Research on the cost control strategy of recycling logistics in the sorting center of enterprise a based on the extension innovation method

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Abstract: logistics cost has an important impact on the return of recycling logistics, and lower recycling logistics cost can achieve higher economic and social benefits. This paper combines the activity-based costing method with the extension innovation method, uses the activity-based costing method to analyze the logistics operation of a recycling sorting center, decomposes the operation process, establishes the operation center, determines the cost driver, analyzes the cost incompatibility through the extension innovation method, and after establishing the corresponding primitive model, carries out the expansion analysis and divergence analysis to screen the feasible cost control strategy, And calculate the correlation degree and select the optimal logistics cost strategy. On the basis of using activity-based costing for cost analysis, combined with the extension innovation method to find and optimize the cost control strategy, it is more intuitive and operable. Through correlation analysis, enterprises can quantify the expected benefits of different cost control strategies according to their own needs, and help recycling logistics enterprises make scientific decisions.

Key words: extension innovation method; Recycling logistics; Cost strategy

Introduction

Recycling logistics is mainly engaged in the recycling and transportation of waste products. It belongs to the front end of the recycling value chain and does not involve the reuse of waste products. Its direct economic benefits are not high and its development is slow. Until recently, the government put forward the concept and policy of environmental protection and conservation, which promoted the rapid development of recycling logistics industry. For recycling logistics business, reducing business costs means obtaining more profits, so cost control strategy is particularly important for recycling logistics enterprises to reduce costs and increase efficiency and enhance market competitiveness.

1 Business profile and process analysis of company a

As a state-owned enterprise, company a is committed to the development and system construction of the whole industry chain including waste classification, resource recovery, recycling and intelligent manufacturing under the guidance of relevant government departments on green and low-carbon development and circular industrial economy, and to building an intelligent integrated service platform, Create a sustainable business model that meets the economic and social benefits of urban development. Since its establishment, company a has developed rapidly, with an average daily waste treatment capacity of 50 tons in 2021. Its main businesses include the design and manufacture of recyclable classification equipment, the transportation, processing and sale of recyclable materials.

The business of the sorting center of enterprise a includes the loading and unloading, sorting, packaging, storage and daily operation management of domestic waste. The specific business process is as follows: the cleaning vehicle will transport the preliminarily classified domestic waste to the sorting center. Stevedores at the specified time

Complete unloading within. Sorting workers carefully sort and separate sundries without recycling value. Recyclable material conveying after sorting

To the packer compressed into a standard square. The compressed recyclables are transported to the warehouse for storage, while the worthless recyclables are transported to the waste incineration plant for incineration and power generation.

2 Activity cost analysis of sorting center

Unloading operation center: unload the recyclables that have been preliminarily packaged and classified in the clearance vehicle. Resource consumption is mainly labor cost, and the cost is driven by man hours. The labor cost is 32000 yuan per month, accounting for 9.96% of the total cost.

Sorting operation center: according to the type of recyclables, more detailed sorting is carried out to separate the recyclables without recycling value and feed back the miscellaneous data. Resource consumption mainly includes labor cost, electricity cost and machine depreciation. Resource dynamic labor hours, power consumption

Machine working hours. Among them, the electricity fee is 5760 yuan per month, the labor cost is 147000 yuan per month, and the depreciation cost is 8928 yuan per month, accounting for 48.94% of the total cost.

Packing operation center: compress and pack the recyclables after fine sorting to form a standard shape. Resource consumption is

mainly electricity and machine depreciation. Power consumption and machine working time are the main reasons for resource fluctuation. The electricity cost is 6660 yuan per month, and the depreciation cost is 6696 yuan per month, accounting for 4.04% of the total cost.

Storage operation center: complete the storage and warehousing management of recyclables. Resource consumption mainly includes storage cost, labor cost and fuel cost. Resource mobility is due to storage area, working hours and fuel consumption. The labor cost is 48000 yuan per month, the depreciation cost is 4464 yuan per month, the storage cost is 47456 yuan per month, and the fuel cost is 9590 yuan per month, accounting for 33.23% of the total cost.

Waste treatment operation center: transporting waste without recycling value to the incineration plant for incineration and power generation. Resource consumption mainly includes labor cost and fuel cost. Resource mobility is due to man hours and fuel consumption. The labor cost is 6000 yuan per month, and the fuel cost is 7545 yuan per month, accounting for 4.10% of the total cost.

3 Extension strategy analysis of cost control

In the logistics cost of the sorting center of enterprise a, sorting cost, storage cost and unloading cost are the main costs, accounting for 48.94%, 33.23% and 9.96% respectively. Therefore, the following uses the extension innovation method to carry out the extension analysis around the sorting cost, storage cost and unloading cost, and explore how to reduce these three costs and optimize the overall logistics cost strategy of the sorting center.

3.1 Analysis of incompatibility of cost control

The average daily unloading volume of the sorting center of enterprise a is 30 tons, and a total of 8 unloading workers in 4 sorting centers are responsible for unloading. As the arrival time and interval of the clearance vehicles are not fixed, and the amount of single unloading operation is small, the time is short, resulting in a waste of unloading resources and a high unloading cost. The current unloading cost is about 35.6 yuan / ton. Considering the low unit value of domestic waste, enterprise a hopes that the unloading cost per ton of recycled materials can reach a lower level while keeping the unloading time per unit vehicle unchanged. It is expected to be controlled within the range of [0,15] yuan per ton, and the optimal target is zero unloading cost.

3.2 Expansion analysis and divergence analysis of incompatible problems

The amount of labor costs in unloading and sorting operations is related to the settlement basis and settlement standard. In the warehousing operation, the goods can be sent to the storage area more reasonably by adjusting the loading strategy, increasing the density of goods, improving the space utilization rate and optimizing the material handling route, so as to reduce the storage cost and handling fuel cost, and achieve the goal of saving the total cost.

Based on the above correlation analysis, divergent analysis is carried out on the corresponding primitives to obtain possible cost control strategies. After combining the cost control strategies of different parts, the overall cost control strategy is obtained. For employee type matter element in unloading operation A_{13}, settlement basis matter element A_{12} The settlement basis of labor cost in sorting operation is matter element A_{22}, coding policy primitive in coding event element A_{33} Do divergence analysis.

3.3 Extension transformation and strategy selection

After the expansion analysis and divergence analysis of incompatible problems are completed, the extension transformation of primitives is expanded, and the new primitives after transformation are combined to obtain the solution strategy of incompatible problems. In the survey, enterprise a believes that the unloading operation of domestic waste in the sorting center is special. On average, each sorting center needs about 9 clearance vehicles for unloading operation every day, and two clearance vehicles can be unloaded at the same time. The arrival time of the clearance vehicles is mainly in the afternoon, and there are rarely three vehicles arriving at the same time. As the domestic waste is pre packaged, the unloading time of one vehicle is about 10 to 15 minutes, which is convenient to handle, and the unloading demand is limited. At the same time, the property of domestic waste also determines that there is no need to consider the problem of cargo damage during the unloading operation. Therefore, the sorting center only needs limited unloading resources to complete the normal unloading operation. The company decided to cancel the full-time unloading post and directly let the clearance driver carry out the unloading operation after arriving at the sorting center. The unloading fee is included in the subsidy of the clearance driver in the current month at the standard of 5 yuan / time. For unloading event A_1 The value of the employee type in is replaced by “part-time” instead of “full-time” as the value of the employee type, and the new event after the transformation is conducted A'_1.

Item element of unloading cost V_1 Reduce and transform the quantity value of the settlement basis in, and reduce the working time by half to obtain the new cost matter element V'_1 The expense amount is reduced to 16000 yuan, which is new A''_1 The intermediate unloading cost is reduced to 17.8 yuan per ton as follows.

Two solving strategies Z11 and Z12 for the incompatibility of unloading operation cost are obtained, in which Z11=A'_1, Z12=A''_1.

As the unloading volume of each sorting center tends to be stable day by day, temporary scheduling is no longer required. After calculating the business requirements, the sorting center believes that under the premise of maintaining the existing sorting efficiency, the

number of sorting workers can be reduced from 35 to 30. right V_2 Reduce the cost to 126000 yuan and get the item of sorting labor cost after transformation V'_2. At the same time, in order to sum up the labor cost according to the actual sorting operation and achieve more for more, enterprise a decided to pay the labor cost to the labor outsourcer at the end of each month based on the monthly total sorting quantity. The specific standard is 100 yuan / ton for clothes, 260 yuan / ton for plastic, 40 yuan / ton for paper, and the comprehensive cost is about 130 yuan / ton. Therefore, for labor cost matter element V_2 Settlement basis quantity value in V_{22} Carry out replacement transformation, and the expense amount quantity value V_{21} And settlement standard value V_{23} Then the conduction transformation is carried out, and the cost amount is changed by 117000 yuan to get a new matter element .

Two solving strategies z21 and Z22 for the incompatibility of sorting operation costs are obtained, in which z21=V'_2, Z22=V''_2.

When the storage strategy of the warehouse changes, both the storage density of goods and the movement line of workers' goods will undergo conduction transformation. The sorting center changed the loading strategy and stacked the standard compressed bags on the fourth or sixth floor. Compared with the original double-layer loading strategy, the new strategy reduced the storage area by 37% and the total travel distance of forklifts by 15%. The total cost was about 100.6 yuan / ton. For the quantity value of the stowage strategy in the storage event element model A3 A_{33} Do replacement transformation to get the solution strategy Z31 for the incompatible problem of warehousing operation cost=A'_3.

Substitute Z11, Z12, z21, Z22 and Z31 into the corresponding compatibility function above to calculate the compatibility degree. The compatibility of Z11, z21, Z22 and Z31 is greater than 0. After combination, the control strategy of the overall logistics business cost of the sorting center is as follows:

S1=z11 □ z21 □ Z31 s2=z11 □ Z22 □ Z31

3.4 Evaluation of extension strategy superiority

Enterprise a hopes that on the premise of reducing the business cost of the sorting center, there will be no shortage of unloading resources and sorting resources, and relevant businesses can still maintain the existing efficiency and normal operation, realize cost reduction and efficiency increase, and support the better development of the enterprise. Therefore, company a selected the average business cost, unloading efficiency and sorting quality as alternative indicators to measure the business cost and the availability of unloading resources and sorting resources. The acceptable range of the average business cost of the sorting center of the new strategy is (0264], the optimal range is (0180], and the unacceptable range is (264, ∞). In terms of unloading efficiency, enterprise a requires that the unloading time of clearance vehicles will not be extended due to the reduction of unloading costs, Therefore, the acceptable range is (0, 15], in minutes. The measurement of sorting quality mainly considers the sorting efficiency, that is, the ratio of the weight of valuable recyclables sorted out per ton of recyclables to the total weight. The sorting efficiency of the sorting center is now 92%, which requires that after the adoption of the new strategy, the sorting efficiency cannot be lower than the existing level, and the acceptable range is [0.92, 1].

It can be seen from the calculation results that the full-time unloading workers will be eliminated, the cost settlement method of sorting workers will be changed, the original fixed salary will be paid according to the sorting weight, and the cargo loading strategy will be changed to multi-layer cargo loading. Due to the low professionalism and lack of continuity of the unloading operation, the single unloading time is extremely limited, so the clearance driver can carry out the temporary unloading operation. The change of sorting workers' compensation method can stimulate labor enthusiasm and improve sorting efficiency. The sorted and compressed domestic waste has low requirements for storage conditions, short storage time and small space demand. Therefore, the density of goods is improved through multi-layer stacking, which reduces the occupation of storage area, and the management cost and cargo damage are lower.

4 Conclusion

This paper starts from company a, which is engaged in the recycling of household waste, and is based on the key sorting center in the logistics system, focusing on the unloading, sorting and storage links in the recycling logistics. In the aspect of cost analysis, activity-based costing and extension innovation method are combined. Analyze the logistics operations of the recycling logistics sorting center through the activity-based costing method, find out the cost drivers, classify the logistics costs incurred according to the drivers, and find out the main costs. This paper uses the extension innovation method to analyze the cost incompatibility of different logistics links. After the basic element modeling, it carries out the expansion analysis and divergence analysis on the possible influencing factors of logistics cost, selects the available strategies from the analysis, calculates the correlation degree, and selects the optimal logistics cost strategy. On the basis of activity-based costing, the use of extension innovation method is helpful to find and combine more logistics cost strategies, and the correlation analysis also quantifies the benefits of different strategies, which has stronger objectivity and operability, and is helpful to the scientific decision-making of recycling logistics enterprises. Due to capacity constraints, the research in this paper still has some shortcomings, such as only analyzing the three links of unloading, sorting and warehousing in recycling logistics, but not analyzing the links of packaging and transportation. In addition, the evaluation index of cost strategy in practical application often needs to consider more factors. For the convenience of research, this paper only selects three main factors.

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