Micro Super Logistics System

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Abstract: The development background of the ultra micro as a starting point, the construction of an ultra micro environmental are analyzed, the pilot micro over the layout of the service function of positioning, the SLP and internal operation unit mutual relationship analysis method of pilot of an ultra micro location, location layout, internal environment were analysis and design, through the establishment of distribution center to solve the distribution of the micro-expansion stage, route optimization problem, by center of gravity method combined with practice of distribution center location, distribution center management process optimization, carried on the design to the information system. Through a series of methods for the final completion of micro super logistics system integration design.

1. Construction Scheme Design
Super micro or mini supermarket is a new business platform. As a platform to provide micro super brand promotion and product distribution services for suppliers; community shopping, free delivery services for consumers; business expansion and marketing support for the napa stores.

   (1) Background of project construction.
   With the development of society and the quickening pace of people's life, micro supermarket, a new type of commercial service platform, is becoming stronger and stronger. Community convenience store is more acceptable to micro super mode, higher acceptance. In recent years, China's government departments have issued a series of policies and measures to encourage the rapid development of the logistics industry and express delivery industry, and the development and growth of the service sector in the economic sector is quite impressive.

   (2)train of thought and way of construction.
   At the beginning of the project, relying on the existing micro super model, existing community convenience store for the pilot, adhering to the "service, preferential and convenient" business philosophy, to lay the foundation for the "super micro integration" project construction; In the medium term, analyzing the existing model and the problem and find the solution, and according to the different characteristics of various locations the copy mode expansion, the integration of social resources to find more franchisees later; Later stage, the main task is to improve the online service function. There are many ways to build super micro, small communities, high-end communities and large communities, respectively, relying on property offices, guards, auxiliary rooms, and community squares or community shops to build micro ultra.

2. Construction of an Ultra Micro Pilot

2.1 Layout of the Service Function of Positioning
There are three major functions of ultra micro pilot, which are living shopping, distribution services and value-added services. Living shopping is the most basic function of ultra micro, requiring a wide range of goods, and there is no lack of novelty. The distribution service mainly includes ultra micro self commodity distribution and express delivery. The former refers to meet certain shopping quota after the implementation of door-to-door service, the latter refers to the establishment of automatic pickup cabinet within the ultra micro, providing delivery service at the end of the express delivery. Value-added services refers to the establishment of micro beyond, and vigorously integrate social resources, community ultra micro build into a shopping, leisure, entertainment, catering, information consulting in one of the integrated service platform.

2.2 Topological Design about Goods Allocation of Ultra Micro Pilot

The inside topological design about goods allocation based on “SLP” of an ultra micro pilot.

The method considering the operation unit of logistics and the relationship between the non-logistics relation relationship between operation units. And then according to the close degree of relationship between the operating units in the relationship in the table, decided the distance between the operating units, arranged the position of the industry between each unit, draw the relevant activity position map that will map the actual size and activity position related various operating units together, forming plans related to operating units, and through the amendment and adjustment, get a number of feasible solutions, finally choose the best scheme. Based on “SLP”, the ultra micro storage layout process as shown in Fig. 1.

Through the preparation and analysis of original data, the analysis of the relationship between ultra micro internal operating units, mapping position relationship chart and operation unit area map considering the actual conditions of various correction factors. And adjusting the area map, we can get more valuable and feasible supermarket location layout scheme. Finally, draw the micro super space lay-out drawing is shown in Fig. 2.
Figure 2 Micro Super Space Lay-out Drawing

Super micro internal storage layout design.

From the physiological and psychological needs of customers, design a people-oriented supermarket layout, will greatly enhance the consumer's purchase intention, improving the operation efficiency of the supermarket, improve service quality, so as to improve the competitiveness and profitability of supermarket. Supermarket layout design should meet the comfortable shopping environment, shopping space distribution is reasonable, and thoughtful service, also should formulate relevant laws and regulations, such as air quality, shelf space constraints; the establishment of trade associations, to achieve self-discipline; establish customer awareness of rights, strengthening the public supervision.

2.3 Design of Pilot Line in Ultra Micro Pilot

Design and internal circulation of the supermarket micro super plane plane shape, size, layout and design, function of regional brand structure positioning and architectural style are closely related, therefore, the supermarket layout must be based on the actual situation of project, according to the design. The aisle of the supermarket is divided into the main channel and the auxiliary channel. The main channel is the main route to induce customer action, and the secondary channel is the branch of the customer moving in the shop. he design of the passageway in the supermarket should follow the condition that the passageway has enough width, straight and flat, the design reduces the corner, meets the requirement of light and barrier free.
3. Perfected the Replication and Distribution System of Micro Super

3.1 Extension of Micro Hyper Mode Replication
① The wholly-owned replication mode. According to the developers before the pilot experience to create a super micro, copy in the new position of micro shop founded solely hyperon.
② The expansion of peer collaboration mode. Select the appropriate operation convenience stores, convenience stores rectification by means of cooperation and operation mode, the storage layout decoration.

3.2 Micro Dispatching Problem
At the beginning of the establishment of ultra micro, there are many delivery problems, such as commercial varieties, high requirements, unsatisfactory results, uniform distribution rate, operation difficulty is high, it is difficult to adapt to the traditional logistics resources, express delivery time span, express automatic pick up cabinet accumulated serious problems, it’s slowing down to the turnover rate distribution.

For the problem of micro delivery, we can solve the problem by establishing a unified distribution center. The basis for adopting a unified delivery model is the establishment of several specialized small distribution centers. The construction of the distribution center is essential in the promotion of the whole project, and its fundamental function is to reduce the delivery cost through highly centralized purchasing and distribution.

3.3 Distribution Denter Construction
The selection of micro super sites should be based on theoretical knowledge, business philosophy and characteristics, development plans and land use planning, combined with traffic environment and local policies.

3.4 Construction of the Rout Optimization of Traffic Distribution of Logistics Distribution Center
The distribution process mainly includes the production from the factory purchase goods work set and gather different needs according to various micro super stores, it need sorting of goods out of order picking process. in the distribution center. The distribution process is shown in Fig 3.

Fig 3 Distribution Process

Line optimization method based on saving mileage method.

The basic idea of the algorithm is to assume that P is the distribution center, and A and B are the distribution points, the distance between them is a, B, C. If the distribution from P to A and B respectively, the total mileage of the vehicle is 2a + 2b, and if you distribute from P to A and B circuit, the total mileage is a + b + c. In both cases, the mileage difference is (2a + 2b) - (a + b + c) = a + b - c, and if a
+b-c >0, the second distribution method makes the total mileage savings. If the continuous distribution for a number of users, if the continuous distribution for a number of users, in order to save the size of the distance to connect the distribution points, that is, the best distribution route. And the more distribution users, the greater the mileage. Adjustment process is shown in Fig 4.

![Fig 4 Mileage Adjustment Process](image)

Optimization process of saving mileage method.
Known conditions: requirements set = \{1, 2,... N\}, the quantity demanded, the shortest distance between points.
Step 1: form an initial solution. Determine the distribution points of each vehicle, = 1, 2,... , n (take single delivery first).
Step 2: the calculation of the degree of savings. Calculate the savings of all pairs of points, and then calculate the results in ascending order.
Step 3: Loop merge. Begin with the highest value in the ascending order of the save sequence until the mileage queue is empty, Repeat the following steps: save the mileage queue from large to small order, analyze the possibility of merging between customer i and j (Is the loading limit satisfied, not within the same path, and the number of merges is not exceeding 2?) , connect i to j. If this is not the case, the current mileage savings are removed from the mileage queue.

4. Design of Information System about Micro Ultra

4.1 Development of Online APP
Develop of online APP can facilitate the expansion of basic functions and expand market share. The online APP functions mainly include payment function, purchase function, express business inquiries, pick up, send business and Huimin value-added services.

4.2 Construction of Micro Distribution Center Information System.
Two main systems, RFID warehouse management information system and electronic tag picking system, are constructed.
①RFID warehouse management information system. Warehouse management information system based on RFID mainly consists of three parts, namely RFID hardware, control network and data center.
②Electronic label picking system. The basic picking methods of electronic tag picking system are picking and seeding. Picking is that the operators according to the number in electronic tags complete the purchase of goods unit of "piece" or "box" timely, correctly and easily. The seeding type is only suitable for the small selection of products. In this scheme, we choose the packing of electronic label picking.

5. Conclusion
In the integration design of micro - super logistics system, the focus of construction is the problem of location, layout, distribution and information system. Through the construction of micro - over stage,
this paper solves the problem of partition of micro-super construction, and delimit the functions and scope of work. In order to reduce the cost of distribution, a unified storage and distribution of small distribution centers is proposed to ensure the zero inventory and upload efficiency in the micro-operation process. The research of this paper has played a good role in promoting the integration of micro-logistics system and theoretical support.

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