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Work Attitude among Malaysian Academicians in the Public Universities: A Social Network Analysis

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Abstract

This study dealt with a social network analysis approach to comprehend the work attitude amongst academicians in the Malaysian public universities. This work attitude presented the psychological attachment between the employee and the organization. The organizational commitment and workplace spirituality amongst the academicians were highlighted here. A total of 40 factors were found to represent four groups of workplace spirituality and organizational commitment. The similarity amongst the factors was measured with two different kinds of associations. The best measure of association, which was the Tschuprow's measure of association, showed better results than the other measure in measuring the correlation amongst the factors. The connections and relationships amongst the factors were studied by using minimum spanning trees (MST). The interpretation of the MST was conducted by using the overall centrality measure.

Keywords: spearman correlation coefficient, Tschuprow's measure of association, minimum spanning tree (MST), centrality measures

1. Introduction

The study about commitment in an organization has been a subject of interest in the research field for almost four decades. It has an impact on individual performance and also the effectiveness of the organization (Allen & Meyer, 1996). Organizational commitment can best be described as the psychological attachment between an employee and an organization. It is the most important work attitude in the study of organizational and management behaviours. Commitment in the workplace can take in various forms; it also has the potential to influence the organizational effectiveness and employee behaviour (Meyer & Herscovitch, 2001). Many studies have related organizational commitment to other factors like job satisfaction (Darwish, 2002; Therese & Steve, 2006), workplace spirituality (Rego & Cunha, 2008), human resource management (Smeenk, Eisinga, Teelken & Doorewaard, 2006), and research and development (Chang & Choi, 2007).

One of the most important organizations in all nations is the education (Noordin, & Jusoff, 2009). In Malaysia, the education sector has become one of the most essential factors to transform Malaysia into a high-income nation. In 2010, Malaysia has implemented the economic transformation program (ETP). With regards to this, the tertiary education development has been identified as one of the most important strategies to transform Malaysia from a middle-income nation to a high-income nation. Hence, the demands of the tertiary education systems have increased. Due to this fact, Malaysia has made a series of dramatic changes, such as upgrading the university colleges to full public university status, increasing the number of new private universities, and also installing a number of foreign universities in the country. Consequently, the role of academic staff has become more challenging and demanding. The university management needs to take into serious consideration regarding this challenging matter in the academic affairs, as well as in research and administration (Daud, 2012).

This new challenge requires high commitment from the public universities staffs. For example, the organisation of international programmes and research competitions improves the global ranking of these programmes. The

performances of organizational commitment on productivity, efficiency, and quality have become important issues here. It is crucial for the management of the public universities in Malaysia to understand the behaviour and work attitude of academicians. The management also needs to find the solutions to produce high quality graduates with vast knowledge and excellent skills to fulfil the job demands out there.

One of the most important factors related to the organizational commitment is workplace spirituality. Organizations are encouraged to develop this factor because humanistic work environment creates a win-win situation for both employees and the organizations.

In this paper, we used the survey method to collect data related to organizational commitment and workplace spirituality among academicians in the Malaysian public universities. The performances of every factor were studied by using the social network analysis approach to understand the relationships between the factors and to identify the most influential factor(s). Since the data were on an ordinal scale, two kinds of association measures were utilised to measure the similarity among the factors, namely Tschuprow's measure of association and the Spearman correlation coefficient. This was to justify the better measurement between the both. As a result, the Tschuprow's measure of association proved to measure better. Besides, by studying the relationships amongst the factors and identifying the most influential factor(s), the public university management can create a better strategic plan for further development.

This paper is organized as follows. The next section describes the literature review, data preparation, and the methodology of social network. This is followed by the discussion pertaining to the results for both coefficients. The paper ends with a conclusion.

1.1 Literature Review

Workplace spirituality is not about religious beliefs, but it is about being energetically at work for people who perceived themselves as spirited beings. The real spirituality is about people who share and experience the common attraction, attachment, and together with the other members within their work unit and organization as a whole. Hence, spirituality can be considered as the valuing spirits and inner life of the employee (Harrington, Preziosi & Gooden, 2002). The perceptions of employees about workplace spirituality help to explain their level of organizational commitment.

There are three quite distinct forms of psychological linkage between employees and their organizations, namely affective commitment, continuance commitment, and normative commitment (Meyer & Herscovitch, 2001). Affective commitment is more to identify with, involvement in, and emotional attachment to the organization. This kind of employees will remain with the organization because they want to do so. This commitment explains what the employees want in terms of desire to stay in the organization. The core of this commitment is an affective tendency, including their desires, wishes, feelings, and etc (Gonza´lez & Guille´n, 2008). Affective commitment explains the bond to the organization as an affective attachment. This attachment includes the feelings like affection, warmth, belongingness, loyalty, fondness, pleasure, and so on (Jaros, Jermier, Koehler & Sincich, 1993). An employee who perceives higher commitment affectively will likely to remain with their respective organization because they want to (Choong et al., 2011).

While continuance commitment refers to commitment based on the employees' recognition of the costs associated with leaving the organization. This type of employees will stay with the organization because they have to do so. When the employee perceives the cost of leaving is more than the benefits when they continue to remain in the organization, then it is better for the employee to stay with the organization rather than to leave (Choong et al., 2011). Lastly, normative commitment defines the commitment based on a sense of obligation to the organization. These employees will remain because they feel they ought to do so. The decision to stay or leave is based on the employee's belief of the right thing to do (Choong et al., 2011). The employee will stay and remain in the organization if they feel that he/she should be loyal to his/her respective employer.

2. Method

2.1 Data Collection

The data for this research were collected through a survey amongst 204 academic staffs from selected Malaysian public universities. The questionnaires, which were distributed to the respondents, were designed based on the literature study, for example, (Choong's et al., 2011, Yusoff's et al., 2012, and Suleiman's et al., 2012). It consisted of two components, namely workplace spirituality and organizational commitment. The first component consisted of five factors (team's sense of community, alignment between organizational and individual values, sense of contribution to the community, sense of enjoyment at work, and opportunities for the inner life), and three for the second component (affective commitment, continuance commitment, and normative

commitment). The total number of questions was 40.

The responses from the academic staff regarding their beliefs to workplace spirituality and organizational commitment were described by using the Likert-type format. This Likert scale with 5 categories; 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), and 5 (strongly agree), allowed the academic staff to respond in different degrees to each factor which described the workplace spirituality and organizational commitment in the Malaysian public universities. The advantage of this format was that it allowed the academic staff to express the degree of their response to each factor rather than to a "yes" or "no" answer (Hayes, 2008).

This measurement scale is known as the ordinal scale. This scale is used to identify if the measurements are relevant. The numeric value used in the measurement is a means of arranging the elements being measured in order, from the smallest to the largest. The name 'ordinal' refers to 'order' of the elements on the basis of their relative size of the measurements (Conover, 1971).

In this study, two measurements were compared; the Tschuprow's measure of association and the Spearman correlation coefficient. The better measurement was discovered for measuring the relationship between the factors in the Likert scale data. From the previous studies, the Spearman correlation coefficient had always been used to find the correlation between the data in ordinal data (Conover, 1971). However, as for the Likert scale, each scale is represented by a number, but this number does not represent the real number, as it only represents a category. Therefore, the Tschuprow's measure of association was used to measure the correlation in an ordinal scale too.

2.2 Data Preparation and Analysis

In this section, the steps in social network analysis approach are briefly discussed to understand the relationships amongst the factors and to find the most influential factor(s). The Spearman's rank coefficient and Pearson's correlation coefficient were some of the several measures for computing the similarity between a pair of ranking vectors (Tan, Kumar & Srivastava, 2004). In this paper, the data from the survey were transformed into association matrix A of size 40x40. The elements of the *i*-th row and *j*-th column in the association matrix were the measures of association from the Spearman correlation coefficient and the Tschuprow's measure of association since the data were in the ordinal scale.

These association measures measured the similarity amongst the factors for ordinal data. In many parametric statistical methods, an interval scale of measurement is required. However, in the non-parametric methods, either the nominal or the ordinal scale is appropriate. In each scale of measurement, it has all the properties of the weaker measurement, and therefore, the statistical methods only require a weaker scale to be used against the stronger scales (Conover, 1971).

The Spearman correlation coefficient is one of the oldest and the best methods (Conover, 1971). This measurement has been always used as a test statistic to test the independence between two random variables (Spearman, 1904). Spearman correlation coefficient can best be described as a non-parametric rank statistics to measure the strength of the association between two variables. It uses the monotonic function to describe a relationship between two variables without making any assumption about the distribution of the variables (distribution free) (Hauke & Kossowski, 2011). Furthermore, the Spearman correlation coefficient does not require the variables to be measured on interval scale; it can be used for variables measured at the ordinal level. The measure of correlation by Spearman is expressed as ρ (rho),

$$\rho = 1 - \frac{6T}{n(n^2-1)} \tag{1}$$

where T represents the entire sum in the numerator,

$$T = \sum[R(Xi) - R(Yi)]^2 \tag{2}$$

T is the ranked difference between two variates, and n is the number of measurements in each of the two variates in the correlation (Jerrold, 1972). $R(Xi)$ is the rank of Xi as compared with the other values of X, for i = 1,2,3,…, n. $R(Xi)$ =1 if Xi is the smallest value in $X_1, X_2,\ldots, Xn$, $R(Xi)$ =2 if Xi is the second smallest and so on.

While $R(Yi)$ is the rank of Yi as compared with the other values of Y, for i = 1,2,3,…., n.

The other measurement is the Tschuprow's measure of association. Tschuprow introduced the measure of association for nominal scale based on the χ^2(chi square) value from the contingency table (Svante, & Jan, 1978). It is defined as below:

$$R_T = \sqrt{\frac{\chi^2}{N\sqrt{(r-1)(c-1)}}} \quad (3)$$

where

$$\chi^2 = \sum_{i=1}^{r}\sum_{j=1}^{c}\frac{(0_{ij}-E_{ij})^2}{E_{ij}} \quad (4)$$

χ^2 is the value computed from the contingency table, N is the number of units, r is the number of row, and c is the number of columns in the contingency table. The term O_{ij} represents the observed number in cell (i,j), while E_{ij} represents the expected number of observations in cell (i,j).

The Tschuprow's measure of association is less well known, but it has some possible theoretical advantages (Bergsma, 2012). The values for Tschuprow's measure of association are between 0 and 1, just like other association measures. The degree of independence between the values of two categorical variables is greater when the values of the association are nearer (Tomizawa, 1994). Tschuprow's measure of association usually uses square tables; row marginal which are identical with the column marginal, and is very seldom used for measuring the association between the two variables. When the contingency table is in square form, it can achieve its maximum value. The usual estimators of these coefficients are simple functions of the Pearson chi-square statistic.

All possible comparisons among the pairs of variables produce a square and a symmetrical association matrix A of size 40x40. The values in this matrix are the comparison between two variables, a_{ij} is the comparison measure between variables i and variables j. The ecological association matrices are usually symmetric since $a_{ij} = a_{ji}$. The values on the diagonal are compared with the variables. The diagonal value equals to 1 according to the Spearman correlation coefficient and Tschuprow's measure of association.

Besides, the dissimilarity matrix or distance matrix was used to determine the minimal spanning tree (MST). The association matrix cannot be used as the dissimilarity matrix or distance matrix since it does not fulfil the three conditions to define a metric (Mantegna, 1999). The conditions are: (i) $d_{ij} = 0$ if and only if $i = j$, (ii) $d_{ij} = d_{ji}$, and (iii) $d_{ij} \leq d_{ik} + d_{kj}$. The association matrix was then, transformed into dissimilarity matrix, D, by using this formula:

$$d_{ij} = 1 - a_{ij} \quad (5)$$

for all $i,j = 1,2,\ldots\ldots,40$.

From this dissimilarity matrix D, the network amongst the factors was analyzed using the MST. MST is constructed to visualize the important information contained in the network in D. MST is a concept in graph theory that connects weighted graph of n objects. It is a tree with n-1 edges that minimizes the sum of the edge distances. MST is built by linking every element in a set of n, together in a graph, characterized by a minimal distance between the nodes. The method used to construct MST by linking a set of n objects is known as Kruskal's algorithm (Mantegna & Stanley, 2000). The MST is also a technique to cluster the nodes in a non-hierarchical clustering by exploring the topological properties of all the factors.

Next, after the network topology of all the factors were constructed, the Pajek software was used to visualize the network. From this network topology, centrality measures were used to understand the importance of each node relative to the others (Borgatti, 2005). There are three different concepts of centrality, as discussed by (Hanneman & Riddle, 2005). The three concepts are degree centrality, closeness centrality, and betweenness centrality, while (Borgatti, 1995) defines four measures of centrality. The latter is eigenvector centrality. Below is the measurement used by Borgatti (2005):

i) Degree centrality is defined as the number of ties that a given node has. The degree of node i is given by: where $d_i = \sum_j a_{ij}$ ifthe i-th and j-th nodes are linked and 0 otherwise.

ii) Closeness centrality is defined as the total graph-theoretic distance of a given node from all other nodes, $c_i = \sum_j d_{ij}$, where d_{ij} is the number of links in the shortest path from i to j. Larger value indicates less central, while smaller value indicates more central.

iii) Betweenness centrality is the number of the shortest paths that pass through a given node;

$$b_k = \sum_{i,j}\frac{gijk}{gij}$$

where g_{ij} is the shortest path from node i to node j, and g_{ikj} is the shortest path from i to j that passes through k.

iv) Eigenvector centrality is also known as a variant of simple degree. An eigenvector of a symmetric square

matrix A is any vector e which satisfies the equation $e_i = \lambda^{-1} \sum_j a_{ij} e_j$, where λ is a constant (eigenvalue) and e_i is the centrality for node i.

The application of centrality measures like degree centrality, betweennness centrality, closeness centrality, and eigenvector centrality can be seen in a number of papers (Yusoff, Djauhari, Sharif & Suleiman, 2012; Djauhari, Sharif &Djauhari, 2012; Gan & Djauhari, 2012, Naylor, Rose & Moyle, 2007).

Since the centrality scores of each characteristic were between zero and one, it was difficult to identify the best measure among the four different measurements of centrality measures. The overall centrality measure helped to find the overall role of each characteristic (Gan & Djauhari, 2012). The overall centrality measure is defined by the Principal Component Analysis (PCA) of the data matrix of size N x 4, where the first until the fourth columns represent the score of degree, betweenness, closeness, and eigenvector centrality. The score of characteristic or factor i in terms of overall centrality measure can be defined as:

$$O_i = e_i C_D(i) + e_2 C_B(i) + e_3 C_C(i) + e_4 C_E(i) \quad (6)$$

where $e = (e_1, e_2, e_3, e_4)^t$ is the eigenvector of covariance matrix S from the matrix of size N x 4. These eigenvector are associated with the largest eigenvalue.

3. Results and Discussion

3.1 Network Topology

Figure 1 presents the network topology of all the factors for Tschuprow's measure of association. The relationships amongst all the factors are visualized in terms of MST. The different colours in MST represent the different groups of factors. The workplace spirituality factors (WPS) are represented in red, the affective commitment factors (AC) are represented in green, the continuous commitment factors (CC) are represented in blue, and the normative commitment factors (NC) are represented in yellow.

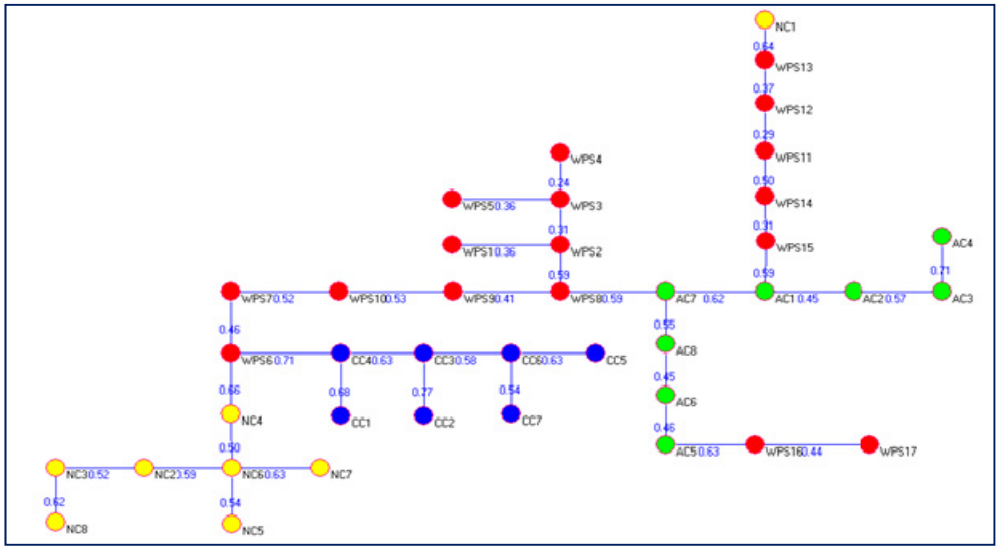

Figure 1. MST of Tschuprow's measure of association

According to Tschuprow's measure of association, there were three factors which were located out of their own groups. Two factors were from the WPS; WPS16 (My spiritual values are not valued in my workplace), and WPS17 (In my workplace, there is no room for my spirituality). Both factors were under the group of AC. Only one factor from NC, NC1 (I think that people these days move from company to company too often), was under the group of WPS.

Figure 2 shows the result of MST for Spearman correlation coefficient. According to this measure, two factors from the WPS; WPS16 and WPS17, were under the AC group. Meanwhile, two factors from the NC; NC1 and NC8 (I do not think that wanting to be an "organization man or 'organization woman" is sensible any more), were under the groups of WPS and AC respectively.

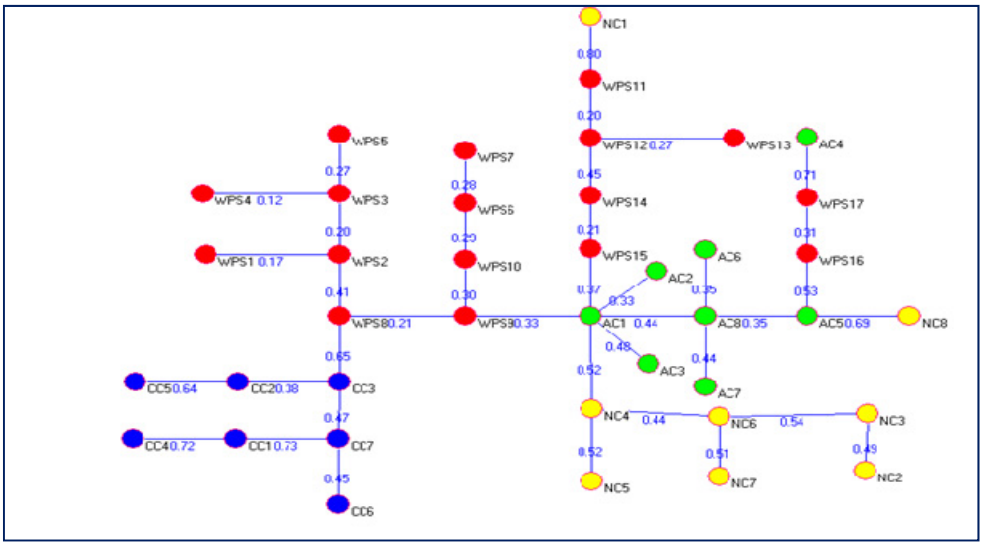

Figure 2. MST of Spearman correlation coefficient

3.2 Centrality Measures

The centrality measures and overall centrality scores for Tschuprow's measure of association are presented in Figure 3. The values measured for the degree centrality, betweennness centrality, closeness centrality, eigenvectors centrality, and overall centrality were computed based on the findings in MST.

3.2.1 Degree Centrality

In the network study, the use of degree centrality is common because it is a basic indicator (Freeman, 2004). Degree centrality can be defined as the number of ties that a given node has (Borgatti, 1995). It also measures the involvement of the nodes in the network (Opsahl, Agneessens & Skvoretz, 2010). The Tschuprow's measure of association had NC6 (believe in the value to be loyal) as the highest degree centrality, which was 4 connections. The second highest degree had 3 connections. The nodes were WPS2 (My team/group promotes the creation of a spirit of community), WPS3 (I feel that the members of my team/group support each other), WPS6 (I feel positive about the values prevailing in my organization), WPS8 (My organization respects my "inner life"), AC1 (I would be very happy to spend the rest of my career in this organization), AC7 (This organization has a great deal of personal meaning to me), CC3 (Too much of my life would be disrupted if I decided I wanted to leave my organization right now), CC4 (It wouldn't be too costly for me to leave my organization in the near future), and CC6 (I believe that I have too few options to consider leaving this organization).

3.2.2 Betweenness Centrality

According to Roy and Sarkar (2011), betweenness centrality refers to the number of times that a node needs a given node to reach another node. In other words, it is the number of shortest paths that pass through a given node. Based on the Tschuprow's measure of association, WPS8 (0.6181) had the highest value in betweenness centrality. The second highest was AC7 (0.5533), and followed by WPS6 (0.5385). WPS8 was considered as a significant node or characteristic in terms of its role in coordinating the information among the characteristics.

3.2.3 Closeness Centrality

According to Borgatti (2005), in degree centrality, although the nodes might be connected to many others, it might not be in a position to reach others quickly to access resources, such as information or knowledge. Thus, closeness centrality can be referred to the inverse sum of the shortest distances to all the other nodes from a focal node. As for Tschuprow's measure of association, WPS8 (0.2108) had the highest value in closeness centrality. The second highest was WPS9 (My organization helps me to live in peace/harmony with myself) (0.2063), and AC7 (0.2021). The higher the value in closeness centrality, the faster the information can flood or spread to the others.

	Degree			Betweenness			Closeness			Eigenvector			Overall	
1	NC6	4	1	WPS8	0.6181	1	WPS8	0.2108	1	WPS8	0.3904	1	WPS8	0.0051
2	WPS2	3	2	AC7	0.5533	2	WPS9	0.2063	2	AC7	0.3809	2	WPS6	0.0048
3	WPS3	3	3	WPS6	0.5385	3	AC7	0.2021	3	WPS2	0.3048	3	WPS9	0.0047
4	WPS6	3	4	WPS9	0.5047	4	WPS10	0.2	4	AC1	0.2999	4	WPS10	0.0047
5	WPS8	3	5	WPS10	0.4966	5	WPS7	0.1921	5	WPS9	0.2369	5	WPS7	0.0047
6	AC1	3	6	WPS7	0.4858	6	WPS6	0.1831	6	WPS6	0.2169	6	WPS1	0.0044
7	AC7	3	7	AC1	0.3887	7	AC1	0.1831	7	AC8	0.2099	7	WPS2	0.0039
8	CC3	3	8	CC4	0.274	8	WPS2	0.1814	8	WPS3	0.2009	8	AC7	0.0038
9	CC4	3	9	NC4	0.2672	9	AC8	0.1749	9	CC4	0.1871	9	WPS3	0.0036
10	CC6	3	10	NC6	0.2389	10	CC4	0.1632	10	WPS10	0.1694	10	AC1	0.0033
11	WPS7	2	11	WPS15	0.2294	11	NC4	0.1632	11	NC6	0.1661	11	WPS4	0.0033
12	WPS9	2	12	WPS2	0.193	12	WPS15	0.1618	12	WPS15	0.1655	12	WPS5	0.0033
13	WPS10	2	13	CC3	0.193	13	AC2	0.1579	13	WPS7	0.1635	13	WPS15	0.0029
14	WPS11	2	14	WPS14	0.1889	14	WPS3	0.1566	14	AC2	0.1623	14	AC8	0.0028
15	WPS12	2	15	AC8	0.1889	15	WPS1	0.1542	15	NC4	0.1621	15	WPS14	0.0027
16	WPS13	2	16	WPS11	0.1457	16	AC6	0.1529	16	CC3	0.1461	16	AC6	0.0026
17	WPS14	2	17	AC6	0.1457	17	NC6	0.1461	17	WPS1	0.129	17	WPS11	0.0026
18	WPS15	2	18	WPS3	0.1012	18	CC3	0.145	18	AC6	0.1152	18	AC2	0.0025
19	WPS16	2	19	CC6	0.1012	19	WPS14	0.1439	19	CC6	0.0963	19	AC5	0.0025
20	AC2	2	20	WPS12	0.0999	20	CC1	0.1408	20	WPS14	0.0912	20	WPS12	0.0025
21	AC3	2	21	AC2	0.0999	21	AC3	0.1378	21	NC2	0.0899	21	AC3	0.0024
22	AC5	2	22	AC5	0.0999	22	WPS4	0.1359	22	WPS4	0.085	22	WPS16	0.0023
23	AC6	2	23	NC2	0.0999	23	WPS5	0.1359	23	WPS5	0.085	23	WPS13	0.0023
24	AC8	2	24	WPS13	0.0513	24	AC5	0.1349	24	AC3	0.0837	24	CC1	0.0022
25	NC2	2	25	WPS16	0.0513	25	NC2	0.1296	25	CC1	0.0792	25	CC2	0.0022
26	NC3	2	26	AC3	0.0513	26	WPS11	0.1287	26	NC5	0.0703	26	AC4	0.0022
27	NC4	2	27	NC3	0.0513	27	CC6	0.1287	27	NC7	0.0703	27	WPS17	0.0022
28	WPS1	1	28	WPS1	0	28	NC5	0.1279	28	AC5	0.0624	28	CC4	0.0019
29	WPS4	1	29	WPS4	0	29	NC7	0.1279	29	CC2	0.0618	29	NC4	0.0019
30	WPS5	1	30	WPS5	0	30	CC2	0.127	30	WPS11	0.0501	30	NC6	0.0018
31	WPS17	1	31	WPS17	0	31	AC4	0.1215	31	NC3	0.0463	31	CC3	0.0017
32	AC4	1	32	AC4	0	32	WPS16	0.12	32	CC5	0.0408	32	CC6	0.0014
33	CC1	1	33	CC1	0	33	WPS12	0.1157	33	CC7	0.0408	33	NC2	0.0014
34	CC2	1	34	CC2	0	34	NC3	0.1157	34	AC4	0.0354	34	NC3	0.0013
35	CC5	1	35	CC5	0	35	CC5	0.1144	35	WPS16	0.0321	35	NC5	0.0011
36	CC7	1	36	CC7	0	36	CC7	0.1144	36	WPS12	0.0271	36	NC7	0.0011
37	NC1	1	37	NC1	0	37	WPS17	0.1074	37	NC8	0.0196	37	CC5	0.0011
38	NC5	1	38	NC5	0	38	WPS13	0.1046	38	WPS13	0.014	38	CC7	0.0011
39	NC7	1	39	NC7	0	39	NC8	0.104	39	WPS17	0.0136	39	NC8	0.0011
40	NC8	1	40	NC8	0	40	NC1	0.0949	40	NC1	0.0059	40	NC1	0.0011

Figure 3. Centrality measures scores of the Tschuprow's measure of association

3.2.4 Eigenvector Centrality

The importance of a node in a network can be measured by using the eigenvector centrality. The relative scores to all the nodes in the network based on the principle that connections with the highest scores of nodes contribute more compared to the lowest scores of nodes. In contrast to degree centrality, eigenvector centrality favours nodes that are connected to nodes that are themselves central within the network (Lohmann, 2010). In the Tschuprow's measure of association, WPS8 (0.3904) had the highest score, and strong relationships with AC7 (0.3809) and WPS2 (0.3048). These nodes had excellent positions and had the highest potential to spread the information throughout the network within a short time.

3.2.5 Overall Centrality

The score for each centrality measure had different roles or functions in every characteristic; thus, the overall centrality measure was needed because the overall centrality measure would identify the most important characteristic. Here, the overall centrality measure was defined as an optimal linear combination of the four centrality measures. The optimality characteristics were based on the PCA of data matrix of size 204 x 4, which represented the 204 respondents and the scores in the four centrality measures. The first principal component

explained 92.8% of the total variations, and the second principal component only explained about 0.062%, which was very small compared to the first principal component. The overall centrality measure was determined since the first principal component was sufficiently adequate. The values of each eigenvector were $e1 = 0.042046$, $e2 = 0.002789$, $e3 = 0.000401$, and $e4 = 0.000064$. The values were substituted in Equation (6) to find the overall centrality. The most important characteristics were WPS8 (0.0051) and WPS6 (0.0048).

4. Concluding Remarks

The connections among the nodes that were linked to the groups were different from both measurements of the association. The 40 factors were supposed to gather in their own groups. By referring to the MST results, according to the Spearman correlation coefficient, WPS16, WPS17, NC1, NC8, and AC4 were separated from their own groups. WPS16 and WPS17 were directly under the AC group; meanwhile, NC1 and NC8 were directly under the WPS and AC groups relatively. Another node, AC4, was under WPS17, which was directly under the AC group.

In the Tschuprow's measure of association, the connections in the network were better compared to the Spearman correlation coefficient. All nodes gathered in their own groups, except for WPS16, WPS17, and NC1. WPS16 and WPS17 were still directly under the AC group and only NC1 was directly under the WPS group. NC8 was already directly under the NC group.

From these results, the Tschuprow's measure of association showed better performance than the Spearman correlation coefficient. A good measure represents the reality. In this study, all the factors in the same groups were highly correlated to each other. From the MST results, the Tschuprow' measure of association gave better results in the grouping of the 40 factors into their own groups, as compared to the Spearman correlation coefficient. The results from the Tschuprow's measure of association showed that almost all the characteristics were gathered or clustered in their own groups. This means that the Tschuprow's measure correlated better than the Spearman correlation coefficient. It grouped the factors under the right groups, and hence, more effective than the Spearman correlation coefficient.

The results of the overall centrality measure showed that the most important factors were WPS8 (0.0051), WPS6 (0.0048), WPS9 (0.0047), WPS10 (0.0047), and WPS7 (0.0047) for the Tschuprow's measure of association. These 5 factors were the most important and influential factors.

WPS8 = My organization respects my "inner life".

WPS6 = I feel positive about the values prevailing in my organization.

WPS9 = My organization helps me to live in peace/harmony with myself.

WPS10 = The leaders of my organization try to be helpful to the larger social good of the community.

WPS7 = People feel good about their future with the organization.

These 5 factors showed the work attitude among Malaysian academicians in the public universities. The factors were from the same group of WPS. The factors were concerned about the work environment, including the members in the organization. The role of a public university in Malaysia in handling the challenges to increase the tertiary education system is very important and it must include the development of humanistic work environment as well. The high performance of an employee in an organization would definitely help to strengthen and increase the level of productivity, efficiency, and the quality in the organization.

In the future, we suggest that this study is continued with another measure of association, for example, the Pearson correlation coefficient. One can also concentrate on every group instead of studying all the groups. This means that every group has their own MST and centrality measures. By doing so, more information can be obtained based on groups. Perhaps, the results can help the Malaysian government to come up with a better strategic plan for development.

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