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## Sales Achievement Assessment Based On Fuzzy Method

To cite this article: Jingxuan Fang and Wei Xiong 2019 *IOP Conf. Ser.: Mater. Sci. Eng.* **490** 062017

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## Sales Achievement Assessment Based On Fuzzy Method

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**Abstract.** The achievement assessment of salesman is an important part of enterprise. In this paper, six real selling practices to 10 salesmen of a world top 500 company were discussed on account of Fuzzy Borda measurement. The achievement assessment ranking result was 15 years before, auditing current situation of the 10 salesmen proves relevant research measurement and forecast then. The achievement assessment measurement could be used to many different industries.

### 1. Background information

Salesman is a very important key parameter to any company's success. Achievement assessment of salesman has relations with parameters like knowledge, psychological quality, organization structure, daily behavior and environment etc. The real selling practice of salesman can show their overall ability to the great extent. Overall assessment based on Fuzzy method including both qualitative and quantitative assessment could be reached.

Overall assessment on Fuzzy gives the tool and measurement to salesman on quantitative analysis. In the measurement way, to the parameter set  $B=\{b_1, b_2, \dots, b_n\}$ , assessment result could be described by different degree and data. Supposing there are  $m$  kind of assessment grade or appraisal, the related assessment set is  $C=\{c_1, c_2, \dots, c_m\}$ . Due to the different degree of different assessment parameter, assessment parameter  $b_i$  is arranged related weight parameter  $a_i$ , and  $\sum_{i=1}^n a_i = 1$ . Other

weight points could get different overall assessment outputs. The weight point of various parameters could be expressed as  $A=\{a_1, a_2, \dots, a_n\}$ . While obtaining  $B, C$  and  $A$ , assessment set could be got by uniting Fuzzy transform ( $A \circ (B \times C)$ ). The Fuzzy overall assessment method had been gradually used in many different industries such as nuclear power plant operators evaluation and etc.[1] The relevant method can be as one of many ways to evaluate nuclear power plant operators.[2]

The steps of Fuzzy overall assessment can be listed as below.

- (1) setting parameter set;
- (2) making single parameter assessment to each parameter;
- (3) arranging the weight of various parameters;
- (4) getting assessment set by Fuzzy transform;
- (5) Fuzzy Borda method decision.



## 2. Achievement assessment of salesmen

### 2.1 Setting overall assessment on Fuzzy parameter set of salesmen

For reaching human reliability measurement to salesmen, six sales practice real achievement results are selected. They are low-end products (PRT1), middle-end products (PRT2), high-end products (PRT3), channel development (CUS1), system integrator development (CUS2) and key account development (CUS3). These real practice results can show salesmen capability under limited time when facing to target and requirement. The real performance result percentage ratio of salesmen could display their capability to process various complicated environments and cases. This could be as their Fuzzy overall assessment parameter set.

Overall assessment on Fuzzy parameter set of salesman is  $B=\{PRT1, PRT2, PRT3, CUS1, CUS2, CUS3\}$ .

### 2.2 Single parameter assessment about overall capability of salesmen

Borda point measurement is applied to obtain assessment of the overall capability of salesmen. Borda point measurement and regulation had been broadly applied in various researches like personnel choosing, health daily life research and economy research and etc. Relevant detail calculation measurements were introduced by Wilfried and Thierry.[3][4]

The measurement on decision regulation of Borda could be utilized in overall Fuzzy assessment. The rule of Borda on points is the well-known process for accumulating the set assigned of  $m$  ranks into a single ranking sequence. With a normal prospect, whatever the grades show the assessments of choices through different people or the options comparing with regarding to other characteristics or regulation. Even though the regulation is designed as a group decision way at the beginning, it is suitable to solve the issue with multiple rule whose decision making confronted through the decision maker who is single. Generally the regulation appoints which the choice is obtained by the calculation of mean rank position of selections. A typical application of the regulation is displayed in Table 1. The rows in Table 1 are about to the choices on  $Y_i$ , and columns (1)-(3) include the rankings  $r_{ik}$  set to the choices on three different cases, assigned  $R_1 - R_3$ . The mean rankings,  $\bar{r}_i$ , are determined in column (4), while column (5) shows the overall ranking.

**Table 1.** The mean rank decision regulation.

Alternative	(1)	(2)	(3)	(4)	(5)
	$R_1$	<u>Ranking</u> $R_2$	$R_3$	Mean Rank $\bar{r}_i$	Aggregate Rank
$Y_1$	3	1	1	5/3	1
$Y_2$	2	3	4	9/3	3
$Y_3$	1	2	5	8/3	2
$Y_4$	5	4	2	11/3	4
$Y_5$	4	5	3	12/3	5

The overall assessment formula is shown as

$$B(x) = \sum_{i=1}^n B_i(x) \quad (1)$$

$B_i(x)$  is the quantity number which is below than  $x$  in  $i$  kinds of parameter assessment of parameter set;  $n$  is the number that salesmen who take part in tests. The advantage of the way is the single parameter on account of other units and contents which owe to overall Fuzzy assessment parameter set could be turned into integer very well. When parameter weight being increased, the overall Fuzzy assessment could be got fastly. The single parameter in the parameter set of paper is the real achievement percentage ratio to different products and customers of salesmen.

In different product selling targets and customer developments, the point of Borda on single parameter assessment to each salesman (achievement percentage ratio) could be got. Through using weight fact table given by the specialists, the overall Borda points  $B(x)$  could be got to make decision on Fuzzy.

10 salesmen were tracked among six real sales practices to get single parameter assessment research. The salesmen selling achievement can be obtained based on their actual performance. The actual data divided by sales target of each salesman, the achievement percentage ratio could be obtained. The actual responding probability  $p$  of 10 salesmen to six selling targets is showed in Table 2.

**Table 2.** Achievements responding probability of salesmen ( $p$ ).

No.	PRT1	PRT2	PRT3	CUS1	CUS2	CUS3
1	0.72	0.47	0.36	0.3		
2	0.86	0.81	0.66	0.55		
3	0.6	0.54	0.43	0.32		
4	0.92	0.74	0.6	0.49		
5	0.95	0.9	0.8	0.85		
6	0.99	0.8	0.7	0.8		
7	0.78	0.73	0.61	0.51		
8	0.96	0.72	0.9		0.86	0.97
9	0.76	0.39	0.48		0.77	0.62
10	0.98	0.99	0.94		0.91	0.92

### 2.3 The weight parameter of overall assessment of salesmen

The weight parameter  $\omega$  assigned by the specialists is displayed in Table 3.

**Table 3.** Evaluation weight parameter of salesmen ( $\omega$ ).

No.	PRT1	PRT2	PRT3	CUS1	CUS2	CUS3
1	0.1	0.2	0.3	0.4		
2	0.1	0.2	0.3	0.4		
3	0.1	0.2	0.3	0.4		
4	0.1	0.2	0.3	0.4		
5	0.1	0.2	0.3	0.4		
6	0.1	0.2	0.3	0.4		
7	0.1	0.2	0.3	0.4		
8	0.1	0.25	0.25		0.15	0.25
9	0.1	0.25	0.25		0.15	0.25
10	0.1	0.25	0.25		0.15	0.25

In fact, each salesman faces different kinds of customers. The weight parameter will be changed to every salesman. The suggestion of managers or advisors on weight assignment needs to be taken into consideration carefully and to be applied.

For instance, the salesman whose number is one sells all kinds of product and develops channel. The evaluation items include 4 to the salesmen. They are PRT1, PRT2, PRT3 and CUS1. Obviously channel is important. Because channel partners can cover more areas in the region of the salesman, so

the factor weight of CUS1 is most important. Among 3 kinds of product, high-end products could bring more profits, it should get more weight.

*2.4 Overall assessment results of salesmen*

Combing Fuzzy transform could be used to calculate the overall point of Borda.

The point of Borda on salesmen is showed in Table 4.

To every salesman, the sum of total weight parameter is 1, or  $\sum_{i=1}^n \omega_i(x) = 1$ .  $n$  is the number that

salesman covers relevant items. The overall point of Borda on every salesman is  $B_t = \sum_{i=1}^n \omega_i(x)B_i(x)$ .

In order to calculate easily, the score is based on relevant ranks. The overall assessment results of 10 salesmen are showed in Table 5.

**Table 4.** Score of Borda on evaluated salesmen ( $B$ ).

No.	PRT1	PRT2	PRT3	CUS1	CUS2	CUS3
1	2	1	0	0		
2	4	7	5	4		
3	0	2	1	1		
4	5	5	3	2		
5	6	8	7	6		
6	9	6	6	5		
7	3	4	4	3		
8	7	3	8		1	2
9	1	0	2		0	0
10	8	9	9		2	1

For example, in low-end products item, 10 of 10 salesmen had the relevant results. The sales whose number is six got 9 which is the highest point. His achievement percentage ratio is the best.

The point of Borda could be obtained in Table 5. For instance, the salesman whose number is two touched four items. His point on Borda is as below:

$$4 \times 0.1 + 7 \times 0.2 + 5 \times 0.3 + 4 \times 0.4 = 3.2.$$

The scores of Borda on other salesmen could be calculated with the same method.

**Table 5.** Overall performance assessment results of salesmen.

Sales No.	$B_t$	Ranking
1	0.4	10
2	4.9	4
3	1.1	8
4	3.2	7
5	6.7	1
6	5.9	2
7	3.5	6
8	4.1	5
9	0.6	9
10	5.75	3

### 2.5 Overall capability assessment about Salesmen

The Fuzzy overall assessment of salesmen is based on the value of both products selling and different customer development. Many parameters of salesmen like age, education background, psychological factor and environment etc. can affect the assessment result.

### 2.6 Following the result of overall assessment

The current situation of 10 salesmen can judge the related analysis measurement and model which was used 15 years before.

Among 10 salesmen, those who ranked top 5 had been promoted or appointed important position in past a few years. These important positions include regional sales director, industry director and etc. The salesmen who ranked 8, 9 and 10 had to leave company because of their both capability and performance issues. That means the assessment result 15 years ago could reflect their relevant capability.

## 3. Conclusion

The overall Fuzzy assessment measurement is introduced in the paper. The measurement is effective and efficient. The evaluation measurement needs to be adjusted when the external environment changes. For example, with internet business growing, the resellers will disappear gradually because of competition. More and more business is going to change to B2C business model.[5][6] The evaluation parameter to salesmen also needs to change.

## Acknowledgments

This work was supported by real foreign company experiment data of sales.

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