The Effect of Transformational Leadership on Affective Commitments with Job Satisfaction and Organizational Culture as An Intervening Variable

Nurhayati Achmad Ratina[1, *], Ratna Indrawati Lestariani[1], Rhian Indradewa[1], Tantri Yanuar R Syah[1]
[1]*Faculty of Economic and Business, Esa Unggul University, Bekasi, Indonesia*

This study aims to examine the effect of Transformational Leadership on Job Satisfaction, Organizational Culture, and Affective Commitment. This study will raise the relationship between job satisfaction and affective commitment as a literature gap. The population used in this study over Harapan Mulia Hospital employees around 200 employees. Here, we use 34 question items with a minimum of 34 x 5 or 170 samples. The research design in this study is explanatory research that will prove the causal relationship between the independent variables and the dependent variable. Significant levels and interrelationships between variables were analysed using the structural equation model (SEM) method Testing with structural analysis Lisrel 8.80 and for descriptive analysis using Statistical Package for Social Science (SPSS) version 20.00. The results shows that the application of Transformational Leadership had a positive and significant effect on job satisfaction (T-Statistics = 6,16). These results are in line with several previous studies that explain the impact of transformational leadership on job satisfaction. Furthermore, that there is a positive and significant influence between Transformational Leadership on Organizational Culture (T-Statistics = 5,23), there is a positive and significant effect on Transformational Leadership on Affective Commitment (T-Statistics = 2,98), there is a significant influence between employee satisfaction on affective commitment (T-Statistics = 2,39), there is a significant relationship between organizational culture and affective commitment (T-Statistics = 2,68). This means that the higher application of a company's organizational culture will encourage employees to have a better affective commitment.

Keywords: Transformational Leadership, Job Satisfaction, Organizational Culture, Affective Commitment.

1. INTRODUCTION

Organizational commitment is becoming important to guarantee the survival and development of an organization. Organizational commitment is needed to show the ownership and responsibility of employees at the company. This encourages a person to achieve success from the goals of the organization and will be able to make a situation that causes an employee to be more impartial to the organization and loyal to his membership in the company [1]. Organizational commitment to employees is characterized by strong belief in and acceptance of organizational goals and values, a willingness to put forth sufficient effort on behalf of the organization, and a strong desire to maintain membership in the organization so that the company is always looking for workers who are highly committed to achieving their goals [2]. One of the important -

Email Address: nurhayati.achmad2906@gmail.com

organizational commitments in the effort to achieve its goal to remain competitive competitively of organizational affective commitment [3]. Affective commitment is an emotional attachment of employees to the company caused by self-identification and employee confidence in the company's goals as indicated by hard work that is reflected through involvement and feelings of pleasure and enjoy its role in the organization [4]. Affective commitment is also called attitudinal commitment (commitment as attitude), which is a condition when individuals consider the extent to which their values and goals are in accordance with the values and objectives of the organization. Individuals with this type of commitment will identify themselves with the values and goals of the organization and want to maintain their membership [5]. Basically, employee affective commitment can be influenced by various factors, one of which is the leadership style, especially transformational

leadership. Transformational leadership has been proven from several empirical studies to have a positive impact on organizational commitment. Transformational leadership has been thought to have a strong influence on employee attitudes and behavior. Private companies are very able to apply transformational leadership styles because an empirical study conducted on companies and top-level managers on the Role of Transformational Leadership in Human Resource Effectiveness has shown success [6]. Leaders of this type are considered admirable, visionary, pay attention to their subordinates, and encourage these subordinates to achieve extraordinary goals [7]. In addition to transformational leadership, job satisfaction is also positioned as the most important antecedent of affective commitment. Several studies have been conducted which show that job satisfaction can positively influence employee affective commitment. Employees will have a strong affective commitment to the organization if they feel that the organization cares about them. This concern is reflected through the amount of salary, security, autonomy, and career advancement [8]. However, in another study, the opposite results were found that there was no direct relationship and significant influence between job satisfaction and affective commitment [9]. Thus, this finding is a rebuttal of the results of previous studies which makes the gap of literature in this study. Based on the correlation matrix analysis, all dimensions of job satisfaction clearly do not have a significant relationship with organizational commitment, especially affective commitment. Employees who emotionally tend to stay in the company or organization because of the needs, not from the job satisfaction they feel. This condition occurs in employees who are approaching retirement age [10].

Another factor that can affect organizational commitment is organizational culture [11]. Some studies have agreed that organizational culture plays a significant positive role in determining employee affective commitment [12]. In the end, this study aims to find out how the influence formed from the relationship of transformational leadership on affective commitment with job satisfaction and organizational culture as an intervening variable.

2. METHODOLOGY

A. *The Effect of Transformational Leadership on Job Satisfaction*

Job satisfaction is one of the most observed attitudes in the field of organizational behavior. Job satisfaction is one of the psychological aspects that reflects a person's feelings towards his work, so the higher he loves his job, the higher his job satisfaction [13]. Job satisfaction is a reasonable attitude of an individual towards work. Individuals with higher job satisfaction show positive attitudes towards work, while individuals with lower job satisfaction express negative feelings at work [14]. Job satisfaction is a multidimensional construction that reflects workers' attitudes in relation to many aspects of

work, including rewards (salary and benefits), growth opportunities (development programs, promotion opportunities), work relationships (supervisors and colleagues), physical working conditions (safety and comfort at work), and the nature of the work itself [15].

Transformational leadership is able to inspire their followers by engaging in effective communication that encourages trust, commitment, and results in greater job satisfaction [16, 17]. Based on these results, many researchers have dedicated themselves to empirically testing the relationship between transformational leadership and job satisfaction the results of the study agree that there is a strong relationship between transformational leadership and job satisfaction [18, 19, 20]. Through a transformational leadership style, superiors or managers can lead to job satisfaction of personnel. Personnel feel comfortable and satisfied through this leadership method because it stimulates them by embracing a perspective that nurtures personnel or staff, provides a vision, promotes self-confidence, helps create innovation, individualized consideration and expands interactions which ultimately develops a level of job satisfaction [21].

B. *The Effect of Transformational Leadership on Organizational Culture*

The role of leadership in creating culture is almost an undeniable reality in organizational theory. Transformational leaders have a high role in creating organizational culture. [22] also suggested that organizational culture is the controller and direction in shaping the attitudes and behavior of members in an organization. Individuals or groups of individuals will not be separated from the culture of the organization and in general members of the organization will be influenced by the diversity of available resources. Transformational leaders are people who can create organizational culture, help employees to be involved in culture and make it theirs and try to make organizational culture stable in organizations with good communication skills and leadership abilities [23]. Transformational leadership is characterized by the ability to bring change to both followers and organizations. Transformational leaders have the ability to lead changes in the organization's vision, strategy, and culture and promote innovation in products and technology [24]. In-depth research on an organization increasingly emphasizes the role of transformational leaders in organizational culture. This study also provides evidence that these concepts have a significant constructive effect on achieving a work climate that has a positive effect on improving employee performance and a supportive relationship between the two [23]. Several previous studies have proven that there is a positive and significant relationship between transformational leadership and organizational culture. Increased transformational leadership in organizations will lead to an improvement in the organization's culture [25].

C. The Effect of Job Satisfaction on Affective Commitments

In an organization, job satisfaction and affective commitment interact with one another. Job satisfaction is a positive affective state of employees that results from pleasant work experience. Job satisfaction reflects a person's feelings towards his work, so the higher he loves his job, the higher his job satisfaction [13]. When they take a positive attitude towards the organization, they will identify with the organization and effectively commit to it. In turn, affective commitment refers to the feelings that employees have about the entire organization resulting from identification with the goals and values of the organization and positive attitudes and behavioral tendencies that result, which are relatively stable [26]. Based on some previous research results show that job satisfaction has a significant positive relationship with affective commitment [27]. Other research results also support the hypothesis prediction and there is a significant relationship between job satisfaction and affective commitment. This shows that when employees get good job satisfaction, their perception of the company increases and this also increases their affective commitment [28].

D. The Effect of Organizational Culture on Affective Commitments

Organizational culture has a role as a tool to determine how much commitment arises in employees of the organization or company. Commitment is seen as an attitude that reflects feelings such as attachment, identification or loyalty to the subject of commitment [29]. The results of the study mention that organizational culture has a significant positive relationship on affective commitment. Another study found that there was a positive and significant influence between organizational culture on affective commitment and able to encourage increased employee commitment. Thus, organizational culture has a strategic role in determining employee affective commitment. Affective commitment is the most important dimension of employee commitment in an organization. This can be calculated to increase employee affective commitment. In addition, organizational cultural values are also influenced by external demands and changes in community needs experienced by its members [30].

E. The Effect of Transformational Leadership on Affective Commitments

Transformational leaders have a great ability to influence organizational commitment by promoting values associated with achieving goals, by emphasizing the relationship between employee efforts and achieving goals and by creating a greater level of personal commitment on the part of followers and leaders and company performance. Many researchers have studied the relationship between leadership style and organizational commitment and have found that leadership style has a

significant influence on the level of employee commitment [21, 31]. The transformational leadership has a positive relationship with employee commitment [31]. Here, the transformational leadership style has an effective influence on employees' affective commitment [32]. Leaders must adopt transformational leadership styles to increase the level of affective commitment in employees and provide practical implications for research related to exploring employee commitment with regard to leadership in a broader context. Based on this understanding, the hypothesis can be assessed as follows:

H₁: *Transformational Leadership has a significant positive effect on Job Satisfaction.*

H₂: *Transformational Leadership has a significant positive effect on Organizational Culture.*

H₃: *Job Satisfaction has a significant positive effect on Affective Commitment.*

H₄: *Organizational Culture has a significant positive effect on Affective Commitment.*

H₅: *Transformational Leadership has a significant positive effect on Affective Commitment.*

Thus, Figure 1 shows the conceptual framework model in this study to analyze effect of transformational leadership on organizational culture (see Figure 1).
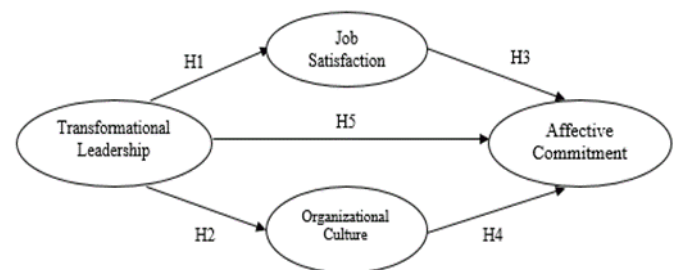

Figure 1. Conceptual Framework Model

3. RESULT AND DISCUSION

The design of this research is explanatory research that will prove the causal relationship between the independent variables, namely Transformational Leadership; intervening variable, namely Job Satisfaction and Organizational Culture; and the dependent variable, namely Affective Commitment. Significant levels and interrelationships between variables were analyzed using the structural equation model (SEM) method. By using this method, it can be seen the influence and relationship between exogenous variables and endogenous variables related to the problem under study. Testing in this study was carried out with the help of software used for structural analysis is Lisrel 8.80 and for descriptive analysis using Statistical Package for Social Science

449

(SPSS) ver 20.00. The population used is Harapan Mulia Hospital employees, amounting to 200 employees while the number of samples used in this study is adjusted to the analytical method used, namely the Structural Equation Model (SEM). In the SEM method, the number of samples needed is at least 5 times the number of question item numbers. Before starting the overall data collection, a pre-test for questionnaires with a total of 30 respondents was conducted. The pre-test was tested using SPSS to do the initial stages of validity and reliability if there are indicators that appear invalid and unreliable, they are removed from this study. The number of questions in this study was 34 question items, so a minimum of 34 x 5 or 170 samples was needed. The measurement of these variables was adapted from the research instrument used using five Likert scales, where 1 shows Strongly Disagree and 5 shows Strongly Agree. After processing the data on all questionnaires collected, the test results can be presented in the research model.

A. Validity and Reliability test
This research through a pretest stage in two ways, namely the validity test and reliability test. Validity test uses product-moment correlation analysis with the help of the SPSS program with a significance level of 5%. The significance test is done by comparing the value of r arithmetic with r table for the degree of freedom (df = n-2) and the significance level of Alpha (α) 5%, or r arithmetic> r table. Guided by the total sample of 170 respondents can be seen as the value of r table of 0.3494. Based on the calculation of the correlation coefficient (rxy), there are six invalid indicators seen from r count <r table (0.3494). the six indicators will be explained further in the discussion. Thus, around 28 item indicators are declared valid. As for the reliability test using Cronbach's Alpha. Cronbach's Alpha value > 0.6, then the instrument can be declared reliable (see Table I).

Table I. Reliability Test

Category	Composite Reliability
Transformational Leadership	0.925
Job Satisfaction	0.926
Organizational Culture	0.924
Affective Commitment	0.924

B. Good of Fit Model
The results of this study use instruments that have been tested in validity and reliability so that the results of the good of a fit, where Chi-Square / Degree of Freedom = 262.58 / 105 = 2.5 <3 (good fit), RMSEA = 0.047 <0.05 (close fit.). ECVI = 0.89; 1.17 is around the EVCI Model = 1.23 (close fit). AIC Model (252.58) compared with AIC saturated (306.00) and AIC independence (2850.80). The AIC model is smaller than the AIC saturated and the difference is much greater than the AIC independence, so the smaller value indicates a good fit. CAIC model (456.05) is far from saturated CAIC (997.76) and also

further from CAIC independence (2927.66), so the smaller value indicates a good fit. Normed fit index (NFI) = 0.94 (> 0.90) indicates good fit. Critical N (CN) = 215.23 (> 200) then the model represents the sample size of the data showing a good fit. Goodness of Fit Index (GFI) = 0.93, ideal value> 0.90, it indicates good fit. Furthermore, this research produces a T-value diagram as shown in Figure 2.
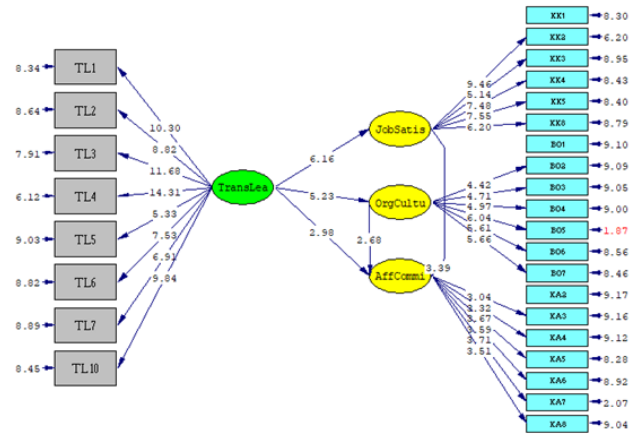

Figure 2. Path Diagram T- Value

C. Structural Test or Hypothesis Test
Hypothesis testing is done by Path Analysis. From the path analysis test we get the relationship between constructs variable (see Table II).

Table II. Hypothesis Test Results

Test Model	T Statistics	P-Values	Remark
Transformational Leadership → Job Satisfaction	6,16	0,000	Supported
Transformational Leadership → Organizational Culture	5,23	0,000	Supported
Transformational Leadership → Affective Commitment	2,98	0,000	Supported
Job Satisfaction → Affective Commitment	2,39	0,000	Supported
Organizational Culture → Affective Commitment	2,68	0,000	Supported

In this study, there are five hypotheses tested and based on the results of the test, the five hypotheses are supported by data.

D. Discussion of Research Findings
The purpose of this study is to complement the previous literature by examining the influence of Transformational Leadership variables on Job Satisfaction, Organizational Culture, and Affective Commitment. Research questions were tested using a questionnaire against 170 employees from Harapan Mulia Hospital. The first test is carried out on the relationship between Transformational Leadership

and Job Satisfaction. From the test of the research model, the results show that there is a positive and significant influence of Transformational Leadership on Job Satisfaction. There are two main factors that can strengthen the impact of Transformational Leadership on Job Satisfaction, which are relationships between colleagues and relations between employees and company management. in this case the company succeeded in creating employee job satisfaction by creating a good work atmosphere so as to cause employee satisfaction from the context of interaction between fellow employees and with the company. In addition, there are two weak indicators in the research model used in organizational culture, which are how management manages the company and gives praise for the work. These results are in line with several previous studies that explain the impact of transformational leadership on job satisfaction. In addition, transformational leaders are also able to create an optimal work atmosphere among fellow employees, so that it will encourage the achievement of work targets.

From the test of the research model the results show that there is a positive and significant influence between Transformational Leadership on Organizational Culture. This means that the higher the Transformational Leadership that is implemented, the Organizational Culture will increase. Increased transformational leadership in organizations will lead to an improvement in the organization's culture. Transformational leadership can influence the perception of employee organizational culture. indicators that are greatly affected by the application of leadership are leaders able to direct employees to provide good final work and is very important for the company. Here, the results of subsequent studies prove that there is a positive and significant effect on Transformational Leadership on Affective Commitment. The results of this study support other research which states that transformational leadership styles have a significant impact on employee affective commitment. This study found that transformational leaders succeeded in making employees have affective commitments so that employees feel the place of work now has an important meaning that makes me have a sense of belonging. this is in accordance with the basic concept of affective commitment itself.

The research result states that there is a significant influence between employee satisfaction on affective commitment. In this study, it was seen that job satisfaction and affective commitment interact with each other. When they take a positive attitude towards the organization, they will identify with the organization and effectively commit to it. The higher the job satisfaction of employees, the higher their affective commitment. This shows that when employees get good job satisfaction, their perception of the company increases and this also increases their affective commitment. The latest research results state that there is a significant relationship between organizational culture and affective commitment. Organizational culture

has a role as a tool to determine how much commitment appears to employees of an organization or company. Organizational culture has a strategic role in determining employee affective commitment. this result is supported by previous research which states that affective commitment is the most important dimension of employee commitment in an organization. This result also supports previous research that there is a positive and significant influence between organizational culture on affective commitment and is able to encourage increased employee commitment. The results of this study state that organizational culture is able to increase employees' affective commitment which includes a sense of caring for company issues and feeling emotionally attached.

4. CONCLUSIONS

Based on the analysis and discussion, the following conclusions can be drawn. First, there is a positive and significant influence on the Transformational Leadership variable on job satisfaction. This means that the better the application of transformational leadership, the job satisfaction of employees will increase. Second, there is a positive and significant influence on the Transformational Leadership variable on organizational culture. This means that the better the application of transformational leadership, the organizational culture in the company will be stronger and improved. Third, there is a positive and significant influence on the Transformational Leadership variable on affective commitment. This means that the better the application of transformational leadership, the affective commitment of employees will also increase. Fourth, there is a positive and significant influence of job satisfaction variables on affective commitment. This means that the higher job satisfaction felt by employees will also increase the affective commitment of the employees themselves. Fifth, there is a positive and significant influence of organizational culture variables on affective commitment. This means that the higher application of a company's organizational culture will encourage employees to have a better affective commitment.

Research implications that can be delivered by companies include is the leaders in the company must maintain attitudes and performance because employees consider them to be a source of inspiration in the work. Transformational leaders must raise awareness of employees through an emotional approach to better know what they want and also have to praise whatever the results of their work. Praise is a simple thing that leaders must do because it can have positive consequences for employees. The company also must be committed to maintaining the good relations that have existed so far between employees and management. The thing that needs to be considered for the company is the need to improve the job guarantee system for employees. In that way, employees feel better attention and are motivated to continue to produce the best work.

References

[1]. Robbins, Stephen P. **(1998)**. Organization Behavior, Concepts, Controvercies, Application, seventh edition, Englewood Cliffs.Mowday

[2]. Mowday, Richard T. et. al. **(1982)**. Employee – Organizational Linkages: The Psychology Of Commitment Absentism And Turnover. Academic Press Inc., New York.

[3]. Chordiya, R., Sabharwal, M., & Goodman, D. **(2017)**. Affective Organizational Commitment and Job Satisfaction: a Cross-National Comparative Study. Public Administration, 95(1), 178–195.

[4]. Meyer, J. P., & Allen, N. J. **(1984)**. Testing the "side-bet theory" of organizational commitment: Some methodological considerations. *Journal of Applied Psychology*, 69(3), 372–378. ht

[5]. Schultz, P. W. **(2002)**. Environmental Attitudes and Behaviors Across Cultures. Online Readings in Psychology and Culture, 8(1).

[6] Gunawan, Indradewa, R. and Syah, T .Y. R., Fajarwati, D. **(2020)**. "Transformational Leadership Role in Human Resource Effectiveness." 04(06).

[7] Riaz, T., Akram, M. U., & Ijaz, H. **(2011)**. Impact Of Transformational Leadership Style On Affective Employees' Commitment: An Empirical Study Of Banking Sector In Islamabad (Pakistan). *The Journal of Commerce*, 3(1), 43.

[8] Mehmood, N., Ahmad, U. N. B. U., Irum, S., & Ashfaq, M. **(2016)**. Job satisfaction, affective commitment, and turnover intentions among front desk staff: Evidence from Pakistan. International Review of Management and Marketing, 6(4), 305–309.

[9] Nath Gangai, K., & Agrawal, R. **(2015)**. Job satisfaction and organizational commitment: Is it important for employee performance. *International Journal of Management and Business Research*, 5(4), 269–278.

[10] Luchak Andrew, A. and Gellatly Ian, R. **(2007)**. A Comparison of Linear and Nonlinear Relations Between Organizational Commitment and Work Outcomes. 92(3) 786-793. DOI: 10.1037/0021-9010.92.3.786.

[11] Sabri, P. S. U., Ilyas, M., & Amjad, Z. **(2013)**. The impact of organizational culture on commitment of Teachers in Private Sector of Higher Education. *Pakistan Journal of Social and Clinical Psychology*, 11(2), 69–76.

[12] Azizollah, A., Abolghasem, F., & Mohammad Amin, D. **(2015)**. The Relationship Between Organizational Culture and Organizational Commitment in Zahedan University of Medical Sciences. *Global Journal of Health Science*, 8(7), 195–202.

[13] Bakotić, D. **(2016)**. Relationship between job satisfaction and organisational performance. Economic Research-Ekonomska Istraživanja. 29(1), 118-130. *https://doi.org/10.1080/1331677X.2016.1163946*.

[14] Robbins, S., Judge, T. and Campbell, T. **(2017)**. Organizational Behaviour. 2nd ed. Boston: Pearson.

[15] Spector, P. E. **(1986)**. Perceived Control by Employees: A Meta-Analysis of Studies Concerning Autonomy and Participation at Work. Human Relations, 39(11), 1005–1016.

[16] Ghanbari, S., & Eskandari, A. **(2014)**. Transformational leadership , job satisfaction , and organizational ınnovation. *International Journal of Management Perspective*, 1(4), 81–94.

[17] Kouni, Z., Koutsoukos, M., & Panta, D. **(2018)**. Transformational Leadership and Job Satisfaction: The Case of Secondary Education Teachers in Greece. *Journal of Education and Training Studies*, 6(10), 158.

[18] Abelha, D. M., Carneiro, P. C. da C., & Cavazotte, F. de S. C. N. **(2018)**. Transformational leadership and job satisfaction: Assessing the influence of organizational contextual factors and individual characteristics. Revista Brasileira de Gestao de Negocios, 20(4), 516–532.

[19] Muslichah, M., & Asrori, S. **(2018)**. The Effect of Transformational Leadership Style on Job Satisfaction with Trust-In-Leader as Intervening Variable. *Journal of Innovation in Business and Economics*, 2(02), 61.

[20] Setiadi, Y., Indradewa, R. and Syah, T .Y. R. **(2020)**. "Transformational Leadership, Organizational Climate, Job Satisfaction on Team Performance over Retail Store." 04(06).

[21] Abouraia, M. K., & Othman, S. M. **(2017)**. Transformational Leadership, Job Satisfaction, Organizational Commitment, and Turnover Intentions: The Direct Effects among Bank Representatives. *American Journal of Industrial and Business Management*, 07(04), 404–423.

[22] Robbins SP, dan Judge. **(2008)**. Perilaku Organisasi Buku 2, Jakarta : Salemba Empat Hal 256.

[23] Aydogdu, S., & Asikgil, B. **(2011)**. International Review of Management and Marketing The Effect of Transformational Leadership Behavior on Organizational Culture : An Application in Pharmaceutical Industry. International Review of Management and Marketing, 1(4), 65–73.

[24] Daft, R. L. **(2015)**. Organization theory and design. Cengage learning.

[25] Muawanah, A., Luddin, M. R., & Purwana, D. **(2019)**. The Effect of Transformational Leadership and Organizational Commitment to Organizational Citizenship Behavior (Ocb) in Building Construction Companies. 2019(1), 653–663.

[26] Xuechu, X. **(2016)**. The Influence of Job Satisfaction and Affective Commitment on Turnover Intention among Senior Professionals in Public Hospitals : An Empirical Study in Guangdong Province , China Xu Xuehu. (March), 1–139.

[27] Chang, Y., Leach, N., & Anderman, E. M. **(2015)**. The role of perceived autonomy support in principals' affective organizational commitment and job satisfaction. Social Psychology of Education, 18(2), 315–336.

[28] Mohamed, S. A., & Ali, M. **(2016)**. The importance of Supervisor Support for Employees' Affective Commitment: An analysis of Job Satisfaction. *International Journal of Scientific and Research Publications*, 6(2), 435–2250. Retrieved from www.ijsrp.org

[29] Morrow, P. **(1993)** The Theory and Measurement of Work Commitment. JAI Press, Greenwich.

[30] Stutts, N. **(2015)**. Understanding the Impact of Leadership and Organizational Culture on Nonprofit Employees ' Commitment and Turnover Intention A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Virginia Commonwealt.

[31] Njoroge, D. **(2015)**. Transformational leadership style and organizational commitment: the moderating effect of employee partcipation david njoroge. The Strategic Journal of Business & Change Management, 2(6), 94–107.

[32] Jia, A., Lim, P., Teck, J., Loo, K., & Lee, P. H. **(2017)**. the Impact of Leadership on Turnover Intention: the Mediating Role of Organizational Commitment and Job Satisfaction. *Journal of Applied Structural Equation Modeling*, 1(1), 27–41.

[33] Amin, W., Akram, U., Shahzad, F., & Amir, M. **(2018)**. Impact of Transformation Leadership on Affective Employee ' s Commitment. European Online Journal of Natural and Social Sciences, 7(1), 48–57.

[34] Hair, J. & Black, W. & Babin, Barry & Anderson, Rolph. **(2009)**. Multivariate data analysis. Prentice Hall. London.