The Academicians' Elite Formal Group Networks Creation in Technical & Vocational Education Institution (TVEI): A Case Study of Politeknik Tuanku Sultanah Bahiyah

Mohd Faizal Jamaludin[1] and Mohd Fahmee Bahaudin[1]
[1]Commerce Department, Politeknik Tuanku Sultanah Bahiyah, Malaysia

Abstract: This study explores structural relationship of academicians' network among academician in the Technical and Vocational Education Institutions (TVEIs) in Malaysia using social network analysis (SNA) techniques at the academic level. This study also analyses whether TVEIs corporate governance practice focuses on the creation of valuable network size and pattern. The SNA performed by using UCINET and NetDraw software, which showed that the academicians in the networks are moderately connected. Thus, it suggests that there is a small group of academicians that is well connected and well positioned thus they have the potential to exercise power and control of influence over the network. Preliminarily, all networks' centrality indicated a positive and significant association among others. Further analysis results identified a group of most well-connected and well-positioned TVEIs academician in the Commerce Department, Politeknik Tuanku Sultanah Bahiyah studying corporate governance environment. The results derived suggested that academicians with sufficient access to critical resources and information were perceived to be highly valuable to others. Thus, this created the perception for others to maintain with these well-connected and well-positioned academicians for the best interests.

Key words: *Social network, academician, pattern, structural, formal network*

1. INTRODUCTION

The academicians' networks, directly and indirectly, are embedded within their formal appointment in any higher education institutions. From the general governance perspective, the networks created by academician is considered as an isolated or unobservable issue pertaining to the performance of students or academic department [1]. In principle, the academicians' network is defined as a set of academicians with a set of connections via formal appointments, which links them together. The academicians are interconnected through shared end-points to form paths that indirectly link other academicians that are not directly connected. The pattern of connections in a network yields a particular structure, and dominant academicians would occupy favourable positions within this structure [2], [3]. The same definition applies when the TVEIs become the focus of network analysis at the organisational level.

The academicians' networks could be categorised into two, namely social networks and professional networks. For instance, networks established through academic background, specific interests such as sports, music or hobby and club memberships, are examples of social networks. Meanwhile, professional networks are established through daily professional works or appointments. Prior studies showed that there were limited literatures within the Malaysian technical and vocational education. Therefore, it is worth exploring and paying more deliberation to the influence of academicians' networks on TVEIs decision making process and monitoring.

2. LITERATURE REVIEW

The social network approach originated from three schools of thought which are sociology, anthropology and role theory [4]. In sociology, the approach emphasised on patterns of interaction and

Corresponding Author: Mohd Faizal Jamaludin, Commerce Department, Politeknik Tuanku Sultanah Bahiyah, mohd.faizal@ptsb.edu.my, 0192332008

communications as the key to understand social life [5]. As for anthropology, the integration of Strauss, Malinowski and Frazer theories emphasised on the content of the relationships joining individuals, the conditions under which they would exit and eventually created the evolution of these bonds over time [6]. Finally, the role theory refined the definition of organisation by Katz and Kahn in 1966 as a 'fish nets' of interrelated offices [4]. It implied the network concepts but only limited to the one-degree role which was an individual directly linked to the focal person. It was also limited because of individual bias evidences [7].

Prior studies in social network structure concept and analysis have defined direct networks physical linkages between the actors [8]. In addition, Bourdieu [9] have defined direct networks extensively than just direct linkages, which included indirect networks. An indirect network is a network between two actors, which occurs only through other actors, also known as 'friend of a friend'. This wider conceptualisation of social network views social capital as an opportunity network of potential resources that can be accessed through such networks.

Social capital is quality created between people. Social capital predicts that return to intelligences, education and seniority depend in some part on person's location in the social structure of a market or hierarchy [10]. Therefore, the direct network indicates the academician network at one degree of separation, which refers to the one-to-one direct linkage between academicians to another. Meanwhile, an indirect network displays the academician network at two degrees of separation, that is, indirect networks that occur through a third person, for example a 'friend of a friend'. Generally, direct network is considered as a strong network and indirect network is considered a weak network.

Scott [11] defined social network as a relationship of individuals by invisible bonds, which was knitted together into criss-cross mesh of networks. According to Tichy[4], social network was defined as a specific set of linkages among a defined set of persons with an additional property that the characteristics of these linkages as a whole, which may be used to interpret the social behaviour of the persons involved. This approach views an organisation in a society as a system of objects such as people, groups and organisations, joined by a variety of relationships.

Social network is also defined as any bounded set of connected social units [12]. This definition highlights three important characteristics of social network. Firstly, networks have boundaries. The second key element of the definition is "connectedness" in social networks. The third key aspect of this definition is the social unit. Scott [11] also described social network as a strange but surprisingly powerful image of social reality. Every individual is connected to one another by invisible bonds, which are knitted together into a criss-cross mesh of networks. These networks could be reflected as a fishing net or a length of cloth that was made of intertwined fabrics. In the Malaysian business context, social network is defined as inter-firm coordination that is characterised by organisation characteristics in the social systems [1].

Tichy et al.[4]described three sets of properties of network, which were transactional content, nature of the networks and structural characteristics. Transactional content emphasised on what is exchanged by the social objects, for example, two academicians may exchange information or affect. In the nature of networks, it referred to the strength and qualitative nature of the relation between two social objects. Finally, a structural characteristic referred to the overall pattern of relationships between the system's actors such as clustering, network density and the existence of special nodes in the network.

Streeter and Gillespie[12]came up with a more extensive definition of social network. They defined social network as any bounded set of connected social units. This definition highlighted three important characteristics of social networks. Firstly, networks have boundaries. That is, some criterion existed to determine membership in the network. In some networks, such as family systems, friendship groups and work teams, boundaries were relatively straightforward and easy to define. However, social networks are also presumed to be embedded in larger social systems. Therefore, it is sometimes difficult to distinguish between a network and its broader social context. The definition of boundaries is a critical first step towards the study of social networks.

The second key element of the definition is connectedness in social networks. To be part of a social network, each member must have either actual or potential networks to at least one other member of the network. These networks may be direct or indirect. While some members may be peripheral in the network or almost completely isolated, each one must somehow

be connected to other members if it is to be considered as part of the network.

The third key aspect of this definition is the social unit. Network analysis can be easily applied to a wide range of social units. They can be individuals, as in the case of social support networks. However, they can also be social service agencies, social institutions in local communities, or nations in the global economy. In a diverse profession like social work, social network analysis has direct applications for the study of clinical practice, social policy analysis, community organisation and organisational management.

Social network theory suggests that the patterns and implications of relationships demonstrate specific behavioural principles and properties where the network theories require specification in terms of patterns of relations, characterising a group or social system as a whole [6]. The use of social network theory as a premise for predicting network behaviour, then, is expected to be lower than the application of the methodology to analyse network structure and operations. To date, two prominent network properties provide a framework for viewing network behaviour, and these properties provide the basis for articles invoking the use of social network theory [13]. Furthermore, Scott [11] simplified the social network concepts as a set of points connected by lines. From this idea, the proponents of social network analysis to the mathematical theory of graphs have emerged, in the hope of discovering a formal model for the representation of network structure.

Therefore, this study attempts to explore whether the presence or existence of connection of academicians would create or enhance an academician elite's status. The proposed conceptual framework is shown in Figure 1.

Figure 1: Conceptual Framework
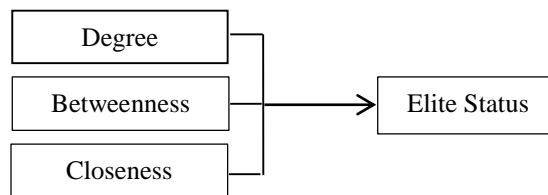
3. DATA AND SAMPLE SELECTION

The data on academician's profiles were obtained from Commerce Department, Politeknik Tuanku Sultanah Bahiyah (CD-PTSB) profiles from CD-PTSB's December 2016 meeting minutes, which highlighted the official job description for each academician. As the population was relatively small, therefore a total of 42 academicians in CD-PTSB took part in the study. However, academician cum CD Head of Department (HOD) was excluded in the analysis. The HOD was excluded, as this is a position, which determined other academicians' additional job descriptions. The HOD also is the person that evaluates the performance of other academicians within the CD. Table 1 describes the population's breakdown and demographic profile of the sample for this study.

The information provided in the CD-PTSB minute of meetings included the names of academician, grades, gender, types of job descriptions and academic backgrounds. In some cases, the meeting minutes also included additional job descriptions at the organisation level. Using the data derived, an undirected academician network was formed by shared academicians. Equivalent with the study by Larcker, So and Wang[14], shared academicians were defined as any two linked job descriptions if shared at least by one academician as committee members, vice versa.

Table 1: Population breakdown

Characteristics	Description	No of academician	Percentage
Gender	Male	8	19.05
	Female	34	80.95
Academic Background	Accounting	16	38.10
	Business Studies	15	35.71
	Marketing	11	26.19
Grade	DH52	3	7.14
	DH48	1	2.38
	DH44	28	66.67
	DH41	10	23.81

In the following section, the calculation on centrality, power and prestige of academicians in CD-PTSB will be discussed. This study focuses on social network analysis at an individual level. This analysis used UCINET version 6.532, a social network analysis tool developed by Borgatti, Everett and Freeman [15].
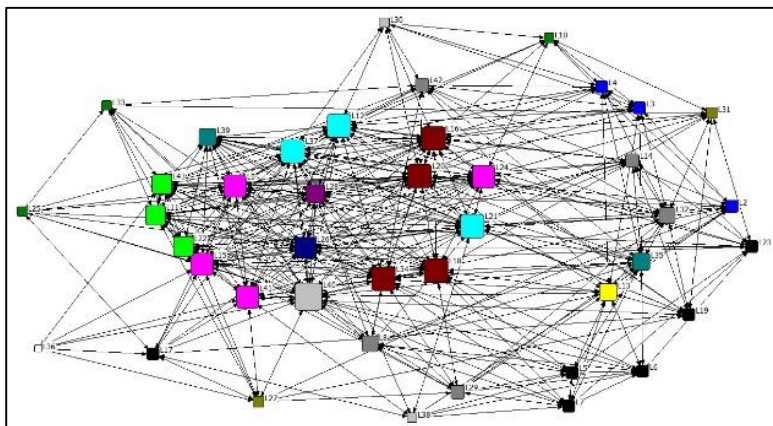

Figure 2: The Visualisation of CD-PTSB Academicians Network.

4. RESULT AND ANALYSIS

4.1 Univariate Analysis
Table 2 shows the descriptive analysis for all network centralities namely Degree, Eigenvector, Betweenness, and Closeness. These four network centralities are widely used in the social network analysis (SNA) [16]. The 'n' signifies the normalised value of each network centrality when compared with more than one network.

Degree and Eigenvector are measurements for direct connection among academicians, whereas Betweenness and Closeness represent indirect connection. The direct connection symbolises the power and control over resources of individual academician among others in the networks. The indirect connection represents the influence of control and information of individual academician.

Table 2: Network Centrality Descriptive Statistics

	Mean	Std Dev	Var	Min	Max	NCI
Degree	18.38	7.49	56.05	6.00	33.00	12.48%
nDegree	14.94	6.09	37.05	4.88	26.83	
Eigenvector	0.14	0.07	0.01	0.05	0.26	20.37%
nEigenvector	19.28	10.22	104.35	6.66	36.06	
Betweenness	12.69	10.13	102.67	0.31	52.30	4.95%
nBetweenness	1.55	1.24	1.53	0.04	6.38	
Closeness	28.60	3.32	11.00	22.50	35.00	32.40%
nCloseness	69.74	8.09	65.41	54.88	85.37	

In Table 2, the Network Centrality Index (NCI) for Degree shows 12.48 percent, which indicates that relatively a few academicians in the network establishing a large network connection with an average direct connection of 18.38. This simply means that on average, an academician creates connections with approximately 18 other academicians. The range of direct connection an academician creates is between six and 33. Note that, the larger NCI indicates the presence of dominant individual academician in the network.

Eigenvector indicates the presence of a group of dominant academicians whom connect with other well-connected academicians. Eigenvector is mostly used to indicate the reputation gained by individual academicians. In average, an academician establishes 0.14 connections with other well-connected academicians. The relatively small Eigenvector indicates that academicians have little influence in creating their network freewill. This simply shows that they have little access or manipulation to create a crony

or favourite team, thus little dominant elite group are present in the network. The NCI 20.37 percent indicates the presence of small elite group but merely with little power or control over resources.

Meanwhile, Betweenness indicates the frequency of individual academicians present in between two other academicians; the NCI is relatively low, 4.95 percent. Relatively, it shows that there is a presence of a very small number of well-positioned academicians in between others. With an average of 12.69 paths, the centrality shows that only 24.26 percent of the academicians in the position bridge between other pairs of academicians. This position has an advantage of creating an opportunity for academicians to have influence over power and control over resources.

Lastly, Closeness indicates how fast resources or information to reach specific academician. In average, individual academicians could reach critical resources or information within 28.60 paths. This is 81.71 percent faster compared to the maximum number of paths existed which is at 35 paths. The larger the number of paths indicates that the information or resources could reach an academician efficiently. Apart from that, NCI indicates 32.40 percent of well-positioned academicians as dominant with efficient resources and information access.

4.2 Bivariate Analysis

Table 3: Correlation

	Degree	Eigenvector	Betweenness	Closeness
Degree	1.000			
Eigenvector	*0.329**￼*	1.000		
Betweenness	*0.697***￼*	*0.663***￼*	1.000	
Closeness	0.300*	*0.969***￼*	*0.668***￼*	1.000

*, ** and *** indicate significance at 0.1, 005 and 0.01 level.

From Table 3, this study concerns with the higher correlation value, which is the correlation between Closeness and Eigenvector at 0.969. However, the VIF value below 5 indicates that the overall research model is acceptable. Overall, the correlation shows a positive relationship between all pairs of variables, indicating that the increment of network centrality would increase the other correlated network centrality.

4.3 Multivariate Analysis

Table 4 shows the main regression models namely, Degree, Betweenness and Closeness with Eigenvector as an attempt to examine whether any network centrality measures would significantly affect the reputation or elite status of an academician. From Table 4, it is documented that Closeness is the only measure that is positively and significantly associated with Eigenvector. This indicates that the ability of the academician to position themselves efficiently in accessing the critical resources and information would enhance their reputation among others. Eventually, it would also enhance their relationship with other well-connected academicians. The results showed that an academician with an access to critical resources and information is a valuable person in the network, thus any relation is assumed to enhance their elite status prestige.

Table 4: Main Regression

Variable	
C	-0.486
	*-14.498***￼*
DEGREE	0.167
	0.742
BETWEENNESS	0.241
	0.888
CLOSENESS	1.335
	*21.478***￼*
Adjusted R²	0.967
F-statistic	*403.251***￼*
Number of Directors	42

*, ** and *** indicate significance at 0.1, 005 and 0.01 level.

5. DISCUSSION

From the small population case study, this paper provides an insight into a complex network structure among academician. Prior studies in social network analysis emphasised the significant influence which network structure has on any organisation. This study explores whether there are significant differences between the academicians' networks. Social network

analysis (SNA) contributes methodologically to this paper by identifying, measuring and visualising the relationships between academicians. This paper found relatively the most powerful and influential academician based on the analysis as an individual's social network, which is considered as "a product of investment strategies" [9].

Regardless, the SNA may provide a sign of any investment opportunities accessible, whether the relationship being fully utilised is yet to be confirmed. For instance, this study discloses that academician's closeness centrality indicates the influenced position of the academician in the entire set of social networks. The academician is perceived to be strategically positioned if the academician's path is to access critical resources and information is higher than other academicians are. This means that the academician is the key academician where every other academician would like to connect with for strategic reasons. While the academician does have connections, it is uncertain whether the connections are fully exploited.

The SNA used in this study only deliberated on one social connection namely academicians' formal appointment as a committee member. Further analyses on other form of social connections such as co-membership in any social organisations, alumni or other professional bodies' memberships are suggested. These forms of social connections also connect the academicians, even to the unconnected academicians from the formal networks.

Furthermore, the academicians' network could not be compromised, as academicians are relatively and likely to be inspired or influenced by other academicians, whether during social or formal events. The more social connections form incorporated, the complex the network will be, hence further analysis could be complicated [17]. Westphal and Stern[18], pointed out that organisations tend to nominate and appoint an academician with high social or formal credentials. However, there is a shortcoming of the organisation's approach. Therefore, individuals lacking these credentials rely on their social connections as an alternative manner to access the elite group status. This group of individuals would commonly have less formal job appointment as compared to academician with credentials.

The result also suggested that there are opportunities for academicians with lesser formal job appointment, provided they able to exploit their own connections. The academicians' ability to utilise their own connection could increase the chances to be appointed at other job appointments. The multiple appointments could be seen as a proxy for academician's reputation. These academicians could be seen to have certain advantages over others such as resource exchange, control and influence over organisation's management [19]. Therefore, organisation tends to appoint academicians with well-connection to other positions [20].

6. CONCLUSION

Firstly, this study has explored the academician's network measures for access of more opportunities, alternative or exchange resources as compared to others. Secondly, whether there are any academicians strategically well positioned in the network for gaining a greater level of influential among other academicians. Finally, whether there are any academicians sufficiently acquiring the power and prestige image as compared to other academicians. The same motive may apply at the organisational level.

Measures of Degree, Betweenness and Eigenvector centrality were used to examine the academician's network for the capability of power exertion. The Eigenvector centrality value revealed that a group of academicians acquired access to the network flow through their indirect connections without the need to maintain the indirect connections directly.

The results of the analysis provided evidence that relatively moderate numbers of academicians in CD-PTSB have the opportunity to employ certain amount of power and influence. Additional tests are suggested to examine whether these group of academicians in fact do apply the exercises. In addition, this study identified a relatively important attribute that the academicians who are well connected and well positioned to exert power were generally noticeable to others in the same network. The academician who has multiple job descriptions has a social group in the same department, may be one of the possible justifications. Consequently, there is likeliness that the academicians with multiple job descriptions are also having multiple connections with other academicians in other committees.

This study also provides a reasonable justification related to the need of restriction of the number of job descriptions enforced for academicians appointed by Jabatan Pendidikan Politeknik (JPP), Malaysia. In average, CD-PTSB appoints four job

appointments to each academician. This common practice emphasises the importance of academicians to perform their duties and obligation for the interest of institution's stakeholder especially for the student's academic performance. The academicians are believed to fulfil their duties and obligations effectively by providing better teaching practice to their students as well as good governance of the institutions.

For future research, it is essential to explore whether there are possibilities of exercising power exertion by the academicians. In addition, the social network in a form of informal relationships should be further explored including the impact of the informal connections as part of contribution to social network studies. Additional study could also be conducted on cross department within the same TVEIs. Additional value to the academician's network could be captured by including TVEIs as an academician who may hold multiple job descriptions at different departments.

This study is also subject to a number of limitations. Firstly, it is limited to Malaysia TVEI for a period of one semester. Meanwhile, the sample only encapsulates the minority of Malaysian TVEI academicians. Secondly, the study has not explored the role the academicians' designation either executive or non-executive, and related committee members within the TVEIs that may also influence the academicians' connections.

REFERENCES

[1] A. Abd. Hamid, "Network Governance in Government-linked Companies (GLCs) and Non-government-linked Companies (NGLCs) in Malaysia," J. Financ. Report. Account, vol. 9, no. 1, pp. 54–73, 2011.

[2] S. P. Borgatti and D. S. Halgin, "On Network Theory," Organ. Sci., vol. 22, no. 5, pp. 1168–1181, Oct. 2011.

[3] G. J. Nicholson, M. Alexander, and G. C. Kiel, "Defining the Social Capital of the Board of Directors: An Exploratory Study," J. Aust. New Zeal. Acad. Manag., vol. 10, no. 1, pp. 54–72, Jun. 2004.

[4] N. M. Tichy, M. L. Tushman, and C. Fombrun, "Social Network Analysis for Organizations," Acad. Manag. Rev., vol. 4, no. 4, pp. 507–519, Nov. 1979.

[5] G. Simmel, "The Stranger," in On Individuality and Social Froms: Selected Writings, D. N. Levine, Ed. Chicago: The University of Chicago Press, 1971, pp. 143–149.

[6] J. Galaskiewicz and S. Wasserman, "Social Network Analysis: Concepts, Methodology, and Directions for the 1990s," Sociol. Methods Res., vol. 22, no. 1, pp. 3–22, Aug. 1993.

[7] S. Wasserman and K. Faust, Social Network Analysis: Methods and Applications. Cambridge: Cambridge University Press, 1994.

[8] W. E. Baker, "Market Networks and Corporate Behavior," Am. J. Sociol., vol. 96, no. 3, pp. 589–625, 1990.

[9] P. Bourdieu, "The Forms of Capital," in Handbook of Theory of Research for the Sociology of Education, J. E. Richardson, Ed. New York: Greenword Press, 1986, pp. 46–58.

[10] R. S. Burt, "The Contingent Value of Social Capital," Adm. Sci. Q., vol. 42, pp. 339–365, 1997.

[11] J. Scott, "Social Network Analysis," Sociology, vol. 22, no. 1, pp. 109–127, Feb. 1988.

[12] C. L. Streeter and D. F. Gillespie, "Social Network Analysis," J. Soc. Serv. Res., vol. 16, no. 1–2, pp. 210–222, 1993.

[13] B. Schultz-Jones, "Examining Information Behavior through Social Networks: An Interdisciplinary Review," J. Doc., vol. 65, no. 4, pp. 592–631, 2009.

[14] D. F. Larcker, E. C. So, and C. C. Y. Wang, "Boardroom Centrality and Firm Performance," J. Account. Econ., vol. 55, pp. 225–250, Apr. 2013.

[15] S. P. Borgatti, M. G. Everett, and L. C. Freeman, "UCINet for Windows: Software for Social Network Analysis." Analytic Technologies, Harvard MA, 2002.

[16] S. P. Borgatti, M. G. Everett, and J. C. Johnson, Analyzing Social Networks. London: Sage Publications Ltd., 2013.

[17] T. Khanna and Y. Yafeh, "Business Groups in Emerging Markets : Paragons or Parasites ?," J. Econ. Lit., vol. XLV, no. June, pp. 331–372, 2007.

[18] J. D. Westphal and I. Stern, "The Other Pathway to the Boardroom : Interpersonal Influence Behavior as a Substitute for Elite Credentials and Majority Status in Obtaining Board Appointments," Adm. Sci. Q., vol. 51, pp. 169–204, 2006.

[19] L. Renneboog and Y. Zhao, "Us knows us in the UK: On director networks and CEO compensation," J. Corp. Financ., vol. 17, no. 4, pp. 1132–1157, Sep. 2011.

[20] A. Barnea and I. Guedj, "Director Networks and Firm Governance," 2007.