

# Employee Job Satisfaction Among The Telecommunication Companies in the Kingdom of Bahrain

\*Fareed Mohammad Albalushi, #Jayendira P.Sankar

\*MBA Student, \*Ph.D., Assistant Professor & Programme Head, College of Administrative and Financial Sciences, AMA International University, Kingdom of Bahrain.

 $^st$ fmbalushi99@gmail.com,  $^st$ jpsankar@amaiu.edu.bh

Abstract: Job satisfaction at work is likely to be related to the productivity of the employees. One of the prominent features witnessed is the different working environment among organizations and their impact on job satisfaction. For Example, working conductions in public and private sectors are totally different in terms of job security, basic pay, retirement benefits, work-life balance and others. The purpose of the current study was to demonstrate the employee satisfaction in the telecommunication companies in Bahrain in terms of pay, benefits, leaves and vacation and work satisfaction. Therefore, a quantitative research is conducted where total of 84 respondents participated. SPSS Software was used to demonstrate the descriptive and inferential statistics. Age, Gender, Education Level and Designation in the company were dependent variable while job satisfaction in terms of pay, benefits, leaves and vacation and work satisfaction were independent variables. The results concluded that there is an overall satisfaction in telecommunication in Bahrain while age is the only demographic character that significantly predicts the overall satisfaction in telecommunication in the Kingdom of Bahrain.

Keywords — Job Satisfaction, Telecommunication Companies, Salary, Benefits, Vacation, Work Environment, Kingdom of Bahrain.

DOI: 10.35291/2454-9150.2019.0327

### I. INTRODUCTION

Job satisfaction happens when an employee feels having job stability, career growth and a comfortable work life balance. Job Satisfaction is not only related to external factors but also to the intrinsic factors which identify a person's needs and wants. One of the prominent features witnessed is the different working environment among organizations and their impact on job satisfaction. For Example, working conductions in public and private sectors are totally different in terms of job security, basic pay, retirement benefits, work-life balance and others. Those who are likely to have higher pays would prefer to join a private sector to enhance their lifestyle while those who like to have a secure and easier lifestyle are mostly prefer the public sector.

The telecommunication companies in Kingdom of Bahrain are highly focused in providing quality service to their employees who are the core of developing and improving telecommunication services. The telecommunication companies in Kingdom of Bahrain assess that their employees are skilled and match the needed qualification as per the job and designation. Further, they insist that employees are satisfied because of offering them attractive benefits in terms of basic salary, housing, education

support, career enhancement opportunities, safety and working conditions (Kullab & Yan, 2018) [10].

The case of Kingdom of Bahrain is no different. Until the last decade, most of the workforce in the Kingdom of Bahrain likes to join public sector after finishing their educational commitments to serve the country in community centers and Ministries. The work environment in public sector is very attractive with secured job and opportunities to develop the careers in a long term (Al-Shammari & Z.Al-Am, 2018) [2]. Commercialization and specially infiltration of Multinational companies have changed the lifestyle of people tremendously, where new generation like to join such corporations for a broader scope of opportunities and better monetary benefits. However, with the passage of time and more competition in the country, it has become very challenging for the private companies to continue paying high stipends or salaries to the locals which needs to be thoroughly analyzed. The current study thus tries to understand various factors that affect the job satisfaction in Telecommunication companies which is one of the biggest service industries in Kingdom of Bahrain other than financial services.



Job satisfaction is an emotional state of mind that assess the physical and mental well-being of the employees and therefore telecommunication companies in Kingdom of Bahrain pay high attention to achieve this state of mind (Kullab & Yan, 2018) [10]. They recognize and reward employees for better performance. This increases their honor and dignity and creates a spark among others also to provide the best work capabilities.

Problems in the telecommunication companies. (Al-Shammari & Z.Al-Am, 2018) [2] recently conducted a study in the telecommunication sector in Bahrain and found that organizational culture is not feasible as there is more autocracy and self-judgment instead of team alignment. Most of the decisions are made at top levels and cascaded down in the companies. This kind of culture creates a problem and need to understand how it effects the employee satisfaction along with other factors.

#### II. OBJECTIVE OF THE STUDY

The study aims to assess the employee job satisfaction in telecommunication companies in Kingdom of Bahrain. Specifically,

- 1. To identify the status of employee satisfaction in telecommunication companies in Kingdom of Bahrain in terms of Salary, Benefits and Allowance, Leave and Vacations, Work Environment.
- 2. To evaluate the level of employee satisfaction by demographics of telecommunication companies in the Kingdom of Bahrain in terms of Age, Gender, Education, and Designation.
- 3. To analyze the significant relationship between statuses of employee satisfaction based on employee demographics of telecommunication companies in the Kingdom of Bahrain.
- 4. To bring out the problems encountered and recommendations to telecommunication companies in the Kingdom of Bahrain.

# III. REVIEW OF LITERATURE

Lazaroiu (2015) [11] finds that motivation is the internal and external factors that persuade people towards an action. It is a reason for behaving or acting in a specific way. It is the interest and desire that acts as a driving force towards pursuing goals and taking actions. The implications are that motivation is the ability of employees to complete tasks and activities that are vital for their success and performance.

Kauppila (2018) [9] finds that motivation provides direction to behavior by inspiring the individual to respond to events or others. Alternatively, the person might be motivated internally which is known as intrinsic motivation.

DOI: 10.35291/2454-9150.2019.0327

Lee et al (2015) [12] finds job satisfaction to be a measure of workers' happiness and commitment with their job. In other words, the levels of satisfaction play a role in influencing the decision of the workforce to remain with the company. Financial rewards can impact job satisfaction because employees will remain with the organization for longer time while they will be satisfied that the compensation is according to their workload. The implications are that wages tend to play a role in motivating the employees to remain satisfied with their work.

George (2015) [8] found that the job satisfaction is important for success of firms because it reduces the costs of hiring and training new employees while creating a knowledge base for firms that can help them to maintain their competitive advantage.

Ramdani et al (2014) [13] finds that organization must enhance the extrinsic and intrinsic motivators of the workforce. The extrinsic motivators for work include providing a competitive salary and financial rewards to improve productivity. The extrinsic motivators are external factors that induce an employee to perform at optimum levels.

Raziq & Maulabakhsh, (2015) [14] argue that job satisfaction can be increased when employees are given opportunities to work on challenging tasks and develop their competencies. The study states that successful firms identify the motivators of workforce and develop proactive strategies to engage with the workforce.

Terera & Ngirande (2014) [15] while conducting a study on the impact of salary on job satisfaction levels of employees found that it can only have a marginal impact on job satisfaction, but it does lead to employee retention. The implications are that financial rewards might be insufficient as the only way to improve job satisfaction of the workforce as organizations must identify other factors that would boost the commitment of employees.

Cuyper & De Witte (2006) [4] in their extensive study conducted on the employees of European employees investigated the impact of multiple variables on employee satisfaction. The researchers found that benefits play a leading role in employee satisfaction because it is the amount of rewards that workers expect from their jobs. The implications are that fair and equitable rewards can enhance the productivity and performance of the workforce because they remain motivated and satisfied with the organization.

Yousaf et al (2014) [17] in their study conducted to determine employee satisfaction related factors found that benefits alone do not play an important role in job satisfaction because the workers have intrinsic motivators that need to be met by the organization and management. The implications are that firms need to develop multifaceted strategies to meet employee satisfaction.



Gabriel et al (2014) [7] found that the work environment must be congenial and collaborative which encourages the employees to perform at peak levels. The work environment can be enhanced by focusing on employee empowerment and engagement. Furthermore, organizations need to have an environment that rewards risk taking behaviors and innovation (Gabriel et al, 2014) [7].

Elovainio et al (2015) [6] finds that the work environment must be responsive to the employees' psychological, physiological, and environmental needs to improve job satisfaction. The work environment must be oriented towards meeting these needs as it can lead to sound outcomes for the benefit of the workforce. The consequences are that the workforce will be able to develop a sense of autonomy and vision for the future. They will be enlightened that their personal growth is directly linked with that of the organization.

Daleure & Al Shareef (2015) [5] conducted research on Emirati workforce by finding that the work environment does have an impact on their satisfaction and performance. The implications are that firms in the Middle East are recognizing the value of the work environment in fostering positive attitudes and behaviors in employees by improving their job satisfaction. Further, they consider that meaningful work, clear performance expectations, feedback on performance, rewards, and standard operating procedures can assist employees in enhancing their performance. All of the above variables are related to work environment because it has mechanisms for growth and development of the workforce. It helps to reward the employees for their work activities.

Al-Ismail et al (2019) [1] finds that location of work and tour promotions are positively correlated with improvements in employee satisfaction because they are part of the strategy by management to retain and promote the talented employees. This is particularly important for female workers as the study was focused on female workers in Saudi Arabia. The implications are that the workforce must be given performance objectives and adequate rewards like tour promotions in order to meet their satisfaction levels.

#### IV. RESEARCH METHODOLOGY

The research is based on the descriptive research method. The respondents of the research are the employees of the telecommunication companies in Kingdom of Bahrain. Stratified sampling design is used to select the population that is employees of telecommunication companies in Kingdom of Bahrain. Stratification is the process of dividing members of the population into homogeneous subgroups before sampling. The sample of 84 employee respondents was selected for the study. The research instrument that was used in this study is a self-made

DOI: 10.35291/2454-9150.2019.0327

questionnaire; these questionnaires were distributed to eighty four (84) employees of telecommunication companies in the Kingdom of Bahrain. Face validity is the extent to which a test is subjectively viewed as covering the concept it purports to measure. It refers to the transparency or relevance of a test as it appears to test participants. Further, the validity has been taken from the experts in the field who have approved the validity as per the attached appendix. The mean scores that the research survey had were 4.53, 4.53, and 4.53 out of 5. The mean score is excellent which indicates that the survey was supported by the respective human resources managers were interviewed. The Skewness and Kurtosis were utilized to identify the status and level of the respondents, Single Liner Regression, Bi-serial Correlation, Cohen's Correlation, Holm Corrections, Multinomial Logistic Regression, Multi Co-Linearity, McFadden R-square to find the significant relationship among the employee job satisfaction. The research has used the T-test as it is a tool that measures the employee job satisfaction among the telecommunication companies in the Kingdom of Bahrain.

#### V. DATA ANALYSIS AND DISCUSSION

The data analysis represents demographic profile of the employee respondents.

Variable	n	%
Gender		
Gender Male	44	52.38
Female 3	39	46.43
Missing	1	1.19

Eng The most frequently observed category of gender was male (n = 44, 52%).

Variable	n	%
Age		
18-25	29	34.52
26-36	36	42.86
37-45	16	19.05
45-55	2	2.38
55 and above	1	1.19

The most frequently observed category of Age was 26-36 (n = 36, 43%).





Variable	n	%
Highest Education Degree		
College Certification	17	20.24
College Degree bachelors	53	63.10
Masters degree	8	9.52
Others	6	7.14

The most frequently observed category of Highest Education Degree was College Degree bachelors (n = 53, 63%).

Variable	n	%
Current Designation Level		
Non-officer	19	22.62
Staff	50	59.52
Officer	15	17.86

The most frequently observed category of Current Designation Level was Staff (n = 50, 60%).

# **Status of Employee Satisfaction**

#### Salary

The observations of not switching the company for the sake of salary had an average of 3.10 (SD = 1.49, SE<sub>M</sub> = 0.16, Min = 1.00, Max = 5.00, Skewness = -0.17, Kurtosis = -1.40). The observations for salary keeps motivated to continue work had an average of 3.10 (SD = 1.15, SE<sub>M</sub> = 0.13, Min = 1.00, Max = 5.00, Skewness = -0.14, Kurtosis = -0.79). The observations of current salary is as per standards of the country had an average of 3.43 (SD = 1.08, SE<sub>M</sub> = 0.12, Min = 1.00, Max = 5.00, Skewness = -0.28, Kurtosis = -0.48). "When the Skewness is greater than 2 in absolute value, the variable is considered to be asymmetrical about its mean. When the Kurtosis is greater than or equal to 3, then the variable's distribution is markedly different than a normal distribution in its tendency to produce outliers (Westfall & Henning, 2013)" [16].

# **Benefits and Allowances**

The observations of benefits provided at the workplace is as per the standard of the country had an average of 3.36 (SD = 1.23, SE<sub>M</sub> = 0.13, Min = 1.00, Max = 5.00, Skewness = -0.24, Kurtosis = -0.85). The observations of not switching the company for the sake of salary 2 had an average of 3.13 (SD = 1.35, SE<sub>M</sub> = 0.15, Min = 1.00, Max = 5.00, Skewness = -0.12, Kurtosis = -1.13). The observations of job provides the benefits other than salary which helps to fulfill the wants had an average of 3.33 (SD = 1.40, SE<sub>M</sub> = 0.15, Min = 1.00, Max = 5.00, Skewness = -0.29, Kurtosis = -1.15). "When

DOI: 10.35291/2454-9150.2019.0327

the Skewness is greater than 2 in absolute value, the variable is considered to be asymmetrical about its mean. When the Kurtosis is greater than or equal to 3, then the variable's distribution is markedly different than a normal distribution in its tendency to produce outliers" (Westfall & Henning, 2013)" [16].

#### **Leaves and Vacations**

The observations for annual leaves at work are enough to provide me a good chance to spend time with family had an average of 3.50 (SD = 1.28,  $SE_{M} = 0.14$ , Min = 1.00, Max = 5.00, Skewness = -0.33, Kurtosis = -1.00). The observations for satisfied with the leaves and vacations getting every year at the workplace had an average of 3.24 (SD = 1.21,  $SE_{M}$  = 0.13, Min = 1.00, Max = 5.00, Skewness = -0.18, Kurtosis = -0.80). The observations for the work provides a wellbalanced work life balance had an average of 3.06 (SD = 1.10,  $SE_{M} = 0.12$ , Min = 1.00, Max = 5.00, Skewness =0.05, Kurtosis = -0.50). "When the Skewness is greater than 2 in absolute value, the variable is considered to be asymmetrical about its mean. When the Kurtosis is greater than or equal to 3, then the variable's distribution is markedly different than a normal distribution in its tendency to produce outliers (Westfall & Henning, 2013)" [16].

#### **Work Environment**

The observations for work environment of satisfied with working in this organization as it giving the chance to do things for others had an average of 3.38 (SD = 1.27, SE<sub>M</sub> = 0.14, Min = 1.00, Max = 5.00, Skewness = -0.35, Kurtosis = -0.81). The observations for satisfied with working in the organization as it provides a steady job had an average of 3.35 (SD = 1.14, SE<sub>M</sub> = 0.12, Min = 1.00, Max = 5.00, Skewness = -0.21, Kurtosis = -0.87). The observations for not feeling pressure while working in the company had an average of 2.90 (SD = 1.19,  $SE_{M} = 0.13$ , Min = 1.00, Max = 0.135.00, Skewness = -0.08, Kurtosis = -0.88). The observations for not leaving the organization right now because having a sense of obligation to the people in it had an average of 3.42  $(SD = 1.27, SE_{M} = 0.14, Min = 1.00, Max = 5.00, Skewness$ = -0.50, Kurtosis = -0.69). "When the Skewness is greater than 2 in absolute value, the variable is considered to be asymmetrical about its mean. When the Kurtosis is greater than or equal to 3, then the variable's distribution is markedly different than a normal distribution in its tendency to produce outliers (Westfall & Henning, 2013)" [16].

# Relationship between Status and Level of Employee Satisfaction Based on Demographics

The results of the single linear regression model were significant, F(4,78) = 40.38, p < .001,  $R^2 = 0.67$ , indicating that approximately 67% of the variance in working environment is explainable by variables. Salary satisfaction did not significantly predict working environment, B = 0.01, t(78) = 0.05, p = .962. Based on this sample, a one-unit increase in salary satisfaction does not have a significant



effect on working environment. Benefits and allowances satisfaction significantly predicted working environment, B = 0.16, t(78) = 2.43, p = .017. This indicates that on average, a one-unit increase of benefits and allowances satisfaction will increase the value of working environment by 0.16 units. Leave and vacation satisfaction significantly predicted working environment, B = 0.67, t(78) = 9.93, p < .001. This indicates that on average, a one-unit increase of leave and vacation satisfaction will increase the value of working environment by 0.67 units.

A point bi-serial correlation analysis was conducted for gender and salary satisfaction, benefits and allowances satisfaction, salary satisfaction, working environment, and leave vacation satisfaction A point bi-serial correlation is a special case of the pearson correlation. Cohen's standard was used to evaluate the strength of the relationships, where coefficients between .10 and .29 represent a small effect size, coefficients between .30 and .49 represent a moderate effect size, and coefficients above .50 indicate a large effect size (Cohen, 1988) [3].

The correlations were examined using Holm corrections to adjust for multiple comparisons based on an alpha value of 0.05. There were no significant correlations between any pairs of variables. This is due to the reason that none of the variable has shown the p level lesser than 0.05. A multinomial logistic regression analysis was conducted to assess whether salary satisfaction, benefits and allowances satisfaction, pay satisfaction, working environment, and leave vacation satisfaction had a significant effect on the odds of observing each response category of age relative to 18-25.

The assumption of absence of multi co-linearity was examined using variance inflation factors. The model was evaluated based on an alpha of 0.05. The results of the multinomial logistic regression model were significant,  $\chi^2$  (15) = 29.09, p = .016, suggesting that salary satisfaction, benefits and allowances satisfaction, pay satisfaction, working environment, and leave vacation satisfaction had a significant effect on the odds of observing at least one response category of age relative to 18-25. R-squared was calculated to examine the model fit, where values greater than .2 are indicative of models with excellent fit the McFadden R-squared value calculated for this model was 0.15.

A multinomial logistic regression analysis was conducted to assess whether salary satisfaction, benefits and allowances satisfaction, pay satisfaction, working environment, and leave vacation satisfaction had a significant effect on the odds of observing each response category of highest education degree relative to college certification. The assumption of absence of multi-co linearity was examined using variance inflation factors. The results of the multinomial logistic regression model were not significant

DOI: 10.35291/2454-9150.2019.0327

based on an alpha of 0.05,  $\chi^2$  (15) = 11.13, p = .743, suggesting that salary satisfaction, benefits and allowances satisfaction, pay satisfaction, working environment, and leave vacation satisfaction did not have a significant effect on the odds of observing any response category of highest education degree relative to college certification. Since the model was not significant, coefficient interpretations were not included.

A multinomial logistic regression analysis was conducted to assess whether salary satisfaction, benefits and allowances satisfaction, pay satisfaction, working environment, and leave vacation satisfaction had a significant effect on the odds of observing each response category of current designation level relative to non-officer. The results of the multinomial logistic regression model were not significant based on an alpha of 0.05,  $\chi^2$  (10) = 10.66, p = .385, suggesting that salary satisfaction, benefits and allowances satisfaction, pay satisfaction, working environment, and leave vacation satisfaction did not have a significant effect on the odds of observing any response category of current designation level relative to non-officer.

#### **Problems Faced by the Respondents**

The problems are listed to management of the companies which are linked to favoritism, pressure, unfair hiring and outsourcing employees to third party employers. Further, it was found that another problem related to the issue were the valuation of employees which was very minimal in the company. Employees are easily replaceable as no skilled work is needed and thus they are always scared of losing their jobs. Also, staff complained about the work-life balance problems. One of the staff clearly mentioned that 6 days a week and one holiday is not suitable. Other said Ramadan timing is very bad and creating difficulties in fulfilling their work.

#### **Recommendations by the Respondents**

The recommendation by the respondents was more training should be given to employees to enhance their career. More games, activities must be in place to encourage communication between staff and enhance work life balance. Pay revision should be in place every year in accordance to the inflation and not on the basis of standard. More benefit should be provided in terms of gym memberships, school fees and insurance. Leave period should be increased must comply the law of Kingdom of Bahrain. Increase the increment every year in accordance with the achievement of the company. Managers should receive proper training and there should be no favoritism. Managers should lead the team from front and should not push employees for unneeded pressure.

# VII. CONCLUSION

The telecommunication companies in Kingdom of Bahrain are highly focused in providing quality service to their employees who are the core of developing and improving



telecommunication services. They assess that employees are satisfied and thus tries to offer attractive benefits and allowances in terms of basic salary, housing, education support, career enhancement opportunities, safety and working conditions. However, this needs to be better understood from employees perspective through research so efficient strategies and further improvements can be suggested. It is important for telecommunication companies in Kingdom of Bahrain as they believe that a satisfied employee can offer his/her duties in a better manner. Further, satisfaction of employees is important as individuals needs and wants are different. Some may consider pay as a satisfactory factor while for other career growth is more important.

Thus, the purpose of the current study was achieved where the satisfaction of employees in telecommunication in the Kingdom was studied on the basis of salary, benefits and allowances, leave and vacations, leave and vacations and work environment. Also the study demonstrated these factors in terms of descriptive characteristics which are age, gender, education and designation. The problems encountered and recommendations suggested by the employees in Telecommunication companies in the Kingdom of Bahrain.

#### VIII. RECOMMENDATIONS

The overall recommendation by the researcher were old employees should be prioritized for promotions than the newer one. Increase allowances of higher aged and marital status. Managers should lead the team from front and should not push employees for unneeded pressure. Increase the increment every year in accordance with the achievement of the company. Managers should receive proper training and there should be no favoritism. More games, activities must be in place to encourage communication between staff and enhance work life balance. Pay revision should be in place every year in accordance to the inflation and not on the basis of standard. More benefit should be provided in terms of gym memberships, school fees and insurance.

#### **REFERENCES**

- [1] Al-Ismail, S., Carmichael, F., & Duberley, J. (2019). Female employment in hotels in Saudi Arabia and UAE. *Gender in Management: An International Journal*, *ahead-of-print* (ahead-of-print).
- [2] Al-Shammari, M., & Z.Al-Am. (2018). Organizational culture and job satisfaction in a telecommunications company in the Kingdom of Bahrain. *Polish Journal of Management Studies*, 18 (1), 33-43.
- [3] Cohen, J. (1988). Statistical Power Analysis for the Behavioral Sciences. Hillsdale, NJ: Lawrence Erlbaum Associates.
- [4] Cuyper, D. N., & De Witte, H. (2006). The impact of job insecurity and contract type on attitudes, well-being and

DOI: 10.35291/2454-9150.2019.0327

- behavioural reports: a psychological contract perspective. Journal of Occupational and Organizational Psychology , 79 (3), 395-409.
- [5] Daleure, G. a. (2015). Exploring under-representation of young Emirati adults in the UAE private sector by examining Emirati job Satisfaction. UAE: Sheikh Saud bin Saqr Al Qasimi.
- [6] Elovainio, M., Heponiemi, T., Jokela, M., Hakulinen, C., Presseau, J., Aalto, A., et al. (2015). Stressful work environment and wellbeing: What comes first? *Journal of occupational health psychology*, 20 (3), 289-295.
- [7] Gabriel, A., Diefendorff, J., Chandler, M., Moran, C., & Greguras, G. (2014). The dynamic relationships of work affect and job satisfaction with perceptions of fit. *Personnel Psychology*, 67 (2), 389-420.
- [8] George, E. (2015). Job related stress and job satisfaction: a comparative study among bank employees. *Journal of Management Development*, 34 (3), 316-329.
- [9] Kauppila, O. (2018). How does it feel and how does it look? The role of employee motivation in organizational learning type. *Journal of Organizational Behavior*, 39 (1), 941-955.
- [10] Kullab, Y., & Yan, C. (2018). The Impact of Institutional Ownership on Income Accounting Strategy: Evidence from Bahrain. *Academy of Accounting and Financial Studies Journal*, 22 (1), 1-17.
- [11] Lazaroiu, G. (2015). Employee motivation and job performance. *Linguistic and Philosophical Investigations*, 14 (1), 97-102.
- [12] Lee, Jin-Soo, Back, K.-J., & Chan, E. S. (2015). Quality of work life and job satisfaction among frontline hotel employees: a self-determination and need satisfaction theory approach. *International Journal of Contemporary Hospitality Management*, 31 (4), 1101-1112.
- [13] Ramdani, B., Mellahi, K., Guermat, C., & Kechad, R. (2014). The efficacy of high performance work practices in the Middle East: Evidence from Algerian firms. International Journal of Human Resource Management sector. Engineering, Construction and Architectural Management, 25 (2), 252-275.
- [14] Raziq, A., & Maulabakhsh, R. (2015). Impact of working environment on job satisfaction. *Procedia Economics and Finance*, 23 (1), 717-725.
- [15] Terera, S., & Ngirande, H. (2014). The impact of rewards on job satisfaction and employee retention. *Mediterranean Journal of Social Sciences*, 5 (1), 481-490.
- [16] Westfall, P., & Henning, K. S. (2013). *Understanding Advanced Statistical Methods*. CRC Press.
- [17] Yousaf, S., Latif, M., Aslam, S., & Saddiqui, A. (2014). Impact of financial and non-financial rewards on employee motivation. *Middle-East journal of scientific research*, 21 (10), 1776-1786.