

Research on the Construction of Urban Luggage Transportation and Storage Service System Based on User Demand

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Abstract: Centering upon the prevailing practical predicaments, including cumbersome luggage carriage, interim baggage depositing, and short-distance cross-site transshipment emerging amid urban outbound journeys, the present research has gathered a total of 58 valid research questionnaires. Statistical outcomes manifest that over 85 percent of sampled respondents have once been plagued by various luggage-related troubles during trips, whereas up to 89.29% of surveyed individuals acknowledge the indispensable value of point-to-point dedicated luggage conveyance service. Rooted in diversified urban travel scenarios, this paper systematically sorts out a full set of operational links covering luggage collection, transit distribution, temporary warehousing, pickup confirmation, as well as emergency exception disposal, so as to formulate an integrated systematic framework for urban luggage transportation and custodial services. The research achievement possesses profound theoretical instructional implications as well as feasible popularization value, which can deliver referential practical suggestions for advancing the convenience coefficient of urban resident travel activities.

Keywords: Urban logistics; Luggage custody; Point-to-point transit; User-oriented demand; Service system construction

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1. Introduction

In recent years, domestic sightseeing tourism and intercity commuting demands have maintained a sustained upward momentum on a nationwide scale. According to authoritative statistical records released by competent departments, the aggregate number of domestic tourist arrivals hit 5.615 billion person-times in 2024, rising by 724 million person-times against the previous year with a year-on-year growth rate of 14.8% ^[1]. Such passenger flow further climbed to 6.522 billion person-times in 2025, registering a 16.2% year-on-year

incremental margin^[2]. Against such a booming market scale, diversified luggage-related dilemmas inevitably impair the holistic travel experience of tourists throughout the whole itinerary. Relevant field surveys indicate that nearly seventy percent of sightseers are compelled to shuttle among traffic hubs, accommodation hotels, and scenic spots with personal luggage on hand, while roughly ninety percent of the traveling population put forward explicit practical demands for professional luggage consignment services. Although conventional luggage deposit services have achieved partial coverage over commercial blocks and transportation terminals, prominent drawbacks still linger in cross-node cargo transfer flexibility, pickup-and-return operability, and standardized pricing benchmark formulation^[3].

Existing academic literature corroborates that supporting elements such as transit infrastructure and livelihood-oriented convenient amenities within the tourist public service system exert tangible influences on the tourist satisfaction index and immersive destination experience^[4]. From such an analytical perspective, luggage storage and cargo transportation are far beyond trivial segmented logistics details, and would further exert restrictive effects over itinerary transfer planning, accommodation docking arrangement, and sightseeing efficiency optimization. Current domestic research focusing on urban logistics distribution predominantly evaluates operational efficiency from delivery lead time, comprehensive operating cost, standardized service quality, and ecological environmental influence dimensions, whereas in-depth academic discussions targeting short-distance customized point-to-point passenger luggage conveyance remain relatively insufficient^[5]. Under such a research backdrop, this thesis elaborates on the detailed construction blueprint of the urban luggage transportation and storage service system from the perspective of real user requirements.

2. Demand analysis of urban luggage transportation and custody service

To profoundly excavate authentic user requirements for luggage carriage, temporary deposit, and transshipment amid urban traveling scenarios, the research team has launched a targeted questionnaire investigation and harvested 58 valid response samples. Statistical analysis reveals that more than 85% of interviewees have encountered troubles stemming from inconvenient luggage transportation, which demonstrates the widespread universality of such a practical social issue. Furthermore, respondents' feedback concerning luggage obstacles is not merely confined to overweight or cumbersome physical attributes of baggage; most complaints originate from schedule-related conflicts, such as unavailable luggage storage space after hotel check-out and extra detour costs to finish luggage custody prior to scenic touring activities.

A total proportion of 89.29% of surveyed users approve the necessity of a point-to-point luggage delivery service, which reflects widespread public recognition of the customized transit mode delivering luggage from the designated origin to the predetermined terminal destination. Empirical data also manifests that consumers prioritize service quotation, standardized service quality, scheduled transit duration, and cargo safety guarantee when selecting relevant luggage service products. Previous academic studies verify that timeliness, security, delivery accuracy, and information transparency constitute core influential determinants of end-user satisfaction in the logistics industry^[6].

With regard to safety perception and extra payment willingness, a portion of surveyed consumers are inclined to pay premium charges in exchange for upgraded secure luggage transit solutions. It illustrates that end users attach equal importance to service accessibility as well as whole-process safety supervision and post-accident liability identification throughout luggage custody and transportation links. Consumers' acceptance level of relevant services is jointly conditioned by pricing strategy and their subjective judgment

on comprehensive service quality and operational reliability ^[7].

3. Systematic scheme design for urban luggage transportation and storage service

On the basis of the collected questionnaire statistical data, the proposed urban luggage service system is positioned as an all-dimensional comprehensive service solution tailored for diversified urban travel contexts. Centered around a point-to-point customized luggage delivery business and supplemented by an interim baggage storage module, this system effectively interconnects core urban functional nodes such as air terminals, railway passenger stations, hospitality hotels, and tourist attraction zones. The *Easy Tour* luggage service reform project implemented in Hangzhou has pioneered multiple innovative service forms, including onsite luggage deposit, terminal-oriented consignment delivery, and railway-tourism industrial linkage, facilitating multi-scenario consignment cooperation among scenic resorts, hotel clusters, commercial districts, and passenger transport hubs ^[8]. Distinct from such existing projects, which simply pursue quantity expansion of fixed storage outlets, the design emphasis of this research's system lies in seamless connection covering tourists' cross-city mobile itineraries. Supported by standardized procedural design, service subscribers are capable of submitting personalized requirement information, including departure location, receiving address, luggage specification classification, and expected service timeline, which sequentially triggers systematic order auditing, task dispatching, and real-time operational status refreshment.

The established system synchronously satisfies dual service demands covering direct cargo transit and temporary baggage warehousing. For passengers requiring one-stop direct delivery to target destinations, core service links consist of luggage pickup inspection, optimal route formulation, cargo distribution, and final delivery confirmation; for travelers who demand deferred pickup or short-term luggage safekeeping, pivotal procedures involve interim storage management, real-name identity authentication, and authorized pickup verification. The two service modules can realize organic seamless connection during actual implementation, enabling users to flexibly adjust luggage disposal schemes in accordance with transit shift schedule, hotel check-in timeline, and sightseeing arrangement.

During practical system operation, synchronized order status visibility among service users, administrative supervisors, and field delivery couriers serves as an indispensable precondition; inconsistent pickup appointments and ambiguous liability demarcation would readily emerge. Relevant logistics literature substantiates that information sharing mechanisms, real-time order tracking, and visualized whole-process monitoring can remarkably improve collaborative operational efficiency of supply chains ^[9]. Specifically, the user terminal undertakes functions of requirement submission, information confirmation, and post-service pickup feedback; the administrative terminal is responsible for order reception, information authenticity audit, service task allocation, dynamic status management, and abnormal event coordination; the delivery terminal fulfills duties of onsite luggage collection, cargo outbound distribution, progress updating, and unexpected condition feedback. Tripartite collaborative operation contributes to enhancing whole-process traceability and clarifying respective liability boundaries of all participants.

The systematically optimized framework effectively alleviates users' physical burden caused by repeated luggage relocation, and eliminates consumers' potential worries by implementing standardized handover documentation, strict identity verification, and standardized exception handling clauses.

4. Construction of service flow chart and functional modules

Relevant academic viewpoints indicate that sorting out standardized service workflows centering on customer

contact points and backstage collaborative links is conducive to upgrading integral organizational efficiency of service operation ^[10]. Combined with the above system design, the holistic service procedure can be split into six sequential phases: requirement submission, systematic order auditing, physical luggage collection, outbound transportation distribution, temporary storage or terminal delivery, and authorized customer pickup. Starting from end-user practical needs, key controlling nodes are set along the whole luggage circulation path from departure site to destination, ensuring complete written records for every cargo handover, transit delivery, and pickup operation.

4.1. Detailed design of standardized service procedures

At the requirement submission stage, service subscribers fill in detailed information, including departure coordinates, target addresses, luggage classification, reserved service period, and other auxiliary essential data via an online user terminal. Within the order processing phase, the managerial backend receives submitted orders and inspects information integrity, then rationally distributes delivery tasks according to geographical distance, luggage property, and service time slot. During the luggage acceptance session, field couriers conduct onsite cargo handover, compile exclusive serial numbers, inspect outer package integrity, and retain photographic archives, followed by formal confirmation signed by service requesters. Subsequent transportation and distribution are carried out along pre-planned routes with dynamic order status updated synchronously, allowing both users and administrative personnel to monitor real-time service advancement. After cargo arrives at the designated destination, luggage will either be put into temporary storage or delivered straight to end users, subject to personalized demands, and the entire service process terminates after formal identity verification and pickup confirmation.

4.2. Partition of system functional modules

Based on procedural design, functional modules of the user terminal, management terminal, and delivery terminal are categorized elaborately as shown in **Table 1**, which mainly serve for procedural specification and follow-up digital system development planning. Through rational division of labor among three terminals, end-user demand collection, order centralized management, field task execution, and abnormal problem feedback are integrated into an organic unified operational framework.

Table 1. Functional module design of urban luggage transportation and storage service system

Terminal Category	Core Functional Content	Detailed Function Interpretation
User Terminal	Online order placement, address filling, luggage type selection, real-time order query, pickup confirmation	Facilitate service applicants to finish demand submission, whole-process order tracking, and post-service confirmation
Management Terminal	Order centralized processing, task rational allocation, dynamic status supervision, abnormal incident disposal, operational data sorting	Enable service organizers to complete order auditing, resource collaborative scheduling, and whole-process operational documentation
Delivery Terminal	Task reception, onsite pickup confirmation, service status update, delivery completion submission, abnormal condition feedback	Support frontline practitioners to conduct luggage receiving, cargo distribution, and timely reporting of unexpected malfunctions

The above three modular components jointly constitute the fundamental operating skeleton of the whole service system. User terminal prioritizes operating convenience and data transparency; management terminal focuses on overall coordination and controllability; delivery terminal highlights execution efficiency and timeliness of abnormal feedback. Research on logistics informatization confirms that synchronous

information sharing, real-time data refresh, and visualized management effectively promote service transparency and inter-departmental synergy^[9]. Organic coordination among three terminals helps form a steady, normative, and traceable service circulation mechanism.

5. Safety guarantee framework and exception disposal mechanism

Service safety and credible operation constitute the core concern of luggage custody and transportation subscribers. Different from conventional commodity distribution, tourist luggage carries distinctive personal attributes, which usually contain identity certificates, daily garments, portable electronic devices, and other private belongings. Delivery delay would disrupt subsequent passenger boarding or hotel check-in arrangements; cargo damage will trigger intricate liability judgment and compensation negotiation; wrongful pickup or illegal claim directly damages users' trust toward relevant service providers. Previous research on logistics service quality proves that timeliness, cargo safety, and delivery precision serve as foundational prerequisites determining customer satisfaction, while logistics risk management literature points out multiple potential risks, including substandard service quality, irregular staff administration, cargo physical damage, and information system malfunction, that exist in the distribution industry, requiring targeted precautionary measures^[6, 11]. Accordingly, this research takes exclusive luggage coding, pre- and post-transit photographic filing, formal handover certification, identity authentication, pickup endorsement, liability ascertainment, and graded compensation mechanism as core design contents, as displayed in **Table 2**.

Specifically, unique luggage serial coding marks every single baggage with distinguishable identification tag so as to avoid cross-confusion among multiple parcels or diversified customer orders; photographic filing preserves original outer appearance before and after handover, providing objective evidence for liability confirmation once package damage disputes emerge afterward; handover and pickup certification fix each circulation node of luggage to eliminate ambiguous disputes over receiving party, delivery timeline and actual pickup status; identity verification effectively guards against wrongful collection and fraudulent claiming risks. Under an intelligent logistics application background, Internet of Things technology realizes real-time positioning, remote monitoring, and pre-warning against potential hazards to elevate the cargo transportation safety coefficient^[12].

When a service breakdown occurs, end users care most about the liable subject, the judgment basis, and the feasible compensation standard. From the perspective of legal risk prevention for logistics service contracts, relevant rights, obligations, and compensation liabilities ought to be explicitly stipulated in contractual clauses; disputes would easily emerge during damage settlement, delivery delay treatment, and indemnity negotiation^[13]. Therefore, differentiated disposal schemes are formulated targeting delivery postponement, exterior package damage, and cargo missing risks respectively, while a practical compensation benchmark shall be further defined combining luggage value certification materials, handover photographic evidence, bilateral confirmation records, service classification, and attached insurance clauses. Especially for important items such as identity credentials and precision electronic equipment, uniform lump-sum compensation cannot be mechanically applied, which demands further consultation with cooperative operators and insurance institutions to clarify detailed liability boundaries in follow-up implementation.

Exception disposal design shall be formulated by combining practical traveling scenarios. Relevant studies indicate that standardized abnormal disposal of logistics service relies on real-time tracking monitoring, effect evaluation, problem feedback, and flexible scheme adjustment^[14]. Meanwhile, timely

communication, reasonable indemnity, and follow-up problem settlement after service fault contribute to restoring customer satisfaction and optimizing subsequent service evaluation ^[15]. Within the research's applicable scenarios, delivery delay may result in tourists missing accommodation check-in, transit shift or prearranged sightseeing schedule, hence disposal measures shall not be confined to simple prompt handling, but include notifying revised estimated arrival time and optional pickup location adjustment for affected users; luggage damage identification depends on photographic archives and handover records to define liability instead of merely oral statement; address alternation would influence transit route, delivery cycle and service charge, which demands reconfirmation of relevant parameters; order cancellation standards vary according to different service implementation phases; service delivery shall be suspended under abnormal identity verification pending administrative staff's further confirmation.

Table 2. Major abnormal scenarios and corresponding disposal strategies

Abnormal Circumstance	Detailed Handling Measures
Delivery Postponement	Refresh order status instantly, inform affected users of delay inducement and updated expected delivery time; coordinate schedule revision via the administrative department if necessary
Luggage Physical Damage	Complete onsite photographic evidence collection and handover inspection, implement follow-up settlement in line with liability identification result and graded compensation regulations
Delivery Address Modification	Reconfirm updated receiving location, revised transit route and service schedule, synchronize possible variations of service cost and delivery efficiency
Unilateral Order Cancellation	Adopt differentiated disposal standards subject to ongoing service progress, archive cancellation reasons, and bilateral communication records
Irregular Identity Verification	Suspend cargo handover temporarily, verify the user's authentic identity information, and complete the pickup operation after administrative confirmation

6. Conclusion

Focusing on the realistic predicaments of luggage carriage and interim deposit arising during urban outbound trips, this paper finishes the overall architectural design of urban luggage transportation and storage service system together with detailed service procedures and modular functional partition on the premise of authentic user demand investigation. The standardized service workflow is mainly divided into three core phases, including centralized order auditing, onsite luggage acceptance, and outbound cargo distribution, while functional modules are split into three categories: user terminal, management terminal, and delivery terminal. On such a foundational framework, the paper further establishes a complete safety precaution system and multi-type abnormal disposal specification.

Nevertheless, the current research still contains inherent limitations: systematic prototype development and detailed functional refinement remain at the theoretical design stage, whereas compensation stipulation drafting, personal privacy protection norms, legal liability delimitation, and field staff scheduling optimization require successive in-depth discussion. Follow-up empirical research can verify route planning rationality, delivery timeliness matching degree, and operability of abnormal disposal clauses, so as to polish the whole scheme and boost its practical implementability in real industrial scenarios.

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Disclosure statement

The authors declare no conflict of interest.

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