slightly good, a little good, good, very good, extremely good }.

Step 1. The decision maker compares the four alternatives with respect to the ten criteria and constructs the linguistic preference relations as shown in Table 1.

Table 1. Linguistic preference relation

	u_1	u_2	u_3	u_4	u_5	u_6	u_7	u_8	u_9	u_{10}
x_1	s_2	s_2	s_0	s_0	s_0	s_3	s_3	s_4	s_2	s_{-1}
x_2	s_3	s_0	s_{-2}	s_3	s_3	s_4	s_3	s_2	s_{-1}	s_2
x_3	s_2	s_3	s_4	s_4	s_2	s_2	s_2	s_3	s_2	s_0
x_4	s_4	s_3	s_3	s_0	s_3	s_0	s_3	s_3	s_0	s_{-1}

Step 2. Utilize the EOWA operator $r_i = EOWA_w\left(r_{i1}, r_{i2}, r_{i3}, r_{i4}, r_{i5}, r_{i6}, r_{i7}, r_{i8}, r_{i9}, r_{i10}\right)$ to aggregate $r_{ij}\ (j = 1,2,3,4,5,6,7,8,9,10)$ corresponding to the alternative x_i with respect to each criterion, and then get all the averaged preference degrees of all the alternatives. The result is as follows:

$$z_1(\omega) = 0.07 \times s_4 \oplus 0.08 \times s_3 \oplus 0.10 \times s_3 \oplus 0.12 \times s_2 \oplus 0.13 \times s_2 \oplus 0.13 \times s_2 \oplus 0.12 \times s_0 \oplus 0.10 \times s_0 \oplus 0.08 \times s_0 \oplus 0.07 \times s_{-1} = s_{1.51}$$

$$z_2(\omega) = 0.07 \times s_4 \oplus 0.08 \times s_3 \oplus 0.10 \times s_3 \oplus 0.12 \times s_3 \oplus 0.13 \times s_3 \oplus 0.13 \times s_2 \oplus 0.12 \times s_2 \oplus 0.10 \times s_0 \oplus 0.08 \times s_{-1} \oplus 0.07 \times s_{-2} = s_{1.85}$$

$$z_3(\omega) = 0.07 \times s_4 \oplus 0.08 \times s_4 \oplus 0.10 \times s_3 \oplus 0.12 \times s_3 \oplus 0.13 \times s_2 \oplus 0.13 \times s_2 \oplus 0.12 \times s_2 \oplus 0.10 \times s_2 \oplus 0.08 \times s_2 \oplus 0.07 \times s_0 = s_{2.38}$$

$$z_4(\omega) = 0.07 \times s_4 \oplus 0.08 \times s_3 \oplus 0.10 \times s_3 \oplus 0.12 \times s_3 \oplus 0.13 \times s_3 \oplus 0.13 \times s_3 \oplus 0.12 \times s_0 \oplus 0.10 \times s_0 \oplus 0.08 \times s_0 \oplus 0.07 \times s_{-1} = s_{1.89}$$

Step 3. Rank all the alternatives and select the best one(s) in accordance with the values of $z_i(\omega)(i = 1,2,3,4)$:

$z_3(\omega) \succ z_4(\omega) \succ z_2(\omega) \succ z_1(\omega)$, so the best alternative is x_3.

5. Summary

In this paper, the problem of evalution of IT outsourcing vendors is studied. Based on EOWA operator and multi-criteria decision making with linguistic preference information, a method is introduced to the problem. An illustrative numerical example is also provided to illustrate the feasibility and practicality of the proposed method. The proposed method is straightforward and can effectively avoid the loss of information.

6. References

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