

Research on the Evaluation System of Community Daycare Center Planning and Implementation from the Perspective of Subject-Object Relationships

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Abstract: Through literature review, we found that evaluations of urban planning implementation often focus narrowly on either the subject (stakeholders) or the object (projects), while micro-level aspects such as site selection and construction are primarily considered within the context of planning implementation. There is insufficient research on the evaluation of implementation. Community daycare centers play a crucial role in the community home care model, yet there is relatively little research on their usage efficiency, satisfaction levels, and spatial evaluation of planning implementation. Based on the theoretical understanding of the human environment, including the subject, object, and their interactions, an evaluation system for the planning and implementation of community day care centers was constructed, incorporating subjective evaluation, objective evaluation, and comparative analysis.

Keywords: Subject-object relationship; Daycare center; Planning implementation; Evaluation system

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1. Introduction

The aging of China's population is a pressing issue that impacts national development, the well-being of hundreds of millions of people, and social harmony and stability. To address this issue, China is now gradually establishing and improving a variety of pension service systems, particularly community home care ^[1]. Community daycare centers are an essential component of community home care. Effectively planning and constructing these centers to resolve issues such as inefficient use and low satisfaction is of great practical significance ^[2]. Improving the quality of community home care not only enhances the well-being of the elderly but also positively addresses the broader challenge of population aging in China ^[3].

Evaluation of urban planning implementation primarily serves to assess the utility and degree of achievement of planning objectives after practice, effectively testing the rationality of the planning practice. Secondly, by evaluating the effectiveness of these objectives, the process helps identify the strengths

and shortcomings of the original planning goals and practices, summarizing key reasons and issues. This evaluation provides more scientific guidance and improvement suggestions for future planning and offers a valuable basis for optimizing physical and spatial planning and spatial policies ^[4]. By studying the planning and implementation evaluation of community daycare centers, we can assess their role in addressing the problem of population aging in China. This includes evaluating the effectiveness of their use by the elderly and identifying deficiencies in the planning and implementation process. Such insights support the improvement and optimization of daycare centers, contributing significantly to policy development and the enhancement of community daycare centers. Ultimately, this has profound value for the overall improvement of the human environment and the formulation of policies aimed at optimizing community daycare centers.

2. Literature review

2.1. Domestic and foreign studies on planning implementation evaluation

2.1.1. Domestic research

Evaluation of domestic urban planning implementation is a crucial aspect of urban operational planning and serves as the foundation for conducting urban planning activities. The effectiveness of urban planning implementation directly impacts the value and significance of urban planning within the context of social activities, influencing the overall development process of the city ^[5,6]. Planning implementation evaluation should cover the entire process, from the initial planning program through to construction and eventual use. However, the focus and values of these evaluations can differ based on the specific issues faced at different times. Evaluating the results of a planning implementation involves analyzing its effects after a certain period, using both quantitative and non-quantitative methods. This analysis helps to understand the effectiveness and impact of the planning efforts ^[7,8].

Currently, the practice of evaluating urban planning implementation is gaining traction. Lv *et al.* utilized a decomposition research method to assess the implementation of Guangzhou's urban master plan, exploring the plan's execution during the planning period ^[9]. Zhang examined the framework and methodology for evaluating the implementation of urban master plans in the new era, using Wuhan's master plan as a case study ^[10]. Liu *et al.* investigated the evaluation mechanism for the implementation of Suzhou City's Territorial Spatial Specialized Plan ^[11]. Shi *et al.* conducted a review and new exploration of the implementation assessment mechanism for Beijing's new urban master plan ^[12].

2.1.2. Foreign research

Research on urban planning assessment in Western countries began in the 1950s. With developed countries entering the stage of construction maintenance and planning review due to their advanced urban development, their research on urban planning implementation assessment has become more in-depth. Historically, the scope of urban planning implementation assessment has broadened significantly. It has evolved from a simple program evaluation to a comprehensive assessment and analysis, encompassing planning value standards, planning programs, implementation policies, the planning implementation process, and its effects ^[13].

In the U.S., the field of urban planning places significant emphasis on studying the intrinsic influence mechanisms of urban master plans and assessing their effectiveness ^[14]. The American urban planning textbook *Land Use Planning* (fifth edition) clearly points out that "good planning" should have the ability to reflect a variety of decision-making processes, as well as include an evaluation of its effectiveness. Scholars in the U.S. have conducted a series of studies on assessing the intrinsic validity of master plan outcomes ^[15]. In 1997, W.C. Baer summarized five types of evaluation methods for planning programs, which include comparative

planning studies and optimization of measures ^[16]. Additionally, there is a subsequent evaluation of the impacts of planning, conducted at a later stage. For instance, New York City managed to increase public space and decrease carbon emissions through the evaluation of its master plan ^[17].

In the UK, a pre-assessment, also known as planning viability assessment, is a mandatory step before any urban planning or development policies are formulated. Its purpose is to evaluate the feasibility and practicality of the plan and to select the most suitable planning options. Following the feasibility assessment, monitoring is conducted during the plan’s implementation to ensure alignment with the intended objectives and programs ^[18]. After the planning period, a comprehensive assessment is carried out to determine if the plan’s objectives have been fully realized and to compile all encountered issues and experiences ^[19]. These three assessments are conducted throughout the entire preparation, implementation, and management process. To enhance efficiency and effectiveness, senior registered planners, expert members, and university researchers collaborate with various local governments to produce the “Measuring the Linked Elements - Planning Outcome Evaluation Study Report,” which focuses on evaluating planning outcomes and impacts ^[20-23].

2.1.3. Summary of review

Looking at the historical trajectory of urban planning implementation evaluation both domestically and internationally, we observe a progression from a focus on innovative evaluation methods back to a more rational evaluation of the objectives of urban planning and user satisfaction. This return to the evaluation of planning values is crucial. By researching and evaluating multidimensional indicators, we can analyze the strengths and weaknesses of existing comprehensive analysis models. Introducing enhancements to relevant mathematical methods, such as hierarchical analysis, allows for the evaluation of multiple elements in a comprehensive analysis, resulting in a nuanced understanding of the outcomes of planning implementation in the human environment. These outcomes often vary in quality, and through careful analysis, we can provide feedback on planning objectives, thus guiding future planning endeavors (**Figure 1**).

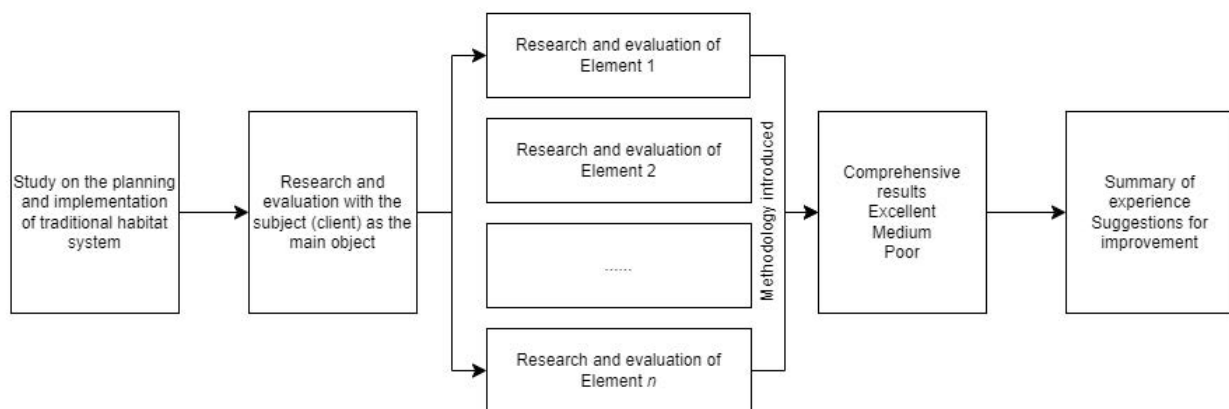


Figure 1. Technical routes for planning and implementation evaluation at home and abroad

2.2. Domestic and foreign studies on community daycare centers

2.2.1. Domestic studies

The study of community daycare centers in China has expanded in response to the gradual emergence of an aging society before and after 2000. Although research began relatively late, it has become extensive and diversified, falling into three main categories. Firstly, there is research focused on the construction of operational and management systems under the perspective of performance evaluation. For instance, Chen *et al.* studied the performance of community daycare centers from the perspective of implementation and operation.

They constructed an index system and evaluation procedure for the performance evaluation of community daycare centers ^[24]. Secondly, there are studies on optimizing architectural space models under different goal orientations. For example, Zhang *et al.* suggested that the setting of community daycare centers should be adjacent to community hospitals. They emphasized accessibility design, including barrier-free design, and proposed a functional layout standard of “six rooms, one living room, one kitchen.” They also recommended setting up a small community nursing home and strengthening the connection with families of the elderly in the community ^[25]. Moreover, Shi proposed a spatial optimization model for community daycare centers based on the composite concept. Drawing on successful experiences from domestic and international planning practices, they developed a spatial optimization model at three levels: the master planning level, the internal level of the building, and the external level of the building. They summarized the design method of the composite space ^[26]. Lastly, there is research on defining service facilities, types, and standards. Li *et al.* categorized day care facilities into four categories: community welfare and medical-type, regional welfare and medical-type, regional self-funded living-type, and community welfare convalescent type. These studies collectively contribute to the understanding and improvement of community daycare centers in China ^[27].

2.2.2. Foreign studies

As pioneers in an era characterized by aging societies, the operation and management models of community daycare centers have undergone refinement. Countries like Britain and Japan, leading the transition into aging societies, witnessed the emergence of daycare centers during the 1950s and 1960s. Research conducted by Wei and Kang in the Sheffield area of the United Kingdom revealed that these centers typically served more than 30 individuals on average. They were often established in community centers, nursing institutions, or hospitals, with various types such as basic day care centers being predominant. These centers were planned and constructed based on community facilities and tailored to meet diverse needs by incorporating additional recreational, personal care, or rehabilitation facilities. Moreover, the spatial utilization patterns and design considerations for common areas such as activity rooms and dining halls in daycare centers were documented ^[28,29]. Chen *et al.* put forward the experience and value in terms of staffing, and service scope, and further contributed insights into staffing, service scope, and assessment protocols by examining the historical development of daycare centers in regions, including Taiwan, Hong Kong, and Macao. Their study encompassed conceptual definitions, developmental modes, and target service recipients ^[30].

2.2.3. Summary of literature on community daycare centers

Community daycare centers for the elderly cater to semi-incapacitated individuals who require daytime services such as meals, personal care, healthcare, rehabilitation, recreational activities, and transportation. Domestic research on these centers primarily centers around establishing operation and management systems, optimizing architectural space models, and defining service facilities, types, and standards ^[31]. Conversely, foreign studies tend to concentrate on measuring and summarizing service scales, differentiating space design standards, flexibly designing space and facilities, and implementing tripartite assessments during construction. Overall, both domestic and international research on community daycare centers primarily revolves around construction management and implementation, as well as operational aspects. The findings, including construction paradigms and management policies, hold significant value for guiding the development and operation of such facilities.

3. Theoretical connotation of planning implementation evaluation under the perspective of the subject-object relationship

Traditional research on planning implementation typically involves linear thinking focused on single targets and sorting through index elements. While the introduction of new comprehensive analysis methods has optimized the original approach to some extent, it also carries the risk of new logical fallacies. Moreover, the conclusions drawn from such analyses often tend to be overly generalized and lack a strong target orientation. From the perspective of the subject-object relationship in urban planning implementation evaluation, some studies have begun to shift towards assessing the dual relationship between the planner and the planned environment. For instance, Sun's evaluation of urban master plans considers both the city's objectives from an objective perspective and social satisfaction from a subjective perspective^[32]. However, in the broader context, planning implementation evaluations of the human habitat system predominantly focus on the planner (objective) as the primary research subject, neglecting the importance of the subjective perspective.

3.1. Subject-object dialectical relationship of the habitat space

From a philosophical perspective, the relationship between the subject and the object is integral to understanding how humans perceive and transform the world. The subject, representing human consciousness, actively engages in recognizing and altering the environment, while the object encompasses elements of the world that are subject to human activities^[33]. These two entities interact in a dynamic process, mutually influencing and promoting each other, thereby contributing to the unity of nature and human society. In the construction of the habitat environment system, this relationship is manifested through three core elements: humans as the primary actors, the environment as the entity being acted upon, and the interaction between them as the dynamic process. This interaction embodies the contradiction and unity within the "habitat environment system," where the subject (humans) and the object (environment) are considered distinct yet interconnected components forming a unified whole^[34]. Throughout history, different thinking paradigms have influenced the cognitive approach to constructing the human environment system. Three modes of relationship have emerged: object-oriented, subject-oriented, and subject-object unity^[35]. The subject-object unity mode represents a comprehensive approach that considers both the subject and the object, aiming to explore their interactions and analyze the contradictions and causal relationships within them. This mode provides essential insights to address conflicts and resolve problems within the habitat environment system.

3.2. Evaluation of planning implementation from the perspective of subject-object relationship

Research and evaluation of planning implementation serve as essential components for assessing the energy efficiency and value of the human environment system. This evaluation typically encompasses two primary levels of analysis: at the subject level, various indicators of resident satisfaction within the human environment system are analyzed, serving as a crucial basis for evaluating the success of planning implementation; however, relying solely on resident satisfaction may lead to biased results and an incomplete understanding of the overall effectiveness of the planning process. At the object level, the focus shifts to analyzing the physical space environment, which constitutes the objective aspect of the human environment system. This analysis involves assessing the main elements of the physical and spatial environment in accordance with relevant norms and regulations. By evaluating the development quality, conditions, and levels of the physical environment, researchers can derive insights into the effectiveness of planning implementation. However, this approach may sometimes overlook the subjective perceptions and cognitive processes of residents, leading to disconnects and low recognition of certain issues. To address these limitations, it's crucial for planning implementation research

to integrate both subjective and objective perspectives, considering the interactions between human residents and the physical environment.

Traditional planning implementation evaluation can be categorized into two approaches: autonomous evaluation and other-principle evaluation. Autonomous evaluation focuses on the users of the physical space, considering their recognition and value judgment of the evaluated object. In this process, the interests of the subject are intertwined with the evaluated object, potentially leading to biased results due to trade-offs between the two. On the other hand, other-principle evaluation is based solely on certain planning concepts or orientations of the physical space itself, without active participation from the evaluated object. Consequently, this approach renders the evaluation group and the evaluated object independent from each other, lacking the involvement and interest of the evaluated object. As a result, the acceptance of evaluation conclusions may be low ^[36]. Therefore, adopting a subject-object relationship perspective in planning implementation evaluation is essential for enhancing the evaluation system, enabling a scientific assessment of urban planning objectives' completion and social satisfaction.

Evaluation of planning implementation under the perspective of the subject-object relationship helps mitigate the shortcomings of solely focusing on objectivity or subjectivity in evaluation studies. By analyzing the degree of awareness of the human environment and people's satisfaction, it seeks to identify the balance point between the two. This approach embodies the "humanistic return" of urban habitat and adopts a scientific perspective. It integrates the subjective cognition of the main body of planning implementation—the public—with the object of planning implementation, which is the physical and spatial environment. Through this process, it comprehensively analyzes the subjective perceptions of people, who are the primary actors in planning implementation, along with the specific characteristics of the physical and spatial environment.

4. Evaluation system construction for daycare center planning and implementation

4.1. Research and evaluation of daycare center performance

The primary approach in performance research and evaluation does not directly rely on satisfaction as the sole evaluation criterion. Instead, it incorporates various objective elements such as the participation rate of elderly individuals, frequency of function usage, and time allocation, along with subjective factors, for a comprehensive analysis and evaluation. This ensures that the evaluation results of the primary use performance are free from subjective interference and possess a stronger scientific basis. The evaluation of daycare centers covers the community as the fundamental evaluation unit. Within each unit, the evaluation primarily focuses on the characteristics of user groups, functional composition, time distribution, degree of satisfaction, and improvement in demand. These aspects constitute the specific evaluation factors outlined in **Table 1**.

Table 1. Research and evaluation factors of daycare center body performance

Form	Evaluation factors
User group feature (S1)	Gender ratio (S11)
	Age structure (S12)
	Occupational composition (S13)
	Number of users (S14)
	Percentage of older users (S14)

Table 1 (Continued)

Form	Evaluation factors
Usage functions frequency (S2)	Rehabilitation and physical therapy (medical care, rehabilitation, and health care, assisted rescue, etc.) (S21)
	Home-based services (housekeeping services, shopping assistance, meal assistance, etc.) (S22)
	Event planning category (birthday party, choir, craft training, etc.) (S23)
	Other categories (leisure and fitness, green environment, etc.) (S24)
Distribution of time of use (S3)	Average daily hours of use (S31)
	Average daily hours of use (S32)
	Average weekly frequency of use (S33)
Satisfaction with use (S4)	Overall level of satisfaction (S41)
	Satisfaction with service/functionality sub-items (S42)
Utilization Improvement Requirement (S5)	Functional claims for the elderly (S51)
	Recommendations for space creation for the elderly (S52)
	Operational management recommendations for the elderly (S53)
	Suggestions for optimizing service stations by the geriatric guardianship community (S54)
	Elderly custodial group willing to pay for community-based elderly services (S55)
	Demand for community-based elderly care services by older custodial groups (S56)

Each indicator is assessed on a scale of four levels: S excellent (4), S good (3), S medium (2), and S poor (1). These assessments are combined with responses from visitor questionnaires and then analyzed using cluster analysis. The main evaluation process utilizes the Analytic Hierarchy Process (AHP) method to determine the weight of each evaluation index. Afterward, a comprehensive evaluation is conducted to calculate the overall performance of each community daycare center. Finally, the Fuzzy Comprehensive Evaluation (FCE) method is employed to assign a graded rating, resulting in classifications of excellent, good, medium, and poor.

4.2. Daycare center physical space environment object planning and construction performance research and evaluation

In addition to evaluating the community daycare center itself, the evaluation of the object also considers the broader community environment, which significantly influences the daycare center's effectiveness. This includes researching and evaluating the characteristics of the community environment where the daycare center is situated, the construction of the built environment, and the implementation of operation and management. These aspects are evaluated based on specific factors outlined in **Table 2**.

Table 2. Research and evaluation factors for planning and construction performance of daycare center guests

Category	Research and evaluation factors
Community environmental characteristics (O1)	Equilibrium ¹ (O11)
	Connectivity ² (O12)
	Suitability ³ (O13)
	Mixed with its public service functions (O14)
	Proportion and spatial distribution of older people in the community (O15)
	Number and distribution of public spaces in the community (O16)
	Sharing of public facilities between communities (O17)

Table 2 (Continued)

Category	Research and evaluation factors
Built Environment Construction (O2)	Site area (O21)
	Building area (O22)
	Building functional composition (O23)
	Outdoor area (O24)
	Space organization (O25)
	Environmental quality (O26)
Implementation of Operations Management (O3)	Organizational management request (O31)
	Operational content (O32)
	Financing (O33)

¹The term “degree of equilibrium” in this context does not pertain to economics but primarily concerns the spatial alignment between the community daycare center and the administrative boundary of the community. It is typically quantified by the distance between the daycare center and the geometric center of the administrative boundary. A shorter distance indicates greater equilibrium, leading to higher energy efficiency and more effective community service delivery.

²The concept of “degree of connectivity” primarily involves the road connections linking each community to the daycare center. Generally, a higher number of connecting roads corresponds to a greater degree of connectivity, resulting in improved energy efficiency in delivering services to the community.

³The term “suitability” primarily encompasses the ventilation and lighting conditions at the site of the community daycare center, as well as factors like road quality and slope. Generally, better ventilation and lighting, as well as flatter roads, contribute to higher suitability, resulting in improved energy efficiency for community services.

Combined with relevant regulations such as compliance with building area standards, design principles like static and dynamic zoning, public and private relations, and age-appropriate stairway ramp design, among others, computer simulation and comprehensive scoring by the research team in the field were utilized to decompose the indicators into four evaluation levels: excellent (4), good (3), medium (2), and poor (1). The object evaluation still employs the hierarchical analysis method (referred to as the AHP method) to determine the weight value of each evaluation index. Then, it carries out a comprehensive superposition to calculate the subjective evaluation performance of each community daycare center. Subsequently, the fuzzy comprehensive evaluation method (referred to as FCE) is utilized to conduct a graded and differentiated comprehensive rating, resulting in four grades: O excellent, O good, O medium, and O poor.

4.3. Comparative analysis and discussion of subject-object associations of daycare centers

By comparing the subject and object evaluations of the same community, several conclusions can be drawn.

Category B: The results of both evaluations align, enabling a direct analysis of successes and shortcomings. This allows for the proposal of optimization paths and solutions based on the respective evaluation results.

Category B+ or B-: There is a slight deviation between the evaluation results of the main body and the object. The reasons for this deviation can be analyzed, and conclusions can still be drawn comprehensively based on the respective evaluation results. Overall, the conclusion orientation is similar to Category B.

Category B++ or B--: A significant deviation exists between the evaluation results of the subject and the object. To understand the reasons for this deviation, it’s necessary to scrutinize the research data and analyze the differences in the evaluation process. The conclusion-oriented approach needs to consider various situations comprehensively and reflect moderately on the regional adaptability of relevant planning technical

specifications and design principles.

Category B+++ or B---: The deviation between the subject and object evaluation results is considerable. In such cases, it's crucial to thoroughly examine the research data and evaluate the process to identify any inconsistencies. If any unreasonable aspects are found, they should be optimized to enhance the evaluation process. If the evaluation process is reasonable, it may be necessary to reassess the value and significance of the planning and design process. This may involve reconsidering planning technical specifications, design principles, and relevant factors while taking into account specific regional characteristics.

Table 3. Comparative analysis of subject and object evaluation correlations

Subjective evaluation	Objective evaluation				
	O excellent	O good	O medium	O poor	
S excellent	B	B-	B--	B---	
S very much	B+	B	B-	B--	
S center	B++	B+	B	B-	
S differ from	B+++	B++	B+	B	

5. Conclusion

Up to now, many regions in China have achieved 100% coverage of community daycare centers, which have become essential hubs for the elderly beyond their family life activities. These centers offer life care, health services, spiritual comfort, cultural activities, and more. Given the current utilization of community day care centers, optimizing their planning, construction, and management is a pressing issue both now and in the future. Urban planning implementation evaluation, as a dynamic process, will increasingly focus on the micro-scale creation of urban spaces with the future development of urban renewal. Elements such as micro-scale planning site selection and planning and construction will be pivotal in the evaluation process in the coming period. Micro-scale urban construction features more tangible material and spatial components, and clearer user utilization, among other characteristics, enhancing the credibility and feasibility of planning and implementation evaluation.

From the perspective of the subject-object relationship, evaluating planning and implementation involves assessing how well the target group perceives the service quality of community day care centers and their cognitive understanding of the physical space's goodness, i.e., the quality of the human environment and the effectiveness of implementation and operation. This evaluation process is not merely about assessing whether something is "good or bad" but also about making decisions for future actions, aiming to provide better solutions for community daycare centers. It offers a more scientific and systematic approach to guide the evaluation and optimization of the planning and implementation of community daycare centers.

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