Job Satisfaction: A Review Appraisal

Dr Sukh Raj Singh

Asstt. Professor (PG Deptt of Commerce)

SGGS College, Sector 26

Chandigarh

Introduction

Simply Job satisfaction is a set of favourable and unfavourable feelings and emotions with which employees view their work. It expresses the amount of agreement between the employee expectations from the job and rewards that the job actually provides. Employees are the key factor in the success of an organization. So the duty of the organization is to keep employees satisfied. Social scientists and researchers have shown keen interest in the concept of job satisfaction because job has an important role to play in the total life of an individual. It is the employee's general attitude towards his job, management and the organization. They may develop positive attitudes and feel satisfied, moderately satisfied or highly satisfied. Similarly they may also develop negative attitudes. It provides both monetary benefits as well as satisfaction. Organization with more satisfied employees tends to be more effective; besides, happy workers are more likely to be a productive worker.

There is no universal definition of job satisfaction. A commonly accepted definition is given by Locke (1976), "The pleasurable emotional state resulting from the perception of one's job as fulfilling or allowing the fulfilment of one's important job values".

Objective and Methodology of the Study

The objective of this paper is to furnish a comprehensive review of the empirical studies conducted to show the effect of job satisfaction on absenteeism, organizational commitment, organizational performance, productivity, job stress, job adjustment, work environment etc. The prime source of the studies reviewed herein includes various websites, selected referred international and national journals, PhD Research work.

Review of Literature

Rice et al. (1980)¹ conducted a meta-analysis of studies to examine the relationship between job satisfaction and life satisfaction covering more than 350 job satisfaction/ life satisfaction relationships reported in 23 studies. The researchers concluded that there were positive relationships in more than 90% cases and the magnitude of correlations between job satisfaction and overall life satisfaction was more in men than women. The results also shown that the strength of the job satisfaction/life satisfaction correlations dropped to the low teens used instead of overall life satisfaction.

Scott and Mabes (1984)² conducted a study to check who are more satisfied with their jobs - men or women, who remains more absent from their job - men or women and the relationship between job satisfaction and absenteeism. For this purpose, data was collected from 78 hourly employees of a large retail department store with the help of questionnaires. The researcher found that absence rates were higher for women than men; women were more satisfied than men and significant relationships existed between all measures of job satisfaction and absence frequency for men, and only satisfaction with pay and absence frequency was significantly related for women.

Argyle (1989)³ conducted a study to examine whether satisfied workers really work harder? If so, was it because they were satisfied or vice versa. The researcher concluded that there was positive relationship between job satisfaction and work performance, absenteeism and lobour turnover especially in white collar workers.

Shore and Martin (1989)⁴ conducted a study to examine the differential relationship of job satisfaction and organisational commitment to two important variables: turnover intention and job performance. For this study, 72 usable questionnaires were received from professional staff of a large midwestern hospital and 71 usable questionnaires were received from tellers of a large midwestern bank. Apart from this, individual performance ratings of 68 respondents in the professional sample and 69 respondents in the clerical sample were taken. The researchers concluded that specific job attitudes were more closely related with performance ratings and global organisational attitudes were more closely related to turnover intentions. The researchers also concluded that for tellers, organisational commitment was more strongly related with turnover intentions than job satisfaction, but it was not true for professionals.

Kim (2000)⁵ conducted a study to examine the effects of demographic variables (sex, education, age and job assignment) and work environment variables (skill variety, task identity, task significance, autonomy and feedback) on cadastral workers' job satisfaction. Data was collected from 300 public officials by interviewing them and multiple regression was used for analyzing. The researcher concluded that eight out of nine hypotheses were supported for satisfaction with job and satisfaction with supervisors except one hypothesis (level of education) and eight out of nine hypotheses were supported for satisfaction with colleagues except one hypothesis (skill variety).

Griffin et al. (2001)⁶ conducted an empirical study to show by what extent teamwork influenced the link between supervisory staff and job satisfaction and differences in average satisfaction levels across UK companies. For this purpose, data was collected from 48 companies comprising 4708 employees and dealing in larger project examining organisational design, management practices, employee attitudes, innovation and economic performance. The researchers found that the extent of teamwork level of analysis moderated the relationship between individual perceptions of supervisor support and job satisfaction and the extent of teamwork was positively related to perceptions of job autonomy but negatively related to perceptions of supervisory support.

Harter et al. (2002)⁷ conducted a meta-analysis of studies to examine aggregated employee job satisfaction sentiments and employee engagement with individual's involvement as well as enthusiasm for work previously conducted by The Gallup Organisation. Data was collected from 1,98,514 participants of 7,939 organisations of 36 firms. The researchers concluded that there were positive and substantive relationships between employee satisfaction and the business unit outcomes of productivity, employee turnover, profit, employee accidents and customer satisfaction and aggregated measures of employee satisfaction and employee engagement were related to business outcomes at a magnitude that was important to many organisations.

Lydon and Chevalier (2002)⁸ conducted a study to examine that the wages were exogenous in a job satisfaction regression and appropriate measures of relative wage could be inferred. For this study, data was collected from a sample of 15,000 graduates of higher education institutions in the UK taking two cohorts gained qualifications in 1985 and 1990. The researchers concluded that direct effect of wages on job satisfaction doubles and past and future

wages were important determinants of job satisfaction. Apart from this, the researchers also found that job match quality including variables such as class of degree and unemployment could be important determinants of job satisfaction.

Srivastava (2002)⁹ conducted a study to measure job satisfaction and work adjustment of the workers and to check whether adjusted/maladjusted workers were satisfied with their job or not. For this purpose, data was collected from 100 employees (workers grade) of Bharat Heavy Electricals Limited, Haridwar Division. The researcher found that there was positive and significant relationship between job satisfaction and work adjustment and adjusted workers were more satisfied with their job than maladjusted workers.

Schneider et al. (2003)¹⁰ conducted a study to explore the relationship between several facets of employee satisfaction and organisational financial and market performance. Data was collected from 35 organisations over a period of eight years. The researchers concluded that there were consistent and statistically significant positive relationships between attitudes concerning satisfaction with security, pay and overall job satisfaction with financial and market performance. This study had shown the longitudinal nature of both the aggregated employee data and the financial and market performance data.

Okpara (2004)¹¹ conducted a study to investigate whether there was a male/female salary differential and its impact on the job satisfaction of male and female bank managers in Nigeria. Questionnaires containing Job Descriptive Index and some demographic questions were sent to 510 managers, who were the members of the Chartered Institute of Bankers of Nigeria, chosen from 20 banks. 340 usable questionnaires were received back. The researcher concluded that there was a significant salary differential between male and female bank managers in Nigeria and female managers were less satisfied with their salary than male managers because they were getting less salary.

Christen et al. (2006)¹² conducted a study to investigate the relationship between job satisfaction and its key determinants, job performance and efforts. 118 usable observations were taken for statistical analysis. The researchers found that there was a negative direct effect of effort and a positive, direct effect of job performance on job satisfaction. and significant relationship between job satisfaction and work adjustment and adjusted workers were more satisfied with their job than maladjusted workers.

Bhatti and Qureshi (2007)¹³ conducted a study to examine the relationship among employee participation, job satisfaction, employee commitment and employee productivity in Oil and Gas, Banking and Telecommunication sectors of Pakistan. Questionnaires were sent to first line managers and their immediate bosses of 34 organisations selected from the website of Islamabad Stock Exchange and data was collected from 15 organisations. The researchers concluded that there was significant and positive relationship among employee participation, job satisfaction, employee commitment and employee productivity.

Cole and Cole (2007)¹⁴ had done a meta-analysis to find the relationship between organisational performance and employees satisfaction. Based on several studies gone through by them, they concluded that employee's satisfaction is related to meaningful business outcomes and these relationships were applicable to maximum number of companies and they believed that there was potential for longitudinal research in the area of aggregated employee satisfaction.

Parks and Steelman (2008)¹⁵ had done a meta - analysis to show the effect of organisational wellness program (fitness only) to reduce organisational cost by reducing absenteeism and improving job satisfaction and employees morale. For the purpose of analysis nearly 200 published and unpublished articles and dissertations from 1980 to 2005 were collected but only a small number of articles examined the effect of organisational wellness program on absenteeism and job satisfaction. The researchers concluded that organisational wellness program had reduced the absenteeism and improved job satisfaction of employees by reducing organisational cost and improving employee's morale.

Shahu and Gole (2008)¹⁶ conducted a study to examine the relationship between job stress, job satisfaction and performance among 100 managers of private manufacturing firms of different sector. The tools used for research were job satisfaction instrument (developed by Mishra and Tiwari) and occupational stress index. Data was collected through questionnaires and was analyzed by using ANOVA. The researchers concluded that there was inverse relationship between job stress and performance and positive relationship between job satisfaction and performance.

Ahsan et al. (2009)¹⁷ conducted a study to examine the relationship between job stress(including management role, relationship with others, workload pressure, homework interface, role ambiguity and performance pressure as determinants) and job satisfaction in university staff from Klang Valley in Malaysia. Data was collected in questionnaire form from

203 academicians from various faculties and races and was analyzed by using cross-sectional analysis, description analysis and regression analysis. The researchers concluded that workload pressure, homework interface, role ambiguity and performance pressure increased the job stress and hence showed a negative relationship between job stress and job satisfaction.

Beckmann et al. (2009)¹⁸ presented a paper in WWZ Forum to check the effect of fixed-term employment on job satisfaction when the employees work under similar organisational conditions as their counterpart permanent employees. The researchers concluded that fixed-term employees and their permanent counterparts differ in terms of responsiveness to various innovative work practices such as task diversity, employee involvement, employee participation, autonomy etc.

Bhaesajsanguan (2009)¹⁹ conducted an empirical study to investigate the relationships among organisational climate, job satisfaction and organisational commitment in the telecommunication industry in Thailand. Questionnaires were sent to 1200 workers and data was collected from 840 workers. The data was analyzed by using t-test and ANOVA. The researcher concluded that the positive relationship of technicians' perception in an organisational climate effect to job satisfaction, job satisfaction effect to organisational commitment and job satisfaction effect to organisational commitment but organisational climate did not affect to organisational commitment.

Ismail et al. (2009)²⁰ conducted a study to show the relationship between physiological stress and job satisfaction and psychological stress and job satisfaction in a private institution of higher learning in Malaysia. Questionnaires were given to 200 employees and usable data was collected from 80 employees. Data was analyzed with the help of SPSS 16.0 using Pearson correlation and regression. The researchers found that the physiological stress was significantly correlated with job satisfaction and psychological stress was insignificantly correlated with job satisfaction showing that level of physiological stress had increased job satisfaction and level of psychological stress had not decreased job satisfaction. The research also confirmed that occupational stress acted as a partial determinant of job satisfaction in the stress models of the organisational sector sample.

Yee et al. (2009)²¹ investigated the impact of employees satisfaction on operational performance in high-contact service industries by taking hypothesized relationship among employees satisfaction, service quality, customer satisfaction and firm profitability. The data for

study was collected from 206 shops comprising 618 participants. Using Structural Equations Modeling, the researchers found evidence of strong relationship among employee's satisfaction, service quality, customer satisfaction and firm profitability.

Alam and Mohammad (2010)²² conducted a study to examine the level of perceived job satisfaction and intention to leave the job among nurses in Malaysia taking six facets (satisfaction with supervisor, job variety, closure, compensation, co-workers and HRM/management policies) based on literature reviews. Usable data was collected from 153 nurses in one of the public hospitals in Perlis through questionnaires. The researchers concluded that the nursing staff was moderately satisfied in all the six facets of job satisfaction and perceived lower level of intention to leave the hospital and the job.

Mansor and Tayib (2010)²³ conducted a study to examine the organisational culture, employee job stress, employee job satisfaction and their correlations of the tax employees of Royal Malaysian Customs Wilayah Persekutuan Kuala Lumpur (RMC-WPKL). Data was collected by distributing 315 questionnaires by employing a proportionate stratified random sampling method and 248 usable questionnaires were collected. The researcher concluded that Royal Malaysian Customs was dominated by the bureaucratic/ hierarchical culture and the main source of stress came from uncertainty on the evaluation for a raise or promotion. Finally, on relationship, job stress was negatively correlated with job satisfaction; job stress was positively correlated with hierarchical culture; and job satisfaction was negatively correlated with hierarchical culture.

Ali et al. (2011)²⁴ conducted an empirical study to check the relationship between employee empowerment and job satisfaction and to identify the level of empowerment used by the Malaysian managers. Questioners were distributed to 250 managers and 128 effective questionnaires were collected. Data was analyzed and the results showed that empowerment had predictive explanatory power on the job satisfaction and there were high levels of empowerment practiced in the organisations which would lead to employees' satisfaction with their jobs and hence a more effective leadership.

Ali et al. (2011)²⁵ conducted a study to find out the factors which determine the level of job satisfaction in employees' of public sector undertakings of Turkey to had effective and efficient management. Data was collected from 220 employees of insurance sector by survey method. The researchers concluded that there was a positive relationship between working

conditions and satisfaction and also there existed a strong relationship between employee satisfaction and loyalty. The most effecting factors of customer satisfaction were found as training and personal development.

Golshan et al. (2011)²⁶ presented a paper on the relationship between job satisfaction with motivator factors and hygiene factors of Gen-Y administrative and diplomatic officers in Malaysia. Questionnaires were sent to 1215 officers and useful data was collected from 128 questionnaires by applying Likert scales. The data was analyzed by using factor analysis, t-test, regression and one-way ANOVA. The researchers concluded that there was significant relationship between job satisfaction and employee's motivators and employee's hygiene factors were not significantly related to job satisfaction.

Malik et al. (2011)²⁷ conducted a study to show the link of organisational learning culture with motivation to learn, job satisfaction, organisational commitment and job involvement. Questionnaires were distributed to 200 employees of a public service organisation located in Lahore city and data was collected from 119 employees. The researchers concluded that organisational learning culture had significant and positive relationship with job satisfaction, organisational commitment and job involvement but not with motivation to learn.

Mansoor et al. (2011)²⁸ conducted an empirical study to examine the impact of job stress on job satisfaction in employees of telecom sector organisations of Rawalpindi and Islamabad in Pakistan. Questionnaires were sent to 200 employees and usable data was collected from 134 employees. Job stress was measured by conflict at work, physical environment and workload. The results showed that job stress had negative impact on job satisfaction of employees.

Padala (2011)²⁹ conducted a study to check the level of job satisfaction and organisational commitment in the employees of Nagarjuna Fertilizers and Chemicals Limited, India and to identify the various determinants for job satisfaction and organisational commitment. For this purpose, primary and secondary data was collected from 200 employees of the company consisting of 35 executives, 55 junior executives and 110 non executive cadre employees. Data was analyzed with the help of SPSS and STATISTICA software using mean, standard deviation, ANOVA and t-tests. The researcher found that the overall job satisfaction level of employees was very high and they were more positively inclined in their commitment to the organisation. Education, age, nature of job, length of service and income had negative

relations with job satisfaction and organisational commitment whereas active participation in trade union had positive relations.

Deshpande et al. (2012)³⁰ conducted a study to identify the employee satisfaction levels, the areas where the employees were unsatisfied and to understand how unsatisfied employees could be made satisfied in a hospitality organisation. For this purpose, data was collected from 105 employees through questionnaire by using Likert scale and was analyzed by using SPSS software showing the satisfaction levels of the employees in various sectors like financial benefits, employee benefits, role clarity, work environment, employee welfare and job stress. The researchers found that the satisfaction level of the employees in the organisation was very high resulted in smooth running of the organisation.

Sripirabaa (2013)³¹ conducted a study on 200 bank employees in Coimbatore city to explore the impact of the variables of employee satisfaction and to identify the factors that discriminate the highly satisfied employees from the others. He collected the data from urban and rural areas of Coimbatore and the collected data was analysed using percentage analysis, correlation, regression and discriminant analysis Results of the study reveal that employee satisfaction is significantly dependent upon Autonomy, Corporate image, Affinity and Employee development. He also found that satisfied employees are more likely to be friendly and responsive compared to dissatisfied employees.

Rafique et al. (2014)³² conducted a study to show relationships between different variables, such as age, gender, years of experience, empowerment, compensation, clear goals of organization, appraisal system, work place, training and development, management behavior and motivation. etc. and job satisfaction of private organisations in Pakistan having offices in Rawalpindi and Islamabad, including hotel industry, banking sector, telecommunication sector and other organizations. Data was collected from Primary source from 130 respondents and considering the aim of study, descriptive research method was used. Likert scale with following choices (Strongly Disagree, Disagree, Neutral, Agree, Strongly agree) was used. The result shows that all the variables showed a positive impact on job satisfaction. Employees are the backbone of any organization; they participate in the growth of the organization along with all other resources. This study has highlighted the requirements of the satisfied employees of private organizations. Only a few policy changes can satisfy many employees.

Conclusion

It can be concluded from the above studies that job satisfaction is impacted by different factors in different ways. Job satisfaction and life satisfaction had a positive relationship, but it had a negative relation with absenteeism. Similarly satisfied workers were more committed in their job and perform better. Satisfied workers had less job stress in work place and this led to increase in productivity. Another factor i.e. work environment also impacted job satisfaction.

BIBLIOGRAPHY

- 1. Rice, R. W., Near, J. P. and Hunt, R. G., (1980), "The Job-Satisfaction/Life-Satisfaction Relationship: A Review of Empirical Research", *Basic and Applied Social Psychology*, 1(1), 37-64.
- 2. Scott, K.D., Mabes, D. A., (1984), "The Job Satisfaction/Absenteeism Relationship: Gender as a Moderating Variable", Available at http://www.pdii.net/docs/6_Job_Satisfaction_Absentee_Relationship_Gender_as_Modera ting_Variable.pdf. Accessed on 14-02-2012.
- 3. Argyle, M., (1989), "Do Happy Workers Work Harder? The Effect of Job Satisfaction on Work Performance", Available at http://www2.eur.nl/fsw/research/veenhoven/Pub1980s/89a-C9-full.pdf. Accessed on 18-02-2012.
- 4. Shore, L. M. and Martin, H. J., (1989), "Job Satisfaction and Organisational Commitment in Relation to Work Performance and Turnover Intentions", *Human Relations* 42(7), 625-638.
- 5. KIM, Y., (2000), "The Determinants of Public Officials' Job Satisfaction- The case of Korean Public Officials in the Cadastral Administration", Available at http://www.fig.net/pub/proceedings/korea/full-papers/pdf/session12/kim.pdf.
- 6. Griffen, M. A., Patterson, M. G. and West, M. A., (2001), "Job Satisfaction and Teamwork: the Role of Supervisor Staff", *Journal of Organisational Behaviour*, 22, 537-550.
- 7. Harter, J. K., Schmidt, F. L. and Hayes, T. L., (2002), "Business-unit Level Relationship between Employee Satisfaction, Employee Engagement and Business Outcomes: A Meta-analysis", *Journal of Applied Psychology*, 87, 268-279.
- 8. Lydon, R., and Chevalier, A., (2002), "Estimates of the Effect of Wages on Job Satisfaction", *Centre for Economic Performance, London School of Economics and Political Science.*
- 9. Srivastava, S. K., (2002), "An Empirical Study of Job Satisfaction and Work Adjustment in Public Sector Personnel", *Delhi Business Review*, 3(2).

- 10. Schneider, B., Hanges, P.J., Smith, D.B. and Salvaggio, A.N., (2003), "Which Comes First: Employee Attitudes or Organisational Financial and Market Performance?", *Journal of Applied Psychology*, 88, 836-851.
- 11. Okpara, J. O., (2004), "The Impact of Salary Differential on Managerial Job Satisfaction: A Study of the Gender Gap and its Implications for Management Education and Practice in a Developing Economy", *The Journal of business in Developing Nations*, vol 8, 65-92.
- 12. Christen, M., Iyer, G. and David, S., (2006), "Job Satisfaction, Job Performance, and Effort: A Reexamination Using Agency Theory", *Journal of Marketing*, Vol. 70, 137-150.
- 13. Bhatti, K. K. and Qureshi, T. M., (2007), "Impact of Employee Participation on Job Satisfaction, Employee Commitment and Employee Productivity", *International Review of Business Research Papers*, 3(2), 54-68.
- 14. Cole, L.E. and Cole, M.S., (2007), "Employee Satisfaction and Organisational Performance: A Summary of Key Findings from Applied Psychology", Available on http://www.teammax.net/files/LiteratureReview.pdf. Accessed on 11.08.2011.
- 15. Parks, K. M. and Steelman, L. A., (2008)," Organisational Wellness Programs: A Meta-Analysis", *Journal of Occupational Health Psychology*, 13 (1), 58-68.
- 16. Shahu, R., and Gole, S. V., (2008), "Effects of Job Stress and Job Satisfaction on Performance: An Empirical Study", *AIMS International Journal of Management*, 2(3), 237-246.
- 17. Ahsan, N., Abdullah, Z., Fie, D. Y. G., and Alam, S. S., (2009), "A Study of Job Stress on Job Satisfaction Among University Staff in Malaysia: Empirical Study", *European Journal of Social Sciences*, 8(1), 121-131.
- 18. Beckmann, M., Cornelissen, T. and Schauenberg, B., (2009), "Fixed-term Employment, Work Organisation and Job Satisfaction: Evidence from German Individual-level Data", Available at http://wwz.unibas.ch/uploads/tx x4epublication/FTE WO and JS WWZ.pdf.
- 19. Bhaesajsanguan, S., (2009), "The relationships among Organisational Climate, Job Satisfaction and Organisational Commitment in the Thai Telecommunication Industry", Available at http://www.g-casa.com/conferences/singapore/ppt_in_pdf/wed2/Sanguan.pdf.
- 20. Ismail, A., Yao, A., and Yunus, N. K. Y., (2009), "Relationship Between Occupation Stress and Job Satisfaction: An Empirical Study in Malaysia", *The Romanian Economic Journal*, Year XII, no.34.
- 21. Yee, R.W.Y., Yeung, A.C.L. and Cheng, T.C.E., (2009), "The Impact of Employee Satisfaction on Quality and Profitability in High- Contact Service Industries", Available at http://repository.lib.polyu.edu.hk/jspui/bitstream/10397/627/1/JOM%20(Accepted).pdf.

- 22. Alam, M. M., and Mohammad, J. F., (2010), "Level of Job Satisfaction and Intent to Leave Among Malaysian Nurses", *Business Intelligence Journal*, 3(1), 123-137.
- 23. Mansor, M. and Tayib, M., (2010), "An Empirical Examination of Organisational Culture, Job Stress and Job Satisfaction within the Indirect Tax Administration in Malaysia" *International Journal of Business and Social Science*, 1(1), 81-95.
- 24. Ali, H. A., Mohamed, S., Suriati, S. and Ismael, A. J., (2011), "Employee Empowerment and Job Satisfaction: An Empirical Study of Malaysian Management", *World Applied Science Journal*, 13(5), 1269-1280.
- 25. Ali, T., Akram, G., Ozkan, C. and Pastuszak, Z., (2011), "Empirical Study of Public Sector Employee Loyalty and Satisfaction", *Industrial Management and Data Systems*, 111(5), 675-696.
- 26. Golshan, N. M., Kaswuri, A. H., Aghashahi, B., Amin, M. and Ismail, K. W., (2011), "Effect of Motivational Factors on Job Satisfaction: An Empirical Study on Malaysian Gen-Y Administrative and Diplomatic Officers", *International Proceedings of Economics Development and Research*, vol. 19.
- 27. Malik, M. E., Danish, R. Q., and Ali, U., (2011), "Impact of Motivation to Learn and Job Attitudes on Organisational Learning Culture in a Public Service Organisation of Pakistan", *African Journal of Business Management*, 5(3), 844-854.
- 28. Mansoor, M., Fida, S., Nasir, S. and Ahmad, Z., (2011), "The Impact of Job Stress on Employee Job Satisfaction: A Study on Telecommunication Sector of Pakistan", Journal of Business Studies Quarterly, 2(3), 50-56.
- 29. Padala, S. R., (2011), "Employee's Job Satisfaction and Organisational Commitment in Nagarjuna Fertilizers and Chemicals Limited, India", *International Research Journal of Management and Business Studies*, 1(1), 17-27.
- 30. Deshpande, B., Arekar, K., Sharma, R., and Somaiya, S., (2012), "Effect of Employee Satisfaction on Organisation Performance: An Empirical Study in Hotel Industry", *Ninth AIMS International Conference on Management, January 1-4*.
- 31. Sripirabba, B., (2013), "Factors Enhancing Employee Satisfaction: An Empirical Analysis", Available at http://www.grgsms.com/wp-content/uploads/2014/03/Sripirabaa-WP-201403005.pdf. Accessed on 15.09.2013.
- 32. Rafique, T., Butt, F.S., Khawaja, A.B., Akhtar, N., Hussain, A. and Bashir, M., (2014), "Factors Effecting Job Satisfaction of Employees Working in Private Organizations: A Case of Pakistan", *Research Journal of Applied Science*, *Engineering and Technology*, 7(7), 1149-1157.