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Application of Marginal Contribution Analysis Based on Operation Costing Method in Pricing Decision-Making of Tourism Products

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Abstract: In 2017, Harbin Railway International Travel Agency Co., Ltd. had 8,103 outbound tourists and 22,676 inbound tourists, with annual operating income of 140 millions Yuan and net profit of 5.6 millions Yua, when 91 Russian oriental express products were sold, 256 Outbound Taiwan aircraft group products were sold, and 529 Xinjiang's special train products were sold, the profit and loss of enterprises were just insured. At this time, the insured sales amount was 5.06 millions Yuan. The average unit price of each product can be adjusted appropriately to meet the condition that the total sales amount is more than the comprehensive guaranteed sales amount, thus improving the market competitiveness of enterprises through differential pricing strategy.
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Key words: Marginal contribution analysis; Operation costing method; Tourism products

Harbin Railway International Travel Agency Co., Ltd. was established in July 1999. For 20 years, it has been taking "serving the public" as its enterprise purpose and "striving all the time" as its enterprise spirit.

The company's main products are "Longtai" Xinjiang special train, "Longjiang Star" tourism train, "Whole China Series Tourism Special Train", "New Oriental Express", "Lake Beijiaer Aircraft", "Railway Transport Vehicle" Self-driving travel vehicle transportation, "Happy and Long Travel" Series products, "Passionate Skiing Tour" Winter product, Research and learning brigade product.

The company currently has dozens of tourism products, and has opened many international travel routes such as Russia. In 2017, there were 8,103 outbound tourists and 22,676 inbound tourists, with annual operating income of 140 millions Yuan and net profit of 5.6 millions Yuan.

With the development of internet tourism services and the maturity of tourism market, the advent of personalized and consumerized era, the mode of travel has gradually changed from traditional group travel to individual travel, self-driving travel, self-service travel and other ways of non-participation and free travel.

Traditional product pricing methods, which mainly take market price as the vane, can not cope with the changes of the market, lack sufficient demonstration of internal and external factors of enterprises, and it is difficult to form a comparative advantage.

1. Overall design

In cooperation with Heilongjiang Huaxin Accounting Firm Co., Ltd., the company has set up a research team to sort out and analyze the product composition, resource consumption, operation situation, key and difficult points of management over the years, obtain basic information, define the variable cost, fixed cost and operation cost, and analyze resource motivation, operation motivation and product life cycle and other planning work.

The assumption and steps of Applying Operation-based costing to product pricing are as follows: dividing travel agency product operations → determining operation costing motivation → gathering resources to operations → calculating total operation costs → marginal contribution analysis.

2. Innovation in the application of marginal contribution analysis method

Profit maximization is the fundamental goal of enterprise decision-making. Marginal contribution is one of the main factors affecting profit in management accounting. It refers to the balance of sales revenue minus variable costs. Marginal contribution is a very important index for product production decision-making based on the principle of profit and loss analysis. Generally, marginal contribution is also called "marginal profit" or "contribution gross profit".

In the past, when using marginal analysis for decision-making, the selected cost indicators are the manufacturing costs under the current system. We find that the indirect cost allocation of manufacturing cost is determined by direct labor cost. In the cost composition of tourism industry, the proportion of labor cost is smaller, the proportion of indirect cost is larger, and operation cost is more suitable for marginal analysis. Therefore, we try to use unit operation based costing to analyze the marginal contribution.

3. Major indicators of marginal contribution analysis based on operation cost

(1) Basic formulas:

Unit marginal contribution = Unit price - Unit operation cost

Total marginal contribution=(Unit price-Unit operation cost)×Sales

Marginal contribution rate = 1 - unit operation cost / unit price

(2) The break-even point formula:

Balanced sale amount= Fixed cost/Marginal contribution rate

Balanced sales = Fixed cost/Unit marginal contribution

(3) Goal formula:

Target sale amount= (Fixed cost + Pre-tax income)/Marginal contribution rate

Target sales = (Fixed cost + Pre-tax income)/ Unit marginal contribution

4. Application process

Based on the analysis and arrangement of the company's operation center, cost motivation and responsibility subjects, the research team selected Russian oriental express, Outbound Taiwan aircraft group, Xinjiang's special train and other products, and analyzed their marginal contribution according to the operation variable cost and fixed operation cost.

4.1 Organizational framework and mode of operation

Institutional settings:

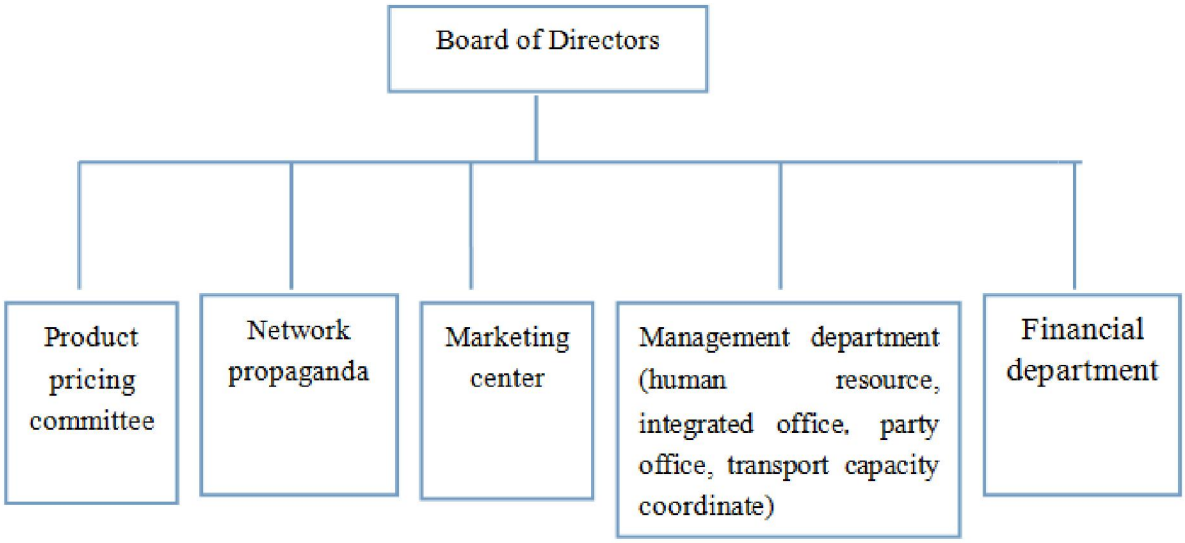

Fig. 1 Organizational framework

The product pricing committee is a product developed by the employment department. It inquires from several travel agencies responsible for reception, and combines various factors to comprehensively evaluate and select the appropriate price of the joint agencies and products; The network propaganda is responsible for the design and propaganda of the products on the network; and the marketing center is responsible for the consultation, sale and contract of the products. The management department acts as the logistic personnel of the whole enterprise to ensure the orderly operation of the enterprise; The financial department is responsible for the budget, accounting and analysis of all revenue, cost and expenses of the whole enterprise; The business departments arrange specific tourism projects and travel and accommodation schedules; and with hotels, transportation departments and tours. Entertainment units, insurance companies and other social and economic parties sign general cooperation agreements and handle specific booking business and business contacts; Departments arrange tour guides (full accompany or local accompany) according to specific reception plans to help tourists complete their tourism operations.

Business process: reception →route quotation →contract signing →travel confirmation →control in travel →late work of team ending →customer file

management.

4.2 Specific application process

4.2.1 Organizational structure

The company has 46 persons in five major operation centers. Among them, there are 6 persons in product pricing committees, 3 persons in network propaganda departments, 15 persons in marketing centers, 15 persons in management department (human resource, integrated office, party office, and transport capacity coordinate) and 7 persons in financial department.

4.2.2 Tourism products

According to the characteristics of inside and outside provinces, days of travel, modes of transportation and themes, three representative routes are selected, namely the 15-day tour of Russian oriental express, the 8-day tour of Outbound Taiwan aircraft group and the 14-day tour of Xinjiang's special train. The steps and specific methods of how to calculate the product cost of travel agencies by using operation costing method are discussed and giving an explanation.

4.2.3 To divide operations and establish operation centers

The division of operations and the determination of operation centers are the basic steps in the implementation of operation costing. They define the scope of operation costing system. To determine the operation should follow the principle of "from wide to fine, from big to small", that is, first describe the general operation of the enterprise, then layered, step by step subdivision. Generally speaking, travel agencies can be divided into two levels to divide operations: the first level is the operation center of each process, and the second level is the component of each operation center.

According to the analysis of travel agency business process and product composition characteristics, the main operations can be determined according to the causality of cost formation, and the corresponding operations and cost motivation of all kinds of operation centers are obtained. The specific contents are shown in Table 1.

Table 1 Operations for travel agency product and operations center

Operation center	Operation	Cost motivation	Cost representation motivation
Product pricing committee	Market research	Travel number	Working hours
	Product price consultation and tendering	Working hours	
	Product pricing		
Network propaganda	Page product design	Number of workers	Working hours
	Establishing publicity strategies	Working hours	
	Advertising		
Marketing center	Product consulting	Number of workers	Number of tourists
	Contract signing	Working hours	
	Sale service	Number of tourists	
Management department (human resource, integrated office, party office, transport capacity coordinate)	Office supplies	Order quantity	Number of workers
	Wage and welfare of employees	Number of workers	
	Labor union and training		
	Contract, Contract filing, Arrangement	Order quantity	
Financial department	Bad debt loss	Number of transactions	Number of transactions
	Net exchange loss		
	Financial institution procedures		

4.2.4 Assemble resource cost to operation

The service process of travel agencies is composed of various operations, and the consumption of all resources of travel agencies also occurs in the operation. Therefore, all resource consumption can be classified and aggregated by jobs. To classify integrated costs into operations, costs should be classified first, and then classified into operations according to categories and uses. In order to distribute all kinds of costs to various operations according to the allocation criteria of cost motivations, such as area, number of tourists and communication time, we must pay attention to the accuracy of cost data when collecting resource costs, otherwise it will affect the accuracy of accounting costs.

Taking August 2017 as an example, the cost aggregation of all consumed resources in each cost base shown in Table 2 below.

Table 2. Cost base and operation cost collection table for travel agency products

Resource and operating center	Product pricing committee	Network propaganda	Marketing center	Management department (human resource, integrated office, party office, transport capacity coordinate)	Financial department	Total
Employee wages	30000	9000	9600	45000	27000	120600
Welfare	690	360	320	1680	840	4890
Travel expenses	2700	0	0	0	0	2700
Communicative compensation	0		500		0	500
Office expenses	350	350	500	600	300	2100
Labor union and training funds	0	0	0	500	0	500
Notarization fee of consultation contract	0	0	0	700	0	700
Postal and telecommunication charges	600	200	300	100	0	1200
Fuel and water costs	100	100	100	300	100	700
Amortization of intangible assets	0	0	0	800	0	800
Loss of bad debts	0	0	0	0	0	0
Processing fees for financial institutions	0	0	0		500	500
Publicity fee	0	2000	0	0	0	2000
Project design fee	1000	0	0	0	0	1000
Total	35440	12010	12320	49680	740	138190

4.2.5 Selection of cost motivation and calculation of cost motivation volume

The core of implementing operation costing lies in choosing reasonable cost motivation. Only by choosing appropriate cost motivation, can we realize the effect of accounting with operation costing. In choosing cost motivations, priority should be given to operations that consume more hours or have higher value. We must be cautious about multi-cost-driven operations. We should consider not only the service caused by operations and the efficiency of services, but also the diversity of services.

Therefore, we can use the analytic hierarchy process and 1-9 scale method to systematically get the representative cost motivations. Then we can count the cost motivations volume according to the number of operations. The specific situation of the cost motivation amount of travel agency products is shown in Table 3 below.

Table 3. Cost motivation volume statistics of travel agency products

Cost base	Product pricing committee	Network propaganda	Marketing center	Management department (human resource, integrated office, party office, transport capacity coordinate)	Financial department
Cost motivation	Working hours	Working hours	Tourists	Number of workers	Transaction number
Russian oriental express	2400	1080	282	26	88
Outbound Taiwan aircraft group	640	720	436	24	168
Xinjiang's special train	1920	2100	1192	26	453
Total	4960	3900	1910	76	709

Cost motivation rate refers to the amount of manufacturing costs per unit cost motivation. According to the contents of tables 3-2 and 3-3, we can calculate the cost motivation rate of the cost base. The specific calculation is shown in tables 4.

Table 4. Cost motivation rate table for travel agency products

Cost base	Product pricing committee	Network propaganda	Marketing center	Management department (human resource, integrated office, party office, transport capacity coordinate)	Financial department
Cost base motivation	Working hours	Working hours	Tourists	Number of workers	Transaction number
Total cost of cost base	35440	12010	12320	49680	28740
Cost motivation amount	4960	3900	1910	76	709
Motivation fee rate	7.145	3.080	6.450	653.684	40.536

4.2.6 Allocation of cost base fee

After the cost motivation rate is obtained, the total cost of the cost library can be allocated according to the quantity of cost motivations consumed by each product. The sum of the costs allocated from each cost base (operation center) is the indirect cost allocation for each product. The specific situation of cost allocation for each product is shown in Table 5 below.

Table 5. Cost distribution table for product cost base of travel agencies

Cost base	Product pricing committee	Network propaganda	Marketing center	Management department (human resource, integrated office, party office, transport capacity coordinate)	Financial department	Total of product
Motivation fee rate	7.145	3.080	6.450	653.684	40.536	
Russian oriental express	2400	1080	282	26	88	42856
Outbound Taiwan aircraft group	640	720	436	24	168	32101
Xinjiang's special train	1920	2100	1192	26	453	63233
Total fee	35440	12010	12320	49680	28740	138190

4.2.7 Calculating the total cost of tourism products

Product cost consists of two parts: purchase cost and operation cost. The specific situation of purchase cost of each product is shown in Table 6.

Table 6 Cost tables for products purchased by travel agencies in August 2017 (RMB 10,000)

Project cost	Russian oriental express	Outbound Taiwan aircraft group	Xinjiang special train
Tuition fee	87	7	157
Air fare	40 Exclusive cost	68 Exclusive cost	
Train ticket	60 Exclusive cost		132 Exclusive cost
Room cost	1.5		
Meal fee			1
Vehicle fare		1	
Insurance premium	1.4	1.7	1
Sales commission	2.2		18
Accompaniment fee	0.7		1
Travel expenses	1.4		
Advertising expenses	0.8		
Total procurement costs	195	77.7	310
Actual number of visitors in August	144	372	816
Variable cost of purchasing unit	6597	261	2181

Table 7. Summaries of variable costs of travel agency products

Cost items	Unit purchase variable cost	Unit operation variable cost	Unit operation variable cost=Operation cost /Actual travel visitor number		Total of unit variable cost
			Operation cost	Actual travel visitor number	
Russian oriental express	6597	298	42856	144	6895
Outbound Taiwan aircraft group	261	86	32101	372	347
Xinjiang's special train	2181	77	63233	816	2258

4.2.8 Marginal contribution analysis

In August 2017, the Russian oriental express received 144 tourists with an average income of 21.17 millions Yuan, with an average unit price of 18400 Yuan per person and a unit variable cost of 6895 Yuan per person; Outbound Taiwan aircraft group received 372 tourists with an income of 1.02 million Yuan, an average unit price of 2980 Yuan per person and a unit variable cost of 347 Yuan per person; and the Xinjiang Special Train received 816 tourists with an income of 4.2 million Yuan per person, average unit price is 4980 Yuan per person and the unit variable cost is 2258 Yuan per person.

Through calculation, the marginal contribution of the above products is 1.18 million Yuan, 0.893 million Yuan and 2.36 million Yuan respectively, and the unit marginal contribution is 11,505 Yuan per person, 2,633 Yuan per person and 2,722 Yuan per person respectively.

Because enterprises produce and operate many kinds of products at the same time and the marginal contribution rates of many kinds of products are different, the calculation of the guaranteed cost of enterprises can not simply divide the fixed cost by the marginal contribution per unit, but must be analyzed comprehensively. In this paper, the comprehensive marginal contribution rate method is used to analyze it.

The comprehensive marginal contribution rate refers to the weighted average marginal contribution rate calculated according to the unit marginal contribution rate of each product and the proportion of the sales revenue of the product in the total sales revenue of the enterprise when the enterprise produces and operates a variety of products. When using this method to carry out cost-guaranteed analysis for enterprises, it is assumed that the variety structure of various products is unchanged, that is, the proportion of sales revenue of each product to the total sales revenue of enterprises remains unchanged, and thus the comprehensive marginal contribution rate remains unchanged. Then according to the comprehensive marginal contribution rate, the comprehensive

guaranteed sales of enterprises are calculated, and then according to the comprehensive guaranteed sales, the sales and sale amount of various products are calculated.

Taking the above three products as an example, the sales revenue is 7.39 millions Yuan, and the fixed cost should be allocated is 3.41 millions Yuan. This paper tries to analyze the state of capital preservation of enterprises.

Table 8 Monthly fixed cost details for travel agencies

Resource and operating center	Product pricing committee	Network propaganda	Marketing center	Management department (human resource, integrated office, party office, transport capacity coordinate)	Financial department	Total
Members	6	3	15	15	7	46
Wages and surcharges	57310	11140	81580	115320	42160	307510
Telephone charges	500	200	1200	800	300	3000
Office expenses	200	200	1000	1800	200	3400
Access fee		2100				2100
Depreciation fees for fixed assets				3500		3500
Amortization of intangible assets				3100		3100
Vehicle maintenance fee				10000		10000
Printing fee		300	500	200	1000	2000
Electricity charges	200	200	500	4400	200	5500
Newspaper fee				1200		1200
Total	58210	14140	84780	140320	43860	41310

It should be pointed out that in the procurement cost, train tickets and airplane tickets are the exclusive cost of all tourist routes. They include: Russian oriental express 1 million Yuan; Outbound Taiwan aircraft group 680,000 Yuan; Xinjiang Airlines 132,000 Yuan.

After deducting the exclusive cost, the residual marginal contribution rates of the three products are 54.4%, 87.5% and 67.4%, respectively.

Among them: Russian oriental express:118/217 = 54.4%;

Outbound Taiwan aircraft group: 89.3/102 = 87.5%;

Xinjiang special train: 236/350 = 67.4%.

In August 2017, the total income of the three products was 6.69 million Yuan (excluding the special subsidized income of the Xinjiang Government of 700,000 Yuan). The proportion of the income of each product was 33%, 15% and 52%, respectively. Then the enterprise's break-even point was analyzed as follows:

The comprehensive marginal contribution rate of the enterprise is 54.4%×33%+87.5%×15%+67.4%×52%=66%.

The comprehensive guaranteed sales of enterprises = (100+68+132+34.1)/66%

=506(10,000 Yuan)

Sales and sale amount of the three products at the time of capital guarantee are as follows:

Sales of Russian oriental express products = 506 ×33% = 167 million Yuan

Sales = 167/18400 = 91 (persons)

Sales of outbound Taiwanese aircraft fleet products = 506 × 15% = 76 (10,000 Yuan)

Sales = 76/2980 = 256 (persons)

Sales of Xinjiang's special products = 506 ×52% = 263 (10,000 Yuan)

Sales 263/4980 = 529 (persons)

With the existing product structure and marginal contribution rate unchanged, when 91 Russian oriental express products were sold, 256 Outbound Taiwan aircraft group products were sold, and 529 Xinjiang's special train products were sold, the profit and loss of enterprises were just insured. At this time, the insured

sales amount was 5.06 millions Yuan.

As can be seen from the above, when the number of any product increases, the average unit price of each product can be adjusted appropriately to meet the condition that the total sales amount is more than the comprehensive guaranteed sales amount, thus improving the market competitiveness of enterprises through differential pricing strategy.

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