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A JOB ADVERTISEMENT MEDIA SELECTION USING GOAL PROGRAMMING: A CASE STUDY ON E-COMMERCE COMPANY IN BANGLADESH

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ABSTRACT

This case study is conducted on an e-commerce company. Secondary data are analyzed here. This e-commerce company has to recruit the employee for different posts. This organization has to spend a lot on its recruitment advertisement purpose. Nowadays they want to take the best job advertising media, which can fulfil their some desired goals. Goal programming is helpful for figuring out their multi-objectivity, and so it is utilized. This analysis brought out that the online job portal performs as a good advertising medium to attract the job searcher.

KEYWORDS: *Human Resource, Job Advertisement, Goal Programming, Cost Effectiveness*

INTRODUCTION

Selecting the best candidate from the market is the most challenging job of a recruiter. He should stimulate the best candidate to employ for his job opening.Growing companies will find recruitment and selection as a critical human resource movement. The labor deficiency means that hiring managers will need distinct care while recruiting. Proper market research serves to hit the target candidates.Recruitment process develops such a fashion that it ensure that the definite sources touched and people with the exact skills are wielded.The ideal recruitment effort might bring in a decent number of capable candidates.Works indicate that about 80% of all applications submitted are unsuitable for the position.But it is a thing of large joy that, today's technology is helping human too easy sorting out the qualified candidates (Decenzo and Robbins, 2010). Manpower Inc. surveyed on similar issues. They reviewed almost 37,000 employers in 27 states and found 41 percent of employers are having trouble noticing the people they need (Kang Yang Trevor YU and Daniel M. Cable, 2014). Use focused recruitment to find qualified applicants from the target group(s). Most companies devote thousands of bucks each year, employing team members, without counting on which acquisition source harvests the finest applicants.The rational solution is to evaluate recruitment efficiency, by means of measures or metrics.Metrics here might comprise the character of new leases and which recruitment sources harvest the newest hires Applicant tracking systems support an employer's talent management efforts in other ways. The staffing source affects the characteristics of the candidates. If the staffing associated actions and resources comprise exact info, then those generate a confident imprint on applicants. Organizational image influences the applicant's preliminary reactions. Even smaller companies spend huge money, yet few firms get effective results. We don't recognize where we should pass our money as a recruiter. More candidates are not always better. The employer needs qualifying, hirable applicants, not just applicants. An Internet ad may generate thousands of applicants, many from so far away that there's no chance they're viable. It's therefore wise to

compare your recruiting sources with measures of how employees from these sources did after about a year on the business. (Gary Dessler, 2015). If the best candidate doesn't apply, then there is a chance to get the mediocrity performer to fill the vacancy. So a recruiter should try to reach his advertisement to the proper candidate. It is a challenging task to reach all the candidates available for the job opening, within a limited budget. So recruiter should try to optimize his budget for accomplishing the best prospects. Different Bangladeshi organizations are using different sources for their Job Advertisement. Most of them use the popular newspapers, different online job portal, online social media, Job fair or Campus recruitment on different premises. Most of those sources are very costly. Besides these, different sources touch different types of candidates based on their skills and competencies. Different sources are good for getting different levels and skilled employees. A hiring manager must use those sources in an optimized way, thus the proper candidates being stimulated to apply for the vacant post. Based on the optimized costing and reaching to the perfect candidates, Goal programming can help to choose the best media.

METHODOLOGY

This study, conducted based on secondary data. All the necessary data gathered in 2016-2018. This e-commerce company used the different online and offline job advertising media. They use Online Job Portal, Campus Recruitment, Facebook Job Post as a Regular Post, LinkedIn Job Post, and Email to a Customer who brought Similar Types of Books. Their objective is not only to meet a limited budget, but also uses the online advertising media, campus visiting to recruit the graduate, reach to a target number of job seekers, and make at least number of effective candidates. Only Goal Programming can solve this type of multi-objective related problem, and that's why hence it is utilized.

LITERATURE REVIEW

Advertisement content for a job posting is significant to attract skilled and unskilled applicants. Moreover, the existence of peripheral cues appears to have a better effect on the organizational attractiveness perceptions of candidates having less work and job search experience versus those having more experience (H. Jack Walker et al.). In research, Allen found that with 989 undergraduate participants show that a constant recruitment message delivered via different media influenced to think well about the company (David G. Allen. et al.). Before writing and posting a job advertisement, one must be careful about to reaching the proper candidates, target market size and its variations, quality of the candidates, and ways of attracting the best candidates. Newspapers Advertisements, Periodical/Journals, Radio & TV advertisement, direct email, special events, employee referrals, networking, walk-in interview, and employment centers are widespread as external recruitment source (Catano, V. M. et al.).Nowadays, using social media is very common. Name on Facebook and LinkedIn will appear first for this purpose. Some recruiters like LinkedIn more than the Facebook (Ioannis Nikolaou). Job advertisements always incur a considerable cost. So cost minimization is a big challenge for every recruitment process. Goal programming approach can help to way out of this challenge. Goal Programming (GP) is good for Multiple Criteria Decision Making (MCDM) paradigm. GP combines the logic of optimization in mathematical programming with the decision maker's desire to satisfy several goals (C. Romero, 1991). Charnes and Copper developed this goal programming technique (Charnes and Cooper, 1961). This method can be applied to the multi-objective problem by considering a set of feasible solutions, and the best solution exists in this set of possible solutions. The goal programming method is developing day by day. For the most straightforward calculation and application, it becomes popular in current days. The algorithm is straightforward to understand and also apply in any priority based case as it works on just the extension of Linear Programming (Aouni and Kettani, 2001). Goal Programming and its variants are already used to solve questions from

various disciplines. S.M. Lee (1972)worked on Goal Programming for Decision Analysis, P.C. Kumar, G.C. Philippatos and J.R. Ezzell (1979) used GP for Portfolio Management, C.A. De Kluyver (1978) studied GP for media scheduling. For Energy Forecasting, J.E. Samouilidis and I.A. Pappas (1980) tried to apply this method. Goal Programming helped S.C. Albright (1975) for Academic Resource Planning.J. A. Chisman and D. Rippy(1977) worked on GP for Water Resource Planning, B.M. Wheeler and J.R.M. Russell (1977) used GP for Agricultural Planning, E.L. Hannan(1978) worked on it for Library Management, L.N. Killough and T.L. Sounders (1973) used GP for solvingAccounting problem. In 1999 BirsenKarpak, ErdoğanKumcuRammohanKasuganti worked on Vendor Selection Decisions using goal programming. Goal programming can help recruiters to utilize the budget in Job Advertisement with selecting the best source. Thus,therecruiter can save huge money every year.

OBJECTIVE OF THE STUDY

The purpose of this research is to select the most efficient job advertising media that made an optimized cost, reach to the target candidates, and encounter the best applicants.

Statement of the Problem

Rokomari.com is one of the most prominent e-commerce companies in Bangladesh. It wants to hire the best candidates in this country. But due to the limited budget, Rokomari.com has to be careful about its job advertisement cost. From the last 2 to 3 years, it has found the following data (by using the different job source for advertisement purpose):

Table 1

Source of Advertisement	Taka Cost (Average)	Reach (Approximately)	Active Application (Average)	Ratio (D/C)	Weight for Quality of Candidates Based on Target Group
A	B	C	D	E	F
Online Job Portal	2,440	5,000	150	3.00%	5
Campus Recruitment	5,000	150	5	3.33%	4
Face book Job Post as a Regular Post	750	2,500	45	1.80%	1
LinkedIn Job Post	860	1,200	5	0.42%	3
E mail to Customer who brought Similar Types of Books	1,000	13,00	4	0.31%	2

***Data collected in the year: 2016-2018 (Source: A Bangladeshi E-commerce Company)

Where,

- Job posting will get priority on the best match of its target candidates.
- At least three campus recruitment.
- Based on this data, Rokomari.com wants to get top quality software engineers within a limited budget of 20,000 Taka.
- The Job Post must reach to more than 100,000 Persons.
- Active applicant should not be less than 500 Persons.

Model Development

Assuming the variables for Online Job Portal, Campus Recruitment, Facebook Job Post as a Regular Post, the LinkedIn Job Post, and E mail to a Customer who brought Similar Types of Books are x_1, x_2, x_3, x_4, & x_5 respectively.

According to the above problem the goal programming model is as below

$$Z_{min}= P_1 d_1^- + P_2 d_2^- + P_3 d_3^+ + P_4 d_4^- + P_5 d_5^-$$

S/t,

$P_1:\ x_1 + d_1^- - d_1^+ =1$ (Target candidates constraint)

$P_2:\ x_2 + d_2^- - d_2^+ =3$ (Campus recruitment constraint)

$P_3:\ 2440\,x_1 + 5000\,x_2 + 750\,x_3 + 860\,x_4 + 1000\ x_5 \leq 20000$ (Budget constraint)

Or, $244\,x_1 + 500\,x_2 + 75\,x_3 + 86\,x_4 + 100\ x_5 + d_3^- - d_3^+ = 2000$

$P_4:\ 5000\,x_1 + 150\,x_2 + 2500\,x_{3\,+} 1200\,x_{4\,+} 1300\,x_5 \geq 100000$(Job seeker constraint)

Or, $100\,x_1 + 3\,x_2 + 50\,x_{3\,+} 24\,x_{4\,+} 26\,x_5 + d_4^- - d_4^+ = 2000$

$P_5:\ 150\,x_1 + 5\,x_2 + 45\,x_{3\,+} 30\,x_{4\,+} 4\,x_5 + d_5^- - d_5^+ = 500$(Effective applicant constraint)

and, $x_1,\ x_2,x_3,x_4,x_5,d_1^{\pm},d_2^{\pm},d_3^{\pm},d_4^{\pm},d_5^{\pm} \geq 0$

RESULT AND DISCUSSIONS

Analyzing the data by Goal programming Simplex method, we get

$$x_1 = 1,\ x_2 = 3,\ x_3 = \frac{256}{75},\ x_4 = 0,\ x_5 = 0$$

$$d_1^- = 0, d_1^+ = 0$$

$$d_2^- = 0, d_2^+ = 0$$

$$d_3^- = 0, d_3^+ = 0$$

$$d_4^- = \frac{129025}{75} \approx 1720.33, d_4^+ = 0$$

$$d_5^- = \frac{13605}{75}, d_5^+ = 0$$

From this inquiry, it isgrounded that online job portals are really fruitful for job advertisement purpose within optimized budget. Besides this Campus Recruitment has a greater impact for getting future brighter employees.It falls short of$\frac{129025}{75} \times 50 = \frac{6451250}{75} \approx 86,017$ in target job seeker and has also been a short of the effective applicant number of$\frac{13605}{75} \approx 181$.

CONCLUSIONS

Advertising the job post to the right candidates for stimulating him or her is not the only ways to get the best candidates. The hiring manager should concern about the proactive searching for the best on every day. For this purpose, professional social media like LinkedIn can help a lot. This study will support a recruiter to choose the best Job Advertisement Media for his recruitment purpose. Besides this, further research issues can be the influences of different factors in selecting the job advertising media for different types of organizations.

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APPENDIX

Table 2

C_j			0	0	0	0	0	P_1	0	P_2	0	0	P_3	P_4	0	P_5	0	Min Ratio
C_B	B	S	x_1	x_2	x_3	x_4	x_5	d_1^-	d_1^+	d_2^-	d_2^+	d_3^-	d_3^+	d_4^-	d_4^+	d_5^-	d_5^+	
P_1	d_1^-	1	1	0	0	0	0	1	-1	0	0	0	0	0	0	0	0	1
P_2	d_2^-	3	0	1	0	0	0	0	0	1	-1	0	0	0	0	0	0	-
0	d_3^-	2000	244	500	75	86	100	0	0	0	0	1	-1	0	0	0	0	8.19
P_4	d_4^-	2000	100	3	50	24	26	0	0	0	0	0	0	1	-1	0	0	20
P_5	d_5^-	500	150	5	45	5	4	0	0	0	0	0	0	0	0	1	-1	3.33
P_1	Z_j		1	0	0	0	0	1	-1	0	0	0	0	0	0	0	0	
	C_j-Z_j		-1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
P_2	Z_j		0	1	0	0	0	0	0	1	-1	0	0	0	0	0	0	
	C_j-Z_j		0	-1	0	0	0	0	0	0	1	0	0	0	0	0	0	
P_3	Z_j		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	C_j-Z_j		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P_4	Z_j		100	3	50	24	26	0	0	0	0	0	0	1	-1	0	0	
	C_j-Z_j		-100	-3	-50	-24	-26	0	0	0	0	0	0	0	1	0	0	
P_5	Z_j		150	5	45	5	4	0	0	0	0	0	0	0	0	1	-1	
	C_j-Z_j		-150	-5	-45	-5	-4	0	0	0	0	0	0	0	0	0	1	

Table 3

	C_j		0	0	0	0	0	P_1	0	P_2	0	0	P_3	P_4	0	P_5	0	Min Ratio
C_B	B	S	x_1	x_2	x_3	x_4	x_5	d_1^-	d_1^+	d_2^-	d_2^+	d_3^-	d_3^+	d_4^-	d_4^+	d_5^-	d_5^+	
0	x_1	1	1	0	0	0	0	1	-1	0	0	0	0	0	0	0	0	-
P_2	d_2^-	3	0	1	0	0	0	0	0	1	-1	0	0	0	0	0	0	3
0	d_3^-	1756	0	500	75	86	100	-244	244	0	0	1	-1	0	0	0	0	3.51
P_4	d_4^-	1900	0	3	50	24	26	-100	100	0	0	0	0	1	-1	0	0	633.33
P_5	d_5^-	350	0	5	45	5	4	-150	150	0	0	0	0	0	0	1	-1	70
P_1	Z_j		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	C_j-Z_j		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P_2	Z_j		0	1	0	0	0	0	0	1	-1	0	0	0	0	0	0	
	C_j-Z_j		0	-1	0	0	0	0	0	0	1	0	0	0	0	0	0	
P_3	Z_j		0	500	75	86	100	-244	244	0	0	1	-1	0	0	0	0	
	C_j-Z_j		0	-500	-75	-86	-100	0	-244	0	0	-1	0	0	0	0	0	
P_4	Z_j		0	3	50	24	26	-100	100	0	0	0	0	1	-1	0	0	
	C_j-Z_j		0	-3	-50	-24	-26	0	-100	0	0	0	0	0	1	0	0	
P_5	Z_j		0	5	45	5	4	-150	150	0	0	0	0	0	0	1	-1	
	C_j-Z_j		0	-5	-45	-5	-4	0	-150	0	0	0	0	0	0	0	1	
	C_j		0	0	0	0	0	P_1	0	P_2	0	0	P_3	P_4	0	P_5	0	Min Ratio
C_B	B	S	x_1	x_2	x_3	x_4	x_5	d_1^-	d_1^+	d_2^-	d_2^+	d_3^-	d_3^+	d_4^-	d_4^+	d_5^-	d_5^+	
0	x_1	1	1	0	0	0	0	1	-1	0	0	0	0	0	0	0	0	-
0	x_2	3	0	1	0	0	0	0	0	1	-1	0	0	0	0	0	0	-
0	d_3^-	256	0	0	75	86	100	-244	244	-500	500	1	-1	0	0	0	0	3.41
P_4	d_4^-	1891	0	0	50	24	-26	-100	100	-3	3	0	0	1	-1	0	0	37.82
P_5	d_5^-	335	0	0	45	5	4	-150	150	-5	5	0	0	0	0	1	-1	7.44
P_1	Z_j		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	C_j-Z_j		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P_2	Z_j		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	C_j-Z_j		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
P_3	Z_j		0	0	75	86	100	-244	244	-500	500	1	-1	0	0	0	0	
	C_j-Z_j		0	0	-75	-86	-100	0	-244	0	-500	-1	0	0	0	0	0	
P_4	Z_j		0	0	50	24	26	-100	100	-3	3	0	0	1	-1	0	0	
	C_j-Z_j		0	0	-50	-24	-26	0	-100	0	-3	0	0	0	1	0	0	
P_5	Z_j		0	0	45	5	4	-150	150	-5	5	0	0	0	0	1	-1	
	C_j-Z_j		0	0	-45	-5	-4	0	-150	0	-5	0	0	0	0	0	1	

Table 4

	C_j		0	0	0	0	0	P_1	0	P_2	0	0	P_3	P_4	0	P_5	0
C_B	B	S	x_1	x_2	x_3	x_4	x_5	d_1^-	d_1^+	d_2^-	d_2^+	d_3^-	d_3^+	d_4^-	d_4^+	d_5^-	d_5^+
0	x_1	1	1	0	0	0	0	1	-1	0	0	0	0	0	0	0	0
0	x_2	3	0	1	0	0	0	0	0	1	-1	0	0	0	0	0	0
0	x_3	$\frac{256}{75}$	0	0	1	$\frac{86}{75}$	$\frac{100}{75}$	$\frac{-244}{75}$	$\frac{244}{75}$	$\frac{-500}{75}$	$\frac{500}{75}$	$\frac{1}{75}$	$\frac{-1}{75}$	0	0	0	0
P_4	d_4^-	$\frac{129025}{75}$	0	0	0	$\frac{-2500}{75}$	$\frac{-3050}{75}$	$\frac{4700}{75}$	$\frac{-4700}{75}$	$\frac{24775}{75}$	$\frac{-24775}{75}$	$\frac{-50}{75}$	$\frac{50}{75}$	1	-1	0	0
P_5	d_5^-	$\frac{13605}{75}$	0	0	0	$\frac{-3495}{75}$	$\frac{-4200}{75}$	$\frac{-270}{75}$	$\frac{270}{75}$	$\frac{22125}{75}$	$\frac{-22125}{75}$	$\frac{-45}{75}$	$\frac{45}{75}$	0	0	1	-1
P_1	Z_j		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C_j-Z_j		0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
P_2	Z_j		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C_j-Z_j		0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
P_3	Z_j		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	C_j-Z_j		0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
P_4	Z_j		0	0	0	$\frac{-2500}{75}$	$\frac{-3050}{75}$	$\frac{4700}{75}$	$\frac{-4700}{75}$	$\frac{24775}{75}$	$\frac{-24775}{75}$	$\frac{-50}{75}$	$\frac{50}{75}$	1	-1	0	0
	C_j-Z_j		0	0	0	$\frac{2500}{75}$	$\frac{3050}{75}$	0	$\frac{4700}{75}$	0	$\frac{24775}{75}$	$\frac{50}{75}$	0	0	1	0	0
P_5	Z_j		0	0	0	$\frac{-3495}{75}$	$\frac{-4200}{75}$	$\frac{-270}{75}$	$\frac{270}{75}$	$\frac{22125}{75}$	$\frac{-22125}{75}$	$\frac{-45}{75}$	$\frac{45}{75}$	0	0	1	-1
	C_j-Z_j		0	0	0	$\frac{3495}{75}$	$\frac{4200}{75}$	0	$\frac{-270}{75}$	0	$\frac{22125}{75}$	$\frac{45}{75}$	0	0	0	0	1

Hence, all C_j-$Z_j \geq 0$ i.e. conditions of optimization by goal programming is satisfied here, so this is the optimal solution. The 1st, 2nd, and 3rd goal is properly perceived here, but it has a fall of short for the 4th and 5th goals.