SOFTWARE SELECTION FOR CALL CENTER IN GOVERNMENT AGENCIES

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Abstract

The call center is organized in order to ensure compliance with laws and regulations in the central government body, objective investigation and response to complaints, prevention of illegal activities, analysis to improve performance and ensuring public satisfaction. An analysis of the data received by the call center is required in order to assure the fairness of government services, the fight against corruption, the objective activities of civil officials, and the prevention of cases aimed at causing public displeasure. There is a need for call centers to operate more rationally and perfectly as an important structural element of government agencies. There is a need for call centers to operate more rationally and perfectly as an important structural element of government agencies. Therefore, in this paper we apply multi-criteria decision making method to selection best software selection for call center. Decision matrix consist of five alternative (Orange Line, ProCall,VoIPTime, Instacall, K3) and five criteria (Telephony, Callback; Call Forward; Reporting, System integration). The obtained results show effectiveness this method.

Keywords: MCDM, call center, PROMETHEE method, software selection

Introduction

Call center a specialized organization or a dedicated subdivision in an organization that processes requests and informs via voice communication channels in the interests of the customer organization or the parent organization [1]. At present, companies use the opportunities of call centers to formulate their marketing policies and determine their future prospects. Later, this tradition spread to government agencies [1]. First of all, call centers were introduced in the service areas provided by government agencies. After a short time, this practice began to be used in all government agencies [2].

The call center is organized in order to ensure the rule of law in the central government body, to objectively investigate and respond to appeals, to prevent abuses, to conduct analysis to improve performance and to ensure citizen satisfaction. At present, call centers have become an important structural element of government agencies [2]. In this paper we use PRMETHEE method for selection software for call center.

Statement of problem

Let us consider MCDM problem which consist of five call center software S1:Orange Line; S2: ProCall; S3: VoIPTime; S4: Instacall; S5: K3. Each of these software has important criteria. And there are criteria that are in one software and not in another. One criterion may be more or less important than another. Criteria:

C1: Telephony; Assignment of a subscriber's telephone number, Interactive Voice Recording system, queuing of calls for processing by the relevant group of operators, keeping and directing calls on the line, recording conversations, recording lost calls, etc;

C2: Callback; Callback also referred to as automated callback, is a feature of IVR (interactive voice response) systems. It is used by contact centers to give callers the option to save their place in the call queue and receive a call back when an agent becomes available;

C3:Call Forward; Call forwarding is a telephony feature of all telephone switching systems that routes a phone call to a different destination, such as a mobile phone or another phone number where the intended called person is available;

C4: Reporting; Call center reporting is the tracking and presentation of key performance indicators (KPIs) and planned metrics on call center activities and individual call center agent performance.

C5: System integration; The use of different technologies ensures uninterrupted workflow, allowing integration with other systems.

Depending on the importance of these criteria, which express the functionality of the software, we can evaluate them with appropriate coefficients and determine the best one based on the PROMETHEE method [3].

Solution of the problem

Weights	**0,1**	**0,15**	**0,15**	**0,25**	**0,35**
	Telephony	**Callback**	**Call Forward**	**Reporting**	**System integration**
Orange Line(S1)	9	9	9	10	6
ProCall(S2)	10	10	8	10	10
VolPTime(S3)	8	8	10	8	7
Instacall(S4)	8	8	10	9	6
K3(S5)	9	7	10	7	6

Step 1:Normalize the Evaluation Matrix(decision matrix)

Benificial criteria:

$R_{ij}=\frac{[x_{ij}-\min(x_{ij})]}{[\max(x_{ij})-\min(x_{ij})]}$

(i=1,2…,m; j=1,2,…,n)

Non-benificial criteria:

$R_{ij}=\frac{[\max(x_{ij})-x_{ij}]}{[\max(x_{ij})-\min(x_{ij})]}$

Weights	0,1	0,15	0,15	0,25	0,35
	Telephony	Callback	Call Forward	Reporting	System integration
Orange Line(S1)	9	9	9	10	6
ProCall(S2)	10	10	8	10	10
VolPTime(S3)	8	8	10	8	7
Instacall(S4)	8	8	10	9	6
K3(S5)	9	7	10	7	6
min	8	7	8	7	6
max	10	10	10	10	10

Weights	0,1	0,15	0,15	0,25	0,35
	Telephony	Callback	Call Forward	Reporting	System integration
Orange Line(S1)	0,5	0,6666667	0,5	1	0
ProCall(S2)	1	1	0	1	1
VolPTime(S3)	0	0,3333333	1	0,3333333	0,25
Instacall(S4)	0	0,3333333	1	0,6666667	0
K3(S5)	0,5	0	1	0	

Step 2:Calculate the evaluative differences of i^{th} alternative with respect to other alternatives

D(S1-S2)	-0,5	-0,3333333333	0,5	0	-1
D(S1-S3)	0,5	0,3333333333	-0,5	0,6666666667	-0,25
D(S1-S4)	0,5	0,3333333333	-0,5	0,3333333333	0
D(S1-S5)	0	0,6666666667	-0,5	1	0
D(S2-S1)	0,5	0,3333333333	-0,5	0	1
D(S2-S3)	1	0,6666666667	-1	0,6666666667	0,75
D(S2-S4)	1	0,6666666667	-1	0,3333333333	1
D(S2-S5)	0,5	1	-1	1	1
D(S3-S1)	-0,5	-0,3333333333	0,5	-0,6666666667	0,25
D(S3-S2)	-1	-0,6666666667	1	-0,6666666667	-0,75
D(S3-S4)	0	0	0	-0,3333333333	0,25
D(S3-S5)	-0,5	0,3333333333	0	0,3333333333	0,25
D(S4-S1)	-0,5	-0,3333333333	0,5	-0,3333333333	0
D(S4-S2)	-1	-0,6666666667	1	-0,3333333333	-1
D(S4-S3)	0	0	0	0,3333333333	-0,25
D(S4-S5)	-0,5	0,3333333333	0	0,6666666667	0
D(S5-S1)	0	-0,6666666667	0,5	-1	0
D(S5-S2)	-0,5	-1	1	-1	-1
D(S5-S3)	0,5	-0,3333333333	0	-0,3333333333	-0,25
D(S5-S4)	0,5	-0,3333333333	0	-0,6666666667	0

Step 3:Calculate the preference function, $P_j(a,b)$

$P_j(a,b)=0$ if $R_{aj} \leq R_{bj}$

$D(Ma-Mb)\leq 0$

$P_j(a,b)=(R_{aj}- R_{bj})$ if $R_{aj} > R_{bj}$

$D(Ma-Mb)>0$

P(S1-S2)	0	0	0,5	0	0
P(S1-S3)	0,5	0,3333333333	0	0,6666666667	0
P(S1-S4)	0,5	0,3333333333	0	0,3333333333	0
P(S1-S5)	0	0,6666666667	0	1	0
P(S2-S1)	0,5	0,3333333333	0	0	1
P(S2-S3)	1	0,6666666667	0	0,6666666667	0,75
P(S2-S4)	1	0,6666666667	0	0,3333333333	1
P(S2-S5)	0,5	1	0	1	1
P(S3-S1)	0	0	0,5	0	0,25
P(S3-S2)	0	0	1	0	0
P(S3-S4)	0	0	0	0	0,25
P(S3-S5)	0	0,3333333333	0	0,3333333333	0,25
P(S4-S1)	0	0	0,5	0	0
P(S4-S2)	0	0	1	0	0
P(S4-S3)	0	0	0	0,3333333333	0
P(S4-S5)	0	0,3333333333	0	0,6666666667	0
P(S5-S1)	0	0	0,5	0	0
P(S5-S2)	0	0	1	0	0
P(S5-S3)	0,5	0	0	0	0
P(S5-S4)	0,5	0	0	0	0

Step 4:Calculate the aggregated preference

Aggregated preference function, π(a,b)

$$=\left[\sum_{j=1}^{n} \mathrm{w_j}\, P_j(a,b)\right] / \sum_{j=1}^{n} \mathrm{w_j}$$

Wj*P(S1-S2)	0	0	0,075	0	0
Wj*P(S1-S3)	0,05	0,05	0	0,1666666667	0
Wj*P(S1-S4)	0,05	0,05	0	0,08333333333	0
Wj*P(S1-S5)	0	0,1	0	0,25	0
Wj*P(S2-S1)	0,05	0,05	0	0	0,35
Wj*P(S2-S3)	0,1	0,1	0	0,1666666667	0,2625
Wj*P(S2-S4)	0,1	0,1	0	0,08333333333	0,35
Wj*P(S2-S5)	0,05	0,15	0	0,25	0,35
Wj*P(S3-S1)	0	0	0,075	0	0,0875
Wj*P(S3-S2)	0	0	0,15	0	0
Wj*P(S3-S4)	0	0	0	0	0,0875
Wj*P(S3-S5)	0	0,05	0	0,08333333333	0,0875
Wj*P(S4-S1)	0	0	0,075	0	0
Wj*P(S4-S2)	0	0	0,15	0	0
Wj*P(S4-S3)	0	0	0	0,08333333333	0
Wj*P(S4-S5)	0	0,05	0	0,1666666667	0
Wj*P(S5-S1)	0	0	0,075	0	0
Wj*P(S5-S2)	0	0	0,15	0	0
Wj*P(S5-S3)	0,05	0	0	0	0
Wj*P(S5-S4)	0,05	0	0	0	0

Aggregated preference function, π(a,b)

$$=\left[\sum_{j=1}^{n} \mathrm{w_j}\, P_j(a,b)\right] / \sum_{j=1}^{n} \mathrm{w_j}$$

Aggregated Prefernce Function	**Orange Line (S1)**	**ProCall (S2)**	**VolPTime (S3)**	**Instacall (S4)**	**K3 (S5)**
Orange Line (S1)	—	0,075	0,2666666667	0,1833333333	0,35
ProCall (S2)	0,45	—	0,6291666667	0,6333333333	0,8
VolPTime (S3)	0,1625	0,15	—	0,0875	0,2208333333
Instacall (S4)	0,075	0,15	0,08333333333	—	0,2166666667
K3 (S5)	0,075	0,15	0,05	0,05	—

Step 5:Determine the leaving and the entering outranking flows

Leaving (positive) flow for ath alternative Φ^+
$=\frac{1}{m-1}\sum_{b=1}^{m}\pi(a,b)\ (a \neq b)$

Leaving (negative) flow for ath alternative Φ^-
$=\frac{1}{m-1}\sum_{b=1}^{m}\pi(b,a)\ (a \neq b)$Aggregated preference function, π(a,b)

Aggregated Prefernce Function	**Orange Line (S1)**	**ProCall (S2)**	**VolPTime (S3)**	**Instacall (S4)**	**K3 (S5)**	Φ^+
Orange Line (S1)	—	0,075	0,2666666667	0,1833333333	0,35	0,21875
ProCall (S2)	0,45	—	0,6291666667	0,6333333333	0,8	0,628125
VolPTime (S3)	0,1625	0,15	—	0,0875	0,2208333333	0,1552083333
Instacall (S4)	0,075	0,15	0,08333333333	—	0,2166666667	0,13125
K3 (S5)	0,075	0,15	0,05	0,05	—	0,08125
Φ^-	0,190625	0,13125	0,2572916667	0,2385416667	0,396875	

Step 6:Calculate the net outranking flow for each alternative

$\Phi(a)= \Phi^+(a) - \Phi^-(a)$

	Leaving flow	Entering flow
	Φ^+	Φ^-
Orange Line (S1)	0,21875	0,190625
ProCall (S2)	0,628125	0,13125
VolPTime (S3)	0,1552083333	0,2572916667
Instacall (S4)	0,13125	0,2385416667
K3 (S5)	0,08125	0,396875

Step 7:Determine the ranking of all the considered alternatives depending on the values of Φ(a)

	Leaving flow	Entering flow		
	Φ^+	Φ^-	Φ	Rank
Orange Line (S1)	0,21875	0,190625	0,028125	2
ProCall (S2)	0,628125	0,13125	0,496875	1
VolPTime (S3)	0,1552083333	0,2572916667	-0,1020833333	3
Instacall (S4)	0,13125	0,2385416667	-0,1072916667	4
K3 (S5)	0,08125	0,396875	-0,315625	5

ProCall (S2) is the best alternative.

Conclusion

This study presents a simple study on the emergence of the call center industry, the pace of development, rates and forms of use, as well as software selection models used in the use of call centers and the rules of use of selected programs, which are of particular importance for business and the public sector. In the paper, PROMETHEE method is used in the program selection for the call center, and the practical application of this method is explained in detail on the basis of an example.

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