

Article

Using the Importance–Satisfaction Model and Service Quality Performance Matrix to Improve Long-Term Care Service Quality in Taiwan

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Abstract: The present study integrates the importance–satisfaction (I-S) model and service quality performance matrix (SQPM) to examine long-term care (LTC) service demands and satisfaction improvement. Many scholars have used a single model to explore project improvement. Each model has advantages, but we think they are too subjective and suggest that it is best to integrate models to determine what should be improved. We established quality attributes of service demands based on more than two sessions of discussions and expert consultations with LTC service users (older adults). The final questionnaire was divided into three parts: a demand survey, satisfaction survey, and demographics survey, and 292 valid questionnaires were collected. The questionnaire items were summarized with means and standard deviations. In this study, if only the I-S model was used to examine LTC in Taiwan, then seven service elements of the system would need to be improved. However, if only the SQPM method was used, then 16 service elements would need to be improved. Only seven service elements were identified by both methods. When time and resources are limited, it is not feasible to take comprehensiveness into account. When many projects must be improved and it is impossible to implement them at the same time, improvement priorities need to be developed. Taiwan lacks sufficient LTC resources, so it is impossible to provide enough resources for all those who need care. To use resources efficiently, the I-S model and SQPM were integrated in this study to identify areas for improvement.

Keywords: Long-term care (LTC); importance-satisfaction (I-S) model; performance evaluation matrix (PEM); service quality performance matrix (SQPM); voice of customer (VOC)

1. Introduction

An aging population and changes in population structure directly impact social systems, such as the labor market, retirement planning, and the medical care system, and can lead to an economic crisis, such as a recession or government bankruptcy [1]. Therefore, population factors have become closely watched important issues in developed countries [2]. Taiwan's population of older adults exceeded 7% in 1993, making it an aging society [3], exceeded 14% in 2018, categorizing it as an aged society [4], and will exceed 20% in 2025, making Taiwan a super-aged society [5].

Long-term care (LTC) involves a variety of services designed to meet people's health or personal care needs during a short or long period of time. These services help people live as independently and safely as possible when they can no longer perform everyday activities on their own [6]. LTC is a very important issue for everyone in an aging society [5]. With the advancement of technology and

medical treatments, the global average age has been extended to 75 years [7]. Taiwan is no exception. The continuous extension of life has resulted in changes in population structures [8]. The aging phenomenon is a problem that developed countries must face, along with related problems regarding the care of older adults [9]. In recent years, late marriage, bachelorism, and infertility have continued to intensify. Coupled with extended average life expectancy, low fertility, and population aging, they have also become concerning and unavoidable issues [10].

The implementation of LTC policies is based on the manager perspective rather than the user or customer point of view. In other words, LTC implementation ignores the voice of the customer (VOC). In the present study, the user point of view was used to explore service demands in LTC in Taiwan. Those who require LTC were divided into two groups: healthy older people, who are only interested in living happily, and older people with disabilities or dementia, who require medical interventions [11]. As the demands of these two groups are different, a service demand design would be ineffective, and could even affect national life, if it was viewed from an official perspective. Furthermore, the Taiwanese government has limited resources, and the needed resources would not necessarily be utilized at the same time. To address these issues and prioritize the efficient use of LTC resources, the importance-satisfaction (I-S) model and the revised performance evaluation matrix (PEM) can be used. Such a practice could fulfill LTC service demands by building a complete set of service design measurement methods.

Yang [12] developed the I-S model with reference to the importance performance analysis (IPA) method. The I-S model is the best tool for quality improvement [12,13]. Lambert and Sharma [14] proposed the performance evaluation matrix (PEM) to determine the importance of logistical service quality factors and the performance of companies based on these factors. PEM-related applications have been used in the machinery industry and in education; few applications have been used in long-term care. The PEM can help industries find service items that need improvement. The present study found no analyses on combining the I-S model and the PEM method for LTC service demands in the relevant literature. Due to insufficient studies and that the fact that currently LTC service demand policies are considered to be very important and urgent, the I-S model and PEM are introduced in the present study. It is hoped that this will provide more accurate quality service design and improve the essentials of LTC services to better meet the needs and expectations of the older adult population in Taiwan.

We conducted in-depth interviews in more than two sessions of discussions with experts and scholars through a focused discussion method to understand the LTC demands of the public and further confirm the service demands of caregivers, and we distributed 350 questionnaires. We also used the I-S model and the revised PEM method to find LTC users of corresponding management strategies to serve as a transmission basis for decision makers to adjust their services. This was to ensure that user service demands could be fully satisfied. In general, the purposes of this study can be summarized as follows:

1. To perform in-depth interviews with experts and scholars in focused discussions to confirm user service demands and service resources.
2. To use the I-S model and the revised PEM method to confirm the importance and priority levels of various service demands in order to serve as a basis for decision makers to adjust LTC service quality design and improve care for older adults.

The rest of this study is organized as follows: Section 2 reviews the literature related to long-term care in Taiwan, long-term care service demands of older adults, the service quality evaluation model, the I-S model, the service quality evaluation model, and related research methods. Section 3 presents the research process, methodology, questionnaire design, data collection method, and statistical analysis methods. The results of the analysis and discussion are given in Section 4. Finally, the conclusions of this study and suggestions are presented in Section 5.

2. Literature Review

2.1. Long-Term Care Act 2.0 of Taiwan

The advent of an aging society has brought about new challenges [11]. In the past, people around the world looked upon older adults as vulnerable and in need of care [8]. Through solutions provided by social welfare programs, we have gradually changed the traditional image that older adults are dependent towards a more positive image [15]. In addition to providing social benefits, such as nursing and medical care, we assist older adults in matters of self-reliance and self-esteem. Therefore, older adults do not become a social burden but instead can share their wisdom and contribute to national competitiveness [16].

Taiwan's LTC industry has taken a significant step forward due to assistance from the government. We must take further preventative measures to cope with the expected rise in the number of older people in Taiwan in the next 10 years. To ease the burden on young people, the Long-Term Care Act 2.0 (LTCA 2.0) is imperative [17]. The overall goal of LTCA 2.0 is to establish a high-quality, affordable, and universal LTC service system that has a community-based spirit, provides disabled people with basic care services, helps older adults to enjoy old age comfortably in familiar environments, and eases the burden of family care [18]. Therefore, a budget of NT\$20.079 billion (0.11% of gross domestic product (GDP)) is expected to be allocated to LTCA 2.0, which is over four times the size of the NT\$5.126 billion budget in 2016. The LTC Management Center has indicated that the linking of social resources such as medical treatment, LTC, and life support can be carried out through an overall community care model by connecting various service systems to provide needed care, while also saving LTC resources [19]. According to the long-term care policy blueprint proposed by Taiwan's Ministry of Health and Welfare [20], older adults who live at home and get sick and need to see a doctor can go through the medical system, older adults who are healthy and able to live on their own can go through the life support system, and older adults who are unhealthy or even disabled can go through the long-term system. The medical/long-term/life support care model can be seen in Figure 1.

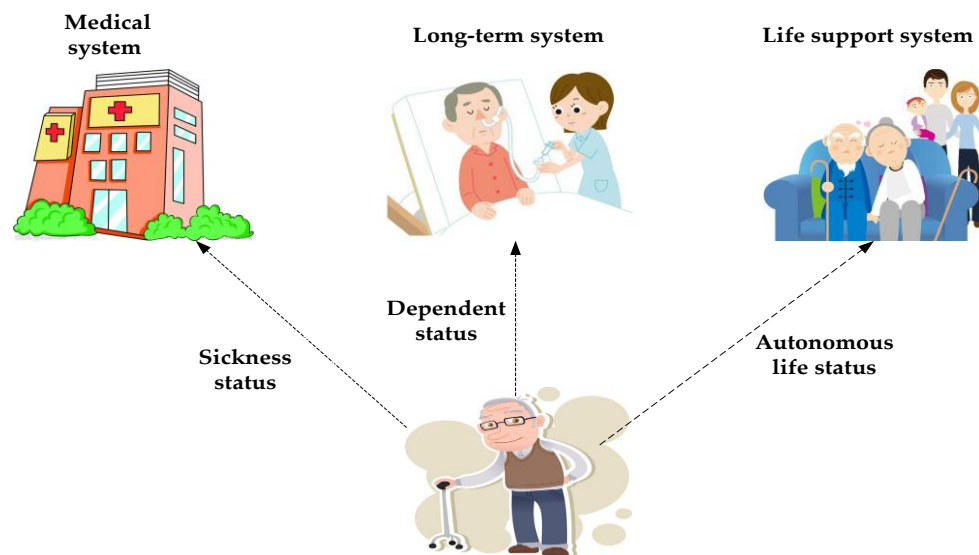


Figure 1. Medical/long-term/life support care model. Source: Ministry of Health and Welfare, Taiwan [20].

LTCA 2.0 is an extension of Taiwan's LTC political views. To address Taiwan's increasingly aging society, LTCA 2.0 proposes improving the strategies of three projects [20].

2.1.1. Widen Service Targets

Besides widening the care level of existing service targets, LTCA 2.0 also covers the following targets: (1) older people over 50 years old with dementia and disabled lowland aboriginals over 55 years old, and (2) disabled people younger than 49 years old and frail older people over 65 years old.

2.1.2. Provide Easily Accessible Service Units for the Public

For older people who could not find ways to get help in the past, the government introduced an innovative system by proposing an “ABC” long-term community-based care model (see Figure 2). It is described as follows: Tier A is referred to as the LTC flagship store, tier B as the LTC specialty store, and tier C as the LTC corner store. These “stores” are located within small communities, local neighborhoods, counties, and townships, and the different levels provide different services. For example, if you want to chat with someone, you should go to a tier C LTC corner store. If you want to receive day care, you should go to a tier B LTC specialty store. Finally, if you want to receive complete services, you should go to a tier A LTC flagship store.

2.1.3. Relax Subsidy Approval Regulations

In the past, the LTC Center paid subsidies in advance before asking for payment. This practice often affected service quality due to long processing times. However, under LTCA 2.0, the subsidy approval regulations have been relaxed to allow more institutions to invest in LTC services.

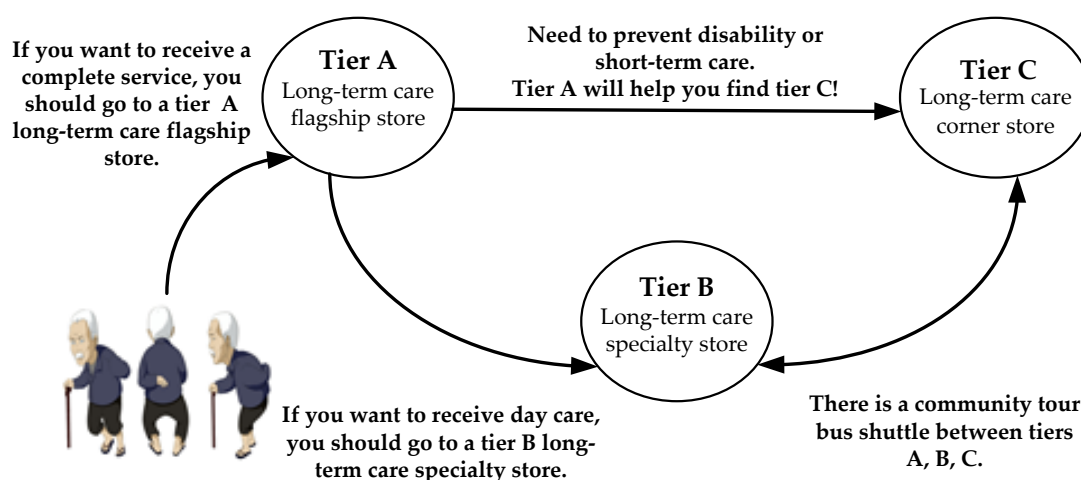


Figure 2. ABC long-term community-based care model. Source: Ministry of Health and Welfare, Taiwan [20].

2.2. Long-Term Care Service Demands of Older Adults

Older people who need care are divided into three categories: retired, demented, and disabled [8]. The physical and mental conditions of older adults in these categories are inherently different, and their demands for services are also different [11]. Since the older adult population continues to grow, along with reduced family capabilities to provide assistance, the demand for care services continues to rise [21]. Furthermore, although physiological differences between older adults are predictable, their mental, psychological, and behavioral conditions are not. The basic demands of older adults include economic, living, safety, health, leisure, and other types of support [22]. Lin and Chen [23] pointed out that the service demands of older adults include medical treatment, economic support, retirement, and reemployment, social participation, family care, interpersonal relationships, psychological adjustment, LTC, housing arrangements, annuity insurance, transportation, education and learning, leisure and entertainment, and other types of support. Shih et al. [24] divided older adult care services into home-based, community-based, and institution-style. The first two are for

older adults living in communities. Home-based services include the following 10 services: health care, rehabilitation, physical care, housework, care visits, telephone-based care, catering, emergency rescue, home environment improvement, and other. Community-based services include the following 15 services: health care, medical care, rehabilitation, psychological counseling, day care, catering, family care, education, legal, transportation, retirement preparation, leisure, provision of information, referrals, and other.

2.3. Service Quality Evaluation Model

2.3.1. Importance Performance Analysis

Martilla and James [25] proposed importance performance analysis (IPA) (see Figure 3). IPA is a technique that prioritizes the relevant attributes of a particular service product by measuring its importance and degree of performance [26]. The IPA framework was first put forward in an attribution study on the motorcycle industry by plotting the average scores of importance and degree of performance in a 2D matrix and proposing different manufacturing/service strategies, depending on the position of each element, to resolve the production process faced by the enterprise [27].

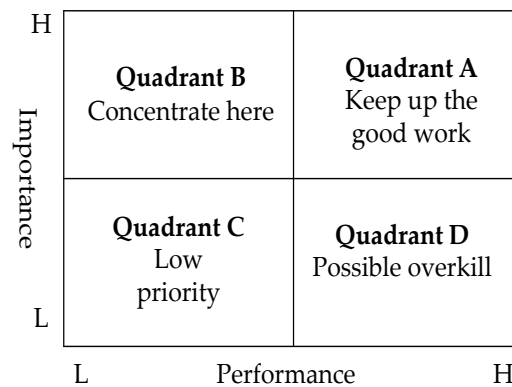


Figure 3. Importance performance analysis. Source: Martilla and James [25].

2.3.2. Importance-Satisfaction Model

Businesses generally determine enhancement priorities based on attributes with low satisfaction rather than considering actual customer requirements [28,29]. Although this approach has removed some unsatisfactory quality attributes, these attributes are not the main areas that customers focus on [30]. Yang [12] considered that low-quality attributes should not be the only consideration when designing an improvement plan. In accordance with this rationale, Yang [12] developed the importance–satisfaction (I-S) model, with reference to the IPA method. This model is illustrated in Figure 4. The quadrants are designated as excellent (high importance, high satisfaction), to be improved (high importance, low satisfaction), surplus (low importance, high satisfaction), and unimportant (low importance, low satisfaction). Improvement strategies are based on the area in which each quality attribute is placed.

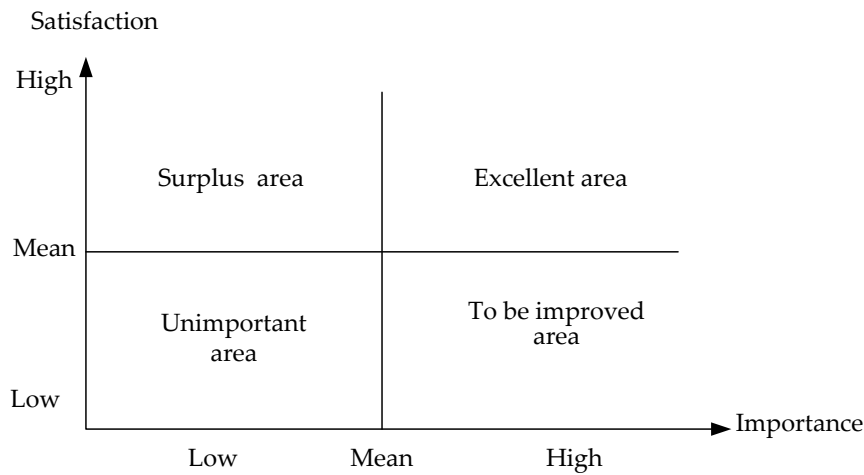


Figure 4. Importance–satisfaction model. Source: Yang [31].

2.3.3. Performance Evaluation Matrix

Lambert and Sharma [14] proposed the performance evaluation matrix (PEM) to determine the importance of logistical service quality factors and the performance of companies based on these factors. Performance variables are placed on the horizontal axis, and importance variables on the vertical axis [31]. Improvement strategies are then suggested based on evaluating these two factors in response to different positions (see Figure 5).

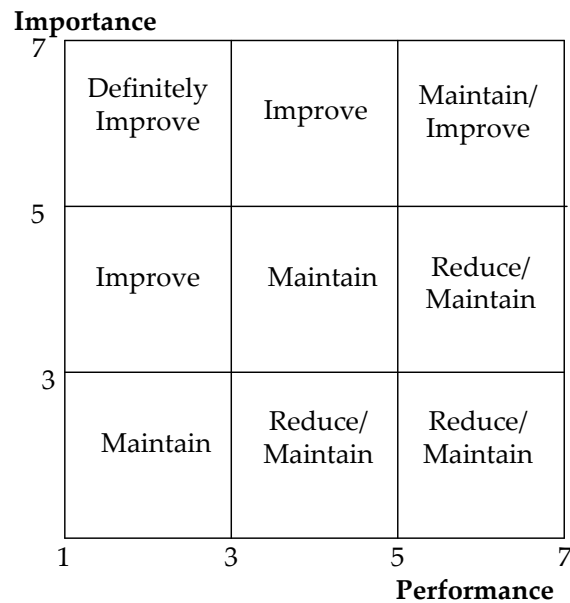


Figure 5. Performance evaluation matrix. Source: Lambert and Sharma [32].

From this matrix analysis, the current performance and competition status of the examined organizations can serve as directions for future development. PEM provides a reference for whether or not business owners should adjust their performance and response strategies [32]. Due to different perspectives explored by scholars, the viewpoints vary. Chen and Yeh [13] proposed amending the variables by placing importance variables on the horizontal axis and satisfaction variables on the vertical axis. The revised PEM was developed from these changes (see Figure 6).

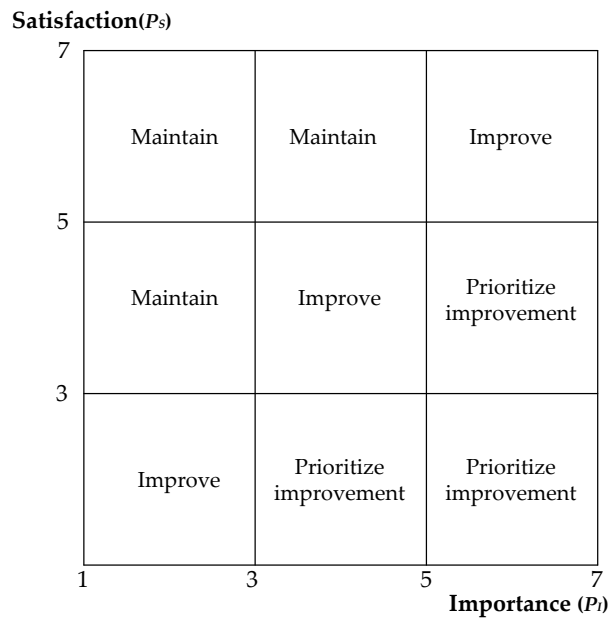


Figure 6. Revised performance evaluation matrix. Sources: Chen and Yeh [13].

2.3.4. Establishment of Service Quality Performance Matrix

Lambert and Sharma [14] proposed the PEM as a reference for quality improvement, but this matrix lacks generalization and standardization and is limited to a 7-point Likert scale [33]. Many subsequent scholars, such as Lin et al. [34] and Chen [28], proposed a revised PEM and applied it to the management method of quality improvement in enterprises. Scholars have not implemented this model as a basis for quality improvement in the LTC industry. In light of the views of previous scholars, this study applied a revised PEM to the quality management strategy of the LTC industry (see Figure 7). To generalize and standardize this model, a 5-point Likert scale, which is considered to be the most reliable scaling tool in the literature and widely used by scholars, was adopted in this study [35].

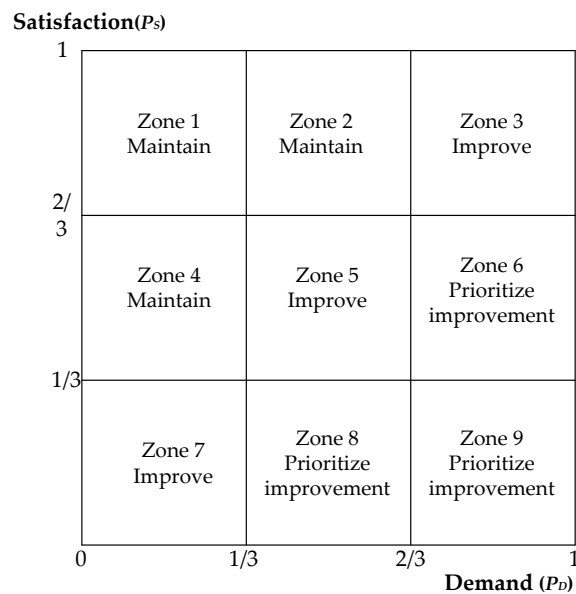


Figure 7. The service quality performance matrix.

Below, according to the theory of Hung et al. [33], the random variable D denotes demand, and S denotes satisfaction. A 5-point scale was adopted to evaluate the demand and satisfaction of each item. The indices of demand and satisfaction are defined as follows:

$$P_D = \frac{\mu_D - \min}{R} \quad (1)$$

$$P_S = \frac{\mu_S - \min}{R} \quad (2)$$

where P_D is the index of demand, P_S is index of satisfaction, \min is the minimum value of scale k , and R is the full range of scale k . Furthermore, μ_D and μ_S are the means of demand (D) and satisfaction (S), respectively, $\min = 1$ represents the minimum of scale k , and $R = k - 1$ is the full range of scale k .

Based on the literature review, we know that PEM has been used extensively in recent years and can be applied to decision-making practices [32]. This method is mostly used in logistics and in the semiconductor, financial, and service industries, and its application in relevant studies of LTC is still rare. Hence, we chose PEM as one of the research methods. In this study, the resource allocation for the LTC concept was used as the basis to explore service satisfaction levels for older people who require care. The corresponding strategies of maintenance, improvement, and priority improvement of the revised PEM put forward by Chen and Yeh [13] were re-proposed. This matrix is called the service quality performance matrix (SQPM). Zones 1, 2, and 4 are areas where older adults' cognitive satisfaction exceeds demand. Therefore, service resources should be maintained at their current status, and the strategy is to maintain service quality. Zones 3, 5, and 7 are areas where satisfaction is equal to demand, indicating that the service does not exceed user expectations; therefore, organizations must improve their existing service quality by investing in more resources, and the proposed strategy is to improve. Zones 6, 8, and 9 are areas where demand exceeds satisfaction, indicating that older adults are well aware of service projects, but they are not satisfied with the services provided. As a result, governments and organizations must actively make improvements to correct these issues, and the response strategy is to prioritize improvement. All factors that prioritize improvement are the response strategies that this study puts forward and are regarded as factors that should be prioritized.

In the relevant literature, most PEM-related applications were in the machinery industry [34] and education [36], and few were applied in the service industry, and PEM was not formally applied to LTC service demand and resource allocation at all. In this study, the literature and relevant practical experience were used to identify the elements of LTC service demands, and the SQPM method was used to determine the priority of these demands to optimize resource allocation and implement care for older adults' retirement.

3. Research Methods

3.1. Research Process

This study aimed to explore issues related to aging and long-term care services in Taiwan. First, the relevant literature was analyzed and sorted to serve as a conceptual framework for the construction of LTC service demands. Second, relevant impacts of LTC on national development, politics, culture, and the quality of the population were explored to confirm the status of and problems faced by LTC. According to the long-term care policy blueprint proposed by Taiwan's Ministry of Health and Welfare and more than two sessions of discussions and expert consultations with LTC users (older adults) to ensure the service elements of LTCA 2.0, the 20 quality attributes of service demands were established as follows. We used these 20 quality attributes for demand and satisfaction surveys.

1. Retirement pension or living allowance subsidies
2. Health-promoting physical fitness activities
3. Visits or telephone care services by social welfare agencies
4. Catering delivery services

5. Emergency medical care and rescue services
6. Transportation services
7. Older people eating meals together
8. Retirement planning
9. Employment services
10. Day care center services
11. Family companionship
12. Financial planning
13. Hospice care
14. Prices charged (older people eating meals together or class fees)
15. Service staff attitudes
16. Institutional accessibility
17. Community/residential institution environmental cleanliness
18. Community/institution activity planning
19. Community/institution dining comfort
20. Community/institution emergency response.

3.2. Design and Size of the Questionnaire

The questionnaire was based on: (i) a review of the literature [22,23,37] and (ii) discussions with experts (including LTC consultants and scholars) and older adults. The final questionnaire included 40 items (20 quality attributes for demand and satisfaction surveys) and was divided into three parts:

1. Demand survey: included 20 quality attributes, responses requested on a 5-point Likert-type scale, with 1 representing extremely low demand and 5 representing extremely high demand; we used a mean value of these items.
2. Satisfaction survey: included 20 quality attributes, responses requested on a 5-point Likert-type scale, with 1 representing extremely dissatisfied and 5 representing extremely satisfied; we also used a mean value of these items.
3. Demographics survey: gender, marital status, age, living status, education degree, and occupation prior to retirement.

The samples for this research were people older than 55 years (service targets of LTC) who lived in a long-term institution or attended a senior citizens' learning camp. Taiwanese older people residing in Taipei and New Taipei were the participants in this study. In addition, in the process of questionnaire distribution, some older people were found to be much older or illiterate. In these cases, the questionnaire was administered verbally to make the questions more comprehensive.

3.3. Data Analysis

In this study, we first reported the frequency and percentage distributions of the participants' basic characteristics (such as gender, marital status, age, living status, education and occupation before retirement). Descriptive statistics were used to summarize the respondents' profiles and then the mean and standard deviation of service demand and satisfaction. Cronbach's alpha was calculated for the sums of demand items and satisfaction items surveys as an estimate of the reliability of a psychometric test. Finally, we put all 20 service elements into the Importance–satisfaction (I-S) model and Service Quality Performance Matrix to determine the items that need to improve. Improvement strategies are then suggested based on evaluating these two factors in response to different positions. We used SPSS version 18 (SPSS, Chicago, IL, USA) to execute all analyses.

4. Research Results

4.1. Sample Narrative Statistical Analysis

The samples of this research were people older than 55 years (service targets of LTC) who lived in a long-term institution or attended a senior citizens’ learning camp. Out of the 350 questionnaires distributed from January to May 2018, 315 were collected, for a recovery rate of 90.0%. A total of 23 questionnaires were found to be invalid, making the total valid responses 292. The results of the questionnaire indicated that 267 respondents were married (91.44%); 189 were female (64.73%); 115 lived in residential institutions (39.38%); 84 had a university education background (28.77%); 87 were in the military, government employees, or teachers before retirement (29.79%); and 87 were in the age range 65–70 years old (29.79%), as shown in Table 1.

Table 1. Descriptive statistics of the sample population.

Category	Items	No.	%	Category	Items	No.	%
Gender	Male	103	35.27%	Education degree	Illiterate	17	5.82%
	Female	189	64.73%		Elementary school	60	20.55%
Marital status	Unmarried (divorced)	25	8.56%		Junior high school	51	17.47%
	Married	267	91.44%		High school	78	26.71%
Age	55–64	52	17.81%		College/university	84	28.77%
	65–70	87	29.79%	Above master	2	0.68%	
	71–75	51	17.47%	Occupation before retirement	Office holder	87	29.79%
	76–80	80	27.40%		Service industry	61	20.89%
	Above 80	22	7.53%		Industry	49	16.78%
Living status	Living with children/couples	106	36.30%		High-tech industry	12	4.11%
	Living with relatives	51	17.47%		Agriculture industry	7	2.40%
	Living in a residential institution	115	39.38%	Household	61	20.89%	
	Living alone	20	6.85%	Self-employed	15	5.14%	

A service needs survey was conducted to examine the demand level of older adults for essential elements. The higher the demand level, the more important these elements are to older adults; therefore, the government should pay attention to them in its administrative measures. The results are shown in Table 2. The average value of the demand survey was found to be 4.16, with a standard deviation of 0.99, showing that older adults have a very high awareness of all the elements, and each element is vital to them. The three items with the highest demand were retirement pension or living allowance subsidies, emergency medical care and rescue services, and retirement planning.

The survey was meant to understand the service demands of older adults and confirm whether their demands were satisfied. The lower the satisfaction level, the higher the dissatisfaction with services provided by the government and service providers, indicating that these items should be improved. The average value of the satisfaction survey was found to be 2.93, with a standard deviation of 0.78, indicating that older adults are less satisfied with all elements. The three items with the lowest satisfaction levels were retirement pension or living allowance subsidies, emergency medical care and rescue services, and family companionship. These elements must be listed in the improvement priorities.

Table 2. The mean and standard deviation of service demand and the satisfaction survey (N = 292).

Item	Demand		Satisfaction	
	ME	S.D.	ME	S.D.
1. Retirement pension or living allowance subsidies	4.89	0.95	2.19	0.49
2. Health-promoting physical fitness activities	4.67	0.81	2.67	0.65
3. Visits or telephone care services by social welfare agencies	4.01	1.01	2.70	0.68
4. Catering delivery services	4.10	1.11	2.68	1.12
5. Emergency medical care and rescue services	4.79	0.91	2.48	0.54
6. Transportation services	4.33	1.05	2.61	0.91
7. Older people eating meals together	4.61	0.99	2.72	0.56
8. Retirement planning	4.72	1.08	2.97	0.54
9. Employment services	4.06	1.11	2.66	0.83
10. Day care center services	3.91	1.18	2.64	1.13
11. Family companionship	4.24	0.91	2.56	0.75
12. Financial planning	3.99	1.04	2.65	0.82
13. Hospice care	4.34	1.10	2.64	1.03
14. Prices charged (older people eating meals together or class fees)	4.69	1.02	3.05	1.07
15. Service staff attitudes	3.51	0.98	3.92	0.71
16. Institutional accessibility	4.18	0.87	3.46	0.93
17. Community/residential institution environmental cleanliness	3.58	0.75	3.37	0.87
18. Community/institution activity planning	3.32	0.91	3.86	0.77
19. Community/institution dining comfort	3.28	0.85	3.40	0.69
20. Community/institution emergency response	4.01	1.07	3.32	0.59
Total of all 20 items	4.16	0.99	2.93	0.78

Note: ME = mean; S.D. = standard deviation.

4.2. Reliability Analysis

A reliability test is used to measure whether a tool is consistent and reliable, and Cronbach's alpha is generally used as a benchmark to measure the reliability of a questionnaire. If Cronbach's alpha is greater than 0.7, it has high reliability, while if it falls between 0.35 and 0.7, the reliability is barely acceptable [38,39]. In this study, Cronbach's alpha for service demand was 0.82, and for satisfaction was 0.89. As the overall reliability value of 0.91 is greater than 0.7, it shows high reliability and indicates that the scale has good consistency and reliability.

4.3. Importance-Satisfaction Model Results

When all the service elements were placed in the I-S model, as shown in Figure 8, those in the excellent area were items 8, 14, and 16. Service demand and service satisfaction are above the average, which indicates that customers need these services, and older adults feel satisfied about services provided by the government or service providers. This also shows that the resources can be used effectively.

The service elements in the to be improved area were items 1, 2, 5, 6, 7, 11, and 13, indicating that service demand is above the average, and satisfaction is below the average. This indicates that customers highly need these services, but they are not offered by service providers or have not been provided at a level found to be satisfactory by older adults. Given the low level of satisfaction, it is recommended that service providers should improve these services first.

The service elements in the surplus area were items 15, 17, 18, 19, and 20, indicating that service demand is below the average, and customers are not concerned with these services. Service satisfaction is higher than the average, indicating that resources are being misplaced or wasted. Therefore, surplus resources should be reallocated to service items with high demand and low satisfaction.

The service elements in the unimportant area were items 3, 4, 9, 10, and 12, indicating that service demand and satisfaction are lower than the average. Customers do not value these services but accept the performance of service providers. Therefore, as long as these elements are provided appropriately, it is not necessary to enhance the service quality. In fact, increasing resources in this area could be considered a waste.

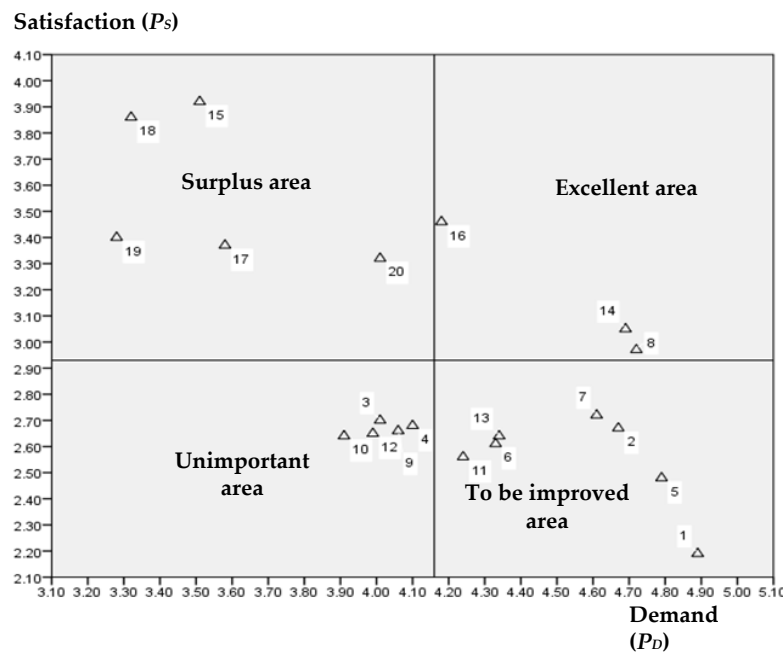


Figure 8. Importance-satisfaction (I-S) model results.

4.4. Service Quality Performance Matrix Results

The average value and index of each question were calculated through Formulas (1) and (2), as shown in Table 3, and the relevant values were introduced into the SQPM, as shown in Figure 9. The service elements in the priority improvement area were items 1–16 and 20, indicating that the demand for these services exceeds satisfaction, and older adults are unsatisfied with them. Therefore, they need to be improved. The service elements in the improvement area were items 17 and 19, indicating that the demand for these services is equal to the satisfaction, and they are accepted by older adults. Therefore, service providers can list surplus resources as secondary improvement items. The service elements in the maintenance area were items 15 and 18, indicating that satisfaction for these services is higher than the demand, and older adults are happy about them and highly satisfied. Therefore, service providers can maintain the current service quality.

Table 3. Relative values for I-S model and service quality performance matrix (SQPM).

No.	μ_D	μ_P	P_D	P_P	I-S Model	SQPM
1	4.89	2.19	0.97	0.30	To be improved	Prioritize improvement
2	4.67	2.67	0.92	0.42	To be improved	Prioritize improvement
3	4.01	2.70	0.75	0.43	Unimportant	Prioritize improvement
4	4.10	2.68	0.78	0.42	Unimportant	Prioritize improvement
5	4.79	2.48	0.95	0.37	To be improved	Prioritize improvement
6	4.33	2.61	0.83	0.40	To be improved	Prioritize improvement
7	4.61	2.72	0.90	0.43	To be improved	Prioritize improvement
8	4.72	2.97	0.93	0.49	Excellent	Prioritize improvement
9	4.06	2.66	0.77	0.42	Unimportant	Prioritize improvement
10	3.91	2.64	0.73	0.41	Unimportant	Prioritize improvement
11	4.24	2.56	0.81	0.39	To be improved	Prioritize improvement
12	3.99	2.65	0.75	0.41	Unimportant	Prioritize improvement
13	4.34	2.64	0.84	0.41	To be improved	Prioritize improvement
14	4.69	3.05	0.92	0.51	Excellent	Prioritize improvement
15	3.51	3.92	0.63	0.73	Surplus	Maintain
16	4.18	3.46	0.80	0.61	Excellent	Prioritize improvement
17	3.58	3.37	0.65	0.59	Surplus	Improve
18	3.32	3.86	0.58	0.71	Surplus	Maintain
19	3.28	3.40	0.57	0.60	Surplus	Improve
20	4.01	3.32	0.75	0.58	Surplus	Prioritize improvement

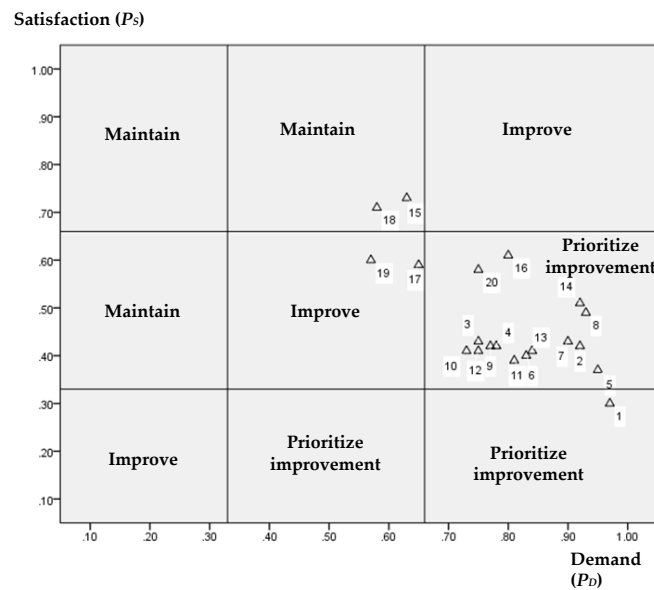


Figure 9. SQPM results.

4.5. Discussion

Many scholars have used a single model or tool, such as IPA, the I-S model, or the PEM, to explore projects that organizations need to improve. Each model has its advantages, but we think they are too subjective. Instead, it is best to use several models to repeatedly determine the areas that need to be improved before proposing an improvement strategy. The present study integrates the importance-satisfaction (I-S) model and service quality performance matrix (SQPM) to examine long-term care (LTC) service demands and satisfaction improvement.

Japan’s LTC system was established in 2000 to support older people with LTC demands and alleviate the burden of caregiving on family members [40]. People choosing to use LTC services, including in-home, facility, and community services, reduce their financial expenses and improve their quality of care [41]. Taiwan established LTCA 1.0 in 1998, and amended it to develop LTCA 2.0 in 2018. The implementation schedule in Taiwan was earlier than in Japan, but its effectiveness has

not been high. Therefore, the Taiwanese government and service providers must actively emphasize implementing the LTC system and making improvements regarding older adults' demands.

Generally speaking, when time and resources are limited, it is not feasible to take comprehensiveness into account. When many projects must be improved and it is impossible to implement them at the same time, improvement priorities are developed [42]. In this study, if only the I-S model was used to examine LTC in Taiwan, then seven elements of the system would need to be improved: items 1, 2, 5, 6, 7, 11, and 13. However, if only SQPM were used, 16 elements would need to be improved: items 1–16 and 20. In other words, the outcomes are different when using different models.

As mentioned earlier, Taiwan lacks sufficient LTC resources, so it is impossible to provide enough resources for all those who need care. To use resources efficiently, the I-S model and SQPM were integrated in this study to identify areas for improvement, and items 1, 2, 5, 6, 7, 11, and 13 were identified by both methods.

From the empirical analysis, it was found that the average demand score is approximately 4 and the average satisfaction score is approximately 3, showing that older adults have a very high demand level, but their tendency for satisfaction is low. Regarding improvements, it was found that older adults are most dissatisfied with pensions and living allowances. Therefore, the results of this study are consistent with the viewpoints of other scholars [22,43]. After all, adequate pensions or government subsidies would allow older adult retirees without income and/or in poor health to feel more assured.

Taiwan's declining birthrate and aging population have become more severe. In 2018, more than 14% of the populations were older adults, making the nation an aged society. This has forced some people to rely on foreign workers to help provide care, companionship, and other support for older adults. However, the improper foreign labor management system and language barriers have caused frequent incidents of abuse of older adults by foreign workers. Therefore, four service elements (items 5, 6, 11, and 13) related to these issues were generated due to older adults' helplessness and loneliness. In addition to satisfaction about materials and money, spiritual sustenance and care for older adults are equally crucial.

Items that need improvement, except for pensions and living allowances, cannot be improved due to financial difficulties, but for emergency medical care and rescue services and transportation services, it is recommended that government agencies and hospitals provide transportation resources for the elderly. For travel to emergency medical care, private sector operators should be encouraged to invest in transport services for the elderly and provide appropriate subsidies to enhance emergency medical services.

The results also shows that most of the older people lived in residential institutions were male, their education level were mainly university, their economic status were better, and their work were mainly in the military, government employees, or teachers before retirement. In a Chinese society, many older people were unwilling to live in residential institutions. In addition to considering financial planning factors, they were also afraid of giving others a feeling that they have been abandoned by their children. Therefore, the proportions of living with their families were also high. The interview found that the older people living families alone have poor financial support, their need government subsidies, and transportation services. The older people lived in residential institutions have a stable pension or their children provide financial assistance therefore, the needs were family companionship and health-promoting physical fitness activities.

Finally, this study attempts to analyze the differences from the sample background information, such as gender, age, education, occupation, living status, marital status, etc., to compare the differences in the needs of different people for LTC. After analysis of I-S model and SQPM, the research results show that there is no significant difference between different background samples and the overall sample. It is speculated that the reason for this might be that the samples for this research were Taiwanese older people residing in Taipei and New Taipei who lived in a long-term institution or attended a senior citizens' learning camp. And Taipei and New Taipei City are the two largest Taiwanese Cities, the

population is evenly distributed, and older adults' views are also converging, which were also likely to be factors in the results.

5. Conclusions and Suggestions

5.1. Conclusions

The advancement of medical science and technology has extended the average life expectancy and brought about changes in social structure and values and, together with the declining birthrate, has accelerated the advent of aged societies. To cope with the current global aging population, LTC for older adults is an essential goal of government administrations. To meet older people's needs, it is unwise to construct aid devices or service needs from a managerial perspective instead of listening to them and customizing relevant services based on a user perspective. It is also important to encourage healthy older people to continue being active, such as by performing volunteer work, participating in community services, and acting as guides, to enrich their retirement lives and simultaneously increase their contribution to society. Older adults who are in poor health, suffering from illnesses such as dementia, or facing disabilities can be provided with medical care to reduce their pains, ensuring that all older people receive proper care. The government is responsible for appropriately allocating the necessary resources.

During the implementation process, the I-S model and SQPM were mainly used to evaluate resource allocation, followed by a secondary consideration of service quality improvement. Seven services were found to be in urgent need of improvement by this study after integrating the I-S model and SQPM. This research results can serve as a basis for quality improvement for the Taiwanese government and service providers investing in resources. If government resources are limited and cannot be allocated simultaneously, it is suggested to prioritize the improvement projects in order.

5.2. Suggestions and Research Limitations

Rapid population aging has made the burden of caring for older adults relatively heavy. Following an extension of the average life expectancy of older adults, their demand for care services has also intensified. Advances in medical technology have led to the control of many diseases, but such advances still cannot fully restore the original state of health, and many older people suffer from physical and mental disabilities. With the continuous growth of the older adult population and the decline of family function, the demand for care services continues to rise, along with the need to rely on foreign workers to handle these jobs. Therefore, it is imperative to strengthen professional training for foreign workers.

There are significant differences in physical and mental health among older people who need care, and the nonuniformity of care resources has created a high variance in care needs. Therefore, healthy older people who could move freely in the community or institutions were chosen as the objects of this study, and those with physical and mental disabilities were excluded. Based on the empirical research, the study proposes the following suggestions:

1. Although the government has established the ABC LTC model, the new system has not properly implemented departmental linkages and integrated resources. Therefore, it is recommended that the government, nongovernment organizations, and social welfare groups coordinate and integrate their communications as soon as possible.

2. From the outside, the LTC industry has the impression of being low-paid, humble work focused on helping older adults with their toileting routines. As a result, young people are not very interested in entering this field. As an alternative, it is suggested to hire foreign workers for this kind of work. It is also the government's responsibility to urgently encourage young people to join and manage this industry, making it into a respectful and dignified profession.

The samples for this research were Taiwanese older people residing in Taipei and New Taipei who lived in a long-term institution or attended a senior citizens' learning camp. The follow-up researchers

can expand the sample size to compare the LTC needs. They may find significant differences between different background samples.

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