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Ageing and the Built Environment in Singapore

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Foreword

The Lee Kuan Yew Centre for Innovative Cities (LKYCIC) in the Singapore University of Technology and Design was established in September 2012. Shortly after, Mrs. Lee Liming, a Singapore philanthropist, agreed to gift a research grant to the Centre on the condition we work on ageing as a topic. Thus, the *Lee Liming Programme on Ageing Urbanism* became the first research programme set up in LKYCIC. The second research flagship programme, the *Future of Cities* was launched in 2014, followed by the *Chen Tianqiao Programme on Cities and Innovation*.

Taking up the topic of ageing was timely and the right thing to do. In 1997, then Prime Minister Goh Chok Tong, speaking at a Triennial Conference for grassroots leaders, raised the issue of the rapid ageing of the population. In 1998, the Inter-Ministerial Committee on the Ageing Population was formed to look into the needs and consequences of the ageing demographics. Academic interest followed. But, ageing as a research topic has gained wider attention more recently, prompted by the fact that 2030, the year when Singapore's population of those aged 65 and older would reach the projected figure of 900,000, is not far away.

Dr. Belinda Yuen working with her team completed a major survey of the ageing population to understand their needs. They verify and enrich their findings with other methodologies to get a full and rounded understanding of the requirements and aspirations of the senior population. We hope this treasure trove of data will be useful to those who have to make decisions affecting the ageing population, and for other researchers who are interested in working in the same area.

Singapore

Prof. Chan Heng Chee
Ambassador-at-large and Chairman
Lee Kuan Yew Centre for Innovative Cities
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Preface

In 2013, when I joined the Lee Kuan Yew Centre for Innovative Cities, Singapore University of Technology and Design, I was asked to develop a research programme on population ageing. Thus was born the Lee Li Ming Programme in Ageing Urbanism and the project: Understanding the Changing Needs of Singapore's Older Population. Being the first project under the programme, it reflected my continuing interest and research on housing and public spaces with an analytical lens focused on a population that I have not closely studied before: older people, their lived experiences and perceptions of growing older in these spaces.

The World Health Organization has highlighted the rapid growth of older population worldwide and the importance of the built environment including housing and outdoor spaces in the older person's health, well-being and quality of life. Yet, relatively little research has addressed the older person's experiences of these spaces. We are inspired to share our research, the methods we have used and some of the findings.

I would be remiss if I did not mention that many people (listed in the individual chapters) have contributed to the completion of the research project and this book. I duly acknowledge their contributions. In addition, I thank Mrs. Lee Li Ming for supporting our research through her generous gift.

I hope the chapter contributions in this Volume, whether you read one or all of them, will go some way towards promoting better understanding of the older person's relationship with the built environment, and will further research and consideration while planning housing and outdoor environments for an ageing society.

Singapore — Belinda Yuen

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Introduction: Framing the Issue

The United Nations (2010) estimates that by 2050, 70% of the global population will be living in urban environments. Crucially, a big proportion of that population will be older than 60 years. This population segment is growing faster than any other age group as a result of both longer life expectancy as well as declining fertility rates (World Health Organization 2015). Projections are predicting an unprecedented global crossing event before the end of the decade—older people aged 65 and over will outnumber children under the age of 5 by 2020 (He et al. 2016). The dynamics of these two trends—rapid urbanisation and rapid population ageing—will undoubtedly shape the future development of cities. It is imperative that cities recognise and respond to these changing realities, now rather than later.

At the Lee Kuan Yew Centre for Innovative Cities (LKYCIC), Singapore University of Technology and Design (SUTD), we have responded to the changing reality by convening a flagship research programme, the Lee Li Ming Programme in Ageing Urbanism. The aim of the programme is to study the twin challenges of rapid urbanisation and rapid population ageing with special focus on ageing population and the urban built environment.

A key challenge facing cities is the question of how we (re)shape the built environment to accommodate the evolving needs of a fast-greying population. Specifically, how we plan and design the built environment, from housing to neighbourhoods, can determine levels of independence, dignity and self-respect in later life (Australian Local Government Association 2006; Garin et al. 2014). More than any other age groups, older people tend to spend more time at home, and if they go out, it is most frequently to the immediate neighbourhood. Getting these spaces right is a crucial factor to achieving successful, healthy ageing. At the global level, the World Health Organization has posited that an age-friendly city offers a supportive built and social environment that enables the older person to actively participate in the community (World Health Organization 2007a).

The first project under the Lee Li Ming Programme in Ageing Urbanism: Understanding the Changing Needs of Singapore's Older Population (2014–2017) seeks to investigate the lived experiences of Singapore's older population (55 years old and older) in two key spaces—housing (live) and recreation (play). Its main aim

is to understand both subjective and objective older person–space relationships. The novel scope is to bring together the 'what' of knowledge with the 'how' of formulating and implementing design solution, explicitly considering the older person–space relationships using a multi-dimensional methodological approach. This approach involves quantitative and qualitative methods, traditional instrumentation as well as recent developments in mobile crowdsourcing. The project combines research with planning, with the focus to include the older person into conversation. The methods and findings are presented in this book. To our knowledge, this is the most comprehensive study using mixed methods of the two mentioned aspects in Singapore to date.[1]

Singapore is a natural laboratory for this study. With its land area of 720 sq km and population of 5.6 million, Singapore is a city-state. It is 100% urbanised and its citizen population is ageing at a rapid rate. Older Singaporeans (aged 65 and older) are expected to double to one in four by 2030. This demographic change has come about quickly. France has taken 117 years to increase its older population from 7% to 14%, Japan 24 years and Singapore is expected to take 17 years to achieve this growth (United Nations 2015). What is the impact of this demographic shift on Singapore's built environment and urban living? How can we adapt and design its housing and neighbourhoods to become more supportive of older residents' changing needs? Recognising and understanding this demographic shift is crucial. This book presents a collection of the methods and tools that may be used to help us better understand this demographic shift.

Singapore Ageing Research

Population ageing has been a topic of policy discussion in Singapore since the 1980s. Several high-level ministerial committees have been established to study ageing trends and their policy implications (see, for example the Committee on the Problems of the Aged 1984; Committee on Ageing Issues 2006; Ministerial Committee on Ageing 2016). The Ministerial Committee on Ageing released an Action Plan for Successful Ageing in August 2015, covering over 70 initiatives in 12 areas including research to help individuals to age well, foster an inclusive community and create a city for all ages (Ministry of Health 2016). This has spurred research on ageing. For example, since 2015, the National Innovation Challenge on Active and Confident Ageing has allocated S$200 million to support research and innovation on work and learning, and the study of ageing well to find ways to delay the onset of disease and disability.

[1] See other studies on Singapore's ageing society and housing such as Addae-Dapaah and Wong (2001); Bozovic Stamenovic (2012); Wu and Chan (2012); on Singapore's ageing society and outdoor spaces such as Teo (1997).

In that same year, two key national research centres were established. The first is the Centre for Ageing Research and Education at Duke-NUS Graduate Medical School Singapore to conduct research and education on ageing and health, in particular, taking a comprehensive gerontological perspective and combining the biological, social and clinical aspects of ageing to contribute to successful ageing. The second is the Geriatric Education and Research Institute to lead the development of research and education on age-related health issues to promote healthy ageing. Notwithstanding the many and growing number of research centres on population ageing in Singapore, local research has tended to largely centre on the domains of inquiry emphasised by the inter-ministerial committees of ageing like older adults' employment, health and caregiving. Analysis of the older population's experience of urban living, in particular, their attitudes, expectations and lived experiences remain an area to be further investigated (see, for example Chan 2001; Chan et al. 2010; Mathews and Leong 2014).

There is an urgent need both to identify and understand the diverse and changing ways in which the older population (and their subsets) perceive and experience the city, especially in light of the policy to promote ageing in place as the key principle of an age-inclusive built environment in Singapore (Inter-Ministerial Committee on the Ageing Population 1999; Committee on Ageing Issues 2006). The usage of methods in the present project is largely premised on this particular reasoning—if we want to improve the older residents' quality of life, we must include them in the study and ask for their wishes, suggestions, ideas and hopes. The discussion concentrates on two aspects of urban living—housing and outdoor recreational spaces.

Housing for Older People

Housing is a key focus of the present study. Housing is one of the most important aspects of age-friendly neighbourhoods, since it is a place where older people spend most of their time. According to the World Health Organization (2007b), housing is essential to the safety and well-being of older residents in the city. Housing provides the basic infrastructure for an older individual's everyday activities, communal connections and access to important services (Menec 2017). As Frochen and Pynoos (2017) observed, '[t]he condition and location of one's residence determines a great many quality-of-life outcomes resulting from structural and neighbourhood features' (p. 160).

Most, 1 in 7, older adults in Singapore live in the community within inter-generational households; less than 0.3% lived in institutional care in 2008 (Ministry of Social and Family Development 2009). Although there is a range of housing types available, the common abode is public housing; 82% of Singapore's resident population currently live in public housing, many are homeowners. About 11% (113,294) of households in public housing are headed by persons aged 65 and above while 13% (144,792) of households have head-of-household who are 55 and above (Housing and Development Board 2014). About 32% of public housing residents aged 55 and older live in 1–3-room flats and 54% in 4-room and larger flats.

There is an emerging trend of decreasing household size and increasing number of one-person households. The 2011 National Survey of Senior Citizens in Singapore reported that the average household size has been declining from 4.4 persons in 1995 to 3.3 in 2011 and more people are living in one-person households. Among the people aged 55 and above, 15% lived in one-person households in 2011 as compared to 6% in 2005. Among those aged 75 and older, the corresponding figures were 16.6% in 2011 and 4.4–7.5% in 2005 (Kang et al. 2013). The change towards smaller households is most prominent among Chinese households; one-person Chinese households increased from 8.8% in 2000 to 13% in 2010 as compared to the corresponding proportions of 4.3% and 6.5% for Malay households and 7.9% and 10.3% for Indian households (Department of Statistics 2011). Many of these one-person households are single (57%), divorced or separated (14%) or widowed (14%).

By 2030, the total number of older persons living alone could increase to 83,000 as compared to 35,000 in 2012 (*The Straits Times*, 12 April 2012). The rapidly growing number of older persons living on their own suggests that community- and home-based eldercare services as well as infrastructure and social support services will be needed even more in the future (Yuen and Soh 2017). Even while the majority of older adults are expected to remain healthy and functional, by 2030, 13% (117,000) of those aged 65 and above (more than double the current number) may be semi-/non-ambulant. The policy towards enabling the older person to age in place is necessary and urgent, especially in the context of Singapore where 5 of 6 public hospitals have over 85% bed occupancy. Rapid population ageing will put even more pressure on public hospitals.

Outdoor Recreational Spaces

Outdoor spaces are ubiquitous features of Singapore's public housing environment. On average, about 50% of public housing town are used for residential development. The remaining area is for the provision of supporting amenities and infrastructure including about 12% for open space to nurture vibrant communities. Parks are evenly distributed and allocated on a hierarchical town, neighbourhood and precinct basis. Providing open spaces in the residential neighbourhoods is equally significant for an older individual's well-being. They serve a range of functions, from visual relief and green buffer between apartment buildings to outdoor recreational spaces to support physical activities and social interaction, factors fundamental to the older resident's social, psychological and physiological health.

The World Health Organization (2010) report on physical activity for older adults suggests that compared to less active individuals, both men and women who are more active have lower rates of coronary heart disease, high blood pressure, stroke, type 2 diabetes, colon cancer, a higher level of cardiorespiratory and muscular fitness, healthier body mass and composition, a biomarker profile that is more favourable for the prevention of cardiovascular disease, among others. Marquet and Miralles-Guasch (2015) further showed in their study of Barcelona's population that living in vital urban environments contributes to building healthy

mobility habits, especially when there are facilities and enough opportunities for walking nearby.

Yet, the Singapore National Health Survey 2010 (Epidemiology and Disease Control Division 2010) has revealed that physical inactivity increases with age. The data shows that 67% of Singaporeans aged between 60 and 69 did not engage in leisure time physical activities. This is not only worrying in terms of their physical health but also social and mental health. To compound matters, as stated earlier, an increasing number of older people are living in one-person households, away from their children and help or companionship may not always be readily available. The challenge is to increase the opportunities for older people to stay socially, mentally and physically active. Evidence suggests that older persons who remain both physically and socially active are diagnosed with fewer diseases and have better social health than those who remain home-locked (World Health Organization 2002). The importance of proximate outdoor spaces cannot be underestimated.

Structure of the Book

Methodology used in this project was wide ranging and combined qualitative and quantitative methods. A total of nine instruments were developed to examine older adults' perceptions and views about Singapore's housing and neighbourhoods: housing audit checklist, mobile phone application, see and snap instrument, community design workshop, interview survey, walk and talk survey, on-site observation, focus group discussion and key informant interview. Depending on the nature of enquiry, we adopted the most suitable tool in order to obtain deeper insights. Together, they provided a more complete glimpse into the older persons' lived experiences of their built environment. The research was approved by the Singapore University of Technology and Design Institutional Review Board.

Each Chapter offers a detailed description of the method used. Each method has its advantages as well as limitations. The methods are not exhaustive, but offer a broad array of some of the tools available for research into older people's lived experiences. It is but a starting point and future considerations of these methods would have to be adapted according to the research problem and question.

The Chapter following the Introduction, Chap. 1, introduces the first instrument that was used for this project, the National Survey. The aim of using this method was to provide a snapshot of older adults' experiences, perceptions, needs and aspirations for the spaces around them through personal interview. The National Survey was designed in the form of a questionnaire that covered four broad areas: demographics, home, neighbourhood and outdoor recreation spaces and respondents' life. The demographics provided answers to general questions relating to participants' age, gender, ethnicity, type of housing and living arrangements. Questions about home arrangements provided an insight into respondents' (dis)satisfaction with their home spaces, residential mobility and living arrangement preferences as they grow older. Questions about neighbourhood and outdoor recreation spaces helped us understand

respondents' outdoor activities, level of satisfaction with public spaces in their neighbourhoods, and needs for facilities. Questions that inquired about respondents' life offered answers to respondents' perceptions on ageing as well as their experiences and satisfaction with growing old in Singapore.

Chapter 2 presents a qualitative research method—focus group—to offer an older user's perspective. Asked in an interactive small group setting, the broad discussion questions in the focus groups were aimed at generating opinions and discussion among the participants about their aspirations, lifestyle needs and experiences on housing and outdoor recreation spaces as they age, the innovations, barriers and opportunities in using current housing and outdoor recreation spaces, how these spaces contribute to enhancing their quality of life, and their suggestions for future development. These discussions were helpful for adding understanding—the 'why' and 'how' of issues and information collected with the survey.

Chapter 3 analyses the results from 33 Key Informant Interviews. These in-depth interviews were used to gather individual experts, community leaders and professionals' first-hand knowledge about older people's housing and outdoor recreation space design and provision. The participants came from four different sectors: government agencies and public sector, development industry, medical and healthcare sector, and caregivers, non/profit organisations, charities and service providers.

Chapter 4 introduces a Housing Audit, which delves into the housing needs and preferences of older residents. Designed as an easy-to-use checklist that can be completed by the individual or with assistance from a helper, the housing audit builds on the World Health Organization age-friendly cities guide (2007b) to identify current and potential barriers and enablers in housing design for ageing, and understand the features that are important to older people in age-friendly housing.

Chapters 5–7 move the audit activity into the outdoor spaces. Urban audit of the neighbourhood public spaces is analysed with the help of three instruments: Walk and Talk survey (Chap. 5), See and Snap study (Chap. 6) and On-site Observation (Chap. 7). Four public spaces in Bukit Panjang Town[2] were studied. The Walk and Talk and See and Snap tools were developed and used to understand the experiences of older users as well as the barriers that they face in the outdoor urban environments. The Walk and Talk survey was conducted as a mobile survey while the See and Snap took the form of a photo-taking activity. Both offer examples of participatory methods to gain insights into participants' sentiments and experiences of public spaces, neighbourhoods and the city as they journey through them on a daily basis.

The on-site observation took place on a weekday and during one weekend day, offering the researcher an opportunity to visit the site and discover its functioning—

[2]Bukit Panjang Town is located in the western region of Singapore. Built since the 1980s, Bukit Panjang's resident population in 2015 was 139,030, almost 9% of whom were residents older than age 65 (Department of Statistics 2016).

its activities, actors and processes—at different times of the day. Although time consuming and not altogether revealing about people's perceptions, motivations and feelings, this method gives a complimentary glimpse into how the public space is being used by people, not just older adults—how many, who, where and what they do while on site.

Chapter 8 presents the development and usage of an Android mobile phone application called 'City' on Google. The application was developed by the research team to capture the everyday journeys and outdoor activities of older participants in Bukit Panjang Town. The Chapter describes the methodology and development of the application as well as explains the process of data collection and analysis of big data from smart phone.

Chapter 9 investigates the social capital of older residents. Again, the Bukit Panjang Town is examined. It seeks to unveil older users' experiences of and contributions to the neighbourhood life and social outcomes. Five areas are examined: demographics of the respondents; the respondents' social connections, which are presented in terms of how many people they know in the neighbourhood, where they usually meet their friends, whom they ask for financial help and what sort of activities they are involved in; trust in respondents' neighbourhood; neighbourhood environment and the respondents' experiences of various facilities and services in their neighbourhood; and their quality of life.

The final chapter (Chap. 10), looks at the use of Community Design Workshop that was developed to work creatively together with the residents on one of the studied public spaces in Bukit Panjang Town—Bukit Panjang Neighbourhood 2 Park. The focus is on issues of identification of community concerns and opportunities for placemaking. The eight workshops explored the participants' Needs, Experiences and Vision; Accessibility and Connectivity; Park Identity and Activity Part 1 and 2; Safety and Security; Walk and Talk Urban Audit Session; Park Spirit and Sense of Place; and Community and Ownership. The workshops gave the older users (and the community) of the park an additional opportunity to voice their concerns, hopes and suggestions on how their proximate community park should look, feel and function in support of their lifestyles and quality of life. Participants' suggestions and recommendations are analysed in this Chapter.

International research suggests that there is great value in innovatively integrating research into a policy and planning agenda, especially when assessing age-friendly environment (Glicksman et al. 2014). Simply put, research on age-friendly environment is only valuable when it can contribute to the effort of creating age-friendlier neighbourhoods and public spaces, and when the agencies and organisations involved in planning the changes incorporate research's findings into their actual plans (*ibid.*). The study took that into consideration and collaborated with both the older users as well as local authorities. The Community Design Workshops (Chap. 10) are a good example of that.

Working together with the residents of Bukit Panjang Town and with the support of the local member of parliament and town council, fresh community perspectives and maps were produced as a graphic guideline for streamlined application and redesign of the community park, Bukit Panjang Neighbourhood 2 Park. In this way,

research that was fuelled with direct feedback of the older users of the park got translated into planning the park's redesign and day-to-day maintenance. In the process, we gave voice to the users and enabled older adults to co-design the nearby public space.

Belinda Yuen
Špela Močnik

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Chapter 1
Surveying Older Adults' Perceptions and Aspirations

Belinda Yuen, Chathura Withanage and Parvathi Nair

Abstract This Chapter presents a personal interview survey. The key instrument is a questionnaire that seeks to find out older adults' (aged 55 and older) experiences and perceptions about growing older in Singapore, their housing and neighbourhood spaces. It explores issues relating to housing satisfaction and mobility aspiration, self-reported housing modification and housing needs, frequency of outdoor activities and satisfaction with neighbourhood public spaces as well as desired facilities and service clusters.

1.1 Introduction

In this Chapter, a survey is introduced and its results discussed. The key instrument is a questionnaire used for collecting a sample population of older adults' (aged 55 and older) experiences and perceptions about the housing and neighbourhood spaces around them. The results gave a glimpse into their satisfaction, concerns and preferences for these spaces as well as their experience of growing older in Singapore.

The survey, conducted in mid-2014 to early 2015, seeks to obtain a national level snapshot of these needs, preferences and experiences. Inspired by the international literature that showed the home and its immediate neighbourhood as key places where older people spend the majority of their time (Help the Aged 2006; Bureau of Labor Statistics 2013), this is the first study to explore older people's views of their housing, neighbourhoods (outdoor public spaces) and growing old in Singapore. Past studies using survey have explored different aspects of the state of older adults in Singapore like their employment, caregiving, health and wellbeing (Ministry of Community

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Development, Youth and Sports 1995, 1999), learning needs (Ministry of Community Development, Youth and Sports 2008), present and future living arrangements in public housing (Housing and Development Board 2014). These surveys have a different focus of study from the survey questionnaire discussed in this Chapter.

1.2 Methodology

Survey research is a common method of collecting information about a population of interest, especially when this population is very large or dispersed across a large geographic area (Andres 2012; Rea and Parker 2014; Moser and Kalton 2016). While surveys offer an excellent way to gather lots of information from a large target population through standardised survey questions, survey administration can be both a time- and manpower-consuming activity. It has the challenge of inflexibility because of the structured process of asking standardised survey questions.[1] Numerous textbooks have been written about the complex but important operation of survey research design and procedures (e.g. Buckingham and Saunders 2004; De Vaus 2014; Blair et al. 2014). This bears no repetition except a reminder to study them closely before embarking on survey research. Survey research has many key features including a predefined questionnaire and sampling.

The survey in the present study was designed as a structured, personal interview with the help of a printed questionnaire. Only Singaporeans or Singapore permanent residents who were 55 years and older were invited to participate in the survey. A total of 3025 older adults (above 55 years old) were interviewed.[2] In view of the feminisation of ageing, a slightly higher proportion of women were interviewed.[3] Instead of a household-based sample, older adults of different age groups and ethnicity were surveyed in a range of public places across Singapore (e.g. markets, hawker centres, parks, public housing void decks,[4] senior activity centres, community centres, transportation and recreational hubs, among others). Since many of those residing in one- and two-room HDB[5] flats were interviewed at senior activity centres, this had resulted in a slightly higher proportion of Chinese respondents.

[1] To address this, focus group discussions were conducted to offer respondents an opportunity to further discuss their personal feelings, perceptions and views. See Chap. 2.

[2] Based on the Department of Statistics (2012) there are approximately 865,000 Singaporeans and Singapore permanent residents aged above 55 years. With a 95% confidence level and ±1.8% sampling error, we arrived at a target sample of 3000.

[3] At national population level, female residents outnumber male with a sex ratio of 963 male per 1000 female.

[4] This is a uniquely Singaporean common space in public housing. It refers to the ground floor of public housing blocks that has been purposefully left open (void) since the 1970s as a sheltered space for residents' common use, e.g. as a venue to meet friends or for block parties, funerals or weddings. See National Heritage Board (2013) for further details about its history, importance, common features and programming.

[5] HDB is the abbreviation for Housing and Development Board, the public housing authority in Singapore. Public housing is popularly referred to as HDB housing/block/flats.

The survey was administered in English, Malay, Tamil, Mandarin and key Chinese dialects in light of Singapore's multi-ethnic population.[6] There was no incentive for participation. The questionnaire comprised some 40 questions in four sections covering,

- Respondents' demographics—questions relating to participants' nationality, age, gender, ethnicity, type of housing and living arrangements;
- Understanding respondents' home—questions relating to their home, levels of importance and satisfaction with home spaces, residential mobility and plans for adapting home spaces, preferences for future home and concerns about housing needs as they age;
- Understanding respondents' neighbourhood and outdoor recreation spaces—questions relating to their frequency of outdoor activities, levels of importance, satisfaction and experiences with public spaces in their neighbourhoods, preferences for near-home facilities and services to maintain independence and active lifestyle;
- Understanding respondents' life—questions relating to their perceptions on ageing, their experiences and satisfaction with various aspects of life and growing old in Singapore.

The questions were mainly closed-ended. They included a couple of dichotomous (2-point questions, e.g. yes or no) followed by contingency questions (this routine avoids asking respondents questions that are not applicable to them), many multiple choice, often including a response option on 'Others' to give respondents the opportunity to go beyond what is provided in the question as well as a number of scaled questions using a five-point Likert scale[7] and matrix questions. All participants' responses were voluntary and anonymous. All responses were analysed as a group, not identified by the individual. As it was a pen-and-paper survey, data checking, cleaning and entry took some time to complete. A total of 2942 questionnaires were admitted to data analysis using SPSS Statistics. The four key demographic (explanatory) variables—age, gender, ethnicity and housing type—of respondents were considered.[8] The sample used for analysis was weighted by ethnic ratios to approximate national proportions.

Age-based segmentation was the primary demographic variable in the analysis to identify the different experiences, attitudes and preferences of generational cohorts of older people. The assumption was that people of the same generation, e.g. baby boomers 1946–1964, traditionalists 1925–1945, by and large go through the same societal contexts and circumstances, and norms and behavioural expectations. Several studies on age and values have shown that values tend to vary with age (Rokeach 1968; Lascu et al. 1996; Bengtson et al. 2009).

[6]The ethnic composition of Singapore's resident population includes 74.3% Chinese, 13.4% Malay, 9.1% Indian and 3.2% Others. See Department of Statistics (2016).

[7]Likert scaling is a widely used bi-polar scaling method to measure the intensity of respondents' feelings for a given item. See Likert (1932), Carifio and Perla (2007).

[8]Even though the survey dealt with all four demographic variables, only age will be considered in this Chapter. A more comprehensive analysis that will include the remaining variables will be published separately.

1.3 Findings

The findings are organised under four broad sections, introducing respondents' economic and living arrangements, their perceptions of old age and growing old in Singapore, and their experiences and perceptions of home and neighbourhood public spaces. It attempts to explore how different older age groups in Singapore: the emerging old (age 55–64), young old (age 65–74), middle old (age 75–84) and oldest old (above age 85) perceive ageing and their surrounding built environment. The importance of this discussion lies in its focus on the views of older people themselves.

1.3.1 Economic and Living Arrangements

Reflecting national residential pattern, most respondents (81.9%) lived in public housing. The majority are homeowners (80.6% among public housing respondents and 90.4% among those residing in private housing). There is a seeming decline in home ownership with age while renting and other housing arrangements (e.g. staying on their own in a housing unit owned by children) increase with advancing age (Table 1.1). Renting appears more prevalent among public housing residents (12% as compared to 3.2% renting among private housing respondents). There is an increase in the percentage of respondents selecting 'other' housing tenure with increasing age. The majority of them elaborated that they are staying with their children or in housing units owned by their children (children living elsewhere).

The majority of respondents have lived in their present dwelling for periods of 11 or more years with the oldest old staying the longest—over 20 years in their housing unit (Table 1.1). The results suggest a general preference to age in place. Marginally more among the public housing respondents reported longer length of residence—70.1% have stayed in their public housing units for 11 or more years as compared to 61.6% among private housing respondents.

On employment status of respondents, there is a trend towards retirement and having no earned income with increasing age. The majority of the oldest old are either retired (51.2%) or economically inactive (36.2%). Only 1.3% of oldest old remain in employment while 8.8% said they are unemployed. In contrast, 60.5% of the emerging old respondents are working (in a range of occupations from administrative/managerial, sales/services and professional to clerical, production, cleaners and labourers). About one in five of emerging old is retired while 6.3% are unemployed. About 2% of all respondents take part in voluntary work (1.7% of male and 2.4% of female respondents).

An increasing trend towards widowhood can be discerned with age. About 50% of the oldest old are widowed and about 60% of them are living in one or two-persons households. Many of them are women. The majority (70.3%) of the emerging old respondents are living in households of three or more people. Many are living with spouse and/or children. Living with spouse (59.2%) and/or children (49.9%)

Table 1.1 Housing tenure

		Respondent age								All respondents	
		Emerging old (55–64)		Young old (65–74)		Middle Old (75–84)		Oldest old (85 and older)			
		N	%	N	%	N	%	N	%	N	%
House ownership	Own	1252	91.1	822	79.8	286	65.0	43	60.3	2404	82.4
	Rent	68	4.9	131	12.7	91	20.6	15	20.5	304	10.4
	Others[a]	55	4.0	75	7.3	64	14.5	14	19.3	208	7.1
Length of stay	<1 year	39	2.8	17	1.6	8	1.9	1	1.3	65	2.2
	1–5 years	196	14.1	149	14.3	60	13.5	6	8.8	411	14.0
	6–10 years	213	15.4	144	13.9	76	17.1	12	16.5	445	15.1
	11–20 years	468	33.7	267	25.8	80	18.0	17	22.9	831	28.3
	>20 years	470	33.9	459	44.2	219	49.4	37	50.5	1185	40.3

Note [a]E.g. stay on own in house owned by children (children living elsewhere)

are the most common living arrangements among respondents. A small number of respondents indicated other living arrangements such as living with tenants.

There is, however, an increasing likelihood towards living alone with age—about one in four of those aged 75 and older reported living alone. The trend towards smaller household size with age could increase the number of older people living alone in the future. At the national population level, the Department of Statistics has observed an increase of living alone households from 10.1% to 11.9% over the past decade (2005–2015), especially prevalent among households with heads aged 65 and older (26.6%) (Department of Statistics 2016).

1.3.2 Perceptions of Old Age and Growing Older

The majority of the respondents do not think of themselves as old. When asked about their self-perceived (how old do you feel you are) and desired old ages (at what age would you consider yourself elderly), the majority would prefer to be and feel younger than their actual chronological age (Table 1.2). The means of the responses to these two questions significantly increased between age groups with advancing age (t-test, $p < 0.05$). This suggests that age seems to influence people's perceptions of their own age: the gap between actual and perceived ages is widening with age. Self-perceived age should not be ignored as international evidence suggests that it can relate to future expectations and to individual envisioned trajectories and pathways of ageing (Furstenberg 2002).

Across the age groups, respondents' self-perceived age (how old people feel) is generally lower than their real age (5–17 years). The mean age at which respondents perceive that old age starts is around 73.6 years with a standard deviation of 10.23 (Table 1.2). The definition of when old age begins varies among individual respondents. As a group, the emerging old tend to perceive old age as starting at 71 years while for the oldest old it is 83 years. Men tend to perceive old age as starting slightly later than women of their age: the mean for men is 74 while for women it is 73. The greatest observed gender difference is among the 75–84 where old age starts at the mean age of 80 for men and 77 years for women. Married respondents, especially among the middle old and oldest old, tend to perceive old age as starting later than others of their age.

Upon closer examination, those with higher incomes seem more inclined to report old age as starting later (one to six years). Those with no income and those with less than S$1000 monthly incomes generally tend to perceive old age as starting earlier (one to six years and one to eight years respectively) than wealthier counterparts of their age. The difference tends to increase with age and becomes greatest among the middle old age group. Respondents who are not employed tend to perceive old age as starting earlier than their employed counterparts. An exception is observed among those retired: the emerging old and oldest old retirees are inclined to give a later beginning date for old age than their employed counterparts.

Table 1.2 Perception of age and ageing

	Respondent age								All respondents	
	Emerging old (55–64)		Young old (65–74)		Middle old (75–84)		Oldest old (85 and older)			
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
How old do you feel you are?	50	9	58	10	67	10	76	11	55.85	11.73
At what age do you consider yourself as elderly?	71	9	75	10	78	10	83	13	73.59	10.23

Private housing respondents generally tend to think that old age starts later than their counterparts in public housing across age groups, apart from the oldest old where the trend appears reversed (old age starts at 82 and 83 years for private housing and public housing respondents respectively). On the whole, for the majority of the respondents, especially among those who are older, married, wealthier and working, old age appears to start later than the official older person age definition of 65 years old adopted in Singapore. This finding seems to lend support to international studies on older people feeling younger than their actual age as they grow older (Pew Research Centre 2009). Perceptions of ageing are an important area for further study as they are at the very core of old age definition, identity and behavioural outcomes (Levy 2003; Sarkisian et al. 2005; Sneed and Whitbourne 2005).

We turn next to self-assessed good health. The results indicate a declining trend with age. The majority (84.6%) of the emerging old respondents consider themselves to be of good/very good health as compared with just 50% among the oldest old (Table 1.3). Less than 1% of emerging old respondents perceive themselves as having poor health. It is possible that respondents were inclined not to reveal the actual condition of their health. When self-perceived age and self-perceived health are examined, it appears that those who feel younger have better self-perceived health, suggesting that self-perceived age might be a potential predictor of one's state of health. Further research will be required to test this postulation.

Self-perceived health was found to corroborate with respondents' satisfaction with their current state of health. The majority (above 70%) of respondents express satisfaction with their present state of health. Younger respondents are generally more satisfied with their state of health. Dissatisfactions with self-assessed health tend to increase as respondents get older: 11.3% among the emerging old respondents, 11.6% among the young old, 14.8% among the middle old and 28.4% among the oldest old are dissatisfied with their current state of health. In addition to health, respondents were asked to rate several other aspects of their subjective quality of life including how satisfied they are with their current state of happiness, family's emotional support, circle of friends and social network, level of participation in social activities, involvement with community, familiarity with technology, and life in general.

Respondents across the age groups are generally satisfied with their life (over 85%) and various other dimensions, especially happiness (over 80%), family support (over 80%), circle of friends (over 70%) (Table 1.4). Higher self-assessed happiness is recorded among the middle old (84.8%) and young old (82.9%) than the emerging old (81.3%) and oldest old respondents (77.9%). More among the younger respondents are satisfied with their circle of friends and social network (over 70% among the emerging old and young old as compared to 64.9% among the middle old and 63.9% among the oldest old) and with their family support (over 80% among the emerging old, young old and middle old as compared to over 75% among the oldest old).

More older respondents are satisfied with their level of participation in social activities and involvement with community than their younger counterparts (over 50% for the older age groups as compared to 46–47% among the emerging old). In the area of their familiarity with technology, the trend is towards increased dissatisfaction

Table 1.3 Self-perceived health

		Respondent age								All respondents	
		Emerging old (55–64)		Young old (65–74)		Middle old (75–84)		Oldest old (85 and older)			
		N	%	N	%	N	%	N	%	N	%
How would you rate the state of your current health?	Very good	308	22.2	153	14.7	32	7.2	4	5.1	497	16.9
	Good	865	62.4	653	62.9	276	62.3	33	45.0	1827	62.1
	Not too good	203	14.7	218	20.9	129	29.0	32	43.5	581	19.8
	Poor	10	0.7	15	1.4	6	1.4	5	6.4	36	1.2

Table 1.4 Satisfaction with quality of life

		Respondent age								All respondents	
		Emerging old (55–64)		Young old (65–74)		Middle old (75–84)		Oldest old (85 and older)			
		N	%	N	%	N	%	N	%	N	%
Your state of health	Very dissatisfied	18	1.3	17	1.6	12	2.6	6	8.1	52	1.8
	Dissatisfied	139	10.0	110	10.6	54	12.2	15	20.3	318	10.8
	Neither satisfied nor dissatisfied	240	17.4	164	15.8	70	15.8	12	16.4	486	16.5
	Satisfied	801	57.8	647	62.2	268	60.3	31	42.5	1746	59.4
	Very satisfied	187	13.5	102	9.8	40	9.1	9	12.7	338	11.5
Your state of happiness	Very dissatisfied	6	0.4	5	0.4	3	0.6	1	1.8	14	0.5
	Dissatisfied	45	3.2	37	3.6	9	2.1	6	8.8	97	3.3
	Neither satisfied nor dissatisfied	209	15.1	137	13.2	56	12.5	8	11.4	410	13.9
	Satisfied	874	63.1	689	66.4	316	71.1	46	62.7	1924	65.4
	Very satisfied	252	18.2	171	16.5	61	13.7	11	15.2	495	16.8
Your family's emotional support	Very dissatisfied	11	0.8	6	0.6	5	1.2	3	3.8	26	0.9
	Dissatisfied	37	2.7	38	3.7	24	5.4	4	5.1	103	3.5
	Neither satisfied nor dissatisfied	199	14.4	137	13.2	54	12.1	11	15.2	401	13.6
	Satisfied	860	62.2	664	64.0	295	66.5	43	59.5	1862	63.4
	Very satisfied	275	19.9	193	18.6	66	14.8	12	16.5	545	18.6
Your circle of friends and social network	Very dissatisfied	6	0.5	4	0.4	2	0.4	1	1.3	13	0.4
	Dissatisfied	34	2.5	45	4.4	22	5.0	6	8.8	108	3.7
	Neither satisfied nor dissatisfied	347	25.1	248	23.9	132	29.8	19	26.1	745	25.4
	Satisfied	822	59.4	607	58.4	247	55.7	41	56.3	1716	58.4
	Very satisfied	174	12.6	134	12.9	41	9.2	5	7.6	355	12.1

(continued)

Table 1.4 (continued)

		Respondent age								All respondents	
		Emerging old (55–64)		Young old (65–74)		Middle old (75–84)		Oldest old (85 and older)			
		N	%	N	%	N	%	N	%	N	%
Your level of participation in social activities	Very dissatisfied	17	1.2	19	1.8	5	1.1	0	0.0	40	1.4
	Dissatisfied	175	12.6	157	15.1	88	19.8	10	13.9	430	14.6
	Neither satisfied nor dissatisfied	533	38.5	336	32.4	122	27.5	26	35.5	1017	34.6
	Satisfied	554	40.0	428	41.3	200	45.0	31	43.0	1212	41.3
	Very satisfied	108	7.8	97	9.4	29	6.6	6	7.6	239	8.1
Your involvement with community	Very dissatisfied	20	1.5	13	1.3	9	2.1	1	1.8	44	1.5
	Dissatisfied	183	13.2	129	12.4	67	15.1	12	16.0	391	13.3
	Neither satisfied nor dissatisfied	543	39.2	375	36.1	139	31.3	20	27.8	1077	36.6
	Satisfied	511	36.9	435	41.9	202	45.4	36	49.3	1184	40.3
	Very satisfied	127	9.2	86	8.3	27	6.0	4	5.1	243	8.3
Your familiarity with technology	Very dissatisfied	38	2.7	71	6.9	60	13.6	17	24.0	187	6.3
	Dissatisfied	174	12.6	216	20.8	112	25.2	22	29.9	524	17.8
	Neither satisfied nor dissatisfied	373	26.9	307	29.6	133	30.1	22	30.4	835	28.4
	Satisfied	695	50.1	399	38.4	125	28.2	9	11.9	1227	41.7
	Very satisfied	106	7.6	46	4.4	13	3.0	3	3.8	167	5.7
Your life	Very dissatisfied	4	0.3	0	0.0	2	0.4	1	1.3	7	0.2
	Dissatisfied	31	2.2	19	1.9	12	2.8	3	3.8	65	2.2
	Neither satisfied nor dissatisfied	151	10.9	111	10.8	46	10.4	9	12.6	317	10.8
	Satisfied	911	65.9	727	70.2	319	71.9	48	65.9	2005	68.4
	Very satisfied	286	20.7	177	17.1	64	14.5	12	16.5	539	18.4