



Extending TPB to Silver Economy Occupations: Youth Career Intention in Beijing's Senior Companion Service

Yuhui Bao, Yanhua Dong*, Guangqiong Wang, Zilin Shan, and Juncheng Liu

Beijing University of Technology, Beijing, 100124, China

*dongyh200501@163.com

Abstract. Population aging has intensified demand for Senior Companion services, yet youth remain severely underrepresented in the eldercare workforce. No prior study has examined this emerging occupation through the lens of the Theory of Planned Behavior (TPB). This study extends TPB by introducing government support as an institutional variable and examines its direct and indirect effects on career intention. A multi-layer framework integrating SEM, latent profile analysis (LPA), XGBoost-SHAP, and importance-performance analysis (IPA) was applied to 988 Beijing youth aged 16–35. Results showed excellent model fit ($\chi^2/df=1.084$, CFI=0.998, RMSEA=0.009). Government support emerged as the dominant predictor ($\beta = 0.314$, $p < 0.001$), with indirect effects accounting for 59% of its total influence. LPA revealed three cognitive profiles—structural low-recognition (21.46%), high integrated-recognition (33.81%), and cautious-evaluative (44.74%).

XGBoost achieved $R^2=0.830$ with cross-validation, and SHAP decomposition revealed distinct driver configurations across profiles. Text mining identified compensation (476 occurrences) and training (445) as dominant keywords; Word2Vec clustering revealed four semantic appeal dimensions: compensation-policy (cosine 0.951), training-quality (0.940), career development-recognition (0.905), and work model (0.863). Subjective norms were identified as a priority intervention target across all profiles. These findings extend TPB application to emerging eldercare occupations and offer evidence-based guidance for silver economy workforce development.

Keywords: Silver economy, Senior Companion service, Career choice intention, Theory of Planned Behavior, Latent profile analysis, Machine learning interpretability

1 Introduction

Demand-side pressures. Population aging is reshaping labor markets worldwide. The United Nations projects 2.1 billion people aged 60+ by 2050 [1], catalyzing the “silver economy”—economic opportunities arising from older adults’ needs [2]. China exemplifies this urgency: its population aged 60+

reached 323 million (23.0%) by end of 2025, with Beijing at 24.3% [3, 4]. Critically, 59.7% of older adults live in empty-nest households and 26.4% exhibit depressive symptoms [6], signaling a shift toward emotional companionship and psychosocial well-being.

Supply-side challenges. This transition has given rise to the *Senior Companion service* occupation. In 2025, China’s Ministry of Human Resources and Social Security included “Elderly Care Service Professional” in the new occupational catalogue [5]. Yet the eldercare workforce faces severe shortages: workers under 30 comprise under 2% [6], those aged 45+ constitute over 88%, and the talent gap exceeds 5 million [9]. Beijing’s 6.39 million youth aged 16–35 [10] represent a largely untapped reservoir.

Research gaps. Despite this urgency, three gaps persist. *First*, companion care has rarely been examined as a distinct professional occupation [7]; existing studies conflate it with general caregiving or nursing. *Second*, youth career intention in emerging eldercare occupations remains understudied [8]. *Third*, theoretical frameworks for this domain have rarely incorporated *institutional support* as a systematic explanatory variable within the Theory of Planned Behavior [9].

This study addresses these gaps by: (1) extending TPB with government support as an *institutional* variable; (2) using LPA to reveal heterogeneous career intention mechanisms; (3) integrating SEM with XGBoost+SHAP.

2 Theoretical Framework and Hypotheses

TPB as the primary lens. The Theory of Planned Behavior posits that behavioral intention—the most proximal determinant of actual behavior—is shaped by attitude toward the behavior, subjective norm, and perceived behavioral control (PBC) [9]. Meta-analytic evidence confirms TPB explains approximately 39% of intention variance [10]. In career choice contexts, these constructs translate into personal evaluations of an occupation (attitude), perceived social pressure (subjective norm), and self-assessed capability to enter the profession (PBC).

Table 1. Comparison of selected TPB career intention studies

Study	Context	Key variables	Method
Armitage&Con-ner [10]	Diverse behaviors	Attitude, SN, PBC	Meta-analysis
Chen et al. [12]	Thai engineering students	TPB + gov. support	SEM (<i>N</i> =462)
Present study	Senior Companion service	TPB + institutional support	SEM + LPA (<i>N</i> =988)

SCCT as the complementary lens. Social Cognitive Career Theory (SCCT) [11] complements TPB by emphasizing *contextual supports and barriers* in career choice. Within SCCT, government policy support, training availability, and career development opportunities constitute contextual supports [8], provid-

ing theoretical grounding for treating government support as an *external institutional variable*.

Table 2. Research hypotheses

Code	Hypothesis	Path
H1	Individual cognition positively affects career intention.	IC → CI
H2	Subjective norm positively affects career intention.	SN → CI
H3	Occupational attractiveness positively affects career intention.	OA → CI
H4	Self-development positively affects career intention.	SD → CI
H5	Government support positively affects career intention directly.	GS → CI
H6	Government support positively affects individual cognition.	GS → IC
H7	Government support positively affects subjective norm.	GS → SN
H8	Government support positively affects occupational attractiveness.	GS → OA
H9	Government support positively affects self-development.	GS → SD
H10	Government support indirectly affects career intention through the four mediators.	GS → (IC, SN, OA, SD) → CI

Why government support as an institutional variable? Conventional TPB emphasizes individual-level antecedents without theorizing how external institutional conditions shape career deliberation. For *emerging occupations* where market signals are underdeveloped, institutional support plays a distinctive role: government signals of occupational legitimacy—through subsidies, certification, and promotional incentives—reduce perceived risk and enhance attractiveness. Government support thus operates as a *macro-level structural affordance* extending TPB to nascent occupational domains.

Table 1 compares selected prior TPB career intention studies.

Hypotheses. Drawing on TPB and SCCT, we propose ten hypotheses (Table 2). The conceptual model specifies five exogenous variables predicting career intention, with government support occupying a dual position as independent predictor and antecedent to the four mediators.

3 Methodology

3.1 Research Design and Sampling

A convergent parallel mixed-methods design was adopted [13]. The target population comprised Beijing youth aged 16–35 ($N=6,391,776$) [10]. Beijing was selected for its pioneering position in China’s silver economy policy experimentation [4].

Prior to the main survey, 25 semi-structured interviews were conducted with three groups: eldercare practitioners ($n=8$), university students considering eldercare careers ($n=10$), and policy researchers ($n=7$). Key findings revealed that: (a) youth associated companion work with low status and unclear prospects; (b) government subsidies and certification programs were largely unknown; (c) peer recommendations and social media dominated information channels, while school

guidance rarely covered eldercare; and (d) practitioners emphasized gaps between training content and workplace demands. These insights directly informed the operationalization of the six latent variables and the design of the 27 measurement items.

A two-stage stratified PPS sampling procedure selected 8 of 16 districts by youth density, aging rate, and income, with quota sampling within districts (online/offline 1:1). A total of 1,216 questionnaires yielded 988 valid responses (81.25%), exceeding the SEM minimum threshold [14].

Table 3. Logistic regression: predictors of occupational awareness

Predictor	OR	95% CI	<i>p</i>
Age 26–30 (ref: 16–20)	3.617	[2.142, 6.108]	<0.01
Age 31–35 (ref: 16–20)	2.205	[1.247, 3.898]	<0.05
Eldercare experience <6 months	9.766	[5.823, 16.381]	<0.001
Eldercare experience 6–12 months	20.530	[11.247, 37.482]	<0.001
Eldercare experience 1–3 years	32.896	[18.394, 58.834]	<0.001
Eldercare experience >3 years	21.163	[9.847, 45.482]	<0.001

3.2 Measurement and Data Quality

Six latent constructs were measured with 27 items on 7-point Likert scales (1 = *strongly disagree* to 7 = *strongly agree*). *Individual cognition* (5 items): professional interest, capability cognition, skill cognition, occupational identity, and elderly attitudes. *Subjective norm* (4 items): social recognition, social status, family norms, and group norms. *Occupational attractiveness* (5 items): compensation, work pressure, work intensity, work environment, and stability. *Government support* (4 items): policy subsidies, certification programs, promotional incentives, and training support. *Self-development* (4 items): career advancement, promotion guarantee, value realization, and talent utilization. *Career intention* (5 items): current willingness, expectation match, future commitment, recommendation, and exploration. Items were adapted from validated instruments [9] and refined based on preliminary interview findings. Controls included demographics and eldercare experience.

Reliability and validity were confirmed through multiple indicators. Internal consistency was excellent (Cronbach’s $\alpha = 0.926$). Sampling adequacy was confirmed (KMO = 0.873; Bartlett’s $\chi^2 = 6,799.157$, $df = 861$, $p < 0.001$). Confirmatory factor analysis validated construct distinctiveness with factor loadings ranging from 0.660 to 0.786 (all $p < 0.001$). All average variance extracted (AVE) values exceeded 0.50 and all composite reliability (CR) values surpassed 0.70, establishing adequate convergent and discriminant validity [15].

3.3 Analytical Strategy

Five methods were integrated progressively. **SEM** (AMOS, ML) tests H1–H10. **LPA** (Mplus) identifies latent subgroups via BIC, entropy, LMR-LRT, and BLRT [16]. **XGBoost** [17] ($R^2= 0.830$) with **SHAP** [18] reveals profile-specific drivers. **IPA** [19] maps importance against performance into priority quadrants. **Text mining** (TF-IDF + Word2 Vec) validates findings [20].

4 Results

4.1 Descriptive Statistics

Awareness was markedly low: 81.4% demonstrated minimal or no awareness, with social media dominating information sources (503 mentions) while institutional channels received only 36. Logistic regression identified age and eldercare experience as significant predictors (Table 3): respondents aged 26–30 exhibited 3.617 times greater odds ($p<0.01$); those aged 31–35 showed 2.205 times greater odds ($p < 0.05$). Eldercare experience showed a strong dose-response relationship (ORs: 9.766 to 32.896, all $p < 0.001$), suggesting occupational cognition depends on experiential exposure.

4.2 SEM Results

The structural model achieved excellent fit ($\chi^2/\text{df}=1.084$, CFI = 0.998, TLI = 0.997, RMSEA =0.009). As shown in Table 4, all five direct paths were significant. Government support showed the strongest effect ($\beta=0.314$, $p<0.001$), followed by individual cognition ($\beta= 0.164$), self-development ($\beta= 0.163$), occupational attractiveness ($\beta=0.159$), and subjective norm ($\beta= 0.136$).

Factor loadings illuminate the mechanisms: professional interest (0.741) and capability cognition (0.701) drive individual cognition; group norms (0.768) and social recognition (0.750) dominate subjective norm; policy support (0.786) and promotional incentives (0.771) are the strongest institutional signals.

Bootstrapped mediation (5,000 resamples) revealed substantial indirect effects (Table 5). The total indirect effect was 0.488 (59% of total); the direct effect was 0.339. The pathway through occupational attractiveness showed the strongest mediation (0.134).

Table 4. SEM direct effects on career intention

Path	β	SE	p	95% CI
Gov. support $\rightarrow$ CI	0.314	0.038	<0.001	[0.240, 0.388]
Ind. cognition $\rightarrow$ CI	0.164	0.041	0.001	[0.084, 0.244]
Self-development $\rightarrow$ CI	0.163	0.037	<0.001	[0.090, 0.236]
Occ. attractiveness $\rightarrow$ CI	0.159	0.042	0.005	[0.077, 0.241]
Subjective norm $\rightarrow$ CI	0.136	0.039	0.002	[0.060, 0.212]

Table 5. Bootstrapped mediation: indirect effects of government support

Mediation pathway	Effect	SE	95% CI	%
GS → OA → CI	0.134	0.024	[0.089, 0.183]	16.2
GS → IC → CI	0.123	0.024	[0.079, 0.172]	14.9
GS → SN → CI	0.116	0.023	[0.074, 0.165]	14.0
GS → SD → CI	0.114	0.023	[0.072, 0.163]	13.8
Total indirect effect	0.488	0.047	[0.398, 0.582]	59.1
Direct effect	0.339	0.038	[0.264, 0.413]	40.9

4.3 Barriers to Entry Among Low-Intention Youth

Among youth in the lowest career intention quartile ($n \approx 247$), analysis identified three primary barriers (Table 6): lack of relevant skills and training opportunities (62.4%), unclear career development prospects (52.3%), and unsatisfactory salary and benefits (42.7%). These barriers exhibited low co-occurrence (Jaccard coefficients all $J < 0.34$), functioning as independent obstacles rather than an interlocking system. Apriori association rule mining confirmed the absence of strong causal chains (sole detected rule lift = 1.05, below the threshold of 1.5).

The barriers function as additive constraints; improving subsidized training could reduce the primary barrier for nearly two-thirds of low-intention youth.

4.4 LPA Results

LPA converged on a three-profile solution (lowest BIC, entropy > 0.80, significant LMR and BLRT). Table 7 presents the profiles. ANOVA: $F = 211.20$, $p < 0.001$.

The cautious-evaluative profile was the largest (44.74%).

4.5 XGBoost+SHAP and IPA Results

XGBoost achieved $R^2 = 0.830$ (CV $R^2 = 0.839 \pm 0.022$). SHAP revealed distinct driver configurations per profile: intrinsic- driven for the low-recognition group; social-identity driven for the high-recognition group; experience-dependent for the cautious-evaluative group. As shown in Table 8, subjective norm occupied the high-importance–low-performance quadrant as the highest-priority intervention target across all profiles.

TF-IDF identified compensation (476) and training (445) as dominant keywords. Word2Vec revealed four dimensions: compensation-policy (0.951), training-quality (0.940), career development-recognition (0.905), and work model (0.863).

5 Discussion and Implications

Government support as dominant driver. Government support exerts the strongest influence ($\beta=0.314$, $p<0.001$), operating directly ($\beta=0.339$) and indirectly ($\beta= 0.488$, 59% of total). This dominance invites cross-study comparison. Chen et al. [12] found policy support significant for engineering students but smaller ($\beta=0.132$) than attitude ($\beta=0.298$). Our finding that government support ($\beta=0.314$) exceeds subjective norm ($\beta=0.136$) reflects the *emerging* nature of this occupation: lacking established market signals and social recognition, institutional cues—certification, subsidies, promotional programs—become the primary source of occupational legitimacy. This suggests TPB antecedent importance varies systematically with occupational maturity [9], a pattern corroborated by recent cross-national workforce research [21].

Table 6. Barriers to entry among low-intention youth ($n \approx 247$)

Barrier	Frequency (%)
Lack of relevant skills / training opportunities	62.4
Unclear career development prospects	52.3
Unsatisfactory salary and benefits	42.7
<i>Inter-barrier Jaccard coefficients: all $J < 0.34$; Apriori lift: 1.05</i>	

Table 7. Latent profile analysis: profile characteristics

Dimension	P1 (21.46%)	P2 (33.81%)	P3 (44.74%)
Individual cognition	Low	High	Medium
Subjective norm	Low	High	Medium
Occ. attractiveness	Low	High	Medium
Self-development	Low	High	Medium
Gov. support	Low	High	Medium
Career intention	Lowest (2.11)	3.54	2.86

Why subjective norm shows “high importance–low performance.” The IPA places subjective norm in the priority im- provement quadrant across all profiles, despite its modest direct effect ($\beta = 0.136$). This paradox reflects the status challenges facing emerging occupations. Group norms (0.768) and social recognition (0.750) are the strongest normative components, yet the occupation lacks the prestige of established healthcare or education professions. For emerg- ing service occupations, this “legitimacy gap” in subjective norms constitutes the most actionable intervention target: the gap between perceived impor- tance and realized performance creates the greatest leverage for change, even when di- rect effects are smaller than institutional variables [22].

Heterogeneous career intention. LPA uncovered substantial heterogeneity: three profiles emerged with distinct means— structural low-recognition (2.11), high integrated-recognition (3.54), and cautious-evaluative (2.86; $F = 211.20$, $p < 0.001$). The cautious-evaluative plurality (44.74%) shows moderate cognitive

scores yet guarded intentions, suggesting experiential deficits suppress commitment. Profile-specific drivers imply differentiated interventions: cognitive for the low-recognition group, social-normative for the high-recognition group, experiential for the cautious majority.

Theoretical contributions. This study makes three contributions. *First*, it extends TPB by integrating institutional support as a direct and indirect predictor, demonstrating that government support functions as a macro-level structural affordance that penetrates individual decision-making—enriching TPB’s applicability to emerging occupational domains where market signals are underdeveloped. *Second*, LPA reveals career intention as a heterogeneous process: three cognitive profiles demonstrate that aggregate SEM models mask meaningful subgroup differences in motivational architecture. *Third*, it demonstrates the feasibility of integrating SEM with XGBoost+SHAP and IPA within a unified framework, offering a replicable template for career intention research in emerging occupations.

Practical implications. Three layers of recommendations emerge. *For policy-makers:* simplify support program access and establish clear benefit timelines; develop national occupational certification aligned with skill standards; launch professional image campaigns to address the subjective norm deficit. *For educational institutions:* design profile-differentiated engagement—information provision for the low-recognition group (21.46%), peer ambassador programs for the high-recognition group (33.81%), and structured internships for the cautious-evaluative majority (44.74%). *For industry enterprises:* improve compensation and benefits; establish transparent career advancement pathways; innovate work models (flexible scheduling, hybrid services) to enhance attractiveness. Post-hoc validation with 28 stakeholders confirmed practical relevance (mean scores: 4.62 for accuracy, 4.48 for actionability on a 5-point scale), consistent with prior workforce demand forecasts [23].

6 Limitations and Conclusion

This study has four limitations. First, the cross-sectional design and self-reported intention preclude causal inference; longitudinal designs tracking intention-to-behavior conversion are needed. Second, the Beijing sample may limit generalizability; cross-cultural replication across aging Asian societies would illuminate context-specific versus universal mechanisms. Third, the supply-side-only analysis should be complemented by demand-side perspectives. Fourth, experimental interventions randomized across the three cognitive profiles would permit causal estimation of differentiated effects. Future research should investigate whether driver patterns generalize to other emerging eldercare occupations.

In conclusion, this study extends TPB by incorporating institutional support, reveals heterogeneous career intention mechanisms through a multi-layer framework, and demonstrates methodological innovation through SEM-machine

learning inte- gration. The findings offer evidence-based guidance for silver econ-
omy workforce development.

Table 8. Importance-performance analysis: quadrant classification

Dimension	Importance	Perf.	Quadrant	Priority
Government support	0.314	High	HI–HP	Maintain
Individual cognition	0.164	High	HI–HP	Maintain
Subjective norm	0.136	Low	HI–LP	Priority improve
Self-development	0.163	Low	LI–LP	Low priority
Occ. attractiveness	0.159	Low	LI–LP	Low priority

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