

# Transforming Needs and Countermeasures of Old Communities

-A Case Study of Dalian in Liaoning Province

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**Abstract**—According to the appropriate dimensions offered by World Health Organization (WHO) and American Association of Retired Persons (AARP), this paper make the transforming need dimensions for old communities in Dalian, China. And we carry out a survey in 50 communities in Dalian, covering four districts and high-tech zone, whose data are then analyzed by a structural equation model. This allows us analyzing empirically the effect of the shortage in aging service in Dalian, so the communities can meet the special physiological, psychological and social needs of the old. The conclusions are that the transforming needs of old communities include accessibility, building and housing, community care and activities and spiritual needs.

**Keywords**—Transformation; Old community; Structural equation modeling

## I. INTRODUCTION

The proportion of residents aged 60 years and more is increasing. The population of residents aged over 60 years is above 21 million accounting for 15.5% of the total population. And the number of people over 65 years old take the share of 10.1%. One report made by Ministry of Civil Affair of China in 2014 showed that with the increasing number of the elderly population, the issue of aging has become a widespread concern in the community[1]. People tend to age in places where they familiar with, such as their house and community. Compared with traditional centralized living aging institutions, aging in place can provide Continuous, comprehensive aging services. Lowen, Davern, Mavoia and Brasher (2015) found the key point of aging in place, which should include health care, entertainment, public transports, home services, necessary facilities, etc[2]. In China, the effective supply of aging services in the elderly community is of shortage. The age-friendly degree of communities in China is still low, which can not meet the special physiological, psychological and social needs of the elderly. Therefore, accurate identification of the age-friendly community is an urgent issue to be solved. Based on that, reasonable planning of age-friendly transformation is needed to create a livable community.

The research on transforming the age-friendly community is mainly focused on two aspects. First, it is necessary to study the necessity of the transformation. Friis (1968) found that the

elderly are willing to stay in the mainstream society[3]. Rowles (1994) supported that it is appropriate to set aging at home as one policy goal[4]. The poor living environment will lead to decline in the health of the elderly (Tinker, 1997)[5]. Cunningham and Michael (2004) put forward a very close relationship between the community environment and the well-being of the elderly[6]. Gilroy (2008) have put forward the community environment has a significant impact on the convenience of the elderly, independent action and quality of life[7]. Therefore, in order to ensure the normal life of the elderly, the community needs to have a complete infrastructure, services and medical facilities (J and CM, 2007)[8].

Second, it is about the research on the design and transformation of the age-friendly community. In recent years, WHO, AARP and other organizations or governments have promulgated the guidelines for the construction of the elder-friendly city. GreatWohl et al. (2003) comprehensively and systematically expounded the principles, contents, community service and other contents of the United States[9]. Engels and Liu (2011)[10], Giles (2009)[11], Wilkinson-Meyers (2014)[12], Davis (2012)[13] respectively researched the importance of traffic convenience, health service availability, convenient shopping environment and community participation. Peng Zhou (2009)[14], Hua Liu (2012)[15] investigated the housing needs of the elder city residents in transformation and analyzes the influencing factors of age-friendly reconstruction needs. Zonghua Bao (2008) has studied the principle and content of the transformation of the old houses[16]. Taking Shanghai Tongji Village as the research object, Ying Zhang (2009) put forward the old residential environment transformation strategy adapting to the aging of the population[17]. Bo Li (2012) took Xi'an as an example to construct the service system of the old residential district[18].

In summary, the academic has paid attention to the transformation of the age-friendly community, and from different levels to carry out a preliminary exploration, but it is still rare to study on the transforming needs under the framework of the age-friendly community under.

Two separate questions deserve attention. First, what are the main aspects of the transforming needs of elderly-friendly communities? Second, How to carry out the transformation? In

this paper, taking Dalian as an example, we carry out the empirical study on the needs of the elderly community in Dalian, based on the investigation and analysis of 50 communities in the city's four districts and high-tech zones. The structural equation model is established to analyze the four aspects of the age-friendly community in Dalian and puts forward relevant policy recommendations.

Section II details our empirical strategy, then proceeds to a description of the data we use. While section III presents basic results using structural equation model. Section IV describes the results in detail and section V makes a conclusion.

## II. THE DESIGN OF RESEARCH

We present here our theoretical basis and research hypothesis. Base on that we construct our initial theoretical model. We also show the data we use and how we build our sample and questionnaire in this section. At last, we present a summary statistic of the date.

### A. Theoretical basis and research hypothesis

#### 1) Accessibility

Berke et al (2007) found that the convenience of travel is beneficial to increase the activity of the elderly, and the infrastructure for the convenience of the elderly can effectively alleviate their depression[19]. Mingpeng Zhao, Bing Tang (2006) suggested that the age-friendly community should implement the principle of nonbarrier to ensure the safety of the elderly[20]. There are some communities of Dalian city with crowding pedestrian road, a random vehicle parked roadside, lacking rest facilities etc. Based on that and drawing on the views of scholars, we set accessibility as an independent dimension, including resting space and wheelchair access. We put forward the hypothesis H1: "accessibility" has a significant positive effect on age-friendliness.

#### 2) Building and housing

As the place the elderly most familiar with and the longest o stay, building and housing have a very important impact on the safety and life quality of the elderly. In the study of China's aging population and development strategies of age-friendly community Fengming Wang(2011) proposed the elderly would have a special demand for housing facilities and the surrounding environment such as handrails, wheelchair etc. for their inconvenient action and their inflexible body[21]. In Dalian, part of the community was built in the 60s and 70s, households are mostly retired workers. It is a common phenomenon that the corridor is too steep and corridor exit is very narrow. Therefore, we set the corridor width, entrance ramp, corridor handrails, and indoor handrail as four variables and suppose H2: building and housing has a significant positive impact on age-friendliness.

#### 3) Community care and medical services

Community care and medical services are difficulties in the community transforming. WHO and other international organizations(2003) emphasized the concept of returning to the community and aging at home and put forward that Older people are more vulnerable and less mobile[22]. That means they need to get basic care in their homes or communities. We

propose the hypothesis H3: Community care has a significant positive effect on age-friendliness.

#### 4) Activities and spiritual needs

Most of the elderly are in the inflection point of the two states from the state of work to retirement, from a healthy, independent state into a semi-independent state. Therefore, the focus should be placed on the participation and the spiritual life of the elderly. In 2007, WHO put forward the eight dimensions in the guidelines for the construction of the global age-friendly city: outdoor spaces, transportation, housing, social participation, community support and health services, communication and information, respect and social inclusion, civic participation and employment[23]. Among them, social participation, respect, and social inclusion, civic participation and employment are essences of activities and spiritual needs. Oman et al. (1999) suggested that the volunteers could prolong the life and reduce the functional damage of the elderly[24]. White et al. (2010) found that elderly people living in the community are more willing to participate in social activities[25]. Uchino (2004) proposed social interaction and community activities can reduce the mortality, reduce the emotional depression of the elderly and reduce the need for community care[26]. On this basis, we put forward hypothesis H4-H6.H4: Activity and spiritual needs have a significant positive impact on age-friendliness.H5: Accessibility has a significant positive impact on activities and spiritual needs.H6: Activities and spiritual needs have a significant negative impact on community care.

According to the above research hypothesis, this paper constructs the initial theoretical model of the old age community: Initial theoretical model is shown in Figure 1.

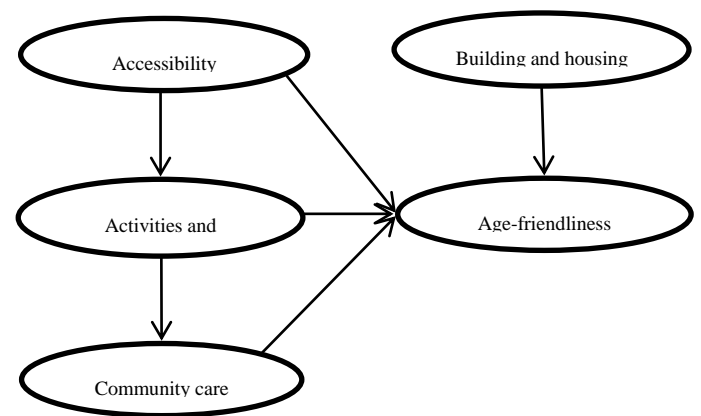


Fig. 1. Initial theoretical model

### B. Questionnaire design and data collection

#### 1) Questionnaire design

The questionnaire was designed according to the Likert scale. There are 6 main parts: personal information, accessibility, activities and spiritual needs, community care, building and housing and age-friendliness.21 items are included in these 6 main parts. Personal information includes gender, education level, and retirement income, age, whether living independent and needing daily care. Accessibility measurement variables identified as the rest space and

wheelchair pass referred to WHO, AARP scale. The measured variables of building and housing include indoor handrail, stair armrest, ramp door, corridor width; the measurement variables of the activities and the spirit needs draw on the WHO scale, including the fitness equipment, the old age university and the volunteers. Community care mainly includes emergency alarm and centralized care.

## 2) Data collection

In this paper, we investigated the elderly living in various communities in Dalian. According to «Notice of the Dalian Municipal People's Government on strengthening the planning of the main new urban areas», the investigated areas are limited to: Zhongshan District, Xigang District, Shahekou District, Ganjingzi District, Dalian District and high-tech zones. Using the network resources 60 communities were extracted from the five areas and each community randomly selected 10-11 elderly to carry out the questionnaire survey. A total of 520 questionnaires were sent out and all questionnaires were collected. 500 questionnaires were valid and the effective rate of the questionnaire was 92%.

TABLE I. BASIC INFORMATION TABLE

Category	Features	Frequency	Proportion
Sex	Male	228	45.6
	Female	272	54.4
Education level	Primary school and below	82	16.4
	Junior middle school	190	38.0
	High school or technical school	157	31.4
	College and above	71	14.2
Retirement income	≤ 1500¥	109	21.8
	1501-3000¥	242	48.4
	3001-4500¥	103	20.6
	≥ 4501¥	46	9.2
Age	≤ 60	79	15.8
	61-65	142	28.4
	66-75	177	35.4
	76-85	95	19.0
	≥ 86	7	1.4
Cohabitant	Spouse	188	37.6
	Children	177	35.4
	Spouse and children	80	16.0
	Live alone	53	10.6
Needs of care	Other	2	0.4
	No need	16	3.2
	Need	484	96.8

## C. Data statistics and analysis

### 1) Sample information

Basic information of sample is shown in Table I.

### 2) Reliability and validity analysis

In order to ensure the reliability of the test results, SPSS 23.0 was used to analyze the reliability and validity of the data. As shown in Table II, the consistency coefficients of Cronbach in each subscale are between 0.7 and 0.9, indicating a high internal consistency.

TABLE II. CRONBACH'S ALPHA TEST RESULTS

Research variables	Number of items	Cronbach's Alpha
age-friendliness	4	0.833
accessibility	2	0.735
Activities and spiritual care	3	0.820
Community care	2	0.753
Building and housing	4	0.877

Factor analysis is carried out in this paper by SPSS 23.0 and KMO results are shown in Table III. The p-value is 0, and the KMO coefficient is 0.618, which is in acceptable range. The results of factor analysis are shown in Table IV, and the standard factor loadings of the observed variables is above 0.5. The results show that the dimension division is reasonable, and the questionnaire has structure validity. The dimensions and indexes are shown in Table V.

TABLE III. KMO AND BARTLETT TEST

Kaiser-Meyer-Olkin		0.618
Bartlett's test	Approximate chi square	903.649
	df	55
	Sig.	.000

TABLE IV. FACTOR ANALYSIS RESULTS

Latent variable	Observed variables	Standard factor load
Accessibility	Wheelchair access	0.679
	Rest space	0.642
Building and housing	Corridor width	0.836
	Entrance ramp	0.787
	Corridor handrails indoor handrail	0.572 0.434
Community care	Concentrated care	0.858
	Emergency alarm	0.835
Activities and spiritual needs	Old university	0.779
	Fitness Equipment	0.779
	Volunteer	0.674

TABLE V. FITTING EXPONENTIAL CALCULATION

Fit index	$\chi^2/df$	RMSEA	GFI	AGFI	CFI
Result	7.673	0.116	0.848	0.793	0.662

III. HYPOTHESIS TEST

A. Initial theoretical model fitting

AMOS21.0 software is used to calculate the initial theoretical model, and the results are shown in Table V. It can be seen that the fitting index of the initial theoretical model does not meet the requirements of the recommended value, which should be revised.

B. Model modification

After modifying the model, a modified model is obtained, and the fitting results show that:  $\chi^2/df = 4.672$ ;  $GFI=0.915$ ;  $RMSEA=0.086$ . Therefore, the model fitting effect is acceptable. The standardized path coefficient is shown in Figure 2.

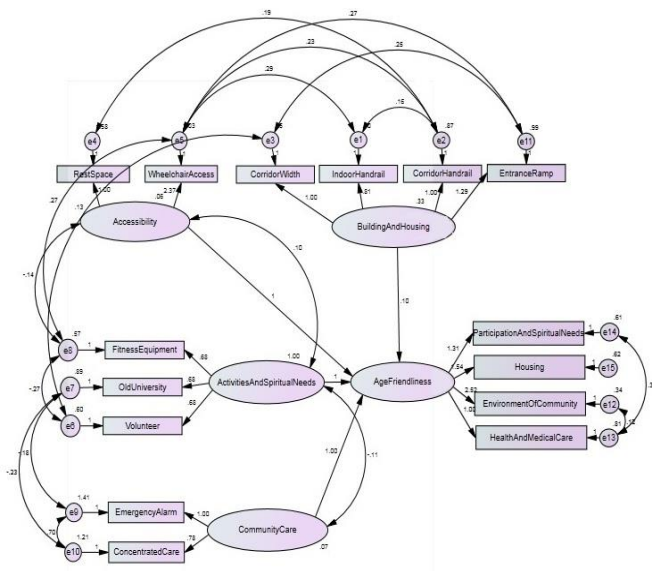


Fig. 2. Standardized path coefficient

IV. RESULT ANALYSIS

According to the estimation results of path coefficients in the structural equation, the path coefficient of accessibility and age-friendliness is 0.64. The path coefficient of rest space and accessibility is 0.18 and the path coefficient of the room for a wheelchair to travel and accessibility is as high as 0.48. This shows that the elderly community should strengthen the construction of barrier free facilities and improve the community sidewalk conditions. Roadside rest space has little effect on the accessibility, but at present, our country is in the primary stage of aging. With the increase in the number and the change in the age of the elderly, the demand for roadside rest space will change dynamically.

Residential buildings inevitably appeared some hidden dangers for the long construction time in Dalian. According to the results of structural equation, the path coefficient of building and housing is 0.16. This is generally agreed with the elderly, the indoor living conditions are only their own decoration and selection issues, and there is not much to do with the community. One of the most intense demands is the establishment of the entrance ramp, whose path coefficient is 0.59. There are full of hills in Dalian, so the stage will increase the difficulties of the travel of the elder. The width of the corridor is the second major factors influencing residential building safety and comfort, the path coefficient is 0.53. In addition, the corridor and interior handrails are essential, and the path coefficients are 0.27, 0.19 respectively.

Community and health care is a key factor shaped the age-friendly community and the coefficient is as high as 0.72. The community should take active measures to integrate community service resources, enrich and expand the content of the life services. From the current questionnaire survey and data analysis results, the path coefficients were 0.22 and 0.18 of emergency alarm and centralized care respectively.

The elderly, especially those who have just retired, are in the transition phase from the state of work to retirement, a healthy independent state to a semi-independent state and that is why they need to participate in more community organizations activities. The path coefficient of activity and spiritual needs and age-friendliness is 0.25. The path coefficient is 0.67, 0.58, and 0.68 of fitness equipment, elderly university, and volunteers.

Older people are in a period of decline in physical function and changes in lifestyle, so there are an unprecedented increase in activity and spiritual needs. Among the exogenous latent variables, the path coefficient of activities and spiritual needs and accessibility is 0.43, and community care and activities and spiritual needs is -0.41. The convenience of travel has a positive effect on the participation of the elderly, while the activity participation has a negative effect on the community care.

It is necessary to understand the needs of the elderly. Then plan ahead and integrate the resources of the community provide effective services for the elderly. In addition, the elderly should be better to participate in activities to meet the spiritual needs and improve the quality of life.

V. CONCLUSIONS AND SUGGESTIONS

A. Research conclusions

In this paper, according to the needs and the characteristics of the elderly in Dalian communities, the demand of the adaptation is divided into 4 dimensions. According to the 500 questionnaires, a structural equation model was established to verify the theoretical hypothesis.

Suggestions on the transforming of the old communities in Dalian:

1) Change the traditional concepts of aging

The transformation of the aging concept is imperative. The community will take the elderly as a burden, rather than the



wealth of the community. In order to change the concepts of aging, we should pay attention to the production of public service advertising, films and television works for the elderly to promote the age-friendliness of communities and the rapid development of the elderly industry.

#### 2) *Safe and accessible space for outdoor activities*

Most of the activities are done by walking in one day. Therefore, Community walking space design is closely related to the life of the elderly. It is meaningful to redefine the original community walking system, and increase wheelchair traffic ramp. The elderly often tend to take a rest when walking, so the transformation of walking space also can be combined with recreational function design.

#### 3) *Pay attention to the details of building and housing reform*

The transformation of the old community building is difficult to achieve immediately. It should be in accordance with the requirements of urban construction and transformation of old residential and overall planning for the needs of the elderly, implement the transformation of the old housing gradually, at a lower cost to get a greater fitness improvement.

#### 4) *Improve community care services*

On the one hand, the community should set up a daycare center, elderly canteens, and other care services. The community should regard it as a life long progress to achieve the goal. On the other hand, the community should actively prevent the emergence and register the special situation of the elderly. Priority will be given to help elderly people living alone within a wide range of services.

#### 5) *Pay attention to the activities and spiritual needs of the elderly*

In the four dimensions, the activity and the spiritual demand are the core to help and maintain the independence of the elderly safely. At present, the elderly community in Dalian often pay attention to the construction of the hardware, and ignore the software construction, especially for the elderly activities and spiritual needs. However, we should focus on the transformation of cultural centers, sports venues and other public places, and open for all elderly people. The community also need encourage the elderly to participate social activities to create a relaxed, free and friendly social environment.

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#### REFERENCES

- [1] Ministry of Civil Affairs of China. (2014), 'Social Services Development Statistics Bulletin'. (In Chinese).
- [2] Tamara Lowen, Melanie T. Davern, Suzanne Mavoia and Kathleen Brasher. (2015), Age-friendly cities and communities: access to services for older people', Australian Planner, 1-11.
- [3] Friis, Henning, Peter Townsend, and Ethel Shanas(1968), Old People in Three Industrial Societies: An Introduction, 2-18. In Old People in Three Industrial Societies, edited by E. Shanas, P.
- [4] Heumann L, Bold D. (1993), Aging in Place with Dignity: International Solutions to the Low-income and Frail Elderly'. London: Praeger.
- [5] Rowles GD. (1994), Evolving images of place in aging and 'aging in place', in: Shenk D, Achenbaum AW, eds, Changing Perceptions of Aging and the Aged. New York: Springer Pub. Co., 115-125.
- [6] Tinker, A. (1997), Housing for elderly people', Reviews in Clinical Gerontology 7, 171-176.
- [7] Cunningham GO, Michael YL. (2004), Concepts guiding the study of the impact of the built environment on physical activity for older adults: A review of the literature, American Journal of Health Promotion 18, 435-443.
- [8] Gilroy R (2008), Places that support human flourishing: Lessons from later life', Planning, Theory and Practice 9, 145-163.
- [9] Pynoos J, Nishita CM. (2007), Aging in place. In: Carmel S, Morse CA, Torres-Gil FM, eds. Lessons on Aging from Three Nations Vol I The Art of Aging Well', Baywood, 185-198.
- [10] Great Wohl, Steve Baker. (2003), 'Aging-in-Place', Healthcare Review 1.
- [11] Engels, B, and G.J.Liu. (2011). Social exclusion, location and transport disadvantage amongst non-driving seniors in a Melbourne Municipality, Australia, Journal of Transport Geography 19(4), 984-996.
- [12] Giles, L.C. J.A. Halbert, L.C. Gray, I.D. Cameron, and M. Crotty. (2009), The distribution of health services for older people in Australia: where does transition care fit?' Australian Health Review 33(4), 572-582.
- [13] Wilkinson-Meyers, L, P. Brown, C. McLean and N. Kerse. (2014), Met and unmet need for personal assistance among community-dwelling New Zealanders 75 years and over, Health and Social Care in the Community 22(3), 317-327.
- [14] Davis, S, N. Crothers, J. Grant, S. Young, and K. Smith. (2012), Being involved in the country: productive aging in different types of rural communities, Journal of Rural Studies 28(4), 338-346.
- [15] Peng Zhou. (2009), 'Research on the housing needs of the aged in Shanghai in the next twenty years and the study of the renovation fitting for senior housing', Tongji University.
- [16] Hua Liu, Bo Li. (2012), 'Research on the Key Factors Affecting the Demand for Residential Buildings Renovation Catering for the Elder People', REFORMATION & STRATEGY 3, 175-178. (In Chinese)
- [17] ZongHua Bao (2008), Transforming of old communities, Shanghai Real Estate 5, 28-29, in Chinese.
- [18] Ying Zhang (2009). The reformation of old live area the old population with environmental adaptability'. SHANXI ARCHITECTURE 13, 43-44. (In Chinese)
- [19] Bo Li (2012), Research on Demand and Service System for Old Urban Residential Area Renovation Catering for the Elder People-With the Exemplification of Xi'an, Xi'an University of Architecture and Technology.
- [20] Berke, E. M., Gottlieb, L.M., Moudon, A.V., Larson, E.B. (2007), Protective association between neighborhood walkability and depression in older men, Journal of the American Geriatrics Society 55, 526-533.
- [21] MingPeng Zhao, Bing Tang. (2006), 'Study on the Living Environment for Old People, Journal of Luoyang Technology College 1, 35-36. (In Chinese)

- [22] Feng Ming Wang. (2011), 'Study on the China aging of population and the development strategy of the elderly home community', Tianjin University, in Chinese.
- [23] WHO (2003), Active Aging-A policy Framework', BeiJing: HuaLing Press.
- [24] Oman, D. Thoresen, C., McMahon, K. (1999), 'Volunteerism and mortality among older adults: Findings from a national sample', *Journal of Health Psychology* 4, 301-316.
- [25] White, D.K, Jette, A.M, Felson, D.T, Lavalley, M.P, Lewis, C.E., Torner, J.C., Keysor, J.J. (2010), Are features of the neighborhood environment associated with disability in older adults? *Disability & Rehabilitation* 32, 639-645.
- [26] Uchino, B.N. (2004), *Social support and physical health: Understanding the health consequences of relationships*, Yale University Press.