Design for Longevity: People, Process, and Platform

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Abstract
This experimental research study explores the concept of longevity in the context of design. It emphasises the importance of creating meaningful and impactful solutions to complex social-technological challenges posed by an ageing population and the longevity economy. In the context of the *diid* issue, different authors discuss the role and influence of design and the creative process in addressing issues related to longevity, and celebrating people's independence, health, finance, and quality of life through innovative products, processes, places, and platforms. It introduces the concept of Design for Longevity (D4L), which incorporates comprehensive considerations encompassing family dynamics, housing, community engagement, health, education, investment, risk, and advocating for the individual's multiple life stages with purpose and respect. The introductory paper also highlights the contribution of D4L in the ongoing discourse on the social impact of design in fostering community building, social interaction, and engagement among older adults to enhance longevity, literacy, fitness, and well-being.

We need to learn how to live meaningfully, not just survive, in the era of a longevity economy and to re-frame and solve the complicated, systemic social-technological problems associated with population ageing.
(Lee et al., 2023d)

Design for Longevity

The world's population is getting older and in industrialised Western countries, the number of older people outnumbers younger generations. This has so far led to serious problems in financing these parts of the ageing population who desire to have a meaningful, quality life rather than staying locked up at home. Design plays a crucial role in this context, from the conception of new accessible products to the planning of services, interfaces and many other intangible elements that make up our increasingly digitised world. With the exploration of the "Longevity Economy", Coughlin (2017) points out the collective sum of all economic activity driven by the needs and desires of older adults. He asserts that this market is not limited to traditional senior-focused industries such as healthcare and retirement services, but also includes sectors such as technology, fashion, and entertainment. The longevity economy, according to Coughlin, is fueled by older adults' desire to maintain independence, health, and quality of life well into their later years. The current issue of *diid* uses selected examples to explore the complexity of this topic in the current design discourse, selected by the authors of this introductory essay to establish a discussion around the systemic approach that Life-Centred Design (LCD) strategies need to create.

By elaborating a framework with some of the core elements that make up the living conditions for people to age in the best psychological and physiological conditions, comparing "age" and "longevity," the authors aim to create an overall scenario of the influences underlying the discourse. Ageing is the natural and gradual process of growing old and the physical and functional changes that occur in an organism over time. It is a universal process that occurs in all living organisms, including humans. With ageing, various physiological functions decline and susceptibility to diseases and age-related problems increases. Longevity, on the other hand, refers to the length of an individual's lifespan or the duration of life. In this context it refers to the potential extension of the lifespan of humans. It is influenced throughout the entire lifespan by actors such as genetics, lifestyle, environment and healthcare. While genetics form the basis, the environment as a whole can play a crucial role in influencing the speed and quality of ageing. A healthy lifestyle and minimising exposure to harmful environmental factors can help promote healthy ageing.

Scheme 1: The tangible and intangble differences between Aging and Longetivity

Fig. 1
The tangible and intangible in relation to ageing and longevity.
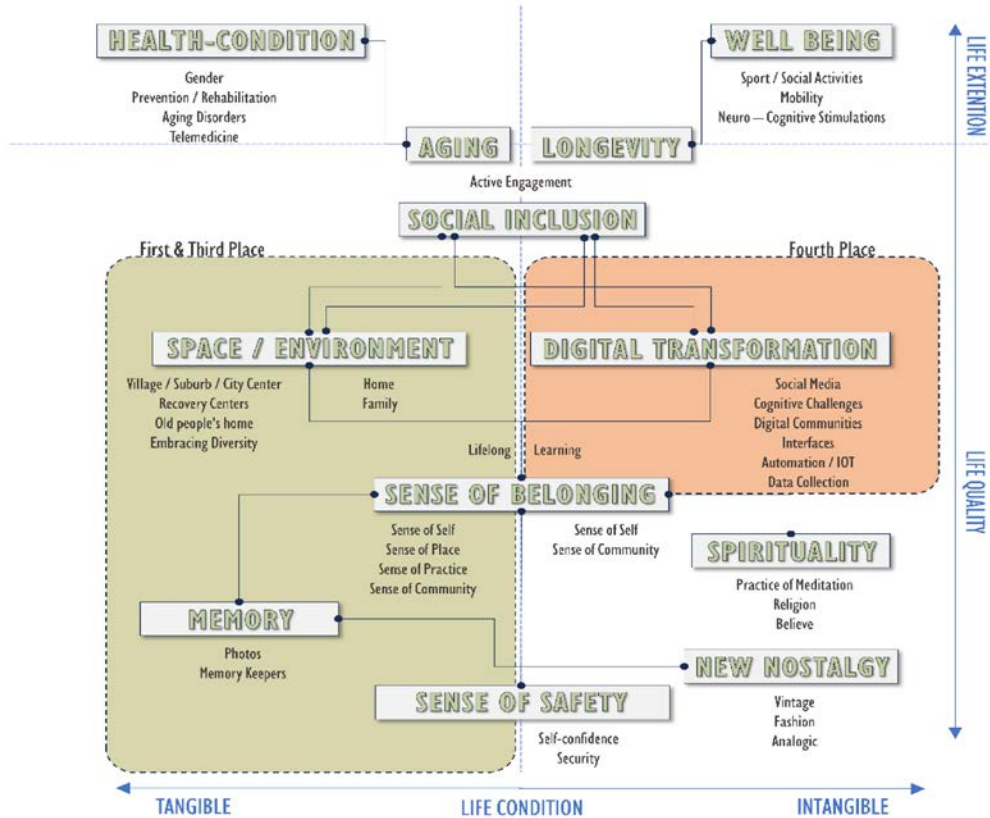
Fig. 1 seeks to illustrate the merging contexts between tangible and intangible life conditions that influence lifelong strategies related to social inclusion, the sense of belonging and sense of safety. These concepts relate to the person in an active and passive way: for example, safety is built up during a lifetime aiming for longevity, while in ageing this safety is considered as the result.

Third Place and Fourth Place

The rise of longevity economics and services- and experience-driven industries has significantly promoted the concept of Design for Longevity — D4L (Lee et al., 2023a). D4L provides a holistic lens to reframe, comprehend, and solve complex socioeconomic challenges and systems (Lee et al., 2023c; 2023b), incorporating a wide range of considerations such as family dynamics, housing, community engagement, transportation, financial planning, risk management, healthcare, education, and more. Consequently, the adoption and understanding of D4L signify a paradigm shift in how individuals perceive their life journey, moving away from the traditional three-stage model of birth, learning, and retirement to embracing a life composed of multiple stages with purpose and respect. This shift

not only redefines our stages of life but also challenges our conventional views of our surroundings—home, workplace, and so called third place.

The third place theory, proposed by sociologist Ray Oldenburg (1999), refers to places where people spend time in addition to their "first" place (home) and their "second" place (work). When people retire, the "second" place is no longer part of everyday life, which is why the importance of third places enlarges significantly besides the home: they are characterised by the feeling of community, social interaction and the commitment they convey. Traditionally associated with cafes, parks, and other informal gathering places, it is associated with longevity and ageing in the following ways.

1   Social inclusion: As people age, maintaining social connections becomes crucial for well-being and longevity. Third places can serve as vital community hubs for older adults, fostering relationships, friendship, and a sense of belonging.
2   Active engagement: The Third Place Theory emphasises the importance of active participation and engagement. Creating third places that offer activities for the ageing population, such as book clubs, art workshops, game nights, or exercise groups, can continue to help them stay engaged and maintain their cognitive and physical abilities.
3   Lifelong learning: Many third places provide opportunities for informal learning and knowledge sharing. Continued learning can enhance cognitive function, improve quality of life, and potentially promote longevity.
4   Sense of self, belonging and purpose: Third places often offer a sense of purpose and community involvement. This can be especially important for Creating third places that encourage volunteering, mentoring, or intergenerational activities can help transitioning into retirement or experiencing changes in their roles and responsibilities.
5   Embracing diversity: Third places are known for their inclusivity and ability to bring people from various backgrounds together. By creating third places that are inclusive and cater to diverse needs, older adults can find a sense of connection, reduce ageism, and promote intergenerational interactions, ultimately contributing to healthier ageing.

Overall, longevity regards the entire lifespan of an individual, but especially the last part of life, after retirement, poses greater risk to humans of a faster decline in psychological and physical performance, which leads rapidly to death, as daily activities are constantly reduced.

Today's environment is primarily a man-made, artificially built environment: it is anthropocene in all its aspects. People move in these physical environments, in the spaces they create, and by doing so, they attribute a personal meaning to the surroundings: the living space remains understood as the first place and home, as Proshansky et al. (1983) quote Relph's 1976 *Place and Placelessness*: "The home is invariably considered the place with the greatest personal meaning in a person's life, the central reference point of human existence". However, the needs of older adults need to be considered as an extended space beyond the four walls of the home. The concept of living is not limited to the private place to which a person retreats

to sleep and eat, but also includes the environment in which s/he lives, consisting of neighbourhood, the streets leading there, weekly markets and supermarkets, the post office and much more.

Proshansky's theory of place-identity highlights the significance of the physical world in shaping our socialisation and self-identity. By understanding how individuals interact with and attach meaning to the places they occupy, we can gain insights into the complexities of human behaviour, social connections, and the ways in which our environment influences our sense of self. This extended space is a vivid integration of physical spaces with their participants and service providers, but is also understood as the digital online communities that expand social interaction.

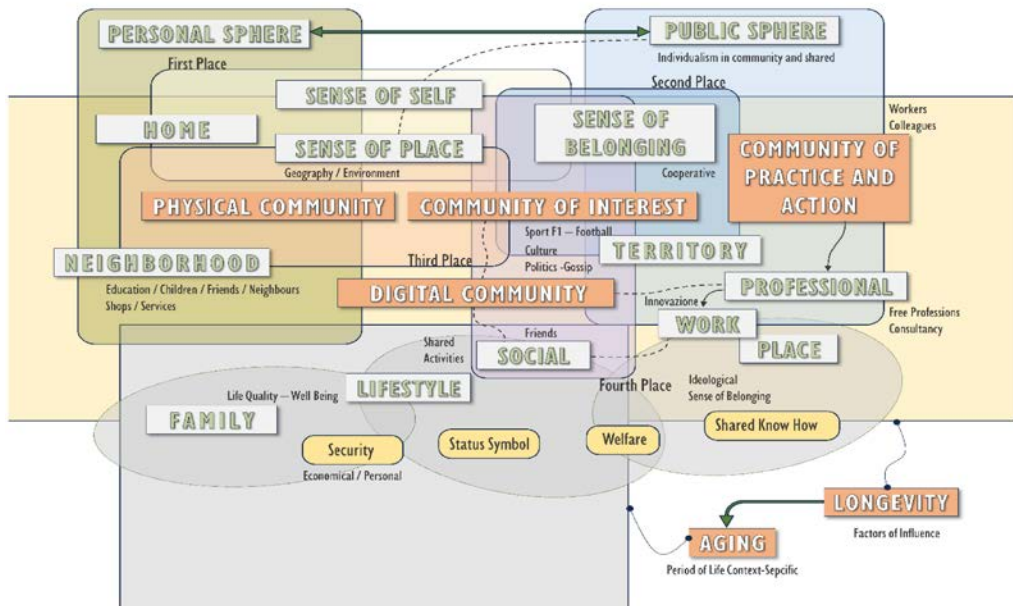**Scheme 2:** How much the different Community Lifes are influencing Longevity

Fig. 2 shows the interaction of self-perception on the one hand, and the aggregations of different kinds of communities that can enhance the quality of life and extend life for elderly people on the other hand, where digital communities offer a wealth of information and resources specifically catering to the needs of the elderly. Through online support groups, forums, and websites, they can access information on healthcare, financial planning, retirement, leisure activities, and more. This access to relevant and reliable information empowers them to make informed decisions, enhance their knowledge, and improve their overall quality of life. They can interact with others, reducing feelings of isolation and loneliness, provide a space for the elderly to seek and offer emotional support.

But within this digital transformation with all its opportunities lies hidden the neglect of a need, which becomes especially important for the elderly: memory. As Flaviano Celaschi (2020) suggests,

Fig. 2
How much the different parts of community life influence longevity.

"on social media, objects exist for the time of their mention, in the dizziness of the list, immediately eclipsed by faces and kittens". In a digital environment, beloved objects, those classic memory keepers that represent lived experience, change in an insignificant period of time based on a continuous request from the metaverse that constantly stimulates us with new inputs. The memory of our lives is erased with one click.

"The radical changes that new digital tools bring are shortening access times to content and therefore people's ability to store and organise the knowledge that arises from the flow of information that we consume every day through the media" (Zannoni, 2022). This is how Michele Zannoni analyses our declining ability to store memories: too much visual material to remember and memorise in too short a time. This also illustrates the degree to which memory is related to the physicality of things, right down to the extent of their ability to be recalled in their physical presence in our environment. Physical objects take time to be placed, remembered, and examined. They are tied to the places of our lives. They are part of the sense of place. The memory of physical objects and our Anthropocene spaces represents the world, is shaped by what we have built, and is solidified by anchoring the time of our lives as part of a narrative. This narrative is linked to memory, which in turn is linked to emotions. Therefore, choosing not to renovate the apartment or to reduce the number of items on the sideboard to make cleaning easier is not a form of laziness: objects are memory keepers and emotional anchors for well-being, especially for the elderly.

We can affirm that D4L deals with a complex system of factors that are interrelated in daily life habits and expectations that contribute to the wellbeing and extended life expectancy of people in a continuously transforming environment.

LCD Approach as a Tool for D4L

In this special edition, we have integrated insights from five distinct submissions to deepen our understanding of the D4L concept across multiple domains, including education, data privacy, underserved communities, and digital transformation. In light of this, we present four thought-provoking challenges in this special *diid* issue with contributors across various backgrounds:

1   How can we tackle socioeconomic design challenges through the lens of D4L, while also amplifying the impact of creative learning (Resnick, 2017)?

2   How can we harness data analytics to conduct a scientific inquiry into the requirements and challenges associated with D4L?

3   How might we utilise D4L toolkits and design approaches to empower vulnerable youth in preparing for their future? Through the lens of Gender Equality, the aim of research and experimentation is to highlight the need for social stability from an early age, as this permanently and in the long term influences the well-being of underestimated social groups, such as young girls who need to struggle for their rights. Using participatory design strategy methods, the involvement of the participants showed initial results in promoting D4L principles.

4 How do we increase our longevity literacy, fitness, and well-being on the levels of individuals, communities, and societies? The scholars have found that exploring the specific implications of trust, confidence, and willingness to adopt AI integration in decision-making processes is crucial for the design of financial planning services. The promotion of technology in the living environment as a tool for self-protection and immediate-continuous connection will be a longevity game-changer for future generations.

 Moreover, we recognize the multifaceted nature and complexity of these research themes as they intertwine with overall well-being, encompassing financial and health considerations, as well as social connectivity, mobility, educational opportunities, and a range of other influential factors.

 Norman (2024) introduces the concept of LCD, which advocates for a comprehensive approach to considering multiple life stages. LCD diverges from Human-Centred Design (IDEO, 2015) by integrating systems thinking, acknowledging the interconnectedness of systems, which share guiding principles similar to those of Human-Centred Systems Design (Lee, 2024). This philosophy is integral to the curriculum at institutions such as the Life-Centered Design School (Spoelstra, 2022) or Stanford University (Burnett & Evans, 2016). As we navigate through a transformative era, the question arises: How can we equip ourselves not only with technical expertise but also with vital soft skills? For instance, these might include enlightened leadership, effective teamwork, creative confidence (Kelley & Kelley, 2013) along with mentorship and communication abilities. However, these complex socioeconomic transformational D4L challenges are only the tip of the iceberg. By incorporating the D4L lens, individuals can gain more comprehensive insights and knowledge about the built environment and mother nature, enhancing our ability to navigate and utilise these spaces effectively and meaningfully: home, workplace, and the third space. D4L advocates for the thoughtful design of our physical surroundings to be inclusive, longevity-friendly, and respectful, while also urging us to cultivate our cognitive space, mental health, and psychological well-being in the context of longevity and LCD.

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He serves as a designer and Ph.D. researcher at the Massachusetts Institute of Technology (MIT) AgeLab and the MIT Ideation Lab, as well as a Board Director for the Industrial Designers Society of America (IDSA). His work, enriched by a diverse array of knowledge and perspectives gained during his tenure at IDEO, currently focuses on research in Design for Longevity (D4L), service innovation, and system design. Additionally, Lee serves as Adjunct Associate Professor at Shih Chien University in Taiwan.

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