

1 **Senior citizens' requirements of services provided by community-based care** 2 **facilities: A China study**

3 **Abstract**

4 **Purpose:** This study aims to identify senior citizens' requirements related to *'Embedded*
5 *Retirement Facilities* (ERFs)', which are small-scale, multi-functional, community-based,
6 care facilities for senior citizens in mainland China, and to discuss whether senior citizens'
7 perceptions are influenced by their backgrounds.

8 **Design/Methodology/Approach:** A questionnaire type of research was administrated to gain
9 senior citizens' rankings of services that should be provided by ERFs. Non-parametric
10 statistical models were applied to analyse the collected data.

11 **Findings:** Results reveal that, health care services for senior citizens are considered the most
12 important. Requirements regarding rehabilitation and entertainment, and daily life assistance
13 are ranked second and third, respectively. Culture-related activities are the least important.
14 Differences in the senior citizens' background also influence their choices.

15 **Research limitations/implications:** This research is based on a questionnaire survey
16 completed in northeast China. Opinions from other areas of mainland China will be collected
17 in the future study. Furthermore, the key items identified in this research, which was
18 completed by participants from the built environment discipline, can be further elaborated by
19 combining interdisciplinary feedback.

20 **Practical implications:** This study explores services that are supposedly provided by ERFs.
21 Findings will provide useful perceptions from senior citizens and will enable decision makers
22 to prioritise services for senior citizens.

23 **Social implications:** Although senior citizens are the end users of ERFs, their needs are easily
24 overlooked. This study calls attention to their needs from ERFs, and the results are likely to
25 serve as references for stakeholders in building improved facilities.

26 **Originality/Value:** ERFs have been provided in mainland China to cater to senior citizens'
27 needs since 2014. However, few studies have identified senior citizens' requirements of
28 provided services. The survey-based results of this work will serve as references for various
29 stakeholders in making enhanced decisions.

30 **Keywords**

31 Senior citizen, Community-based facility, ERF, Service, Briefing

32 **1 Introduction**

33 Population ageing, with urbanisation, has become one of the greatest challenges throughout
34 the world in the 21st century. The effects of China's 37 years of one-child policy, combined
35 with significant improvements in health care services, have made the country's population
36 grow more rapidly than those of nearly all other countries. Although the government has been
37 facilitating social reform of the industry and service for the aged since 2011 to face the rapid
38 ageing situation (that is, "9073" and "9064" retirement patterns: 90% of the senior citizens
39 obtaining home-based care with the help of relatives or trained workers, 7% or 6% using
40 community-based services such as day care, the 3% or 4% remaining staying in nursing
41 homes (Beijing Municipal Commission of Planning and Natural Resources and Beijing
42 Municipal Civil Affairs Bureau, 2015, The People's Government of Beijing Municipality,
43 2008, The People's Government of Shanghai Municipality, 2007), which have been formed
44 during the past years), the Chinese government still has many difficulties in catering to senior

45 citizens' needs regarding ageing in place.

46 *Embedded Retirement Pattern* (ERP), a new model that combines home-based care with
47 community-based care, aims to overcome the weaknesses of '9073' and '9064' retirement
48 patterns and focuses on the advantages of home-based, community-based and institutional
49 care services; the ERP model gradually emerged in 2014 from mainland China (Hu et al.,
50 2015), together with its practical form, namely *Embedded Retirement Facility* (ERF), in the
51 field of architectural design and construction. An ERF is a small-scale, multifunctional
52 community-based care facility with a total construction floor area of no more than 800 m²,
53 service radius not longer than 450 m and capacity of no more than 45 beds for senior citizens;
54 given senior citizens' specific demands, an ERF can either offer day respite services,
55 long-term residence or both; ERFs not only assist senior citizens in their daily lives but also
56 help them maintain good health conditions by setting canteens, organising social and
57 recreational activities and providing regular health examination service, among others (Xiang
58 et al., 2017, Zhang and Zhao, 2017).

59 As suggested by Gopikrishnan and Paul (2018), considering user requirements regarding
60 physical, functional and financial aspects is essential for building construction. Given that
61 ERFs are built as an important supplement to cater to senior citizens' needs after retirement,
62 people's opinions on provided services contribute a lot to the design stage. Briefing, known as
63 'Architectural Programming' in the United States, is the process of identifying and
64 articulating requirements from clients as early as during the design process of a construction
65 project. This process is crucial for the success of such projects (Yu et al., 2007). The
66 importance of briefing has been highlighted in various studies (Hershberger, 1999, Kumlin,
67 1995, Salisbury, 1998), and architects in mainland China have begun to focus on briefing
68 before pre-design, particularly during the past decade (Zhuang, 2015, Zhuang, 2017). By

69 identifying senior citizens' requirements during briefing, decision makers will know the kinds
70 of services that should be provided by ERFs, and architects can make better decisions
71 regarding functional divisions when dealing with limited floor areas. Thus, the fact that most
72 Chinese communities lack sufficient access to professional services, including but not limited
73 to health care, rehabilitation and social support, may be alleviated.

74 The aim of this study is to identify senior citizens' requirements related to services that should
75 be provided by ERFs. Four main kinds of services that should be provided by
76 community-based care facilities (daily life assistance, culture-related activities, health care,
77 rehabilitation and entertainment) were first listed according to design guidelines and policies
78 released by the Chinese government. Then, 22 detailed items under the four aspects were
79 identified through a document analysis and brainstorming session; these items formed the
80 basis for a questionnaire. The survey was completed in Heilongjiang Province, northeast
81 China, to gain senior citizens' rankings regarding the main aspects and the detailed items.
82 After data collection, Mann-Whitney U and Kruskal-Wallis tests were performed to analyse
83 whether the senior citizens' choices differed by gender, age and other background factors. On
84 the basis of the findings, from these procedures, the significance of the four aspects was
85 evaluated. The results of this research will provide useful insights coming from the
86 perspective of senior citizens, who are the most important end users of the built facilities. This
87 study will enable decision makers to prioritise services according to the facilities' floor areas,
88 availability of funds, and other salient factors during briefing or pre-design processes.

89 **2 Literature review**

90 Physical environments significantly impact individuals of all ages, especially senior citizens
91 who rely on their immediate locality for support and assistance. Age-friendly housing design,

92 supportive neighbourhoods and connections to families and communities are overarching
93 themes that may help in dealing with the social isolation of senior citizens (Biggs and Carr,
94 2015, Buffel et al., 2012, Chan et al., 2016). Given that these individuals spend most of their
95 time in homes and communities, they are likely to be sensitive to the services provided by
96 community-based facilities.

97 Current studies have exerted effort to determine the kinds of services that should be provided
98 in community-based care facilities for senior citizens and the means by which such facilities
99 can benefit senior citizens and other age groups.

100 Under the western cultural and social background, researchers have been discussing
101 community-based since the 1990s, after Canada and the United States began to reform
102 long-term care facilities and focus on policies and programmes that would enable senior
103 citizens to live in their homes for as long as possible. Through a questionnaire survey, Kelly et
104 al. (1998) explored women's views on long-term care and found that community care was
105 more positively perceived than institutional care. In the early 2000s, healthcare policy
106 changes and the government's adjustment of investment in the United Kingdom also directed
107 researchers' attention to community-based care facilities for senior citizens, especially those
108 offering rehabilitation and intermediate care (Jacobs and Rummery, 2002).

109 Van Bilsen et al. (2008) divided the services and facilities provided in communities into five
110 categories and found that senior citizens' uses of socio-cultural activities and restaurants were
111 more satisfactory compared with the use of telephone circles, personal advisors and buddy
112 projects in the Netherlands. Xia et al. (2015) performed a content analysis of facilities in 124
113 Australian retirement villages around rural and suburban areas. Results indicated that
114 community centres, libraries and barbeque facilities were the most commonly provided to
115 support senior citizens' quality lifestyles. Community-based care facilities will not only help

116 reduce the burden on seniors' families, but promote people's healthy ageing process (O'Shea
117 and Monaghan, 2017, Spring, 2018).

118 Discussions about community-based care facilities in the east started slightly later than in
119 western countries. Japan's amendment to *the Long-Term Care Insurance Act* in 2006
120 promotes the implementation of community-based integrated care systems and small-scale,
121 multifunctional residential care facilities (Tsutsui, 2014). Unlike conventional care facilities,
122 which offer all relevant services, such as daytime commuting, temporary lodging, emergency
123 or night-time nursing care visits, and in-home service to senior citizens, small-scale
124 multifunctional residential care facilities tend to understand and respond to the changing
125 conditions of senior citizens' and support them without separating from their familiar
126 environments (Katahira and Tsukasaki, 2016, Yamazaki and Kawahara, 2017, Yu, 2013).
127 Considering cost and distance, people in Taiwan also rely on community-based long-term
128 care facilities to take care of their family members, especially disabled seniors. Studies
129 quantifying residents' care and service needs and determining their predictors have been
130 conducted through descriptive and cross-sectional survey methods (Huang et al., 2008, Li and
131 Yin, 2005). As the *Ministry of Health and Welfare* in Taiwan started to promote small-scale
132 multifunctional services in 2015, such facilities also began attracting researchers' attention
133 (Chien, 2015).

134 Researchers have also performed several studies to thoroughly understand community-based
135 care facilities in the east. For example, through collecting data from behaviour observation
136 and pattern examination in a small-scale elderly care facility, researchers clarified the actual
137 conditions of an environment where individualised care was provided (Hishida et al., 2010,
138 Hishida et al., 2012). The relation of neighbourhood environments to the physical and mental
139 health of senior citizens, and means through which cities and communities can increase their

140 age-friendliness to encourage ageing in place were also discussed (Loo et al., 2017, Tao et al.,
141 2018). Furthermore, culture was claimed to be an essential prerequisite for communities
142 where senior citizens live (To and Chong, 2017). With specific facilities as examples, the
143 actual use of multifunctional long-term care services and architectural spaces, as well as the
144 roles of community facilities adjacent to small-scale multifunctional care facilities for senior
145 citizens were identified (Kim et al., 2016, Nakashima, 2013). The relationship between the
146 spatial compositions of small-scale care multifunctional facilities and how senior citizens
147 spend their time in such facilities were investigated (Imura et al., 2008). Moreover, potential
148 methods of converting residence in old communities to small-scale multifunctional care
149 facilities in China were explored (Hu et al., 2018). Regional differences in the management
150 modality and nursing needs of these facilities were also examined (Yamada and Satoh, 2008).

151 Given that user satisfaction is considered a parameter in evaluating the performance of any
152 facility, involving users during briefing is essential (Jiboye, 2012). Designing new facilities in
153 accordance with sponsors' needs and intentions, learning from the advantages and
154 disadvantages of existing facilities and ensuring new facilities' acceptance and appreciation
155 among users were identified by Jensen (2006) as the most important reasons behind user
156 involvement in the briefing process. During the past decade, briefing has evolved from being
157 an initial stage of a project to being a continual and interactive process due to the
158 development of universal and inclusive design concepts (Jensen and Pedersen, 2009). As
159 suggested by Chrysikou (2018), designing for the vulnerable and senior citizens should be in
160 harmony with these people's perception and physiology. Therefore, user participation has
161 become an increasingly significant means of understanding people's requirements, and
162 numerous studies have been conducted, especially in the field of facilities for people's
163 wellbeing (Barnes et al., 2011, Chrysikou et al., 2017, Khandokar et al., 2009).

164 Chinese researchers have explored the significance of ERFs and analysed problems related to
165 design, construction, operation and management on the basis of existing facilities in
166 economically developed areas (Shanghai, Beijing, Nanjing, etc.) in mainland China and
167 experiences from Japan (Hu et al., 2015, Kang, 2017, Ming et al., 2016, Yao, 2016, Zhang
168 and Zhao, 2017, Zhu, 2017). However, few have concentrated on identifying senior citizens’
169 requirements on services that should be provided by ERFs. To bridge this gap, this study
170 explores the service requirements of senior citizens and preliminarily discusses factors that
171 may influence their perceptions.

172 **3 Research methods**

173 **3.1 Document analysis and brainstorming session**

174 A targeted literature review was conducted to thoroughly understand ERFs and similar
175 facilities. ‘Small-scale elderly care facility’ and ‘community-based care facility for older
176 people’ were utilised as the retrieval keywords in *Web of Science*, whereas the Chinese term
177 for ERFs was applied in searching for Chinese papers in *China National Knowledge*
178 *Infrastructure*. ERFs in mainland China share similarities with the small-scale multifunctional
179 residential care facilities that the Japanese government promoted vigorously in 2006.
180 Moreover, Japan is a typical eastern country and has been facing ageing society issues for a
181 much longer time than China. Therefore, studies and experiences from practical projects of
182 small-scale multifunctional residential care facilities in Japan also assisted in identifying
183 senior citizens’ requirements. Firstly, a session for identifying services was conducted after
184 the retrieved documents were reviewed and suggestions were gathered from three senior
185 managers of care facilities for senior citizens. An initial list of services that should be
186 provided by ERFs was then created.

187 Then, a brainstorming session was conducted with participants, which included (1) three
188 master's students in architecture or urban planning who were working on ERF research
189 projects, (2) twelve research students majoring in architecture or urban planning but were not
190 working on said projects and (3) one professor with more than 20 years and two associate
191 professors with 10 years of teaching and practical experiences in construction. All of the
192 participants had at least 1.5 years of experience in practical cases in architectural design or
193 urban planning. These participants were encouraged to write their opinions on the services
194 that senior citizens may need to enjoy a high-quality retirement life without leaving their
195 original communities. Subsequently, a question-and-answer session was conducted to ensure
196 that everyone's opinion was fully understood. Criticism was not allowed, and the list of
197 services that should be provided by ERFs was revised during this stage.

198 After the brainstorming session, comprehensive document analysis was conducted, including
199 design guidelines implemented by the *Ministry of Housing and Urban-Rural Development of*
200 *the People's Republic of China* (MOHURD, 2014) and the latest policy documents published
201 by the *Ministry of Civil Affairs of the Peoples Republic of China* (MCA, 2017a, MCA, 2017b).
202 All services that were identified through the two former steps and also considered mandatory
203 by the design guidelines and policy documents were confirmed. For the remaining
204 requirements, another voting round was held with the members of the brainstorming session;
205 factors which were supported by more than half of the participants were confirmed, and the
206 rest were eliminated. Afterwards, services provided by community-based facilities that may
207 contribute to a high-quality retirement life for senior citizens were divided into four main
208 aspects, namely, (1) daily life assistance, (2) culture-related activities, (3) health care and (4)
209 rehabilitation and entertainment. Twenty-two detailed services under these four aspects were
210 also obtained (Table 1) were obtained, and formed the basis of the questionnaire (Appendix).

211 <Table 1 Main aspects and detailed services provided by ERFs>

212 **3.2 Questionnaire design and survey**

213 A questionnaire survey was administrated in Heilongjiang Province, northeast China. This
214 survey targeted senior citizens living in their original communities to enjoy retirement lives.
215 Three sections were included in the questionnaire, namely, (1) background information of the
216 respondents (gender, age, physical condition, educational level and living pattern), (2) ranking
217 of the four main aspects of services and (3) ranking of detailed services related to each main
218 aspect (given that each main aspect contains different detailed services that could be provided
219 to senior citizens inside ERFs).

220 The questionnaire was designed as a five-point Likert-type scale, a technique for the
221 assessment of attitudes. All services were measured as follows: 5 for ‘very important’, 4 for
222 ‘important’, 3 for ‘neutral’, 2 for ‘unimportant’, and 1 for ‘unimportant at all’. However, a
223 preliminary survey answered by 10 targeted participants showed that they tended to choose 3
224 for more than 90% of the 22 items. The same outcome happened for the questionnaires filled
225 out by the investigators after asking for the senior citizens’ ideas. Given that ‘3’ indicated a
226 neutral feeling, identifying the participants’ real needs was difficult. Thus, the questionnaire
227 was adjusted by prioritising questions. Firstly, the participants were asked to rank the four
228 main aspects according to their preferences and then rank the detailed item under each aspect.
229 Another preliminary survey was answered by the former 10 targeted participants, and
230 improved results were obtained.

231 The survey was administrated during a one-month period from May 2017 to June 2017. Given
232 the physical conditions and educational levels of the participants, most of the questionnaires
233 were filled out by the investigators after conducting an approximately 20 min interview with
234 each participant to explain the questions and ask for ideas. A total of 98 responses were

235 collected, of which 82 were deemed valid through data screening.

236 3.3 Data analysis

237 The mean priorities of the four main aspects and of the detailed services were calculated and
238 accordingly ranked (Table 2). In this questionnaire survey, the smaller the value of mean
239 priority, the more important the item meant to the participants. A normality test conducted via
240 *IBM SPSS Statistics 25* revealed that the data were not normally distributed. Then,
241 non-parametric statistical tools were applied to explore the level of agreement among the
242 respondents and correlations between their backgrounds and their opinions towards the
243 different aspects of services.

244 <Table 2 Ranking of services provided by ERFs>

245 4 Analysis results

246 4.1 Characteristics of respondents

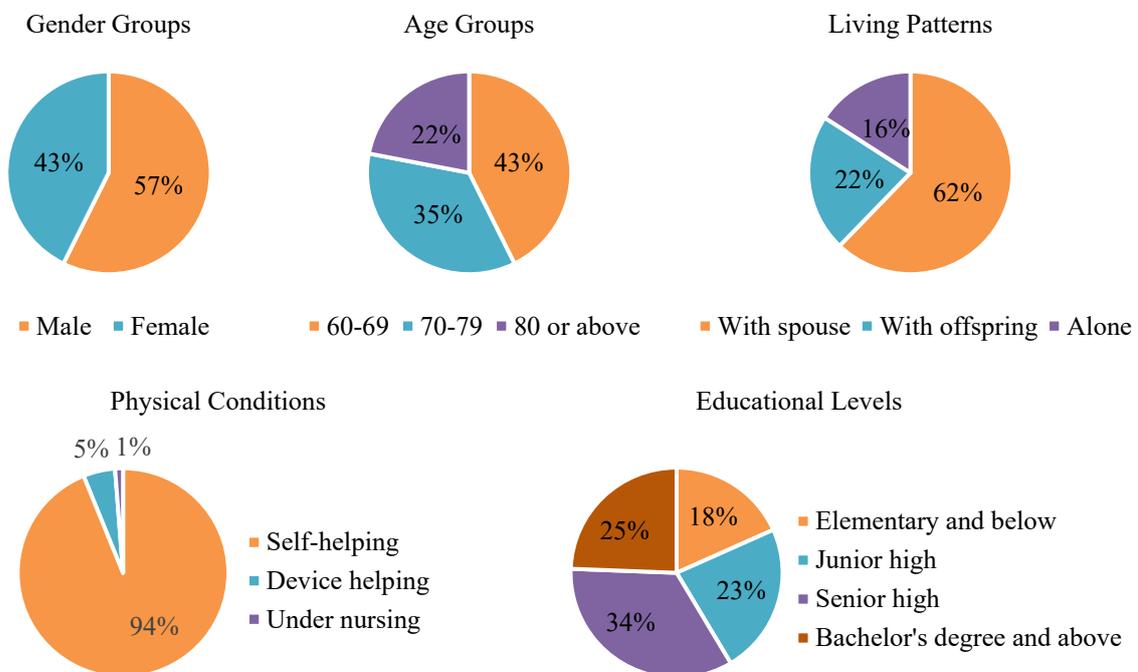


Figure 1 Characteristics of respondents

247 Among the 82 valid responses, 47 are from male respondents (57%), and 35 are from females
248 (43%). Thirty-five of the participants (43%) are in their 60s (60 to 69 years old), 29 (35%) are
249 in their 70s (70 to 79 years old) and the 18 remaining (22%) are aged 80 years and older. In
250 terms of physical condition, 77 (94%) are self-helping senior citizens (can take care of selves),
251 4 (5%) are device-helping senior citizens (need help from others or certain supporting
252 facilities) and 1 (1%) is under nursing (cannot finish daily routines by himself and needs
253 others to take care of him). In addition, 15 respondents (18%) finished elementary school and
254 below, 19 (23%) completed junior high school; 28 (34%) graduated from senior high school
255 and the 20 remaining (25%) hold bachelor's or higher degrees. Finally, 51 respondents (62%)
256 live with their husbands or wives; 18 (22%) live with their offspring and 13 (16%) live alone.
257 Characteristics of respondents are illustrated in Figure 1.

258 **4.2 Level of agreement among respondents**

259 Given that the senior citizens were asked to give mutually exclusive responses in the survey,
260 the questionnaire was reliable (Gopikrishnan and Paul, 2018). Kendall's coefficient of
261 concordance test was conducted to measure the level of agreement regarding the participants'
262 ratings of the main aspects and of the detailed items of services provided by community-based
263 facilities.

264 Table 3 shows that Kendall's coefficient of concordance (W) for the rankings of the main
265 aspects is 0.082, whereas those for the detailed items under the four main aspects are 0.369,
266 0.236, 0.450 and 0.488. The computed W values indicate a relatively low level of agreement,
267 despite the statistical significance of all the rankings (0.000). Mann-Whitney U and
268 Kruskal-Wallis tests were conducted to further explore the correlations of the respondents'
269 perceptions and their backgrounds.

270 <Table 3 Kendall's coefficient of concordance test on rankings>

271 **4.3 Correlations of respondents' perceptions and backgrounds**

272 Given that the collected data were not normally distributed, non-parametrical techniques were
273 applied to explore the correlations. A Mann-Whitney U test was conducted to test whether the
274 male and female groups had different views on rankings of the services provided by ERFs.
275 The following hypotheses were formulated and tested:

276 H_0 : Rankings of services provided by ERFs are the same from the male and female groups.

277 H_A : Rankings of services provided by ERFs differ from the male and female groups.

278 At the 95% confidence interval, H_0 would be rejected if the test significance level (presented
279 as p-value in Table 4) was less than 0.05. Under such circumstance, H_A would be accepted.

280 The Kruskal-Wallis test is similar to the Mann-Whitney U test, but the former can compare
281 variables for three or more groups (Pallant, 2016). In this research, Kruskal-Wallis tests were
282 performed to investigate whether differences other than gender among the respondents would
283 affect their choices. Hypotheses were also formulated according to age, physical condition,
284 educational level and living pattern.

285 H_0 : Rankings of services provided by ERFs are the same across age groups / physical
286 conditions / educational levels / living patterns.

287 H_A : Rankings of services provided by ERFs differ across age groups / physical conditions /
288 educational levels / living patterns.

289 **4.3.1 Results of Mann-Whitney U test**

290 Results of the Mann-Whitney U test indicated that rankings of the detailed services provided
291 by ERFs are not influenced by gender, whereas rankings of two main aspects, namely, daily
292 life assistance and cultural related activities, differ between the two gender groups (Table 4).

293 The average rank of ‘daily life assistance’ showed that the female group cares more about this
294 aspect than does the male group, whereas the male group pays more attention to
295 culture-related activities. According to Pallant (2016), *IBM SPSS Statistics* does not provide
296 effect size statistics for the Mann-Whitney U test; however, an appropriate value of r could be
297 calculated using the z value by Eq. (1). The computation results revealed a small to medium
298 effect size in both services provided by ERFs according to the following criteria: 0.1 = small
299 effect, 0.3 = medium effect and 0.5 = large effect (Cohen, 1988).

300 $r = \frac{z}{\sqrt{N}}$ Eq. (1), where N = total number of cases

301 <Table 4 Mann-Whitney U test results on services provided by ERFs regarding gender groups>

302 4.3.2 Results of Kruskal-Wallis test

303 Results of the Kruskal-Wallis test showed that rankings differ not only in the main aspects but
304 also in detailed items when the various characteristics of the participants were considered.
305 The respondents not younger than 80 years tend to prioritise ‘daily life assistance’ and care
306 more about ‘postoperative nursing’ service than the other age groups. People in their 70s show
307 considerable interest in ‘chess and cards playing’, whereas people in their 60s have a
308 moderate attitude toward the activity. Apart from ‘general practitioner’ service, the average
309 rank of functional requirements they gave seldomly came to the first or the last among three
310 age groups (Table 5).

311 <Table 5 Kruskal-Wallis test results on services provided by ERFs regarding age groups>

312 <Table 6 Kruskal-Wallis test results on services provided by ERFs regarding physical conditions>

313 The senior citizens’ choices are influenced by their physical conditions in several detailed
314 items (Table 6). ‘Day care’ and ‘massage’ services are important for the device-helping senior
315 citizens, whereas places for ‘singing and dancing’ are a critical factor for the self-helping
316 participants. For the only under-nursing respondent who was injured in a vehicular accident

317 many years ago and is still undergoing recuperation therapy, care services related to
318 post-operative nursing are the first consideration.

319 <Table 7 Kruskal-Wallis test results on services provided by ERFs regarding education levels>

320 Education levels also impact the senior citizens' considerations among the main aspects and
321 the detailed items (Table 7). 'Daily life assistance' is the first concern for the senior citizens
322 who hold bachelor's or higher degrees but the last for the participants who graduated junior
323 high school at most. For the 'chess and cards playing' places, the seniors who graduated
324 elementary and below are the most interested, whereas those with bachelor's or higher
325 degrees are the least interested.

326 <Table 8 Kruskal-Wallis test results on services provided by ERFs regarding living patterns>

327 Living patterns affect senior citizens' choices among the detailed items (Table 8). The
328 participants who live with their offspring tend to need 'full time nurse' and 'purchasing'
329 services, they are also more interested in handmade activities than those who live alone or
330 with husbands/wives.

331 **5 Discussions**

332 **5.1 Senior citizens' requirements of services provided by ERFs**

333 According to the 82 valid responses of the questionnaire survey, health care services in ERFs
334 are considered the most important. Requirements regarding rehabilitation and entertainment,
335 and daily life assistance are ranked second and third, respectively. Meanwhile, culture-related
336 activities are the least important.

337 For health care services, the senior citizens can clearly recognise their physical conditions
338 through 'regular health examination' and thus care most about it than the other services.
339 Several of the senior citizens believe that having doctors in ERFs offering medical advice

340 may help them deal with the difficulty and high cost of accessing medical service, which have
341 long been issues in mainland China, to some extent. As many challenges hinder the
342 assignment of general practitioners and companions for seniors in going to hospitals, most
343 senior citizens therefore hold wait-and-see attitudes. Only a few senior citizens prioritise
344 ‘psychological counselling’ service, and this finding reflects the insufficient attention
345 currently given to the psychological health of the seniors.

346 Regarding rehabilitation and entertainment-related places that ERFs can provide, the senior
347 citizens’ focus tends to concentrate on fitness exercises, as well as chess and cards playing
348 spaces. They also need special places for singing and dancing to avoid disturbing the younger
349 people who live in the same community. Massage and post-operative nursing services are
350 mentioned only by a small number of people (those who had just undergone surgeries shortly
351 before participating the questionnaire survey).

352 Regarding daily life assistance, the senior citizens’ needs mostly focus on canteens, room
353 cleaning and meals-on-wheels services. Most people who rely on their original communities
354 after retirement are self-helping ones; that is, they can finish daily routines without day care
355 or full-time nursery services. Moreover, senior citizens tend to eat less and may lower their
356 required taste of meals overtime; thus, canteens and meals-on-wheels services will be
357 convenient, especially during weekdays, when their children are not home. However,
358 housework becomes more difficult as seniors age, thereby gradually increasing their need for
359 room cleaning, laundry and purchasing services.

360 Results from the questionnaire survey showed that senior citizens normally engage in
361 culture-related activities of reading and listening to seminars. Some may continue to enjoy
362 their hobbies after retirement, such as drawing, calligraphy and photography, to make their
363 retirement lives rich and colourful. According to the standards released by MCA (2017a),

364 ERFs should contain spaces that can be used for the abovementioned activities. Although
365 current ERFs or community centres in mainland China provide such spaces, the areas are
366 always quite limited and not well-utilised by senior citizens (Xiang et al., 2017, Yao, 2016). In
367 addition, organising culture-related activities is difficult due to limitation in facility managers'
368 focus on senior citizens' cultural needs and in the time and money needed (Jin, 2018).
369 Communities may consider cooperating with local collages for senior citizens and encourage
370 the holding of culture-related events, such as developing study groups among senior citizens
371 who share similar experiences or hobbies. Thus, these seniors will benefit increasingly from
372 the communities they live in.

373 **5.2 Factors affecting senior citizens' choices**

374 According to the results of the Mann-Whitney U and Kruskal-Wallis tests, gender, age,
375 physical condition, educational level, and living pattern influence the choices of the senior
376 citizens.

377 Opinions on main aspects differ by gender. The women prefer 'daily life assistance' more than
378 the men, whereas the latter focuses more on culture-related activities than the former.
379 However, the effect size is not large; thus, differences between gender groups should not be
380 decision makers' priority when allocating spaces in ERFs for senior citizens. This
381 phenomenon may reflect the traditional gender role differentiation in Chinese culture; that is,
382 men handle matters that occur outside the family, and women are in charge of things in the
383 family (Shek, 2006).

384 Age and educational level impact the seniors' choices not only among the main aspects but
385 also among the detailed items, such as 'daily life assistance' (main aspect), and 'chess and
386 cards playing' (detailed item). Physical conditions and living patterns influence the senior
387 citizens' choices on the detailed items, but their effects do not share similarities in a certain

388 item. Such results are expected, given that age causes sensory, physical and psychological
389 changes in individuals. Moreover, the levels of *Activities of Daily Living* gradually influence
390 senior citizens' requirements of services provided by care facilities in communities. Richard et
391 al. (2009) stated that in Canada, senior citizens' access to private transportation has become
392 limited, and they may rely on walking and participate in community-based activities more
393 than before; the participants also mentioned this concern when the questionnaire survey was
394 administrated.

395 Several respondents, especially those who are young, have higher educational levels and good
396 physical conditions, tend to try more types of rehabilitation and entertainment-related
397 activities than what the questionnaire listed and what an ERF can provide, such as winter
398 swimming, ice-skating, skiing and golf-playing. For the seniors who have just entered their
399 60s and those who are in good health, the needed leisure activities are normally not largely
400 different from those of younger citizens. Such seniors are encouraged to participate in
401 wide-ranging activities organized by communities instead of focusing only on activities
402 specially designed for senior citizens.

403 **5.3 Social participation of senior citizens 'ageing in place'**

404 Traditional Chinese culture and senior citizens' senses' of belonging together have made the
405 term 'ageing in place' increasingly popular. Policies that set ageing in place make sense from
406 the economic and social perspective (Lui et al., 2009). Although discussions related to this
407 practice mainly focus on the home, the growing awareness has revealed that the community is
408 also crucial for people's ability to stay put (Wiles et al., 2012). Such trend is consistent with a
409 statement from Davey et al. (2004): ageing in place means 'remaining living in the
410 community, with some level of independence, rather than in residential care'.

411 Amenity factors and social influences always affect people's expectations to move or age in

412 place (Schiamberg and McKinney, 2016). Present studies point out the need to promote
413 policies targeting communities and policy makers with urban planners should provide senior
414 citizens supportive environment for social interaction and participation (Richard et al., 2009).
415 ERFs and other outdoor spaces in communities can encourage senior citizens to go out, to
416 participate in leisure activities and to communicate with others. Such activities are always
417 associated with successful ageing and senior citizens will enjoy better quality of life in their
418 communities (Desrosiers et al., 2004).

419 Apart from top-down policies and strategies, senior citizens' bottom-up participations in the
420 construction process of ERFs may result in useful interventions. Senior citizens and their
421 families, carers and friends are the end users of ERFs. Such participation and involvement
422 will not only encourage these end users to voice their concerns but also define the
423 characteristics of ERFs and identify the kind of service that should be provided (Buffel et al.,
424 2014, Buffel et al., 2012, Chan and Cao, 2015, Lui et al., 2009). Stakeholders become
425 increasingly likely to build enhanced facilities for senior citizens by taking the latter's
426 requirements into consideration.

427 In the coming decades, senior citizens in urban areas in China will not only be healthier but
428 also be wealthier and better educated than today, thereby resulting in a rapid growth in their
429 usage of the Internet (Chan and Cao, 2015). Unlike teenagers, who tend to build larger social
430 networks with friends of similar ages, senior citizens normally have smaller social networks
431 with a broader age range (Jung and Sundar, 2016). After retirement, individuals rely on the
432 social networks they have built to share feelings and to keep in touch with families and
433 friends living in distant places. Future ERFs are likely to adopt digital technologies and to
434 develop virtual components, including but not limited to WeChat groups, VR and AR
435 entertainment products. Compared with the mere provision of traditional leisure spaces in

436 ERFs for activities such as chess and cards playing, these digital elements may benefit senior
437 citizens' wellbeing more by keeping them productive and connected to the rest of society.

438 **6 Conclusion**

439 Population ageing results in an increasing demand for services meant for senior citizens. From
440 the perspectives of humanities and political economy, promoting senior citizens' participation
441 in building ERFs not only fosters quality and social justice but also ensures that public
442 policies safeguard the rights of senior citizens. Although senior citizens are the end users of
443 community-based facilities, their needs are easily overlooked by decision-makers and facility
444 managers. In addition, senior citizens in China are predominantly passive and relatively silent
445 in formal and informal civic participation because they normally hope that policy-makers can
446 notice and satisfy their requirements.

447 This study aims to identify senior citizens' requirements related to ERFs in mainland China
448 and to discuss whether senior citizens' perceptions are influenced by their backgrounds.
449 Results from the questionnaire survey revealed that, health care services for the seniors are
450 considered the most important, among the four main aspects. Requirements regarding
451 rehabilitation and entertainment, and daily life assistance are ranked second and third,
452 respectively. Culture-related activities are least important. Differences in senior citizens'
453 background also influence their choices. This survey-based study calls on attention to senior
454 citizens' needs from community-based facilities, and the results are likely to serve as
455 reference for various stakeholders in working together in the briefing process of ERF projects.
456 By knowing the services that senior citizens need from ERFs, decision makers can consider
457 the aged when implementing design guidelines. In addition, architects and investors can make
458 improved decisions when working with limited spaces or investments.

459 **Acknowledgement**

460 The authors wish to express their sincere gratitude to all the participants who shared their
461 opinions through the questionnaire survey.

462 **Appendix: Survey Questionnaire**

463 **Senior citizens' requirements on services provided by ERFs**

464 This questionnaire survey is carried out to identify your needs on community-based care
465 facilities in urban cities of mainland China. It takes about 10 minutes to complete this
466 questionnaire survey.

467 **Part 1 Background information**

- 468 1. What is your gender? A. Male B. Female
- 469 2. What is your age? A. 60~69 B. 70~79 C. 70~79
- 470 3. What is your physical condition now?
- 471 A. Self helping B. Device helping C. Under nursing
- 472 4. What is your highest educational level?
- 473 A. Elementary school and below B. Junior high C. Senior high
- 474 D. Bachelor's degree and above
- 475 5. What is your living pattern now?
- 476 A. With spouse B. With offspring C. Alone

477 **Part 2 Rankings of main aspects**

478 If your community can provide the following four aspects of services, please give ranks to
479 them in the order of importance from **1 to 4**, where 1 is the most important and 4 is the least
480 important to you.

Daily life assistance

Culture-related activities

Health care

481 **Part 3 Rankings of detailed items**

482 1. Please give ranks to the detailed items under the main aspect of ***“Daily life assistance”*** in
483 the order of importance from **1 to 8**, where 1 is the most important and 8 is the least
484 important to you.

Full time nursery

Room cleaning

Day care

Laundry

Meals on wheels

Purchasing

Canteens for senior citizens

Legal assistance

485 2. Please give ranks to the detailed items under the main aspect of ***“Culture-related activities”***
486 in the order of importance from **1 to 4**, where 1 is the most important and 4 is the least
487 important to you.

Reading

Handmade activities

Painting and calligraphy

Seminars

488 3. Please give ranks to the detailed items under the main aspect of ***“Health care”*** in the
489 order of importance from **1 to 5**, where 1 is the most important and 5 is the least important
490 to you.

Regular health examination

Health counselling

General practitioner

Going to the hospital with someone accompanied

Psychological counselling

- 491 4. Please give ranks to the detailed items under the main aspect of ***“Rehabilitation and***
492 ***entertainment”*** in the order of importance from **1 to 5**, where 1 is the most important and
493 5 is the least important to you.

Chess and cards playing

Singing and dancing

Fitness exercises

Massage

Postoperative nursing

494

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