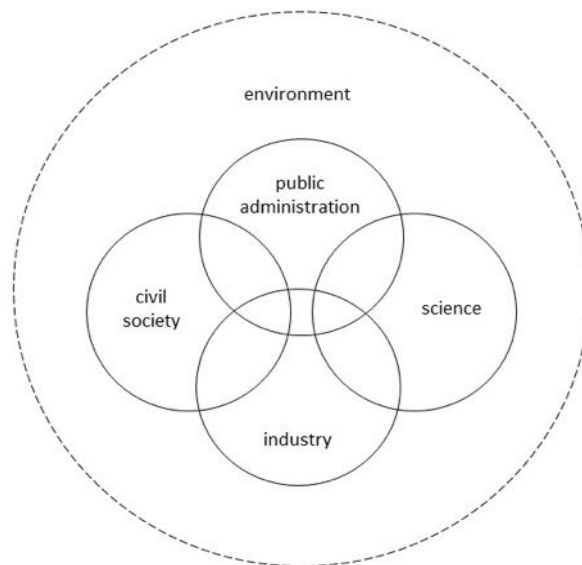


Fig 2. Quintuple Helix model (own figure)

Students research

Over the course of the collaborative research on future cities, students looked into urban design strategies and established empirical surveys for the testing ground. All gained insights and concept ideas were presented and

discussed during the series of dialogue forums and were further developed in the Co-Creation process.

Based on previous studies, the course "Young spaces – Munich Westkreuz 2050" developed fundamental structures for a new urban environment and identified urban modules that serve as catalyst for future

transformation processes. Aim is the development of a dense urban structure with mixed use in the immediate proximity of the central station in Westkreuz. With the background knowledge of “social inequality and health”, the importance of health-promoting city, building and open space structures are attached early on and are ought to be beneficial to the health of all citizens of the district.

Within the scope of the research workshop “future city – empirical social research” a survey was conducted to determine the expectations for a city in 30 years. The development of the questionnaire based on the Likert scale on which respondents could indicate their agreement or disagreement with the respective proposition. Furthermore, a ranking among the answer categories had to be set for certain questions.

Secondary analysis

The results of a study conducted by the municipality of Munich (Statistisches Amt München, 2019) show a total population of 49.072 inhabitants in the municipal district Aubing-Lochhausen-Langwied in the year 2019. During the years of 2017-2019, there was a rise among the age group 15- to 44-year-old inhabitants and the mean age was 41,7 in the respective district. This group accounts for almost half of the district’s total population. The share of non-German residents between 20 and 30 years of age attains over 0,4%, which is relatively high compared to other age groups. In contrast, Germans with a migrant background between 20 and 30 years of age reach a lower proportion than the ones in the age group 0- to 20-year-olds.

According to prognoses of the Munich Department of Urban Planning and Building Regulations (Referat für Stadtplanung und Bauordnung, LH München, 2017) the municipal district will experience a significant population increase within the next 20 years. In particular a rise in the age group of the 20- to 45-year-old inhabitants is expected. Compared to the year 2019, in 2040 a total growth of 92,9% of entitled residents is predicted, whereby the mean age will lower by 3,0 years. The youth ratio will increase by 3,0, whereas the old-age dependency ratio will decrease by 8,6. Overall the population density will increase from 1.452 to 2.802 inhabitants per km².

A social space analysis of the area Neuaubing-Westkreuz (Referat für Bildung und Sport, LH München, 2014) in the year 2013 revealed that the region on one hand is a rather young part of town and on the other hand is a region of an aging population. As compared to the aging quotient of 25,2 in the entire city of Munich, the aging quotient of Neuaubing-Westkreuz is much higher (33,6). Furthermore, the youth ratio in Westkreuz (22,1) exceeds the ratio in Munich (17,5).

The municipal district Aubing-Lochhausen-Langwied is the largest district in Munich by area (3400 hectares), however shows the lowest density of population (14 inhabitants per hectare). Agricultural area constitutes most of the area (1517,76 hectares), followed by built-up area (787,13 hectares). Due to the demographic development, 17.300 new construction activities are assumed in the municipal district by the years 2018-2040.



Fig 3 study area “Westkreuz”, district 22.2.4 (own figure)

Dialogue panels

The dialogue panels are based on an iterative approach, which allows to incorporate the collected findings in the continuous process. The workshops partially took place in a digital format and therefore enabled accessibility to a wider spectrum of participants and facilitated social inclusion (Doğan & Jelinčić, 2022).

The series of interdisciplinary dialogue forums launched with a virtual kick-off workshop. The Quadruple-Helix-Workshop was attended by 17 different stakeholders from science (35%), politics and administration (7%), economy (41%) as well as civil society (17%). Aim of the moderated workshop was to identify inter- and transdisciplinary topics. Reflecting the Design Thinking Approach, the participants formulated visions for “the future city” and were acquainted with the reference area and its current situation. Subsequently three discussion groups were formed to define the notions of sustainability, health, and participation. Further component of the workshop was the presentation of the students’ first concept ideas for the district’s urban development.

In the course of the first dialogue forum, 16 stakeholders from science (28%), politics and administration (12%), economy (43%), and civil society (17%) discussed the central issues that ought to be addressed in the residents survey. Furthermore the secondary analysis was presented to the participants and an insight on an exemplary qualitative and quantitative analysis, which formed the baseline of the needs-oriented recommendations for the development of health-promoting measures and programs, was given. The workshop was held virtually.

The second virtual dialogue forum was attended by 15 parties, representing science (22%), politics and administration (17%), economy (8%), and civil society (53%). The workshop targeted at defining the challenges, which need to be solved in order to live healthy and ecologically sustainable in Munich in 2050. To provide further in-depth information, three key notes were held by experts from the group of participants representing the municipal administration, local government politics as well as local health care systems, and ecclesiastical associations as well as professional associations of social work.

In order to adjust the ongoing process, an internal workshop took place and was attended by the project partners and further advisory experts. During the workshop the conducted dialogue panels were reflected, and the present results were consolidated and discussed. Thereupon, next steps were derived to conceptualize the upcoming dialogue panels.

A third virtual dialogue forum took place with 13 participants from science (38%), politics and administration (16%), economy (23%), and civil society (23%). The aim of the workshop was a synthesis of empirical social research and urban management. By amalgamating the findings of the student’s survey and the urban design concepts, conflicting priorities occurred.

The members of the research project proceeded with a further internal workshop. Once more the meeting was used to reflect the present results and the collaboration. During this workshop the basic structure of the closing event was developed.

The closing session was attended by 16 stakeholders from science (45%), politics and administration (13%), economy (6%), and civil society (36%). It pursued the target of summarizing the process of development as well as the findings of the interdisciplinary dialogue panels and visualizing them by an exhibition. A participatory discussion

on the urban development conflicting empirical research and urban planning completed the closing event.

RESULTS AND DISCUSSION

Urban planning insights

The students reached the consensus that the area around the district’s central station Westkreuz has to be transferred to an urban and vital space by the year 2050. It is ought to be committed to support a health-promoting mixture of social, urban, building, and open space structures. This is supposed to be enabled by transforming and densifying the existing structures as well as including public infrastructure and social institutions. The emerging high density results in a district of short paths, thus reducing environmental impacts. However, it is essential to create a gentle transition between the public and the private area and to design those interspaces. The city of the future is based on the principle of a sharing community and co-living.

Open spaces

The students’ concepts aimed at the design of urban spaces, which attract all user groups at day- or nighttime and reflect a sense of security. Furthermore, the missing connection between public space and the neighborhood shopping center, where most of the urban life takes place, was made a subject of discussion. In an ideal vision of the neighborhood Westkreuz in the year 2050, open spaces show easy access, promote the citizens’ as well as the climate’s health and provide leisure activities and high qualitative daily life spaces for all inhabitants. This is to be achieved by flexible development of infrastructure, which creates interspaces for public areas and open spaces for leisure activities and encounters and at the same time promotes the development towards sustainable mobility. Thereby, a clear distinction among the infrastructure is needed to establish public sections (i.e. boulevards), common areas (i.e. secondary roads), as well as private and intimate spaces (i.e. courtyards).

In the city of the future, various urban modules that serve leisure activities solve the spatial separation between different areas of use and form a connecting link. One approach to ensure this transformation is the merging and extension of the existing green spaces. Furthermore, the recurrence of open spaces provides orientation within a district and contributes to its sense of identity. By stimulating the green areas with shared spaces for common use and activities, such as playgrounds, the phenomenon of feared areas can be prevented and through the broad range of leisure activities the social and physical health of the inhabitants is promoted. Besides conventional parks, further surfaces such as rooftops, courtyards or bridges have the potential to provide shared spaces for the use of leisure activities, social interactions, working or communicative space. Due to a prominent mix of open spaces within neighborhoods, cities of the future provide high living quality for individuals as well as for an entire community.

In addition, a healthy climate within a city is a focal point, which can be improved by an increase of green and connected spaces. In close connection to this, concepts in order to stop the sealing of surfaces and ideas on sustainable water management have to be developed.

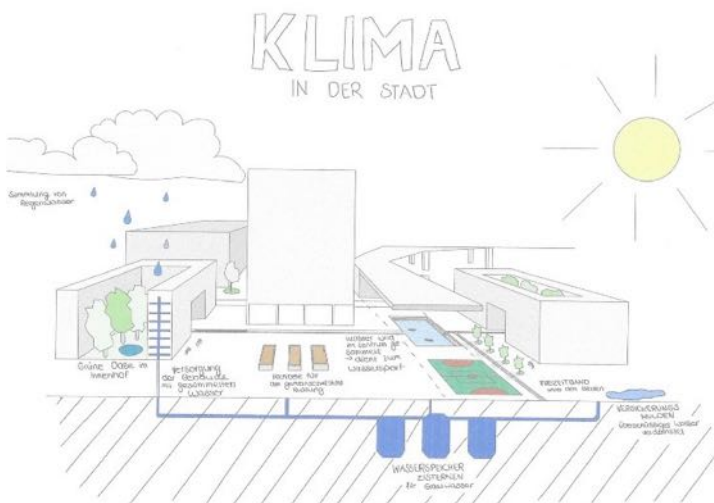


Fig 4. Healthy, inclusive and sustainable urban design concept (Thannheimer, 2021)

Living area

The future neighborhood Westkrenz is supposed to provide a new, attractive, and healthy living space for all age groups and support a social mix. Therefore various concepts were developed which intend a conversion of existing megastructures as well as new constructions of innovative living typologies. By the means of new layout typologies, living in Westkrenz is supposed to be attractive for various groups of inhabitants. Three main solution approaches were developed.

The first concept pursues the target of maximum flexibility and small-scale structures to provide high density. Inhabitants can adjust the housing types to their needs throughout different stages of life, regardless of increasing or decreasing numbers of fellow occupants. Different layout typologies were assessed in which the facade is the key component and either forms a separating layer between the inner and the outer space (loggia), builds a heated conservatory (envelope) or connects different spaces (access gallery).



Fig 5. Healthy, inclusive and sustainable urban design concept (Brunner, 2021)

The second approach focuses on the merging of living and working spaces within neighborhoods. At the latest since the outbreak of the covid-19 pandemic, the importance of a healthy working environment within the close living space became apparent and that innovative co-

working spaces have to be included in new architectural and urban planning measures. Besides the private spaces, all of the developed apartment types have access to inner or outer common spaces dedicated to leisure time, work or home schooling.

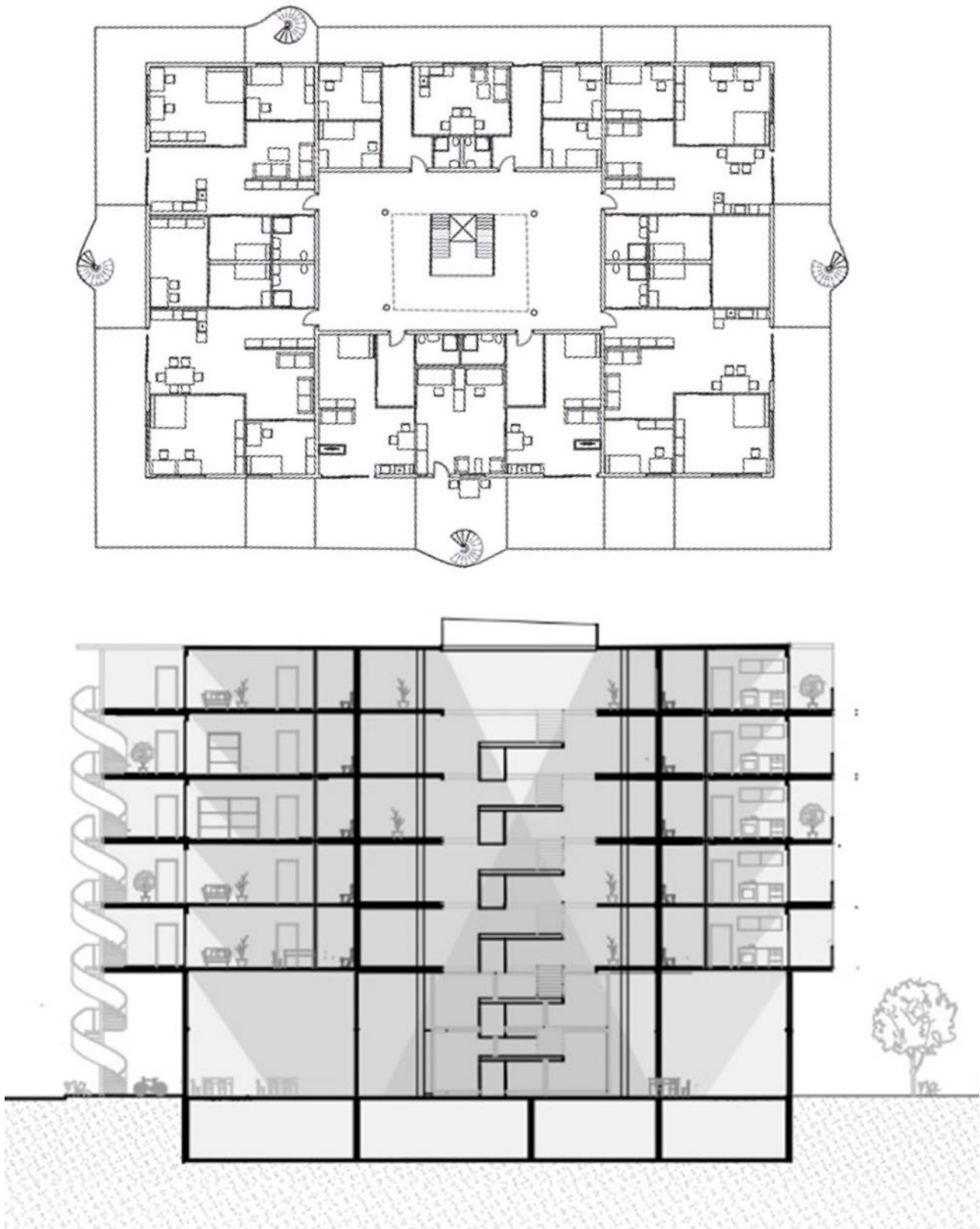


Fig 6. Healthy, inclusive and sustainable urban design concept (Meyer, 2021)

The third architectural concept follows a modular structure. The main objective is to create more freedom for the inhabitants of determining the own living unit in terms of size and design. Individual spaces can be connected or disconnected to common areas as needed. Outdoor spaces such as terraces or balconies serve as a further living module. They serve as a buffer zone between privacy and

the public sphere and can be flexibly patched into the interior spaces. By means of the developed modules and depending on the season and the weather conditions, the occupants have the opportunity to expand the different rooms in the living unit. The direct relation to the outdoors provides a healthy living climate and ensures a sufficient ventilation of the building structure.

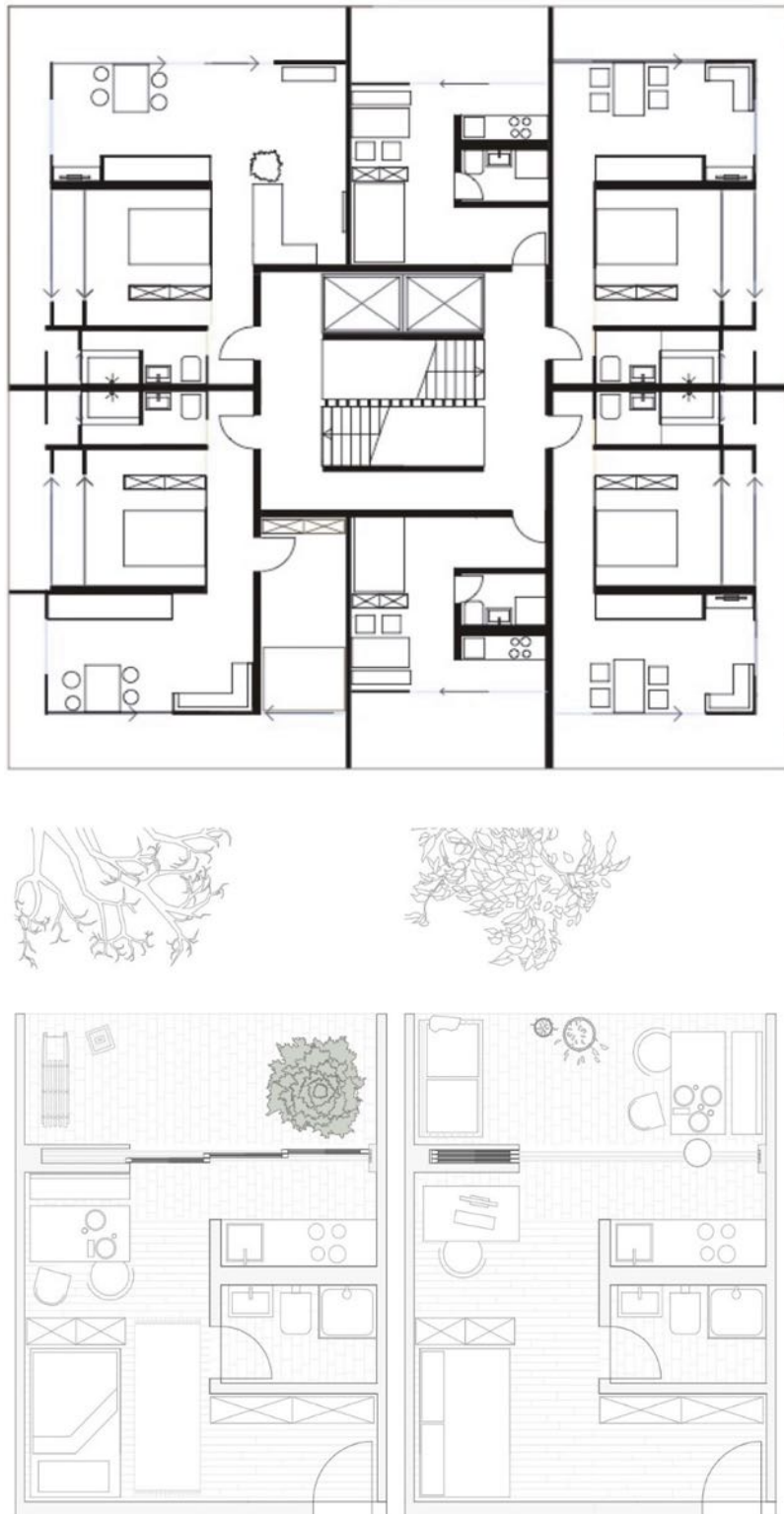


Fig 7. Healthy, inclusive and sustainable urban design concept (Hoepfner, 2021)

Traffic and Access

At its present state, Westkreuz is a transit area which attracts numerous retail shops. The commercial megastructures stimulated the motorized private transport. Due to the lack of promoting the local public transport and through the heavy traffic on the main street of Westkreuz, the district is spatially divided.

In line with the goal of creating an environmentally sustainable and resource-efficient urban district, the

students developed a variety of mobility concepts. These include traffic-calmed areas, bike highways or pedestrian walkabouts. Focal point of the development was an exclusive access for the non-motorized traffic which allows an easy and fast movement within the district. Various scenarios of the future, such as the car-free city, were discussed in order to enable urban connections while disbanding traditional structures of urbanity.

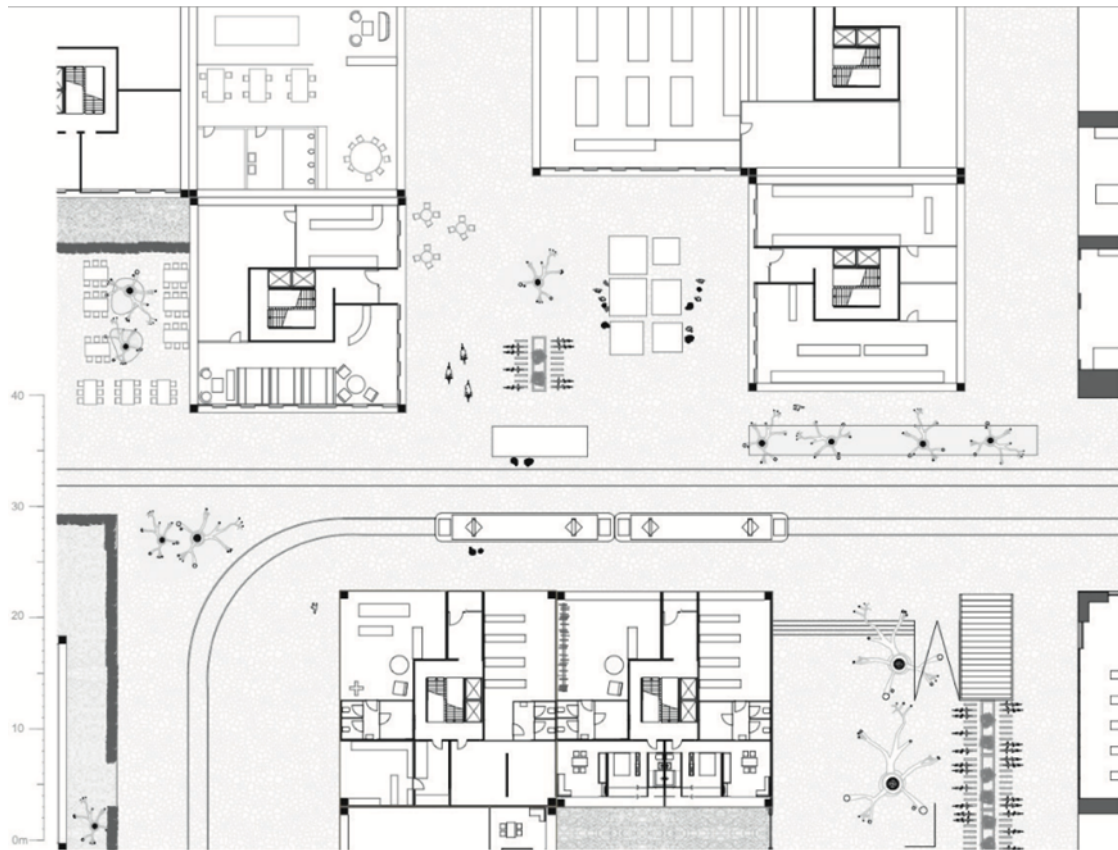


Fig 8. Healthy, inclusive and sustainable urban design concept (Hoepfner, 2021)



Fig 9. Healthy, inclusive and sustainable urban design concept (Thannheimer, 2021)

The reduction of motorized traffic and the enhancement of the non-motorized traffic will have direct consequences for the townscape of future cities. A new and slower speed is introduced to the neighborhood and the spatial separation of traffic and open spaces disappears. The urban landscape has to be redesigned and street dimensions have to be thought in a different and collective scale.

Empirical social research insights

The quantitative study shed light on the topics education, health, leisure activities and cultural offerings, living and traffic. Data were gathered within the framework of an academic seminar, as a non-interventional study. The

questionnaire was sent per e-mail to participants via social and occupational networks within the scope of social work. In total 180 participants of different gender, age, nationality, occupational status and educational, as well as social background were interviewed.

Education

In the category education, questions were asked that primarily addressed childcare and the own knowledge building. Therefore the participants were asked what they wish for the education fields to look like in 30 years. Especially topics such as care offers, footpaths, living conditions and group sizes were queried. Noteworthy is the strong disapproval with overnight childcare.

Health

The health related questions refer mostly to medical care and the possibilities of a healthy lifestyle within the future city. They are designed to discuss a cross section of the health sector, from mental, medical, and emergency care to care dependencies as well as prevention offerings. The questions on the proximity to general practitioners and specialists, as well as the importance of healthy diet and the reduction of environmental impacts were rated with a high significance among all participants.

According to a study on the health in Germany, the mental health condition has a direct connection to the gender as well as age of the affected person (Hapke et al., 2012). On that basis the hypothesis was formulated, that in the future nearby offerings for psychosocial care (such as self-help groups, advisory services, psychotherapy, etc.) are important. The respondents came to a mutual understanding and rated the offerings with a high significance. Unexpectedly, there were only minor differences in the results among the subgroups referring to age and gender.

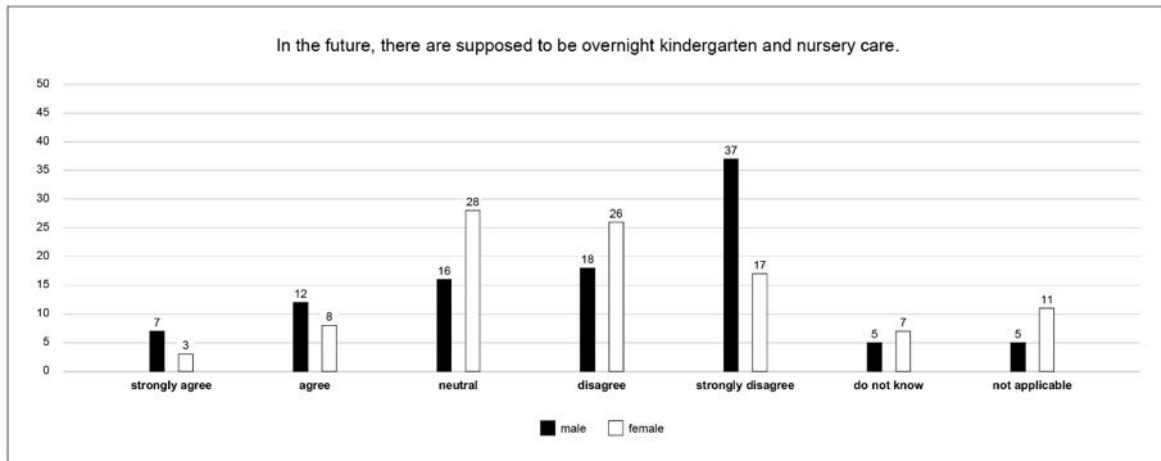


Fig 10. evaluation of the relevance of overnight kindergarten and nursery care by gender (own figure)

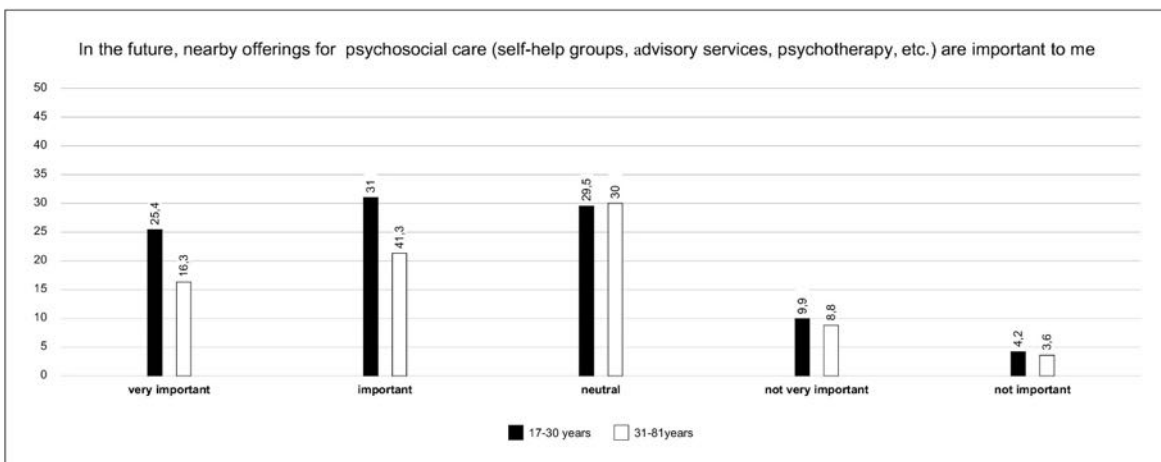
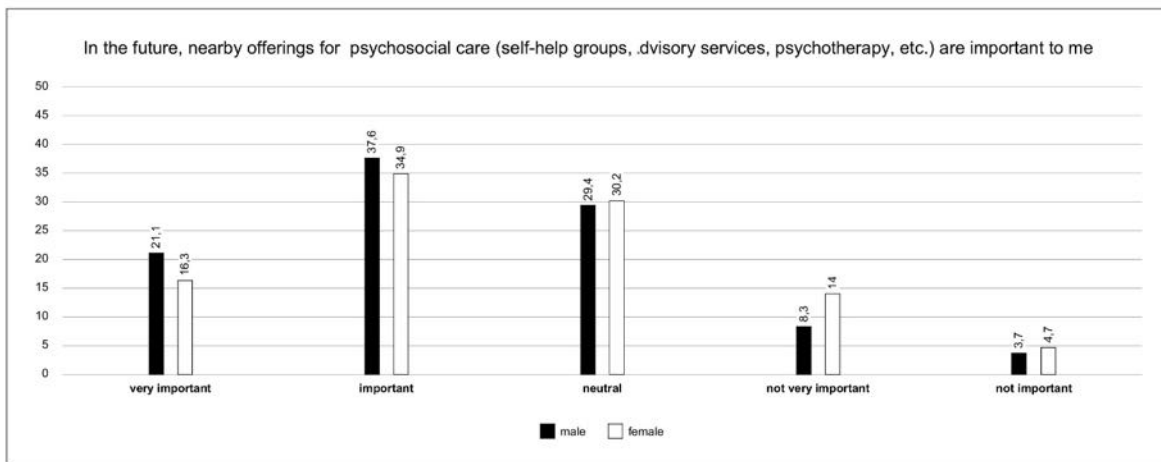


Fig 11. evaluation of the importance of local offerings for psychosocial care among subgroups (own figure)

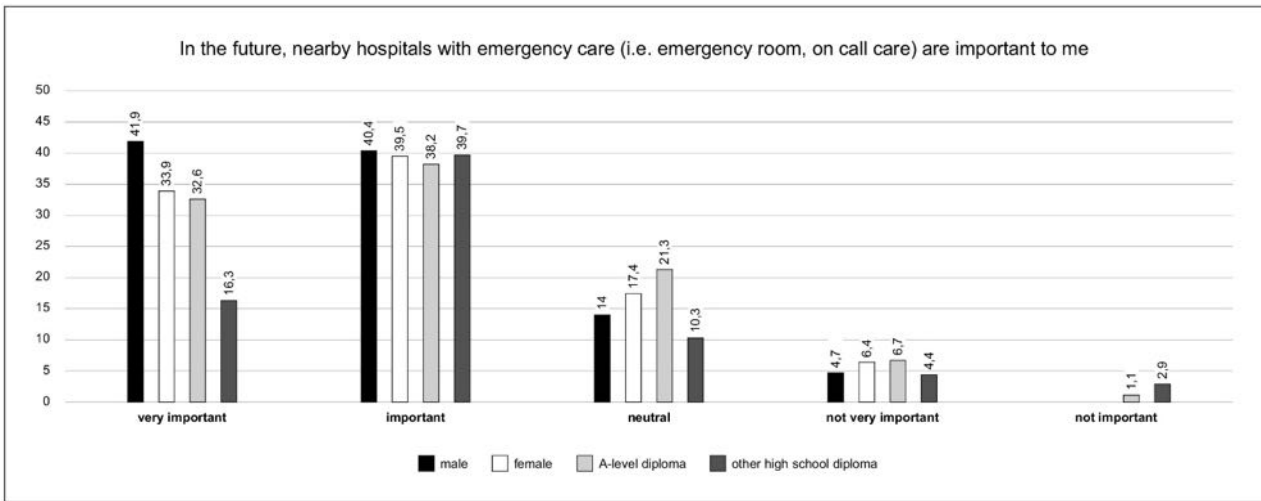


Fig 12. evaluation of the importance of close emergency care by gender and educational attainment (own figure)

Further differences are shown in the frequency of the given answer “strongly agree” towards the claim that in the future it is important to have hospitals with emergency care (i.e. emergency room, local on call care, etc.) close by. The survey showed that more male than female respondents strongly agree and that compared to others, to participants with a higher educational status, it is very important that in the future there are hospitals with emergency care close by.

Leisure activities and cultural offerings

The category leisure activities and cultural offerings discusses which public facilities and spaces, as well as cultural offerings are desired by the inhabitants in the future. As expected, there is a high approval for green spaces in a city, cultural centers, cultural participation and open spaces for creative activities among all participants. Solely, there is a deviation concerning the willingness to social engagement in the future. The survey shows that more of the older and female respondents are willing to commit themselves.

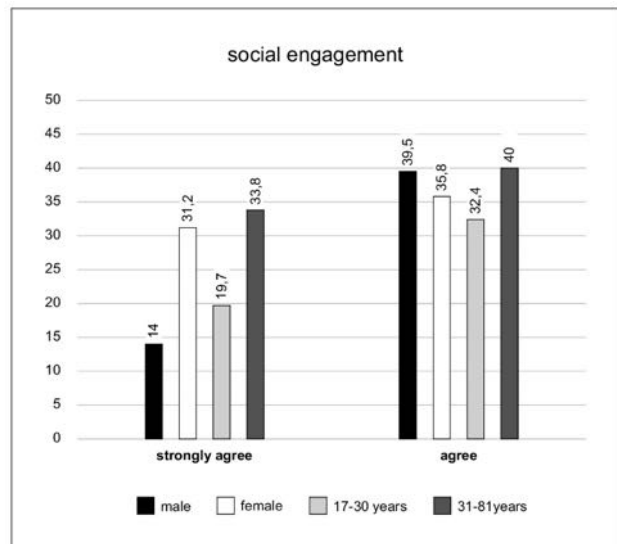


Fig 13. evaluation of willingness to social engagement by gender and age (own figure)

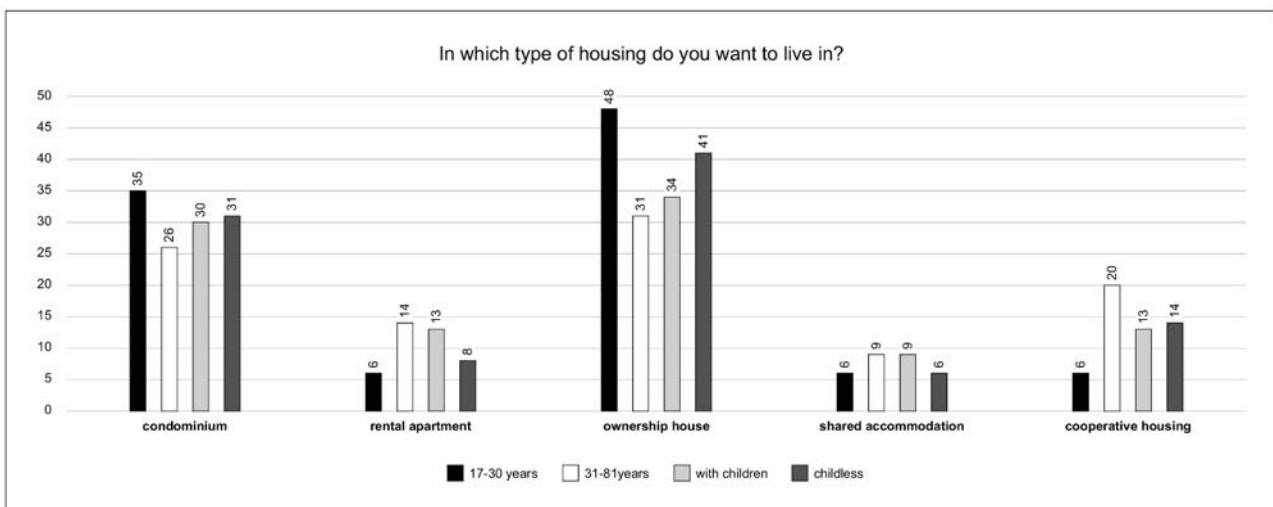


Fig 14. ranking of favored types of housing by age and potential children (own figure)

Living

In the living category, questions about neighborhoods, ideal conceptions of outdoor areas, as well as rental prices were asked, revealing two unexpected results.

Whereas the share of residential property in Germany accounts 46,5% (status of 2018) (Statistisches Bundesamt, 2020a), according to the survey the majority (68%) favor property ownership.

In terms of household members, only 9% of the respondents wish to live alone. This result is contrary to the development of the number of household members, which in Germany has declined since several decades. In 2022 there were 42,3% single households (Statistisches Bundesamt, 2020b) and according to the statistical federal office, this trend will continue.

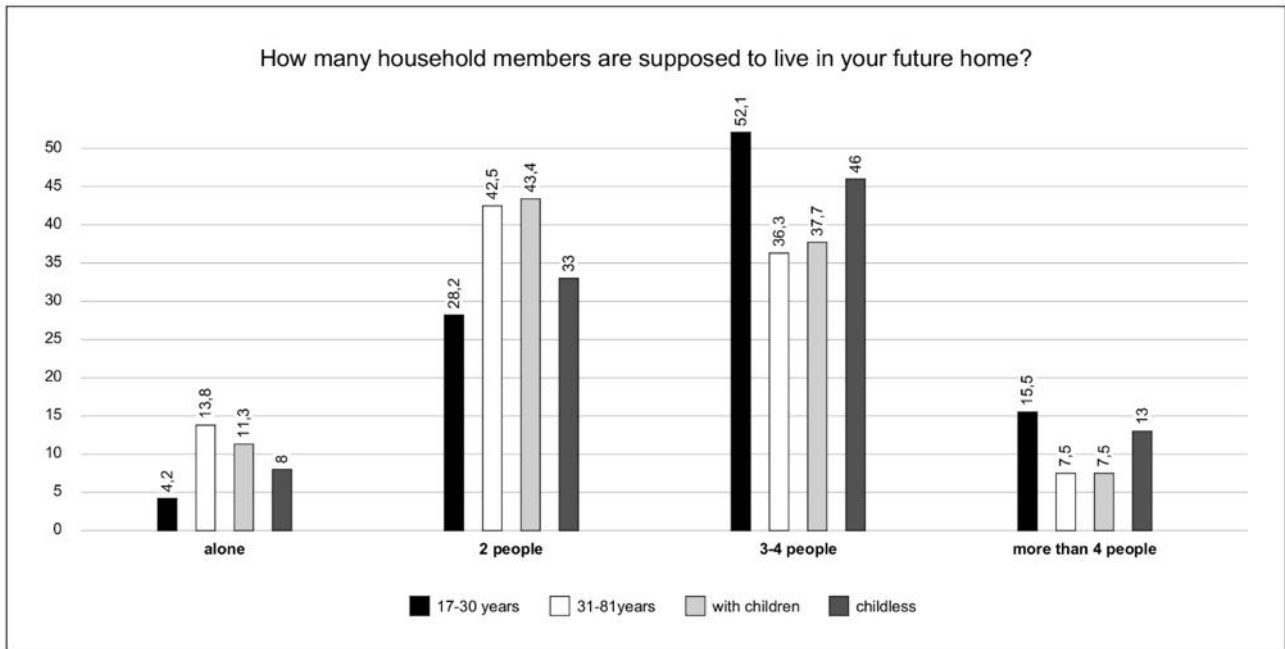


Fig 15. ranking of favored number of household members by age and potential children (own figure)

Traffic

The category traffic sheds a light on the peoples' expectations of public, as well as private transport systems in the future. The evaluation shows, that a large share of the respondents welcome sustainable mobility concepts, such as carsharing, emission-free transport systems, and further development for bicycles and therefore correspond to the guidelines of the European Union (EU).

Dialogue panels

In the course of the kick-off workshop the crucial notions were specified to generate a common basis for the research process. The participants defined "health" as healthy living/building, justice, care for all social classes, digital networking with focus on local medical care and various prevention offerings, as well as sport opportunities in public space. Furthermore, the importance of health within a society was discussed and data based planning was identified as particularly important. "Sustainability" was described as clear distinction between private and public space and high capability of adapting the planned urban spaces. It was stressed that sustainability has to be considered across technical borders and urban planning has to be human oriented. In terms of "participation", the participants identified themselves with the solidarity city, in which all people have the right to live and work and

everybody has access to education and medical care. Furthermore all inhabitants, regardless of their resident status, financial possibilities, skin color, gender, sexuality, and religion, are supposed to be able to participate, co-determine, and shape urban life. In addition, the participants emphasize that infrastructure has to be made usable for all and that there is a need for a normative framework which allows certain liberties.

The first dialogue forum was dedicated to the structure of the inhabitants survey. Not only the questions to be asked were discussed, but also who should be interviewed and with which method. The participants decided that the group of respondents should be put together from representative samples from society such as young and old respondents, families, people with migrant background and people in precarious situations (i.e. homeless people). It was important to the participants of the workshop to thematize mixed housing between young and old, low-threshold meeting grounds, climate neutrality of neighborhoods as well as sharing common spaces. The participants agreed on a digital participation format and a personal interrogation. In general, the participants concluded that the questions had to be customized to the respective target audience (i.e. translation into different languages).

During the second dialogue forum, the participants compiled a list of various topical clusters which are relevant to the participants to live healthy and ecologically sustainable in Munich in the year 2050.

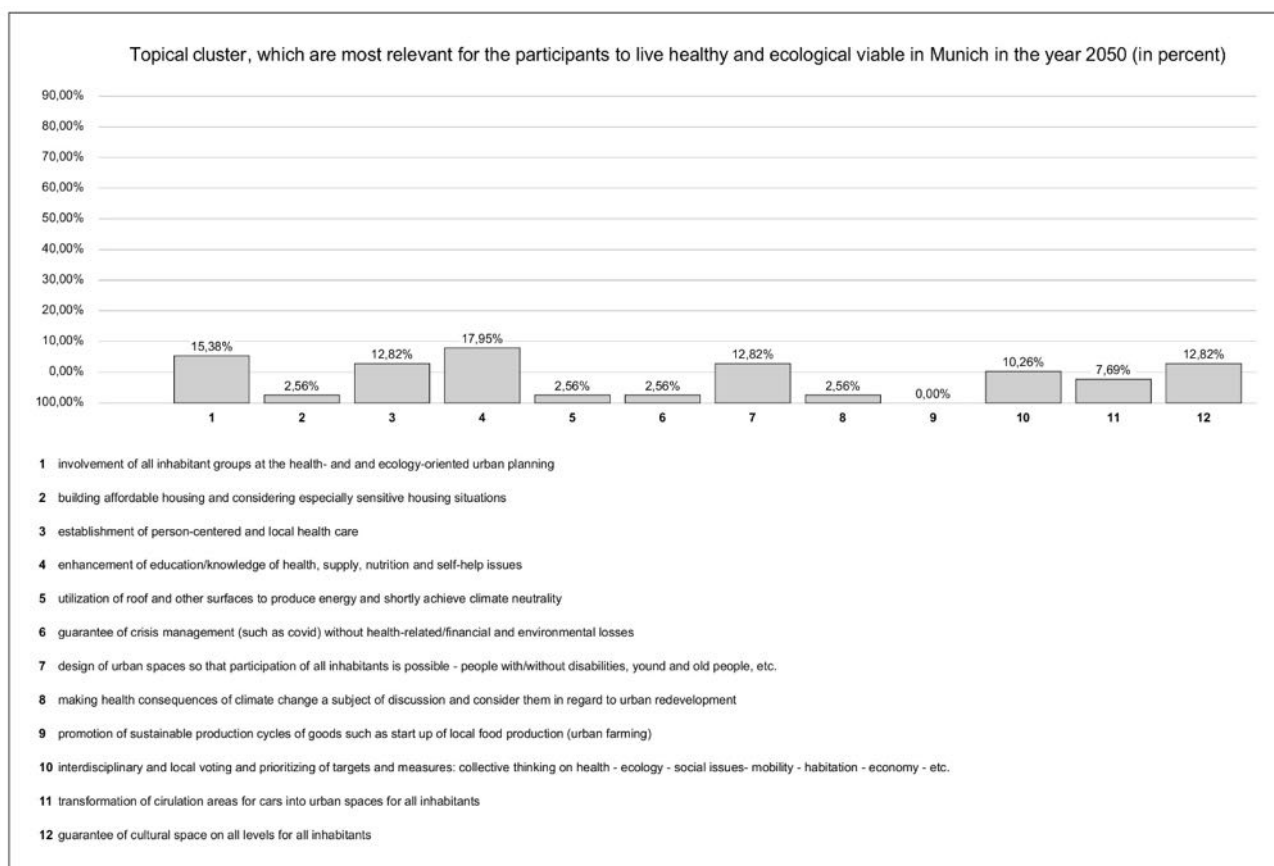


Fig 16. evaluation of the most relevant topics among the participants (own figure)

The guarantee of spatial access for all population groups is especially highlighted. Moreover the importance of enabling a purchase of condominiums to people of lower income classes was discussed. A further aspect that was addressed referring to the creation of housing, is the very high land usage per capita. The existing living space should be used more wisely in the future city. From the participants view, the socially fair land use as well as the equity over several generations are topics that further on should be made a subject of discussion. The availability of social housing has decreased strongly in recent years and the current need cannot be satisfied. The sole measure of providing cheap housing is not seen as a solution to the existing challenges. The construction of new housing is identified as the wrong approach, as this promotes the throwaway society and is not tolerable in terms of sustainability. Solutions should be found within the existing space (i.e. reconstruction, modernization, repurposing, etc.).

The third dialogue forum had the aim of comparing the results of the empirical social research and the urban planning designs. Due to the synthesis of the different findings, tensions were identified, and potential measures were collected. There were significant discrepancies referred to the topic of future types of living. Within the urban design concepts, the students considered people having to live together on confined space in the future and identified communal living as the living form of the future. Whereas according to the conducted survey the majority and in particular the young generation prefers to occupy ownership properties. Therefore, new types and models of housing have to be found in order to reduce land usage. Concerning this matter, in the future development plans have to be adjusted and serve as a determining factor. Likewise the respondents wish for hospitals close to their

residence in the future, whereby the urban planning concepts focus on mobile health care. Further discrepancy concerns open spaces. While the respondents ask for parks, future urban planners face the challenge of increasing drought. On these grounds, more water elements have to be integrated in urban planning. Also the participants stated the importance of fitness centers close to their residence, however the aim of sustainable urban planning is to minimize future land sealing and to promote grassing of urban spaces. Equally questionable are the mobility concepts of future cities. Though the majority of the respondents have a negative attitude towards carsharing or the dispatchment of private vehicles, from an urban planning point of view, future mobility concepts should focus on the further expansion of public transport systems. The students' core concept is to make neighborhoods with mixed use better accessible and to create short distances in order to simplify and promote sustainable movement.

The summarizing closing session served as a platform for both disciplines to advocate their stances. From the social research point of view it emphasized the consequences of social inequality and the formative environmental factors such as noise, air pollution and the proximity to health care. On the other hand the urban planning perspective stressed the relevance of healthy and safe public spaces referring to future quality within cities. Furthermore, the transformation, including a mobility change and climate-friendly urban spaces, creates synergies, and future cities ought to minimize health-related strains at the place of residence and the working place, and to promote social networking on site as well as to enable sustainable ways of living.



Fig 17. Discussion board (Weber, 2022)

CONCLUSION

Due to the holistic approaches and developed Co-Creation formats, the project contributes to healthy and sustainable metropolises and in addition provides methodical contribution to a participatory development of health-promoting and ecological urban neighborhoods. Therefore the project can be used as a blueprint for further research.

While architecture and urban planning is a future-oriented discipline, which identifies circumstances through projections into the future, empirical social science refers to actual facts and present circumstances. A synthesis of both specializations, the data based research and the design research, inevitably leads to tensions. This showed in the merging of the empirical social study and the urban planning concepts for a future city in the year 2050. However, those frictions stimulated the discussions and forced the different parties to come up with new and innovative ideas. The opposing methodologies lead to a holistic observation of the challenges and increase the feasibility and acceptance of the solution approaches.

The research project demonstrates the need of structures within evolved neighborhoods which are participatively designed, health-promoting, and sustainable. With its groundwork, the opportunity for a new category of space evolves: "urban area". "Urban areas" other than conventional categories of space such as residential area, commercial area, and mixed area, enables more scope of design. It is ought to provide living area, accommodate businesses as well as social, cultural, health-promoting and other institutions within a small-scale mix of use as far as the residential use is not disturbed. In the case of Munich, this change in the sense of greater inner development arises high prospects for the future to increase life quality, mixture as well as density in monofunctional and monostructural districts. Therewith a city of short distances, broad range of services, as well as high density of social interactions and events can be enabled.

The results of the different formats are solution approaches and do not state the end of the process. It will be necessary to carry out a detailed analysis of whether the

solutions are accepted and if there are technical, legal, or other barriers that overrule an implementation.

DECLARATIONS

Funding:

This work was supported by the Fritz and Hildegard Berg Foundation [grant numbers T0133-34.930].

Conflicts of interest

Not applicable

Ethics approval:

Not applicable

Consent to participate:

Not applicable

Consent for publication:

Not applicable

Availability of data and material:

On request

Authors' contribution:

N.K., N.P. and C.J. carried out the research. A.D. took the lead in writing the manuscript. All authors provided critical feedback and helped shape the analysis and manuscript.

ACKNOWLEDGMENTS

The authors want to thank Benedikt Schneider, Leinani Mayer, Linda Ehinger, Vanessa Schubert, and Anne-Isabelle Zils for their tremendous help in gathering, analyzing, and

reporting the data and the results of the empirical social research study. Equal gratitude to Franziska Thannheimer, Sophia Brunner, Sophia Meyer, and Cora Höpfner for their creative and innovative urban and architectural designs for the future neighborhood Westkreuz.

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