

A Social Network Analysis of Political Networks and Democracy in Thailand

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Abstract

Personal relationships have historically been a significant influence in Thai culture, extending into national politics. Ties between members of the Senate and the House of Representatives through various networks are good examples of this observation. Academic research has suggested that such networks could lead to oligarchic politics and thus jeopardise the quality of a functioning democracy, but it has yet to identify the specific patterns and quantify the intensity of these relationships. Using Social Network Analysis framework, this paper compared the levels and patterns of relationships between members of Parliament during four recent parliamentary terms and analysed their relationship with the quality of Thailand's democracy during each period. The results showed a strong inverse correlation between the intensity of political networks and the quality of democracy. Although the mechanism for this relationship is not clear, these political networks may intervene in government policymaking to formulate policies that favour partisans and coordinate to reduce democratic governance of policymaking and other political institutions. The finding suggests that Social Network Analysis can be used to monitor the level of in-group networks in parliament, which may

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reduce economic rent-seeking, a distinguished characteristic of oligarchy, and thus facilitate a better-functioning democracy in Thailand.

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1. Introduction

Personal relationships have long been valued in Thai society. Their importance is demonstrated in the pervasiveness of political patronage, which in turn has influenced the system of government and the social governance of Thailand until today (Christensen, 1993; Doner & Ramsay, 2000; Yomnak, 2016). After the transition into democracy in 1932, Thais increased their participation in formal politics through various institutions – be it through the House of Representatives or through the Local Government Organisation (LGO). Theoretically, with increasing public participation, personal relationships were expected to play a lesser role in the process of government. Policy decisions were supposed to be made through a system of processes where reviews and opinions were heard and decided upon. However, these political institutions have been dominated by a network of ‘elites’ through the formal and informal patronage system, for example, by the appointment of relatives (Rohitarachoon & Hossain, 2012) or classmates from educational institutions to major public positions (Treerat & Vanichaka, 2016; Phongpaichit et al., 2016). Such actions have led to policy and budgetary decisions that have not responded to the citizens’ true needs. Instead, policies are distorted to benefit the people in the networks (Chardchawarn, 2012). Such consequences are a constant concern when the political class is composed of a close-knit network of people or there is a high degree of nepotism in government.

This phenomenon was evidently reflected through the image of the political relations within the Thai Parliament under the 1997 Constitution. According to the constitution, all 200 senators needed to be directly elected by citizens for a term of six years. Theoretically, this was supposed to promote and protect the political rights of individuals, giving them opportunities to participate in politics and to scrutinise state power (Thanasthit, 2020) as well as maintaining the independence of senators. But in practice, some senators were accused of having family connections with members of political parties or members of the House of Representatives. They were spouses, brothers and sisters, or parents and children of established politicians and therefore would not be independent from the politicians in the House of Representatives. The media dubbed the Senate ‘The Assembly of Spouses’ or ‘The Family Assembly’ indicating the doubt they had on senators’ objectivity (Suphap, 2019).

In addition to the nicknames given by the media, the Constitutional Court ruled that the rectified selection process of senators in the 2007 Constitution, which changed from a mixture of elected and appointed senators to fully elected members, was unconstitutional. A part of the ruling stated that such a change was ‘the precarious flaw which could lead to the loss of faith and unity of the Thai citizenry... this would make the Senate a so-called "Assembly of Relatives," "Family Assembly," and "Assembly of Spouses." It would lose the status and potential of being the wisdom of the House of Representatives, as it would only become the echo of like-minded people’ (Moolsilpa, 2016).

Today, the 2017 Constitution states that senators must be ‘selected by and amongst persons having the knowledge, expertise, experience, profession, or characteristics or having common interests or working in or having worked in varied areas of the society’ (The Secretariat of the House of Representatives, 2017). Its objective is to ensure the senator’s working independence, in contrast to ‘the Assembly of Spouses’ Senate. However, the process simply led to similar accusations that many senators had a stronger relationship with the administration than with the citizenry because they were

selected into the Senate by the National Council for Peace and Order (NCPO). It would seem that the problem of the independence of the Senate remains unresolved.

As described above, such networks of political elites, or so-called patronage networks, have an incentive to obstruct the formation of more constructive forms of social organisation found in stable and functioning democracies, such as transparent and open political parties or legitimate interest groups (Jackson & Amundsen, 2022).

At the same time, Thailand has repeatedly received a poor score when evaluated by various democratic indexes, including the Varieties of Democracy (V-Dem) Research Project, which comprehensively assessed multiple core principles of democracy in 180 countries around the world, and the Polity Project, which is an index developed and conducted by the Center for Systemic Peace to examine concomitant qualities of democratic and autocratic authority in governing institutions. In V-DEM's 2022 report, Thailand is ranked in the bottom 30 percent of all countries and is categorised as autocratic (V-DEM, 2022). In the Polity V 2018 report, Thailand was assessed as having a closed autocracy form of governance (Integrated Network for Societal Conflict Research, 2018).

Other indexes used to evaluate governments' effectiveness in showing monopolies and economic rents from political networks, such as Transparency International's Corruption Perception Index (CPI), have also ranked Thailand rather low. Looking into the index's details, Thailand has constantly faced challenges related to the patronage system and nepotism (Transparency International, 2021). Still, these indexes only indicate problems in the overall picture and do not explicitly show the relationship between cronyism and the quality of democracy. This missing information may be useful and may lead to policy recommendations that help prevent or solve these problems.

At present, the use of data to analyse phenomena and environments has become more advanced and widespread. Data storage has become more systematic. Analysing relationships in networks using complex statistical data is possible with social network analysis tools. These tools perform statistical analysis and can quantify the intensities of different aspects of networks. Here we compare kin-based relationships and course-based relationships in Thai politics. Short courses at certain institutions have previously been shown to be important for forming political networks (Phongpaichit et al., 2016), and these courses include classes of the Armed Forces Academies Preparatory School, the National Defence Course, the Joint State-Private Sector Course, the Advanced Certificate Course in Politics and Governance in Democratic Systems for the Executive, and the Capital Market Academy Programme (CMA). The analysis of such data using the Social Network Analysis method can then be compared with the results of various democracy indexes to show the relationship between the presence and intensity of political networks and democracy in Thailand.

There are three objectives in this study. First, this study aims to examine levels and patterns of political relationships between people in the Thai parliaments using social network analysis tools. Second, this paper shows the levels and patterns of relationships between people in the Thai parliaments in different parliamentary terms from the 2007 Constitution through to 2023. Thirdly, the relationship between the calculated statistical values of the parliamentary networks and the level of democracy in Thailand is analysed.

Regarding the scope of the study, this paper studies the political relationships, whose formation and patterns are varied, between people in Thai parliaments. The study examines four terms of Members of Parliament –the 23rd term during governments led by Samak Sundaravej, Somchai Wongsawat, and Abhisit Vejjajiva (23rd December 2007-10th May 2011), the 24th term with Yingluck Shinawatra as the prime minister (3rd July 2011-9th December 2013), the 2014 National Legislative Assembly (31st July 2014-21st May 2019), the 2014 National Legislative Assembly (a military-appointed

government under NCPO), and the 25th term under Prayut Chan-o-cha (24th May 2019-2023). The reason for studying these parliamentary terms is that in between these terms there were many changes to the constitution and political institutions related to the appointment of members of Parliament. Important events in relation to the appointment of members of parliaments include the elections for the 23rd and 24th terms, a military takeover and military-appointed government under the NCPO, and a subsequent election after the military government under a new constitution (the 25th term). Thus, over the 4 terms studied, members of parliaments were appointed through a variety of methods, and democracy in Thailand varied up and down.

The network diagrams demonstrating the kin-based and course-based relationships were constructed from data obtained from course registries that the Members of Parliament from all 4 terms attended at the Armed Forces Academies Preparatory School, the National Defence Course, the Joint State-Private Sector Course, the Advanced Certificate Course in Politics and Governance in Democratic Systems for the Executive, and the Capital Market Academy Programme (CMA).

The rest of the paper is as follows. Literature review related to political networks is shown in Section 2. Section 3 lays out the methodology and the empirical model employed in the study. Section 4 shows the results, and the last section provides conclusions and policy inferences.

2. Literature Review

The review of the literature related to political networks is divided into three parts: first, to explain the application of social network analysis in economics; second, to review the relationship between political networks and democracy; and lastly, to review the studies of political networks in Thai society.

Firstly, analyses of power structures or social structures usually focus on the elements of the structures, the roles of each element, and the system of checks and balances for each element. Generally, this leads to a lack of social analysis at the individual level, where each individual is considered a social agent in the context of interactions between agencies and the dynamics of each agency.

Network Theory was developed to fill the gap in the study of power structures from structuralism and functionalism points of view. It emphasises that agencies are one of many social actors. But, at the same time, an agent cannot act individually. Therefore, analysis of social agencies needs to be done at the community level, where various agencies exist (Ward, Stovel, & Sacks, 2011). Robert Putnam's community study was considered the pioneer of network study, aiming to explain that people in communities interact with each other in network patterns. Such interactions create social capital, leading to trust, which then leads to cooperation that increases political participation (Putnam, 1993). However, Putnam's work employed social network analysis unofficially, and it did not give social actors a clear position.

In the last few decades, social network analysis has become a popular tool in social science research when systematic relationship analysis is required. It uses nodes to represent agencies and edges to represent an agency's relationships, such as the relationship between relatives, friends, or bosses and subordinates. Nodes are then drawn into diagrams to show the relationships in networks. Theoretically, social phenomena are the results of interactions between nodes. More recently, programmes have been developed to provide more detailed analysis by giving different weights to nodes and different widths to edges based on the strengths of relationships in the networks. The differences can help infer relationships as constant values and mathematically calculate the results of relationships to

identify each node's centrality, community, or connectivity. In terms of social network analysis, this explains the power relations within those networks (Borgatti & Halgin, 2011).

The relationships delineated in social network analysis will also pinpoint people who are important within the network and who act as a link between other people within the network. When considering the network of political relations, a high degree of closeness within the network or within part of the network may reflect cronyism, which is a known risk factor for conflicts of interest resulting in activities for mutual benefit and corruption.

A study by Sørensen & Torfing (2003) attempted to examine the impact of political networks on democracy in Denmark. Skanderborg found that political networks of a small number of people who had relationships with policymakers at both national and local levels could influence policy-making processes (De Rynck & Voets, 2006). They were able to intervene in the formulation of policies for their own benefit. This led to the implementation of state policies that neither reflected representative democracy nor produced policies for the real needs of the people in the area. There was also a lack of transparency in the implementation of government policies, which eventually led to corruption problems.

In addition, a study by Jang (2009) examined the effects of political networks on participatory democracy in the United States. It was found that tight political networks had a negative effect on participatory democracy in areas with high political conflict and caused people in the area to have low political interest. As a result, policy formulation in such areas received little public scrutiny and was often inconsistent with local needs.

However, political networks can also be beneficial, particularly if the government is not dominated by a certain group of people. Policy formulation in this situation helps to accelerate policies that reflect and solve the people's needs (Sørensen & Torfing, 2003; Jang, 2009).

In summary, political networks can affect democracy in both negative and positive ways. When the quality of institutional factors is poor, political networks may undermine democracy and produce distorted policies. On the other hand, if the institutional structure is of high quality, then political networks can facilitate effective policymaking (Sørensen & Torfing, 2005). Unfortunately, when considering the quality of political institutions in developing countries, these institutions are often imperfect, and political networks can dominate and have a negative impact on democracy.

Lastly, the studies on political networks in Thai society aim to establish frameworks that explain the characteristics and interactions between actors and agencies. They are divided into two groups. The first group focused on kin-based networks of elites or politicians, whilst the second group focused on studying political networks related to non-kin-based networks, such as short courses or education.

The first group of studies focused on studying political relationships through kin-based relationships in the countryside with families with established political influence. A study by Thananithichot & Satidporn (2016) compared the 2011 election of members of the House of Representatives to past elections, postulating that political dynasties were still important in elections. The work compared candidates who were related to or from political families to those who were not, especially candidates from the Pheu Thai Party and the Democrat Party. Such networks gave clear advantages to the heirs of political dynasties (Thananithichot & Satidporn, 2016). This paper thus depicted the influence of kin-based relationships in Thai politics, similar to that of course-based relationships. Each province had different forms of kin-based relationships, depending on the families in it. On the contrary, Thinbangtio (2020) study looked at the election on March 24, 2019. The study considered Ban Yai Bangsaen Group as the political network of the Khun Pluem family. The group that had been winning previous elections lost to other political groups, and in some electoral districts, they lost to newcomers. This indicated that kin-based relationships did not always play significant roles in winning elections (Thinbangtio, 2020).

Another group of studies looked at factors contributing to the formation of political networks in Thailand outside of kinship. Treerat & Vanichaka (2016) studied networks arising from six short courses run by important institutions, including the National Defence Course, the Advanced Judicial Management Executive, the Advanced Certificate Course in Politics and Governance in Democratic Systems for the Executive, the Capital Market Academy Programme (CMA), the Top Executive Programme in Commerce and Trade (TEPCoT), and Advanced Political and Election Development (Treerat & Vanichaka, 2016). Another work by Phongpaichit et al. (2016) studied network creation through the CMA Programme (Phongpaichit et al., 2016). Both studies showed the creation of political relationships through these short courses, particularly among classmates. People taking several courses were seen as the network's centrality or connectors to other groups, forming a closed network that could then lead to economic rent-seeking. These social network analyses were also adapted to help analyse anti-corruption organisation networks in Thailand in order to study patterns and relationship traits that could lead to policy proposals on building effective and sustainable anti-corruption cooperation (Yomnak & Ruckchart, 2021).

The literature review shows that relevant empirical datasets on political networks are not yet comprehensively and collectively used to analyse the overall picture of Thailand's political network. Therefore, studies to establish analytic frameworks incorporating several datasets to explain political changes are important to understand the dynamics of political networks and power relations. There is also still a lack of studies analysing the relationship between the calculated or empirical values of a network and its effects on democracy. This understanding may lead to policy proposals designed to promote democracy, prevent economic rent-seeking, and support long-term development.

3. Methodology

In the previous section, we pointed out the importance of networks in the political system in influencing democracy and the study of relationships in various forms through social network analysis. In this section, we will explain how social network analysis can reveal the relationship between members of parliament and those who are influential within the network through kin-based relationships and course-based relationships using the Gephi programme, which is described as follows.

3.1. Coding Members of Parliament in Social Networks

A social network analysis tool was employed to study parliament members' social networks. The results are displayed in a diagrammatic form to indicate various relationships between nodes, which represent the Members of Parliament – including both members of the House of Representatives and senators. This paper focused on kin-based and course-based relationships. The social network diagram in this paper includes these two key components:

-  is the node¹ or a Member of Parliament.
-  is the edge or relationships connecting each Member of Parliament.

¹ The size of a node represents the position in that parliament, with the Prime Minister being the largest, followed by the Deputy Prime Ministers, Ministers, Deputy Ministers, and Members of Parliament being the smallest. Moreover, the colour of the node represents the affiliation of the political parties of the members of parliament, except for the members of the National Council for Peace and Order (NCPO) who do not have any party affiliations.

There were four periods during which the relationship patterns of MPs under each government were compared. The periods were (1) the 23rd term under the government led by Samak Sundaravej (2) the 24th term under governments led by Yingluck Shinawatra (3) MPs under NCPO², and (4) the present 25th term³ under the government led by Prayut Chan-o-cha. The study of these four MP terms explored two relationship patterns.

The first pattern was kin-based relationships. Emphasis was mainly put on the MP's surnames⁴. For example, if A and B shared the same surname, the diagram would show that they had a relationship. Surnames in Thailand are rarely identical if the families are unrelated. In addition, to make kin-based relationships more accurate, this paper added relationships using spouses' surnames⁵. For example, if MP A is married to B, who is not an MP but shares the same surname with C, another MP, the diagram would show that A and C are related.

The second pattern was relationships in education courses. The study covered the five aforementioned short courses. MPs taking the same course at the same time are considered related. For example, if A and B were in the 18th class at Armed Forces Academies Preparatory School, they would be considered to have a relationship.

3.2 Calculating Social Network Statistical Value

This social network analysis studied graph density, the statistical value explaining connectivity strength within networks. Higher values indicate stronger connectivity within the network. Similarly, low density indicates low connectivity. In addition, the network's centralities were analysed to explain and identify people who were strategically important within it (Wasserman & Faust, 1994).

3.2.1) Social Network Density

Graph density reflects connections between nodes. Information in denser networks is transferred more effectively, more thoroughly, and more rapidly than in lower-density networks. However, rapid information transfer is not always beneficial. In this case, relationships refer to relationships between MPs, which, when excessive, may also increase the risk of mutual interests and corruption. Graph density is calculated by counting the number of edges with an actual connection and then dividing it by the number of potential edges in the network (potential connection⁶)

This results in values between 0 and 1. A density closer to 1 indicates denser connections. On the other hand, a density closer to 0 indicates less dense connections. The equation is as follows:

$$G = \frac{A}{P}$$

Where G is graph density.
A is actual connections.
P is potential connections.

² Members of the National Council for Peace and Order (NCPO) are members of the National Council for Peace and Order (NCPO), the National Legislative Assembly (NLA), the Cabinet (Cabinet), the National Reform Council (NHSO), and the Constitution Drafting Committee

³ As of January 4, 2020, the Future Forward Party has not been dissolved.

⁴ MP's surnames were drawn from the Human Resource Information System (HRIS), Secretariat of the House of Representatives (https://hris.parliament.go.th/ss_th.php)

⁵ The surnames of spouses were obtained from the asset declaration database, the National Anti-Corruption Commission, which also includes politicians' spouses' assets by law.

⁶ Potential Connection's formula is $N*(N-1)/2$ where N is the total number of nodes in the network.

3.2.2) Centrality

Centrality analysis highlights important nodes within networks. Nodes with a high degree of centrality can rapidly transfer information.

Degree centrality is a formula based on the number of relationships connecting a node. A node with more relationships with other nodes has a higher centrality. In our example, the node would represent an MP who is connected with other MPs. If the MP's degree centrality is high, it would mean that the MP was a centre of relationships between many other MPs. The equation is as follows:

$$d(i) = \sum_j^i m_{i,j}$$

where $d(i)$ is degree centrality of nodes at i .

$m_{i,j}$ is relationships between nodes at i and j . If they are related, $m=1$. If not, $m=0$.

3.3 Analysing the relationship between the statistical values of networks and the level of democracy

To further study the relationship between the network characteristics of members of parliament and democracy in Thailand, we used the V-DEM electoral democracy index, (V-Dem)⁷, which comprehensively assesses multiple core principles of democracy in 180 countries around the world, and the Polity V index, which was developed and conducted by the Center for Systemic Peace to examine concomitant qualities of democratic and autocratic authority in governing.

The corresponding data from the social network analysis from the previous section, which included the graph density and the average degree in the network for each parliamentary term, was used to find correlations with the degree of democracy in Thailand. If the graph density and average degree values were high, this would mean that the overall relationship within the network of members of parliament was very strong. By interpreting higher network density or degree to mean that political power was concentrated in the hands of a certain close-knit group rather than being widely dispersed across the country, we expect that this result would be correlated with a lower quality of democracy (Sørensen & Torfing, 2003; Jang, 2009). In examining the correlation between the degree of closeness within the parliamentary networks and the level of democracy, we controlled for the GDP per capita, unemployment rate, and human development index to see if any correlation, if found, was independent of these factors. The underlying theory for this analysis is that the control of power by a close-knit network is associated with higher levels of economic inequality, and the lack of public participation in policy formulation reduces the public auditing of governmental work, which consequently makes it less effective. (Feng, 1997; Pixley, 1994; Gerring et al., 2012).

In the analysis of the relationship between the networks of the members of parliament and democracy, we used the econometric model (Multiple Regression) by using the Ordinary Least Square (OLS) method, which has the following models:

$$VDEM = \beta_0 + \beta_1 gd_i + \beta_2 cpi_i + \beta_3 gdppc_i + \beta_4 unemp_i + \beta_5 edu_i + \beta_6 year_i + e_i \quad (1)$$

$$VDEM = \beta_0 + \beta_1 avg_i + \beta_2 cpi_i + \beta_3 gdppc_i + \beta_4 unemp_i + \beta_5 edu_i + \beta_6 year_i + e_i \quad (2)$$

⁷ The election index used to measure electoral democracy collected by Varieties of Democracy.

$$Pol5 = \beta_0 + \beta_1gd_i + \beta_2cpi_i + \beta_3gdppc_i + \beta_4unemp_i + \beta_5edu_i + \beta_6year_i + e_i \quad (3)$$

$$Pol5 = \beta_0 + \beta_1avg_i + \beta_2cpi_i + \beta_3gdppc_i + \beta_4unemp_i + \beta_5edu_i + \beta_6year_i + e_i \quad (4)$$

Table 1: Variables Used in the Model

Variable	Meaning	Reference
VDEM _i	V-DEM electoral democracy index of the members of parliament term i	(Dahl's, 1971; Brown, 2006)
Pol5 _i	Polity V index of the members of parliament term i	(Brown, 2006)
gd _i	graph density (social network density) in each parliament of the members of parliament term i	(Sørensen & Torfing, 2003; Jang, 2009)
avg _i	Average degree of degree centrality in each parliament of the members of parliament term i	(Sørensen & Torfing, 2003; Jang, 2009)
cpi _i	CPI ranking of Thailand of the members of parliament term i	(Kuzio, 2011)
gdppc _i	GDP per capita of the members of parliament term i	(Feng, 1997)
year _i	Each period of the year of the members of parliament term i	-
e _i	Error term of the members of parliament term i	-

Note : subscript *i* showcases in 4 term of the members of parliament, it contains 23rd Term MPs, 24th Term MPs , MPs under NCPO and 25th Term MPs.

Source: Authors' compilation

4. Results

In this section, the social network analysis was used to study the four parliamentary terms. The aim was to explore relationships between parliamentarians and compare changes in relationships throughout the four terms. The study contains four parts. (1) The study on kin-based relationships (2) the study on course-based relationships, which includes comparing kin-based relationships and course-based relationships among MPs. (3) The aggregate relationship patterns of MPs to highlight important networks and influential persons during each term. and (4) Discussion of results.

4.1 Results from the study on kin-based networks

We have provided two levels of analysis of the kin-based networks. In the first level, we use only MPs' surnames as an identifier of edges between nodes. Consequently, we extend our coverage of the analysis by incorporating their spouses' surname as an identifier. The result is shown in Table 2.

Table 2: Social Network Analysis of Kin-Based Relationships

Family Assembly		23 rd Term MPs	24 th Term MPs	MPs under NCPO	25 th Term MPs
MPs' Surnames	Nodes	687	673	668	767
	Number of nodes that are connected	118 (17.18%)	97 (14.41%)	39 (5.84%)	76 (9.91%)
	Edges	75	59	24	48
	Graph density	0.0003	0.0003	0.0001	0.0002
	Surnames with the highest number	Thianthong (4 Node)	Thianthong (5 Node)	Kuangam, Wongsuwan, and Nakornthap (3 Node)	Rattanaset (4 Node)
MPs' and Spouses' Surnames	Nodes	687	673	668	767
	Number of nodes that are connected	131 (19.07%)	113 (16.79%)	39 (5.84%)	88 (11.47%)
	Edges	85 ($\Delta 10$)	67 ($\Delta 8$)	24 ($\Delta 0$)	58 ($\Delta 10$)
	Graph density	0.0004	0.0003	0.0001	0.0002
	MP and spouse's surnames with the highest number	Thianthong (4 Node)	Thianthong (5 Node)	Kuangam, Wongsuwan, and Nakornthap (3 Node)	Rattanaset (4 Node)

Source: Authors' calculations

In the 23rd parliamentary term, among the 687 nodes of the members of parliament, 118 members, or 17.18% of all members, have at least one family member in parliament. Thus, we are able to identify 75 edges of kin-based ties. When combining the spouses' surnames, we found that the number of connected nodes increased modestly, and the total number of edges went up to 85. In the 24th term, which has 673 nodes, 14.41% of all members have at least one family member in parliament. We identified 59 edges, which increased to 67 edges when the analysis was expanded to include spouses' surnames. However, under the junta regime, among 668 members, the number of connected nodes was slightly lower than in the previous administration, and the number of identifiable edges dropped to 24 regardless of extending the coverage to spouses' surnames. However, after the general election in 2019, the common trend resumes. In the 25th parliamentary term, 76 nodes are connected and 48 edges are used when using MPs' surnames as the connector. The number increases by 40 nodes and 10 ties when spouses' surnames are included in the analysis.

When comparing graph density, which is the proportion of actual edges compared to all the potential edges, we observe that the density of the identifiable network dropped by 75% after the coup, suggesting that familial ties among MPs were less dense during the coup. The graph density in the post-junta regime suggests that the trend resumes, with a denser familial tie observed, yet still below the pre-junta level.

Moreover, when analysing the qualitative characteristics of the networks, we observed a change between the pre-junta and post-junta regimes. In the pre-junta regime, we were able to identify the Thianthong family as having the highest number of nodes. The Rattanaset family constitutes the family with the highest number of nodes in the post-junta regime.

4.2 Results of the study on course-based networks

Based on the work by Treerat & Vanichaka (2016), we have identified 4 courses of interest, namely, the National Defence Course, the Joint State-Private Sector Course, the Advanced Certificate Course in Politics and Governance in Democratic Systems for Executives, and the Capital Market Academy Programme (CMA). Additionally, we have included the Armed Forces Academies Preparatory School classes in the analysis. The results are shown in Table 3.

Table 3: Social Network Analysis of Course-Based Relationships

Educational Institutions		23 rd Term MPs	24 th Term MPs	MPs under NCPO	25 th Term MPs
Armed Forces Academies Preparatory School	Node	687	673	668	767
	Number of nodes that are connected	12 (1.75%)	12 (1.78%)	189 (28.29%)	79 (10.30%)
	Edge	10	15	1689	398
	Graph density	0.00004	0.0001	0.008	0.001
	Class with the highest number	6 (4 Node)	6 (5 Node)	15 (31 Node)	12 (22 Node)
Advanced Certificate Course in Politics and Governance in Democratic Systems for Executives ⁸	Node	687	673	668	767
	Number of nodes that are connected	48 (6.99%)	91 (13.52%)	41 (6.14%)	86 (11.21%)
	Edge	265	777	111	385
	Graph density	0.001	0.003	0.0005	0.001
	Class with the highest number	6 (20 Node)	13 (26 Node)	15 (9 Node)	16 (16 Node)
The Joint State-Private Sector Course Class ⁹	Node	687	673	668	767
	Number of nodes that are connected	2 (0.29%)	3 (0.45%)	59 (8.83%)	30 (3.91%)
	Edge	1	3	224	66
	Graph density	0	0	0.001	0.0002
	Class with the highest number	16 (2 Node)	16 (3 Node)	20 (14 Node)	20 (10 Node)
The National Defence	Node	687	673	668	767
	Number of nodes that are connected	20 (2.91%)	26 (3.86%)	158 (23.65%)	66 (8.61%)
	Edge	22	32	809	156
	Graph density	0.0001	0.0001	0.004	0.0005

⁸ In the Advanced Certificate Course in Politics and Governance in Democratic Systems for Executives in the 24th term, the analysis covered only attendance of the 1st – 14th classes of the Advanced Certificate course because the study focused on the relationships between members before the 2011 election. For the MPs under NCPO, the analysis covered only the MPS who attended the 1st – 16th classes of the Advanced Certificate course because the study focused on the relationships between members before the 2015 election. For the 25th term, the analysis covered only the attendance of the 1st – 21st classes of the Advanced Certificate course because the study focused on the relationships between members before the 2019 election.

⁹ In The Joint State-Private Sector Course Class, for the 23rd term, the analysis covered only those who attended the 16th – 18th classes The Joint State-Private Sector Course because the study focused on the relationships between members before the 2007 election. For the 24th term, the analysis covered only those who attended the 16th – 22nd classes The Joint State-Private Sector Course because the study focused on the relationships between members before the 2011 election.

Educational Institutions		23 rd Term MPs	24 th Term MPs	MPs under NCPO	25 th Term MPs
Course	Class with the	41	41	49	48
Class ¹⁰	highest number	(5 Node)	(6 Node)	(20 Node)	(11 Node)
The Capital	Node	687	673	668	767
Market	Number of nodes	0	16	82	61
Academy	that are connected	(0.00%)	(2.38%)	(12.28%)	(7.95%)
Programme	Edge	0	20	219	78
(CMA) ¹¹	Graph density	0	0.0001	0.0008	0.0003
	Class with the	-	7,10,11	5,7,10	21
	highest number		(4 Node)	(9 Node)	(6 Node)

Source: Authors' calculations

The most apparent case of course-based relationships is the case of the Armed Forces Academies Preparatory School classes. Prior to the coup, we identified 12 connected nodes with 10 edges in the 23rd term and 12 nodes with 15 edges in the 24th term. However, the number increased significantly to 189 connected nodes with 1,689 edges under the NCPO and 79 nodes with 398 edges in the 25th term. For the Advanced Certificate Course in Politics and Governance in Democratic Systems for Executives, we identified 48 connected nodes with 265 edges in the 23rd term, 91 nodes with 777 edges in the 24th term, 41 nodes with 111 edges under the NCPO, and 86 nodes with 385 edges in the 25th term. Regarding the Joint State-Private Sector Course, we identified 2 connected nodes with 1 edge in the 23rd term, 3 nodes with 3 edges in the 24th term, 59 nodes with 224 edges under the NCPO, and 30 nodes with 66 edges in the 25th term. For the National Defence Course Classes, we identified 20 connected nodes with 22 edges in the 23rd term, 26 nodes with 32 edges in the 24th term, 158 nodes with 809 edges under the NCPO, and 66 nodes with 156 edges in the 25th term. As for the Capital Market Academy Programme (CMA), we found 0 connected nodes and 0 edges in the 23rd term and 16 nodes with 20 edges in the 24th term. Surprisingly, the number of connected nodes increased to 82 with 219 edges under the NCPO and 61 nodes with 78 edges in the 25th term.

It is apparent that the graph density clearly differs from that of kin-based relationships. The degree was higher among members of the Legislative Assembly under the NCPO and MPs in the 25th term, while it was lower among MPs in the 23rd and 24th terms, except for those who attended the Advanced Certificate Course in Politics and Governance in Democratic Systems for Executives.

¹⁰ In The National Defence Course Class, for the 23rd term, the study analysed only those who attended the 1st – 48th classes of The National Defence Course because the study focused on the relationship between members before the 2007 election.

¹¹ In The Capital Market Academy Programs (CMA), for the 23rd term, the analysis covered only those who attended the 1st – 3rd classes of the Capital Market Academy Programs because the study focused on the relationships between members before the 2007 election. For the 24th term, the analysis covered only those who attended the 1st – 11th classes of the Capital Market Academy Programs because the study focused on the relationships between members before the 2011 election. The MPs under NCPO, the were only analysed if they attended the 1st – 17th classes because the study focused on the relationships between members before the 2015 election. For the 25th term, the analysis covered only those who attended the 1st – 21st classes of the Capital Market Academy Programs because the study focused on the relationship between members before the 2019 election.

By employing a social network analysis tool to analyse information on the 4 terms of MPs – the 23rd term, the 24th term, under NCPO, and the 25th term, we showed that different patterns of relationship networks existed between MPs during these 4 terms. Two existing relationship patterns were discovered. The first was a kin-based pattern, and the second was course-based. We found the highest number of course-based relationships among those who attended the Armed Forces Academies Preparatory School during the NCPO term. The graph density was as high as 0.008, followed by the 25th term at 0.001. The number of relationships between those who attended the Preparatory School during the 23rd and 24th terms was low. The results were similar when we explored relationships between those who attended the National Defence Course, the Joint State-Private Sector Course, and the Capital Market Academy Programme (CMA). The graph density was highest during the NCPO term at 0.004, 0.001, and 0.0008, respectively. This was followed by the 25th term at, respectively, 0.0005, 0.0002, and 0.0003. For the 23rd and 24th terms, relationships between those who attended these three courses were extremely low to non-existent.

However, the course-based relationship between those who attended the Advanced Certificate Course in Politics and Governance in Democratic Systems for the Executive was different from the other courses. We found high numbers of relationships between the 24th term MPs. The graph density was 0.003, followed by the 23rd and 25th terms, both at 0.001. The density for MPs under the NCPO term was 0.0005.

4.3 Results of the study on the total network of relationship

In addition, when all relationships within each term were aggregated and compared all types of relations. It is apparent that the graph density of the NCPO MPs was the highest at 0.0144. This was followed by the 24th and 25th terms, at 0.0036 and 0.0032, respectively. The 23rd term had the lowest density at 0.00154. Table 4 summarises the graph densities showing the relationship links between Thai politicians.

Table 4: Social Network Analysis of Thai Politicians

Links	23rd Term MPs	24th Term MPs	MPs under NCPO	25th Term MPs
Kin-based relationships				
MP Surnames	0.0003	0.0003	0.0001	0.0002
MP and Spouse's Surnames	0.0004	0.0003	0.0001	0.0002
Course-based Relationships				
Armed Forces Preparatory School	0.00004	0.0001	0.008	0.001
Advanced Certificate Course in Politics and Governance in Democratic Systems for the Executive	0.001	0.003	0.0005	0.001
Joint State-Private Sector Course	0	0	0.001	0.0002
National Defence Course	0.0001	0.0001	0.004	0.0005
CMA	0	0.0001	0.0008	0.0003
Graph density	0.002	0.004	0.012	0.004
Average degree¹²	1.115	2.707	8.838	2.863

Source: Authors' calculations

To summarise, we have employed social network analysis in this study and were able to show that the graph density of the NCPO parliament is 3 times higher than the

¹² Average degree is the average of degree centrality of all nodes in the networks.

density of the second and third densest parliamentary terms (the 24th term and the 25th). Moreover, the density is 6 times denser than the least dense network (the 23rd term). It is useful to note that the density is the proportion of the identified networks, through kin-based or course-based relationships, the higher density suggests that members of the network are more connected to the specified ties. Therefore, the densest network of the parliament under NCPO suggests that compared to elected governments, the members are more tightly connected. Among the two means of connection, kin-based and course-based, we observe a slightly lower kin-based relationship. However, we observed a significantly higher connection through the course-based relationship, especially for the Class 15 of the Armed Forces Preparatory School. Yet, the result is not surprising, as the school has been well regarded as the only institution responsible for training high school students who would later become commanders in the armed forces. Nevertheless, the interesting result lies in the denser ties between the CMA course alumni, which mostly incorporates executives from the private sector. We observe an eightfold increase in graph density from this course after the coup by the NCPO.

When analysed using the average degree of the networks, the NCPO term has 3.1, 3.26, and 7.9 times more mean edges per node than the 25th, 24th, and 23rd terms, respectively. It is also worth noting that relationship patterns were obviously diverse in different ways. Relationships during the 23rd and 24th terms were highly kin-based, while those during NCPO and the 25th term are highly course-based. There was a clear change from a kin-based regime to a course-based regime.

4.4 Results of the analysis for correlation between the calculated network values and the level of democracy

In this analysis, we examine the relationship between the network characteristics of members of parliament and democracy in Thailand by employing social network analysis statistics across four sets of members of parliament. The analysis covers the period from 2007 to 2022, resulting in 16 observations.

The results from the analysis, as shown in Table 5, illustrate an inverse relationship between graph density and average degree with the V-DEM electoral democracy index from 2007 to 2022, with coefficients of -19.5733 for graph density (Column 1) and -0.0260 for average degree (Column 3). This indicates that during the terms where there was a stronger network of connections within the parliament, the quality level of democracy was assessed as lower. One possibility is that democracy deteriorates because policymaking does not truly reflect the needs of the public but is instead captured by the network. This finding is consistent with studies by Sørensen & Torfing (2003) and Jang (2009).

If the yearly variation of the V-DEM electoral democracy index is included in the analysis for each period of the parliament term (Columns 2 and 4), the effect of graph density and average degree on the V-DEM electoral democracy remains significant. Moreover, this model points out that graph density and average degree were inversely related to the V-DEM electoral democracy index, with a coefficient of -16.5848 in graph density and -0.0220 in average degree.

Table 5: The Relationship Between the Network of Members in Parliament and Democracy Using V-DEM

VDEM	(1)	(2)	(3)	(4)
con	0.7386 *** (0.2056)	61.5616 ** (25.2614)	0.7197 *** (0.2018)	60.6134 ** (2.1278)
gd	-19.5733 *** (4.0416)	-16.5848 *** (8.0895)		
avg			-0.0260 *** (0.0053)	-0.0220 *** (0.0049)
cpi	-0.0035 ** (0.0039)	-0.0010 (0.0042)	-0.0035 (0.0038)	-0.0010 (0.0031)
gdppc	-0.0001 (0.0001)	0.00010 (0.0001)	-0.0001 (0.0001)	0.0001 (0.0001)
year		-0.0306 ** (0.0127)		-0.0301 ** (0.0126)
observation	16	16	16	16
F-test	10.03	7.74	10.39	7.97
p-value	0.0014	0.0032	0.0012	0.0029
r-square	0.5316	0.6589	0.5385	0.6614
Adj r-square	0.4140	0.5350	0.4230	0.5380

Note: The model uses an ordinary least squares approximation. It is a consideration of factors affecting the level of democracy in Thailand (VDEM). The left-hand side variables are independent variables that show the factors affecting VDEM, which each column represents, coefficient and, in the bracket, as error terms of factors. For columns (1) - (2) correspond to equation (1), it is a model that uses the network graph density (gd) and robustness check by adding the year variable in column (2). For column (3) – (4) correspond to equation (2), it is a model that uses the average degree of centrality (avg) of every node in each parliament and robustness check by adding year variable in column (4). ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors' calculations

To confirm the effect of the relationship between the characteristics of the network of members of parliament and the level of democratic quality, we repeated the analysis with Polity V. However, there are only 13 observations in these models because the Center for Systemic Peace collected data every 4 years. Therefore, we have data only from 2007 to 2019.

From Table 6, it can be observed that the graph density and the average degree of the networks were also inversely related to Polity V (Columns 5 and 7). However, when the yearly variation in Polity V was included in the analysis (Columns 6 and 8), the correlation between the network values and the level of democracy as determined by Polity V became insignificant.

Table 6: The Relationship Between the Network of Members in Parliament and Democracy Using Polity V

Polity V	(5)	(6)	(7)	(8)
con	7.0896 (9.2757)	3868.88 (2634.196)	6.5073 (9.3199)	3806.091 (2656.684)
gd	-685.2631 (269.812)	** -196.4962 (447.7959)		
avg			-0.9034 (0.3487)	** -0.2716 (0.5905)
cpi	-0.0187 (0.1277)	0.0226 (0.1287)	-0.0191 (0.1265)	0.0217 (0.1290)
gdppc	-0.0001 (0.002)	0.0052 (0.0033)	0.0001 (0.0019)	0.0051 (0.0033)
year		-1.9363 (1.3201)		-1.9049 (1.3312)
observation	13	13	13	13
F-test	3.80	3.71	3.88	3.73
p-value	0.0519	0.0541	0.0494	0.0535
r-square	0.5589	0.6499	0.5641	0.6509
Adj r-square	0.4118	0.4749	0.4188	0.4764

Note: The model uses an ordinary least squares approximation. It is a consideration of factors affecting the concomitant qualities of democratic and autocratic authority in governing in Thailand (Pol5). The left-hand side variables are independent variables that show the factors affecting Pol5, which each column represents, coefficient and, in the bracket shows error terms of factors. For column (5) – (6) corresponds to equation (3), it is a model that uses the network graph density (gd) and year variable in column (6). For column (7) – (8) corresponds to equation (4), it is a model that uses the average degree centrality (avg) of every node in each parliament and robustness check by adding year variable in column (8). ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Source: Authors' calculations

To summarise, both the network density and average degree were inversely correlated with the quality of democracy as determined by well-recognised indexes for democracy, VDEM and Polity V. This correlation appears to be robust and remained significant when yearly variations of the indexes were used for analysis and controlled for GDP, unemployment rate, and the human development index. The simplest explanation for this inverse correlation is that when parliamentary networks from kin-based relationships and course-based relationships are stronger, there is a higher risk of cronyism and nepotism in parliament. As parliament is the place where national laws and policies are determined, these may be distorted by cronyism or captured by the networks. The beneficial effects of potential policies and laws on the people are attenuated, as is the power of the people to determine effective policies for their needs, and thus democracy is weakened.

5. Conclusions and Policy Inference

In this section, we summarise the key findings of the study. We provide recommendations for improving governance and political processes in Thailand. These insights aim to foster greater transparency and public participation.

5.1 Conclusions

In this paper, we first studied the levels and patterns of relationships between Members of Parliament using social network analysis tools. Secondly, we compared the levels and patterns of relationships between Members of Parliament in different parliamentary terms, starting from their appointment under the 2007 Constitution through today, and lastly, we analysed the correlation between the statistical values of the networks and the level of democracy in Thailand. The main contribution of this paper is that we are the first to have quantified the empirical values for the strengths, sizes, and densities of networks among people in the Thai political system and analysed the relationship of these political networks to the level of democracy in Thailand.

Social network analysis and regression estimation were employed as the main methodologies in this paper. Due to the limited dataset, this paper studied the political relationships between Members of Parliament during four different parliamentary terms, some of which were electoral while others were appointed by the military or contained many previous military personnel. These 4 terms were: the 23rd term during governments led by Samak Sundaravej, Somchai Wongsawat, and Abhisit Vejjajiva (23rd December 2007-10th May 2011), the 24th term with Yingluck Shinawatra as the prime minister (3rd July 2011-9th December 2013), the 2014 National Legislative Assembly (31st July 2014-21st May 2019, the military government under NCPO), and the 25th term under Prayut Chan-o-cha (24th May 2019-2023). The political network diagrams show kin-based and course-based relationships, which were constructed from data obtained from course registries that Members of Parliaments from all 4 terms attended at the Armed Forces Academies Preparatory School, The National Defence Course, The Joint State-Private Sector Course, the Advanced Certificate Course in Politics and Governance in Democratic Systems for the Executive, and the Capital Market Academy Programme (CMA).

The results from the study on kin-based networks using MPs' and spouses' surnames showed that the highest values of graph density were seen during the 23rd and 24th terms, while the values for course-based networks arising from the 5 specific courses were highest during the military government under NCPO and the 25th term. This result indicates changes in the composition of networks and evidently confirms that networking is still present in the Thai political system as cronyism. Although the values for graph density and average degree for the National Legislative Assembly under the NCPO were higher than the other terms when the total network of relationships was used, there is currently no context to judge how significant this is or whether these values are high or low for a military-appointed parliament. Similarly, the network values obtained for the electoral parliaments in this study need to be compared to other parliaments in other countries before it can be judged as high or low.

Finally, this paper analysed the correlation between the statistical values of the networks and the level of democracy in Thailand. The results showed a significant inverse correlation between the statistical value of network concentration, in both measurements of total graph density and average degree in each parliament, and the level of democracy, for both the V-DEM electoral democracy index and the Polity V index, when CPI

ranking, GDP per capita, unemployment rate, human development index, and yearly data were controlled. These empirical results demonstrate that the level of political networks in the parliament, and by extrapolation, the problem of cronyism, is associated with the problem of democracy in Thailand.

5.2 Limitations

Our study has some limitations. Although it is the most detailed study looking at the networks of parliamentarians in Thailand to date, the relationships that were used to calculate the network values were only the surnames, spouses' surnames, and course-based relationships. Other relationships may have existed, such as business ties, alumni or school ties, or kinship ties beyond surnames (such as nephews and nieces or in-laws with different surnames), which were not included in our study. Other countries may have other types of relationships, such as tribal or clan relationships, which are not pertinent to Thailand, or conversely, they may not have educational courses that help form relationships later in life similar to those found in Thailand, and all this may make the results of our study seem less valid or generalisable. Nevertheless, even with our limited scope, we have shown that, firstly, for different parliamentary terms, the type or pattern of relationships changes, corresponding to some degree with the selection method of the members of parliament (electoral or military government), and secondly, the strength of the network, as determined by its density and average degree, is inversely correlated with the quality of democracy as measured by accepted indexes such as the VDEM and Polity V indexes.

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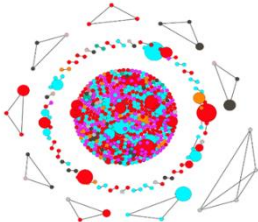
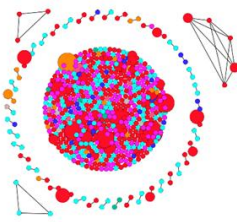
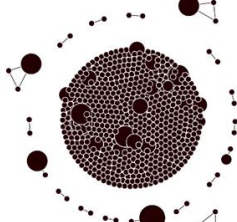
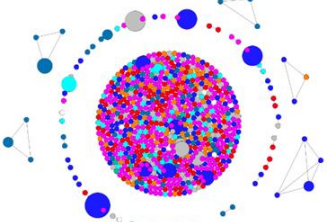
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Appendix

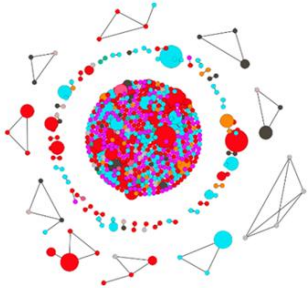
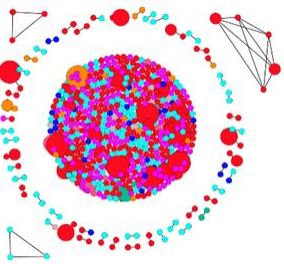
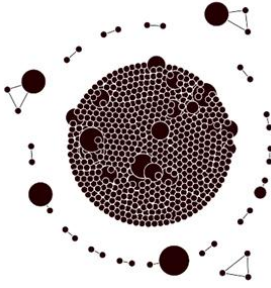
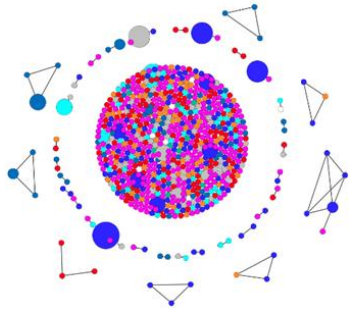
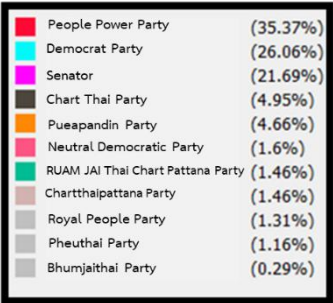
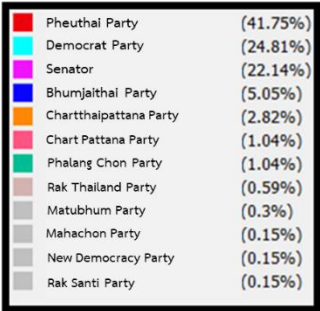
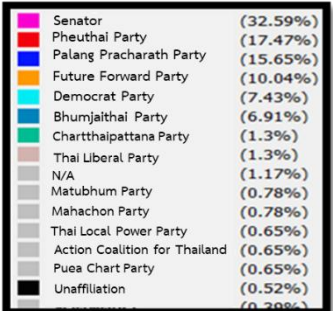
Table 7: Social Network Analysis using MPs' Surnames (for kin relationships)

Links	23 rd Term MPs	24 th Term MPs	MPs under NCPO	25 th Term MPs
Surnames ¹				
Party identification	- People Power Party (35.37%) - Democrat Party (26.06%) - Senator (21.69%) - Chart Thai Party (4.95%) - Pueapandin Party (4.66%) - Neutral Democratic Party (1.6%) - RUAM JAI Thai Chart Pattana Party (1.46%) - Chartthaipattana Party (1.46%) - Royal People Party (1.31%) - Pheuthai Party (1.16%) - Bhumjaithai Party (0.29%)	- Pheuthai Party (41.75%) - Democrat Party (24.81%) - Senator (22.14%) - Bhumjaithai Party (5.05%) - Chartthaipattana Party (2.82%) - Chart Pattana Party (1.04%) - Phalang Chon Party (1.04%) - Rak Thailand Party (0.59%) - Matubhum Party (0.3%) - Mahachon Party (0.15%) - New Democracy Party (0.15%) - Rak Santi Party (0.15%)	-	- Senator (32.59%) - Pheuthai Party (17.47%) - Palang Pracharath Party (15.65%) - Future Forward Party (10.04%) - Democrat Party (7.43%) - Bhumjaithai Party (6.91%) - Chartthaipattana Party (1.3%) - Thai Liberal Party (1.3%) - N/A (1.17%) - Matubhum Party (0.78%) - Mahachon Party (0.78%) - Thai Local Power Party (0.65%) - Action Coalition for Thailand (0.65%) - Puea Chart Party (0.65%) - Unaffiliation (0.52%)
Node	687	673	668	767
Edge	75	59	24	48
Graph density	0.0003	0.0003	0.0001	0.0002
Surnames with the highest number	Thianthong (4 Nodes)	Thianthong (5 Nodes)	Kuangam, Wongsuwan, and Nakornthap (3 Nodes)	Rattanaset (4 Nodes)

Source: Authors

¹ Nodes without edge lines to other nodes or groups of nodes are placed in the middle of the network in the image. This means that there are no kin relationships with other members of Parliament at all. A node with an edge line is associated with other nodes, meaning that there is a kin relationship with that node.

Table 8: Social Network Analysis using MPs' Own and Spouses' Surnames (for kin relationships)

Links	23 rd Term MPs	24 th Term MPs	MPs under NCPO	25 th Term MPs
MPs' and Spouses' Surnames				
Party identification			-	
Node	687	673	668	767
Edge	85 ($\Delta 10$)	67 ($\Delta 8$)	24 ($\Delta 0$)	58 ($\Delta 10$)
Graph density	0.0004	0.0003	0.0001	0.0002
MP and spouse's surnames with the highest number	Thianthong (4 Nodes)	Thianthong (5 Nodes)	Kuangam, Wongsuwan, and Nakornthap (3 Nodes)	Rattanaset (4 Nodes)

Source: Authors

Table 9: Social Network Analysis using Armed Forces Academies Preparatory School attendance

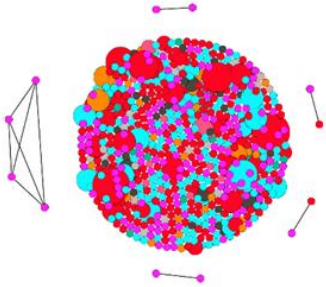
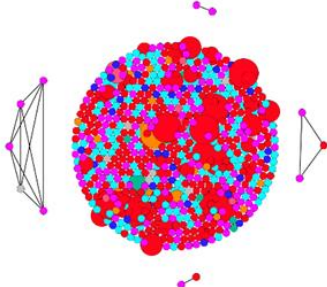
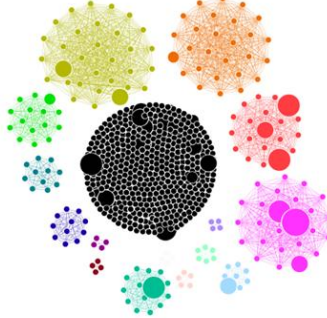
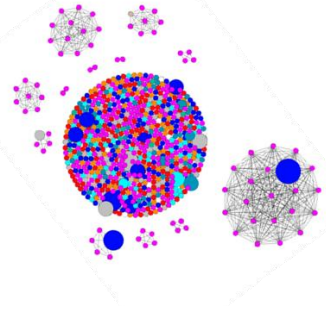
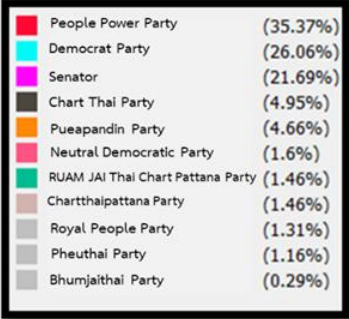
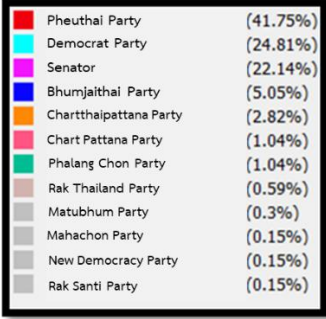
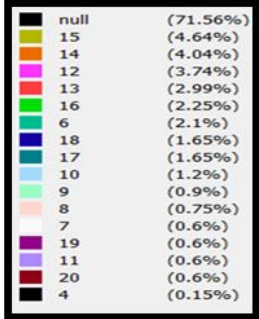
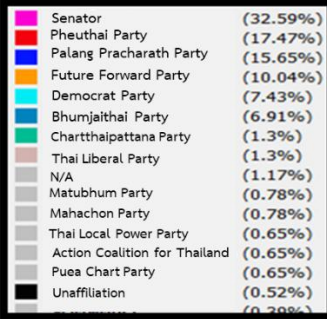
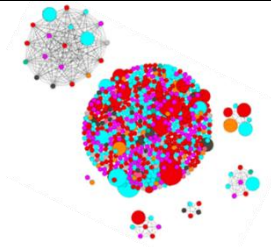
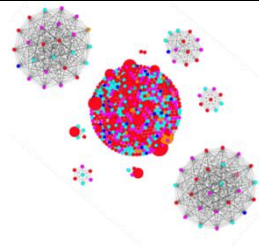
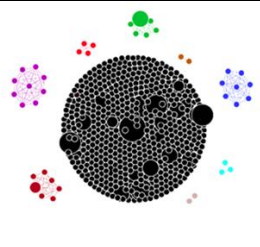
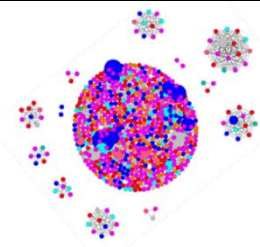
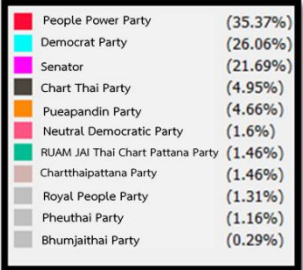
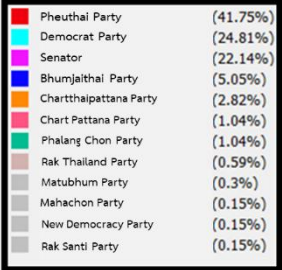
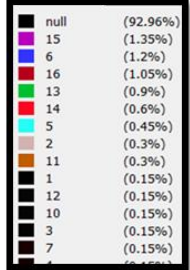
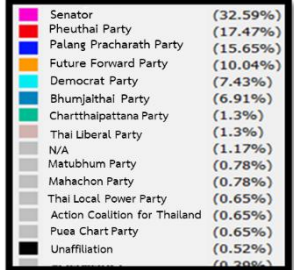
Links	23 rd Term MPs	24 th Term MPs	MPs under NCPO	25 th Term MPs
Armed Forces Academies Preparatory School				
Party identification /class				
Node	687	673	668	767
Edge	10	15	1689	398
Graph density	0.00004	0.0001	0.008	0.001
Class with the highest number	6 (4 Nodes)	6 (5 Nodes)	15 (31 Nodes)	12 (22 Nodes)
Source: Authors				

Table 10: Social Network Analysis using Attendance of the Advanced Certificate Course in Politics and Governance in Democratic Systems for the Executive

Links	23 rd Term MPs	24 th Term MPs ²	MPs under NCPO ³	25 th Term MPs ⁴
Advanced Certificate Course in Politics and Governance in Democratic Systems for Executive				
Party identification /class				
Node	687	673	668	767
Edge	265	777	111	385
Graph density	0.001	0.003	0.0005	0.001
Class with the highest number	6 (20 Nodes)	13 (26 Nodes)	15 (9 Nodes)	16 (16 Nodes)

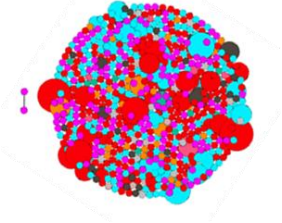
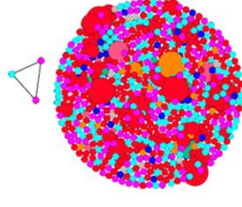
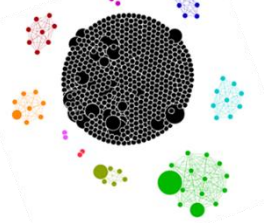
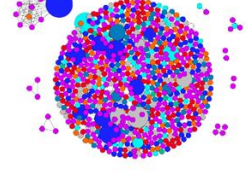
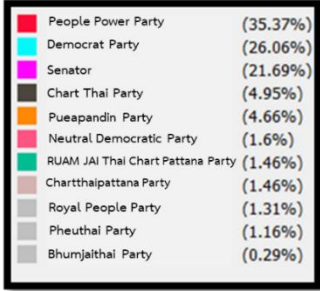
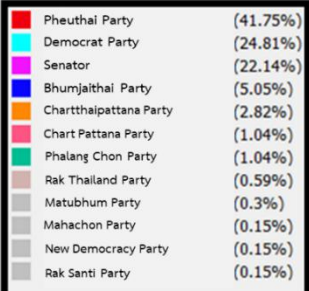
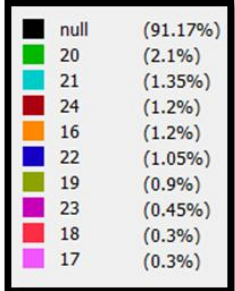
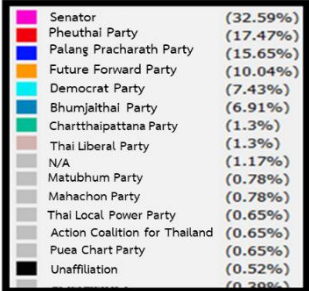
Source: Authors

² For the 24th term, the analysis covered only attendance of the 1st – 14th classes of the Advanced Certificate course because the study focused on the relationships between members before the 2011 election.

³ For the MPs under NCPO, the analysis covered only the MPS who attended the 1st – 16th classes of the Advanced Certificate course because the study focused on the relationships between members before the 2015 election.

⁴ For the 25th term, the analysis covered only the attendance of the 1st – 21st classes of the Advanced Certificate course because the study focused on the relationships between members before the 2019 election.

Table 11: Social Network Analysis using Attendance of The Joint State-Private Sector Course

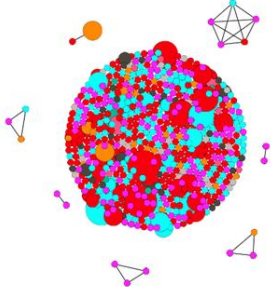
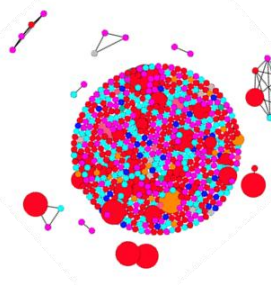
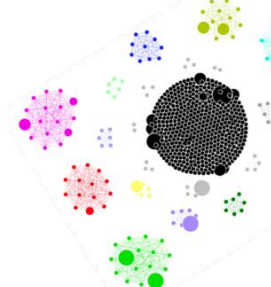
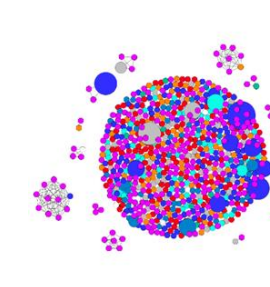
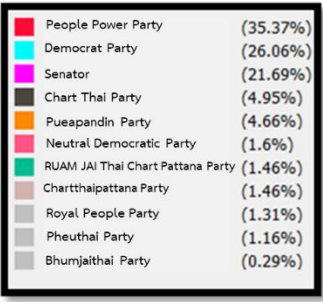
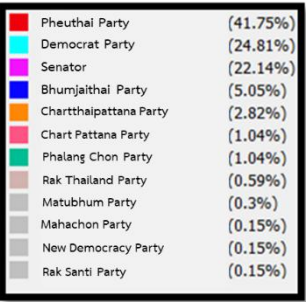
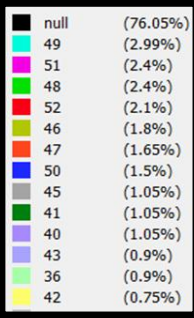
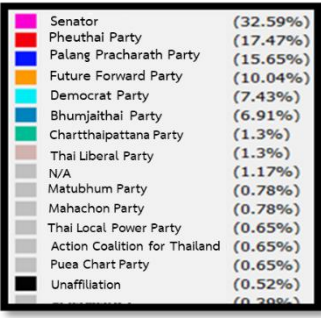
Links	23 rd Term MPs ⁵	24 th Term MPs ⁶	MPs under NCPO	25 th Term MPs
The Joint State-Private Sector Course Class				
Party identification /class				
Node	687	673	668	767
Edge	1	3	224	66
Graph density	0	0	0.001	0.0002
Class with the highest number	16 (2 Nodes)	16 (3 Nodes)	20 (14 Nodes)	20 (10 Nodes)

Source: Authors

⁵ For the 23rd term, the analysis covered only those who attended the 16th – 18th classes the Joint State-Private Sector Course because the study focused on the relationships between members before the 2007 election.

⁶ For the 24th term, the analysis covered only those who attending the 16th – 22nd classes the Joint State-Private Sector Course because the study focused on the relationships between members before the 2011 election.

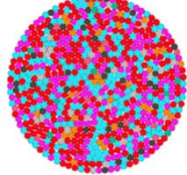
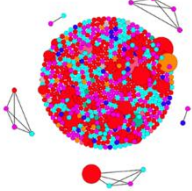
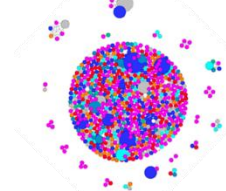
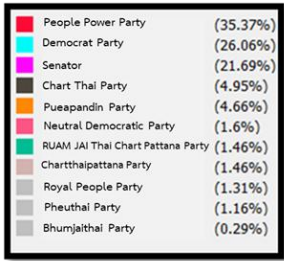
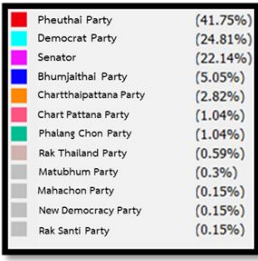
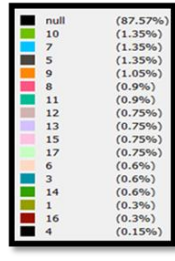
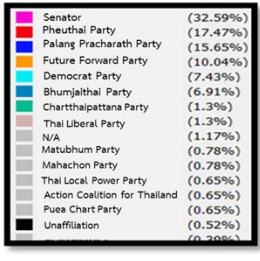
Table 12: Social Network Analysis using Attendance of The National Defence Course

Links	23 rd Term MPs ⁷	24 th Term MPs	MPs under NCPO	25 th Term MPs
The National Defence Course Class				
Party identification /class				
Node	687	673	668	767
Edge	22	32	809	156
Graph density	0.0001	0.0001	0.004	0.0005
Class with the highest number	41 (5 Nodes)	41 (6 Nodes)	49 (20 Nodes)	48 (11 Nodes)

Source: Authors

⁷ For the 23rd term, the study analysed only those who attended the 1st – 48th classes of the National Defence Course because the study focused on the relationship between members before the 2007 election.

Table 13: Social Network Analysis using Attendance of the Capital Market Academy Programme (CMA)

Links	23 rd Term MPs ⁸	24 th Term MPs ⁹	MPs under NCPO ¹⁰	25 th Term MPs ¹¹
The Capital Market Academy Programme (CMA)				
Party identification /class				
Node	687	673	668	767
Edge	0	20	219	78
Graph density	0	0.0001	0.0008	0.0003
Class with the highest number	-	7,10,11 (4 Nodes)	5,7,10 (9 Nodes)	21 (6 Nodes)

Source: Authors

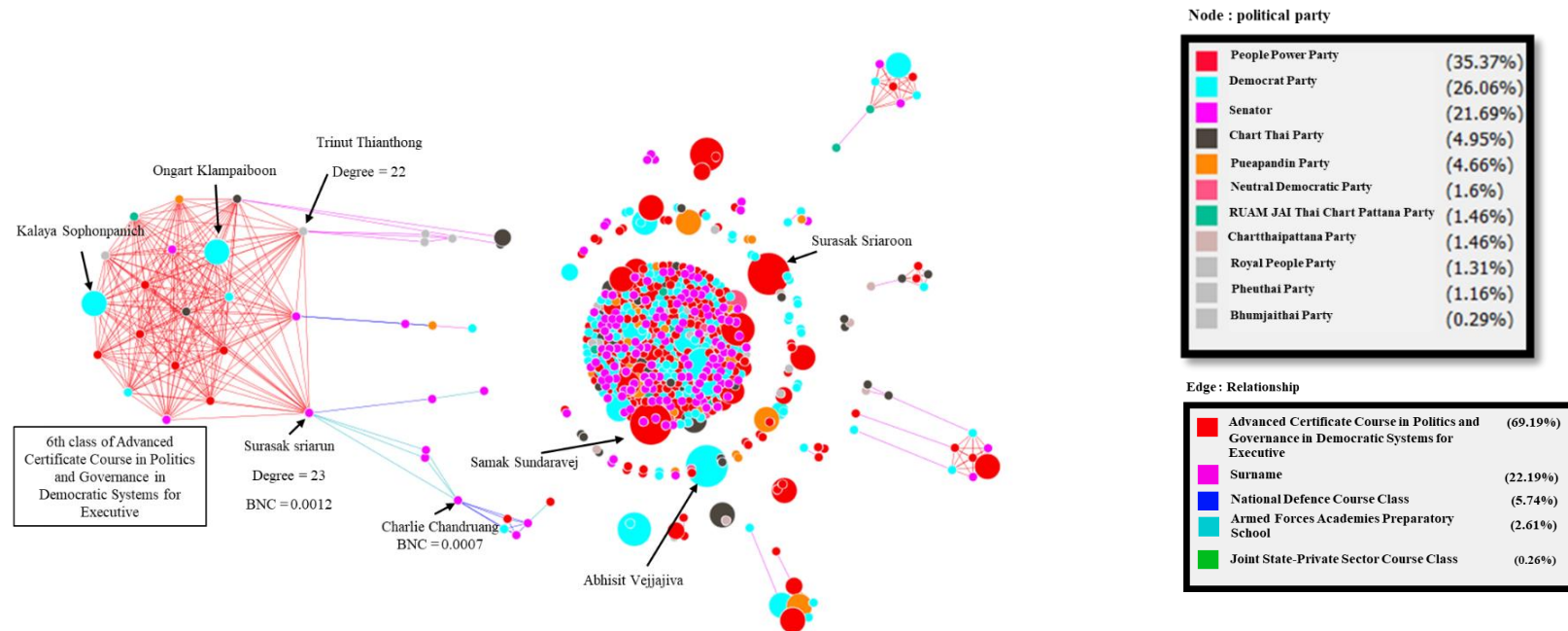
⁸ For the 23rd term, the analysis covered only those who attended the 1st – 3rd classes of the Capital Market Academy Programmes because the study focused on the relationships between members before the 2007 election.

⁹ For the 24th term, the analysis covered only those who attended the 1st – 11th classes of the Capital Market Academy Programmes because the study focused on the relationships between members before the 2011 election.

¹⁰ The MPs under NCPO, the were only analysed if they attended the 1st – 17th classes because the study focused on the relationships between members before the 2015 election.

¹¹ For the 25th term, the analysis covered only those who attended the 1st – 21st classes of the Capital Market Academy Programmes because the study focused on the relationship between members before the 2019 election.

Figure 1: Relationship Patterns between the 23rd term MPs

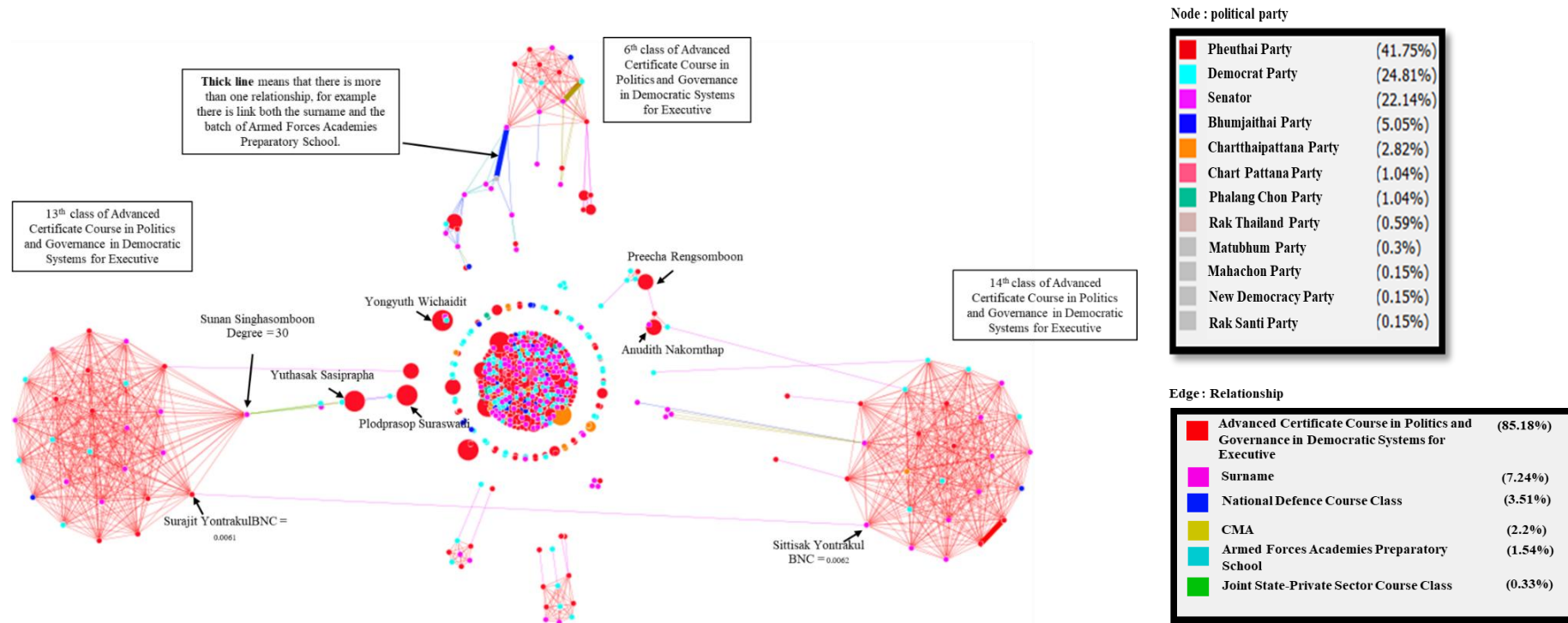


Source: Authors

Among the 687 nodes representing MPs in the 23rd term, we found the highest number of edges linking those who attended the Advanced Certificate Course in Politics and Governance in Democratic Systems for the Executive. This was followed by edges linking surnames, attendance at the National Defence Course, the Armed Forces Academies Preparatory School, and the Joint State-Private Sector Course, respectively. There were 383 pairs in total, with a graph density's value of 0.002 and an average degree of 1.115. Surasak Sriaroon had the highest graph degree at 23. He also had the highest betweenness centrality¹² at 0.0012, followed by Charlie Chandruang at 0.0007.

¹² Betweenness Centrality is a formula based on the connections of relationships between node groups within the network. They may not be directly connected. Nodes with a high degree of betweenness centrality can be compared to bridges connecting node groups within the network. In this case, they would represent MPs who had relationships with several groups of MPs in the network.

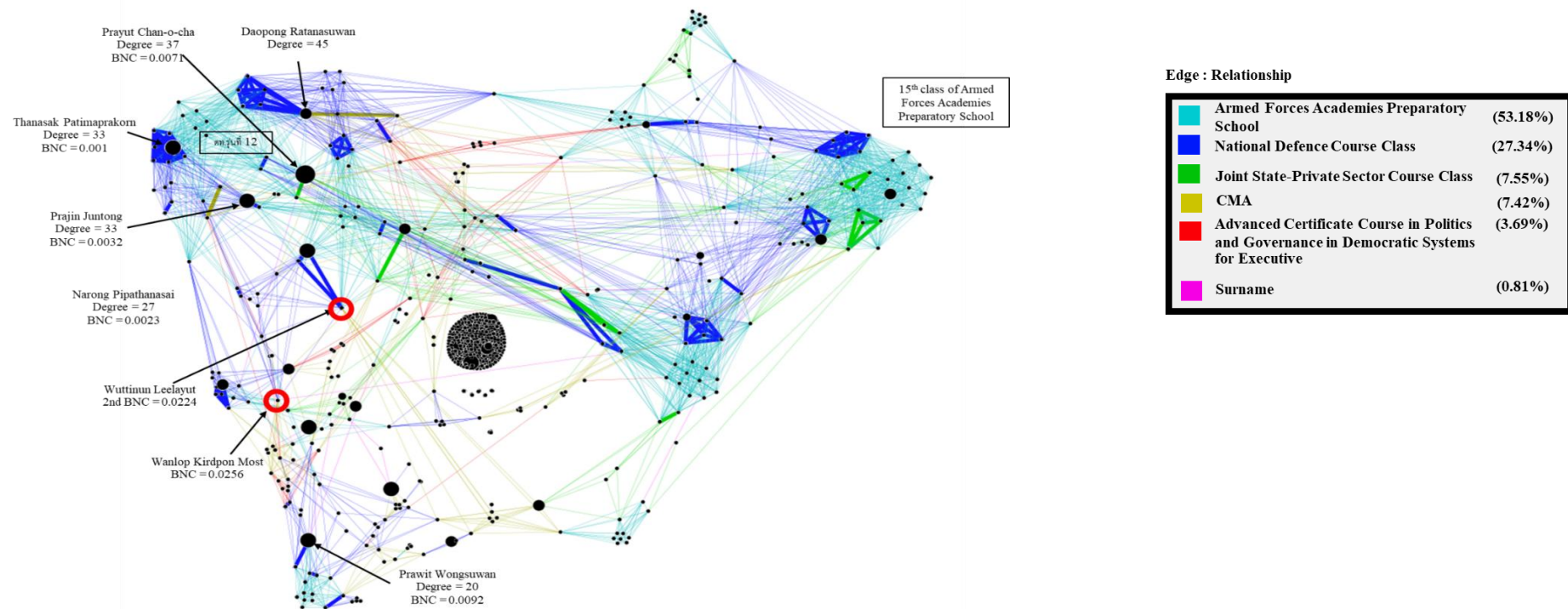
Figure 2: Relationship Patterns between the 24th term MPs



Source: Authors

Among the 673 nodes representing MPs in the 24th term, we found the highest number of edges linking those who attended the Advanced Certificate Course in Politics and Governance in Democratic Systems for the Executive. This was followed by edges linking surnames, attendance at the National Defence Course, the Capital Market Academy Programme (CMA), the Armed Forces Academies Preparatory School, and the Joint State-Private Sector Course, respectively. There are 911 pairs in total, with a graph density value of 0.004 and an average degree of 2.707. Sunan Singhasomboon had the highest graph degree at 30. Sittisak Yontrakul had the highest betweenness centrality at 0.0062, followed by Surajit Yontrakul, a Pheu Thai Party member, at 0.0061.

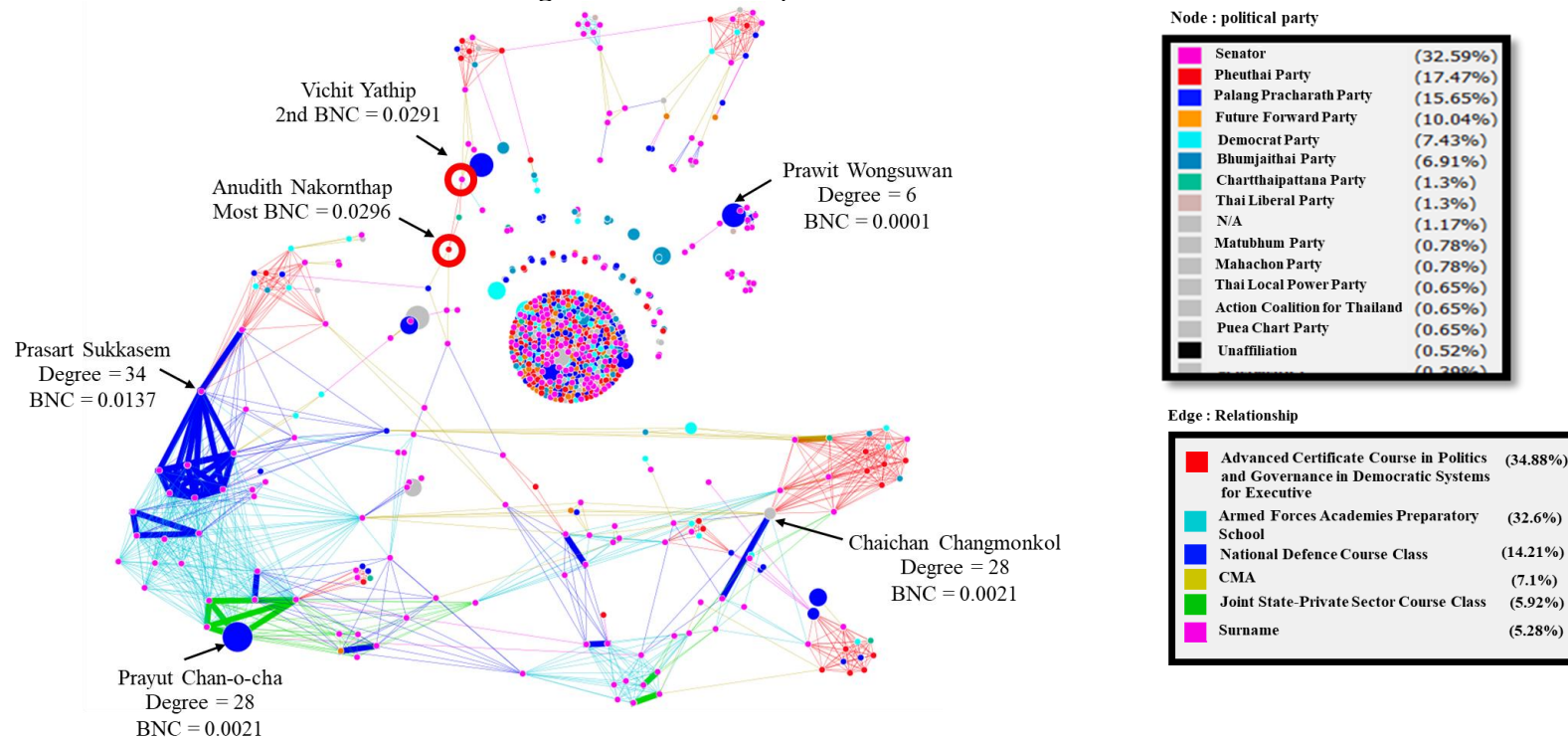
Figure 3: Relationship Patterns between MPs under NCPO



Source: Authors

Among the 668 nodes representing MPs under NCPO, we found the highest number of edges linking those who attended the Armed Forces Academies Preparatory School. This was respectively followed by edges linking the National Defence Course, the Joint State-Private Sector Course, the Capital Market Academy Programme (CMA), the Advanced Certificate Course in Politics and Governance in Democratic Systems for the Executive, and surnames. There are 2,952 pairs in total, with a graph density value of 0.012 and an average degree of 8.838. Daopong Ratanasuwan had the highest graph degree at 45. Wanlop Kirdpon had the highest betweenness centrality at 0.0256, followed by Surajit Yontrakul at 0.0224.

Figure 4: Relationship Patterns between 25th term MPs



Source: Authors

Among the 767 nodes representing MPs in the 25th term, we found the highest number of edges linking those who attended the Advanced Certificate Course in Politics and Governance in Democratic Systems for Executives. This was followed by edges linking attendance at the Armed Forces Academies Preparatory School, the National Defence Course, the Capital Market Academy Programme (CMA), the Advanced Certificate Course in Politics and Governance in Democratic Systems for the Executive, and surnames, respectively. There were 1,098 pairs in total, with a graph density value of 0.004 and an average degree of 2.863. Prasart Sukkasem had the highest graph degree at 34. Anudith Nakornthap, a Pheu Thai Party member, had the highest betweenness centrality at 0.00296, followed by Vichit Yathip at 0.02917.