فصلنامه مدیریت شهری
(ویژه نامه لاتین)
Urban management
No.**43** Summer **2016**
319 - 328
Received *12 Oct 2015*; **Accepted** *2 Jan 2016*

The Expansion of Economic Order Quantity Model to Reduce the Costs of Internet Recruitment Innovative Technologies in cities

Ahmad Tavakoli-*Assistant Professor, Ferdowsi University of Mashhad, Mashhad, Iran.*
Mohsen Sojoodi[1]-*PhD student at Ferdowsi University of Mashhad, Mashhad, Iran.*

Abstract
In this paper, an economic decisions-making model based on mathematics in order to optimize the costs of investment in accordance with innovative technology of human resources recruitment introduced and in the next section, the economic impact of the Internet recruitment technologies has been examined. In order to fulfill these demands classic economic order quantity model of have developed as cover unique cost of recruiting activities such as human resource management and coordination related to it. Therefore, using this method calculated the required minimum of recruitment level and consequently optimal investment in online recruitment technology has been resulted. The findings suggest that optimal investment costs near the minimum level of recruitment is rapidly increasing but the stunning developments in efficient technologies in recruitment system and lack of awareness of this minimum level of employment has caused total number of employees is more than the required minimum level. In this article, how to use this model in a research sample of online recruitment websites in Iran entitled "Iran recruitment" its potential as a tool for decision-making in the field of optimal investment for managers appeared.

Key words: *internet recruitment technology, economic decision making, optimal investment, development of economic order quantity*

1.Corresponding Author, Tel: 09120214033, Email Address: mohsened@yahoo.com

Introduction

Today, in order to attract job seekers growing in online labor market, a number of businesses as sources of online recruitment and as a recruitment agency in mid-1990 were introduced to the world [1] and internet recruitment as one of the fastest growing public have technologies [2]. Often, the benefits of online recruitment field, including issues such as increasing the number of employment opportunities for job applicants [3], faster exchange of information among employees and potential employers [4], reducing the cost of advertising [5], the availability of data [6], reduces communications costs [7], and improve organizational uptake [8] respectively. Also had drawbacks on the Web-based recruitment system is mainly with individuals overload resume [9], increase the variability in the quality of applicants [10], lack of personal feedback to applicants [11], and private of each applicant [12]. However, an online job-search process as system with more efficient costs find staff efficient and faster way than traditional paper-based recruitment system is considered [7]. Despite the widespread use of various methods of internet recruitment there is a gap between research conducted and Internet system in practice [13]. With the increasing number of studies, many concentrations in multiple positions at Internet sites (recruitment.com, Hot Jobs. com) [14], occasion and special job positions (Iran recruitment.ir; Marketing Jobs.com) [17], applications provides employment service (Job Iran; Iran Apps), combined services (online and offline) online recruitment (recruitment Foundation; Barzmehr higher education, Aria recruitment) [16]. Consortium of internet recruitment (employment Nations departments and agencies, recruiters directory) [18], and professional corporate website (Ease Iran, IKCO) has been done. Since the introduction of internet recruitment resources in the mid-1990s, a large part of its literature consisted of empirical evidence and description of the effectiveness and efficiency of internet recruitment provided. However, the surplus risk capital investment in these new technologies are misled by subcutaneous industry so that we see the boom and bust in the sample study site "Iran recruitment" [19]. Since the vast majority of companies, the technology of the Internet as a source of employment critical to their success at the recruitment strategy, urgent need to invest in developing a decision-making model based on online job search technology among the most important things must be considered. In practice, human resource managers in order to secure the funds for investment in these technologies, must be able to justify the return on investment in the field of online recruitment at senior management and had great emphasis on corporate line to fulfill the minimum investment. Therefore, the decision-making model to invest in online recruitment technology can accurately assess the various options available to them as well as gain insight in economic transactions related to virtual recruitment, had great importance. This technology employs a wide range of literature evaluation methods by providing a model decision to invest in online job completed. This research was the basis for the analytical model of classic economic order quantity model that is now widely used in the field of production and inventory management will be used. Since the difference between the components of cost and its operators in classic economic order quantity model and recruitment decision-making model, author developed economic equity model to the unique cost model components also include recruitment decisions.

Review of literature

Internet recruitment process by sending organizational posts requested on the website of a company or in online recruitment sites started and allows applicants to electronically send their CV via form or e-mail [20]. The online recruitment in company is doing to improve the process and speed [21]. As a result, employment growth in online recruitment technology is simpler and more efficient [22].

Online recruitment as a useful method over traditional recruiting methods has emerged in this field [21]. Also with the advancement of technology and the rise of ways of facilitating and enhancing corporate processes and operations, at present, global companies used Internet domain jobs. As a development tool that identifies a website dedicated to employment of job seekers. This is direct route to the slopes for easier access to job opportunities available for people. "Jobs." is unique domain name as part of your organization's name as the domain puts in record time. For example (www.shrm.jobs) the scope of a simple, fast and consistent for Human Resources Management Association for direct online communication between organizations capture page and provides job seekers using the Internet [22].

In Asia, the importance of internet recruitment accepted and developing countries in Asia have benefited from constant speed of internet recruitment process. Malaysia's corporate executives believe the Internet recruitment lead them towards a new competitive position in the labor market due to the importance of worker's knowledge and sources based completion [23] [24]. Similarly, Pakistani bosses also confirmed the validity of these claims and they have acknowledged significant impact of internet recruitment on their business processes [25]. Web-based businesses in the country, in the last 15 years, slowly expanding and it are inclusive. Developing ICT-based tools in the country, creation of electronic commerce, has been effective. Example of internet recruitment in Iran, most recently increased, and this represents the needs of the community in the use of web recruitment services in the information society. Also reasons such as reduce investment costs, shorter recruitment cycle, reach a wider range of applicants, better quality of applicants, opportunity to address specific market and attract the passive job-seekers considered as potential reasons to use internet recruitment [20]. In line with the discussion by Turban et al showed that the key factors that are important for recruitment include job duties, company itself, opportunities for advancement, potential relationships with colleagues, salary and job security [26]. Some relevant research has shown that the level of salary, opportunity to acquire knowledge and skills and challenging and interesting job for applicant's decision has a significant impact to accept a position [27]. In many of researches the effects of advertising on the work shows that more than 20% job seekers simply based on poorly designed Web sites that have denied job opportunities [29]. There is also the fact that recruitment in the enterprise Web site management included part of the success of internet recruitment. as well as many recruitment corporate websites designed complex so have lost about three-quarters of all job seekers [30]. Findings in other studies also show that providing accurate information about job recruitment force the applicant to use an important part of website and apply for jobs role and recorded [31]. Collins and Han showed that corporate advertising is only forecasting tool had continued significant direct effects on the quality of the applicant and his performance is evident [32]. Therefore, review of literature we determined that in addition to the fixed costs in organizations, use of these new tools imposes additional costs to the organization. Review and determination of minimum these costs were the main objectives of this article and demonstrated economic value can be customized by developing a simple method and costs of the organization's management reach to its lowest level.

Theoretical Foundations

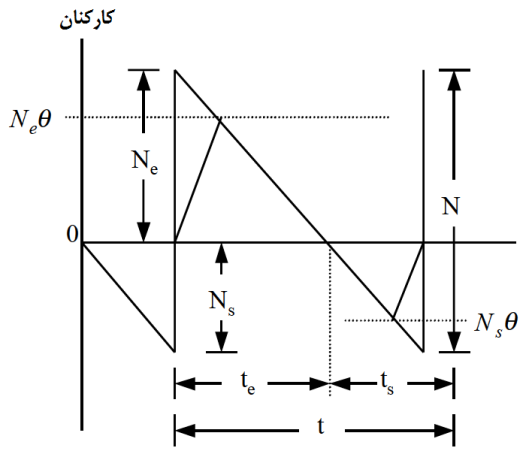
In this section, to optimize the fixed costs of internet recruitment, recruitment economic decision-making models introduced and relations between model parameters and the optimal number of employees examined. Recruitment economic decision-making models presented here are derived from the model of minimizing the costs and labor of Dale Keown [33]. Dale and Kevin is decision analysis

LABOR COSTS	
FIXED FEE RECRUITMENT	Development of technical jobs
	Develop criteria for recruitment
	Advertising Costs
	Management recruitment activities
	Recent interviews expenses and travel costs
	Sorting applicant jobs
	Planning interviews
	Tracking Applicant
FIXED COSTS HARMONY	Review sources
	Identifying and processing needs of Recruitment
	Collection and processing of job applications
	Pre-screening
	Contact Information Seekers
	Coordinating the interview (phone calls)
	Met with the applicant's
	Feedback to the applicant's articles
	Contract Programming
FIXED COSTS SURPLUS HUMAN RESOURCES	Cost too much training
	Compensation costs
FIXED CO MANPOWER SHORTAGE	Overtime compensation costs (variable)
	Lost sales / production opportunities (variable)

Table 1. Categories of costs related to recruitment [33]

models for professional's human resource in the field have absorbed the labor force. Their model is framework to estimate the optimal size of the recruitment and employment during the planning horizon. It also explicitly surplus labor costs and lack of reconciliation between them show it. At the time of absorbing surplus labor, reduce overtime costs. On the other hand, labor shortages overtime costs by using too much work. Classic economic order model specifies optimal order quantity that minimizes total cost of inventory management. Similarly, the decision to recruitment of the optimal number of employees in each cycle determines based on minimizing total cost of employment. While the constant cost in recruitment economic decision-making model is comparable with the cost of setting up the economic order model. However, recruitment economic decision-making model offer component of unique cost including surplus cost of labor and shortage costs of labor, coordination costs, and employment rates compared to the demand. Table 1 is a list of expense categories related to employment.

The economic recruitment decision-making model economic decision-making model consists of four major fixed costs of employment, surplus labor, labor shortages and coordination. Fixed cost of recruitment is usually associated recruitment source. For example, fixed costs imposed recruitment by advertisements in newspapers and traditional recruitment organizations are typically more expensive than recruitment agency and recruitment professional websites. Coordination costs depend on business processes. The cost of shortage and surplus labor per employee depending on the type of contract employees is relatively constant. While certain groups of workers em-



Diag 1. Recruitment and recruitment rates based on demand [34]

ployed by a company do not follow a pattern of regular employment, most employees follow a standard audit process for many of the costs are related to recruitment. The economic decision-making model assumes that the total number of new employees is fixed. The annual turnover rate of labor force growth and the cost of labor can also estimate in advance and reflected in the budget plan and the annual recruitment. The following naming symbols used throughout this article introduced and we talk about model formulation.

3.1 List of Symbols and Abbreviations

• The annual cost of labor surplus per new employee (currency / employee / course)
• Annual labor cost per new employee (currency / employee / course)
• Surplus labor time as a fraction of T planning period
• Labor shortages time as a fraction T planning period
• Recruitment cycle
• The number of recruitment in each recruitment cycle
• The favorable number of recruitment in each recruitment cycle
• The favorable number of recruitment more than staff level (at the time of surplus labor) in each cycle recruitment
• The average number of employees too (at the time of labor shortages) in a cycle of recruitment
• The average number of employees too in a cycle of recruitment
• Fixed employment costs per cycle recruitment
• Coordination cost each new employee during the planning period T
• Annual number of new employees
• Daily turnover
• Daily recruitment rate
• Recruitment rates based on demand
• Acceptable error management
• Planning period (number [one] is assumed)
• Formulating recruitment economic decision-making model

Mathematically, the cost of recruitment, in each cycle is defined as follows [34]:

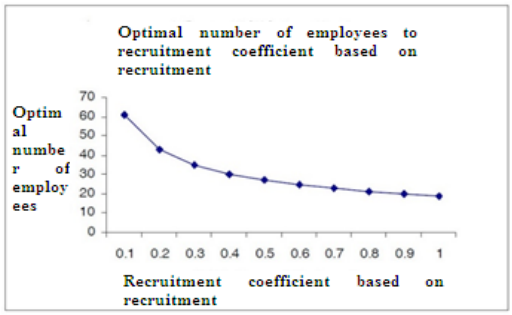
After that, the recruitment cost of new employees during a planning period is derived by the following expression:

If in the terms of equation (2) and first derivative its value equal to zero and solve it, we will gain optimal value .

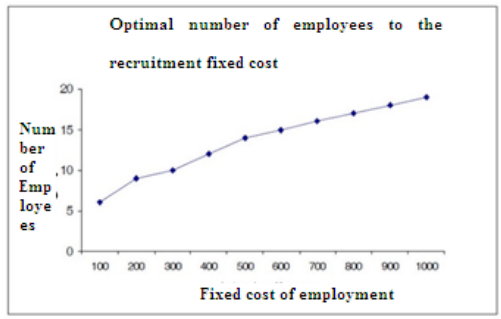
By replacing in the phrase and the first derivative of equation (4) in term of , and embed value to zero and solve the equation, the optimal number of staff to employed in any cycle will be estimated.

Figure 1 show additional costs and labor shortages and its effect on the recruitment coefficient on the basis of demand relative to the number of surplus human resources and lack. When all employees are required to employ at one time absorbed in each cycle (eg, immediate recruitment), recruitment coefficient based on demand will be equal to one. When employees at a time close to the time actually needed, absorbed, recruitment rates near zero will be based on demand. When the coefficient of recruitment on the basis of demand reaches zero, that is precisely the timing of recruitment for employment is consistent with our needs and the cost of labor shortage and surplus is equal to zero.

3-3 Numerical example of recruitment economic decision-making model



Dig 2. (b) The relationship between fixed cost of recruitment and the optimal number of employees



Dig 2. (a) The relationship between recruitment coefficient based on demand and optimal number of staff

Web Site "Iran recruitment" based on the record of accomplishment and turnover rate of progress, the number of new recruitment each year 500 people had predicted. This is particularly important for companies to staff recruitment because fixed recruitment cost per recruitment cycle imposed on them. There is a exchange between rotation cycles of recruitment and labor costs. When the number of recruitment cycles increases over a period of planning, recruitment fixed cost increases linearly and labor costs are reduced. Work time specifies the start of recruitment, surplus labor cost and labor deficit. Surplus labor costs occur when employed workers due to workforce too are not fully used. The costs of labor shortages also occur when the existing staff overtime incurred to meet production schedules. When the cost of overtime is not used, the cost of labor shortages may be estimated using sales opportunities lost. Coordination cost is variable and dependent total number of new employees recruited. The company needs to optimize the number of employees recruited in each cycle over a period of recruitment in order to minimize the total cost of the recruitment planning.

The following parameters for this example are assumed to be as follows:

Tomans (recruitment employee / planning period)

Tomans (recruitment employee / planning period)

Tomans (recruitment cycle)

(Coefficient of recruitment on demand)

Tomans (recruitment employee / planning period)

(Planning period)

Direct application of equation (3), (4) and (5) lead to optimal solutions as following:

Sections (a) and (b) in the figure (2) the relationship between the optimal numbers of employees recruited in each cycle and recruitment coefficient based on fixed cost and demand have shown.

As can be seen from (a) and (b) in the figure (2) received, recruitment coefficient based on demand and the fixed cost of employment in order to optimize the number of staff employed in each cycle in the opposite direction and will affect to minimize the total costs of recruitment. Decline in demand has a depressing effect on the recruitment coefficient based on the average number of employees during the planning period of the recruitment and reduce the total cost of the surplus and shortage of labor. On the other hand, decreased recruitment fixed cost causes the number of employees needs to be addressed in every cycle.

Thereby reducing recruitment fixed cost coefficient based on employment and demand, as well as other factors reduce the total cost of employment. Although the economic decision making to recruit a useful tool for human resources planning and recruitment, but is unable to determine the optimal investment that changed the parameter values recruitment fixed cost and the recruitment coefficient

based on the demand in the model decision. These questions will be answered in the following sections.

Research Methodology

In this paper, the internet as a company-wide recruitment process with defined activities and employment that a variety of online tools is used during all stages of recruitment. In the past decade, internet recruitment company's large sums in technologies to reduce the cost of attracting investment and improving the recruiting process have spent. While the content of this article, internet recruitment technologies to cost-effective and efficient in internet recruitment has shown. This study provides descriptive results in the best way and exchange between the cost of investment and its benefits are clearly identified so far not been investigated. Several studies of corporate investment in information technology show many business organizations are extremist in their IT investments but rarely achieve higher financial returns [35]. To complete lack of content of this research, a model of economic decision-making to invest in internet recruitment technology and analysis of the relationship between investment in technology and internet recruitment and the total cost of recruitment is provided. This model allows better conditions under which companies invest in online recruitment choose a model with the help of search engine rankings and selection of the most visited websites in Iran recruitment has accepted. Research shows that in order to reduce the cost of hiring, most companies as if the company of choice for this study were considered constant variable cost of recruitment this is a point of discussion in this study why always this value is not fixed. In addition, other components in this amount are important and continuing with the expansion and integration of new variable is possible to include other costs prototype has developed.

4-1 developing economic decision-making model to invest in the internet recruitment technology

In previous recruitment economic decision-making model, fixed recruitment cost is assumed constant. In this section, we assume the exponential function with the base so the cost of investing in internet recruitment S will reduce fixed costs. Billington similar exponential function with the base to determine the favorable investment costs to reduce the cost of setting up the classic model of economic order quantity has proposed [36]. Porteus has proposed an economic order quantity model to study the favorable investment in order to reduce launch costs for both the logarithmic function and setup fees power function [37]. In this paper, the equation (2) in order to cover investment costs S, which was mentioned in the research literature, developed and results in equation (6) is displayed.

Investment exponential function to reduce the equation (7) is defined [37].

So that investing S has made H as the highest fixed cost of employment, when there is no investment in internet recruitment technologies and L as the lowest fixed cost of recruitment will be reached. In order to obtain the optimal solution to invest in technology, the first derivative of equation (6) with respect to S and then taken to be zero and solved. The result is:

The first derivative of equation (7) according to S taken and the results will be:

With the embed equation (9) and (10) and replace the value of N in equation (11) by equation (5) equation (12) is obtained. Then, by solving the equation (12), fixed cost optimization through the equation (13) is derived.

Whereas

After obtaining optimization fixed cost , investment optimization value and value respectively by equations (15) and (16) will be achieved.

To determine the minimum number of employees over the course of planning for optimal investment, equation (13) was less than or equal to the value H, solving and equation (17) formed. Note that at least employees derived from equation (17) can also be calculated

without the optimal solution. Therefore, as a threshold value can be applied to decide on investment.

4-2 Numerical example of investment analysis in online recruitment

To better understand the developed model in above example with the same data including the new values that defined us consider fixed costs. The annual cost per new recruitment labor surplus 50.000, fraction of the labor force 60.000, most fixed-cost recruitment 10,000 and the lowest fixed costs 2000, the cost of aligning each new employee during the planning period 10,000 and the recruitment coefficient 0.1 is considered hiring based on demand.

According to the previous example, the total cost of hiring without investing in technology employment is estimated at 802.244.88 Toman. To solve this problem using equation (17), the minimum numbers of employees that are employed to reduce the investment for a fixed fee are calculated.

After the calculation of the minimum number of employees were 115 persons. Therefore, employment levels of less than 115 cannot be defined any cost optimal investment. It can be seen that both the value of the minimum rate at about the same for both models in the company's 115 employees will be imposed. It also should be considered that if the total number of workers employed near the level of employment is less than 115 people, the investment cost will be increased rapidly. However, when the total number of recruitment increases, the growth rate will slow down investment costs. On the other hand, cost savings overall recruitment increase linearly when the total number of recruitment increased.

Conclusion

Now, many large business organizations to set up their professional recruitment websites provide detailed information on jobs, describe the work culture, promote its interests, and have long relationship with job seekers. However, despite the popularity of internet recruitment technology, yet significant statistic on investment return in different technologies in the field of internet recruitment and the effectiveness of its management practices are not available. In order to complete the content of the studies have been mainly descriptive, in this study two decision-making analytical model for recruitment based on the classic economic order model in the areas of inventory management is provided. The model developed in this study initial model with consideration of optimal investment in internet recruitment technologies in addition, decisions taken in the first model has been developed. The developed model is insight to managers in relation to investment decisions in recruitment systems in different companies. The analysis of optimal investment decisions were based on four main components of cost: fixed cost of recruitment, recruitment coefficient based on demand, surplus costs, and labor shortages.

While in this study an exponential function with the base as the investment function has been used, other functional forms can also be easily applied to the model and can be optimized investment decisions with ease with the help of computer software such as excel calculated.

Analysis of the model suggests that when the investment costs variable added to the basic model, employment level increased optimal investment costs but with further savings in costs, it also has the potential to reduction. As far as we know, the study is first effort in the development of internet recruitment decision-making model and analysis technology impact in internet recruitment in large enterprises is cost savings. This study offers valuable insights on the benefits and costs associated with investing in Internet recruitment technologies. The decision-making model proposed and other complementary factors of decision-making in mind, managers will be able to obtain better decisions in the field of investment. In short, to achieve a strategic advantage arising from the extravagances of the systems em-

ployed in investing in the technology, but superior management of Internet technologies and processes are employed.

References

[1] Lawrence, J. D., Sauser, L. D., & Sauser, W. I. J., (2007). Recruiting Strong Applicants: Process, Prospects, Challenges in "Human Resource Management: Contemporary Issues, Challenges, and Opportunities" (Sims, R.R., Ed., Information Age Publishing.

[2] Lee, I. (2005). The Evolution of E-Recruiting: A Content Analysis of Fortune 100 Career Web Sites, Journal of Electronic Commerce in Organizations, 3 (3), 57-68

[3] Kay, A. S. (2000). Recruiters Embrace the Internet, InformationWeek, (778), 72-76

[4] Singh, P., & Finn, D. (2003). The Effects of Information Technology on Recruitment, Journal of Labor Research, 24 (3), 395-408

[5] Zall, M. (2000). Recruiting and the Internet, Fleet Equipment, 26 (10), 39-43

[6] Sylva, H., & Mol, S. T. (2009), E-Recruitment: A Study into Applicant Perceptions of an Online Application System.

[7] Lin, B., & Stasinskaya, V. S. (2002). Data Warehousing Management Issues in Online Recruiting, Human Systems Management, 21 (1), 1

[8] Ployhart, R. E., Schneider, B., & Schmitt, N. (2006): Staffing Organizations: Contemporary Practice and Theory Lawrence Erlbaum Associates, Publishers.

[9] Dessler, G. (2006): A Framework for Human Resource Management. Pearson Education Inc.

[10] Bartram, D. (2000). Internet Recruitment and Selection: Kissing Frogs to Find Princes, International Journal of Selection and Assessment, 8 (4), 261-274

[11] Cappelli, P. (2001). Making the Most of on-Line Recruiting, Harvard Business Review, 79 (3), 139-146110

[12] Lee, I. (2005). The Evolution of E-Recruiting: A Content Analysis of Fortune 100 Career Web Sites, Journal of Electronic Commerce in Organizations, 3 (3), 57-68

[13] Anderson, N. (2003). Applicant and Recruiter Reactions to New Technology in Selection: A Critical Review and Agenda for Future Research International Journal of Selection and Assessment, 11 (2/3), 15

[14] Braddy, P. W., Meade, A. W., Michael, J. J., & Fleenor, J. W. (2009). Internet Recruiting: Effects of Website Content Features on Viewers' Perceptions of Organizational Culture, International Journal of Selection and Assessment, 17 (1), 19-34

[15] Cober, R. T., Brown, D. J., Keeping, L. M., & Levy, P. E. (2004). Recrutiment on the Net: How Do Organizational Web Sites Characteristics Influence Applicant Attraction? , Journal of Management, 30 (5), 23

[16] Iranian trade association of international recruiment offices, www.scaba.ir/fa/Placement.aspx

[17] Iranian e-recruitment service, www.e-estekhdam.com

[18] Iranian web directory , www.iran-directory.com

[19] Iran-Estekhdam iranestekhdam.ir

[20] Galanaki, E (2002), "The Decision to Recruit Online: A Descriptive study", Career Development International, 7(4), 243-251.

[21] Tong, T. Y. K., and Sivanad, C. N (2005), "E-recruitment Service Provider Review", Employee Relations, 27(1), 103-117.

[22] society for human resource management (SHRM), www.shrm.org (report 2007)

[23] Ahmed, A. F (2009), "The Employability of Graduates in Competitive Organizations", Business Intelligence Journal, 2(2), 288-318.

[24] Poorangi, M. M., Razavi, S., and Rahmani, N (2011), "An Evaluation of the Effectiveness of E-recruitment Practices for SMEs in Malaysia", 2011 International Conference on Innovation, Management and Service IPEDR.14, 74-78.

[25] Khan, N. R., Taha, S. M., and Ghouri, A. M (2011), "Bridging the Gap through ERecruitment: Evidences from Private Employment Sector in Karachi", Indian Journal of Commerce & Management Studies, 2(6), 40-48.

[26] Turban, D. B., Eyring, A. R., and Campion, J. E (1993), "Job attributes: Preferences compared with reasons given for accepting and rejecting job offers", Journal of Occupational and Organizational Psychology, 66(1), 71-81.

[27] Barber, A. E and Roehling, M. V (1993),

"Job Postings and the Decision to Interview: A Verbal Protocol Analysis", Journal of Applied Psychology, 78(5), 845-856.
[28] Marr, E. R (2007), "E-Recruitment: The Effectiveness of the Internet as a Recruitment Source", Dissertation Master of Business, The School of Management, Faculty of Business, Queensland University of Technology.
[29] Bhargav, S. Reddy, P. K., and Kiran, R. U (2011), "Coverage Patterns For Efficient Banner Advertisement Placement", 20th International World Wide Web Conference (WWW2011), 131-132. Retrieved December 02, 2011
[30] Brown, D (2004), "Unwanted online job seekers swamp HR staff", Canadian HR Reporter, 17(7), 1-2.
[31] Zusman, R., and Landis, R (2002), "Applicant Preferences for Web-Based versus Traditional Job Postings", Computers in Human Behavior, 18(3), 285-296.
[32] Collins, C. J., and Han, J (2004), "Exploring Applicant Pool Quantity and Quality: The Effects of Early Recruitment Practice Strategies, Corporate Advertising, and Firm Reputation",Personnel Psychology, 57(3), 685-717.
[33] Dyl, E. A. and Keaveny, T. J. (1983). Cost minimization in staffing. Human Resource Planning, 6(2), 103-113.
[34] Thomas V. Mikosch, Sidney I. Resnick, Stephen M. Robinson Principles of Inventory Management- When You Are Down to Four, Order More.
[35] Carr, N. G. (2003). IT doesn't matter. Harvard Business Review, 81(5), 3-10.
[36] Billington, Peter J. (1981). The classic economic production quantity model with setup cost as a function of capital expenditure," Decision Sciences, 18, 25-42.
[37] Porteus, Evan L. (1985). Investing in reduced setups in the EOQ model. Management Science, 31(8), 998-1010.