Migration Letters
July 2021
Volume: 18, No: 4, pp. 425 – 438
ISSN: 1741-8984 (Print) ISSN: 1741-8992 (Online)
journals.tplondon.com/ml

TRANSNATIONAL PRESS® LONDON

Received: 3 June 2020 Accepted: 29 December 2020
DOI: https://doi.org/10.33182/ml.v18i4.1035

Diaspora Network of ASEAN-5: Centrality Analysis and Implication for Diaspora Engagement

Kuk Fai Fok[1], Ming Yu Cheng[2], and Hoi Piew Tan[3]

Abstract

The highly skilled diasporas (HSDs) are increasingly recognised as important development resources stored abroad for the home countries. This motivated many countries to implement diaspora engagement initiatives to transfer the skills, knowledge and financial remittances of their HSDs. However, there is lack of systematic approach to understand how to tap the economic resources associated with these HSDs. Using a novel approach based on the centrality metrics of Social Network Analysis (SNA), this study assessed the capabilities of Indonesia, Malaysia, Philippines, Singapore and Thailand (ASEAN-5) to engage their HSDs from the perspective of Global Diaspora Network (GDN). The findings reveal that Thailand and the Philippines could optimise their strong connectivity in GDN to channel overseas economic opportunities from heterogeneous destinations. However, Indonesia, Malaysia and Singapore should implement a more targeted diaspora engagement strategy which focuses on a smaller number of well-connected destination countries, in order to overcome their weak connectivity in GDN. The difference in the network advantages suggests that ASEAN-5 should complement each other by establishing a collaborative platform to pool the expertise and transnational networks of their HSDs for national and regional development.

Keywords: *Highly skilled diasporas; global diaspora network; social network analysis; centrality; ASEAN*

Introduction

Increasing mobility of highly skilled persons, driven mainly by globalisation and career opportunities has created a large pool of overseas talents (Cangia and Zittoun, 2018). Such human capital deposited abroad has been increasingly recognised as critical resources for economic development in their home countries (Ho and Boyle, 2015; Ullah et al., 2019). Many countries have introduced diaspora engagement initiatives to tap into the transnational networks of their highly skilled diasporas (HSDs), in order to channel diaspora resources, such as business opportunities and technological innovations from destination countries (Gamlen 2014; Cheng, 2016; Fok et al., 2018).

The five most dynamic economies in ASEAN, namely Indonesia, Malaysia, the Philippines, Singapore and Thailand (hereinafter abbreviated as ASEAN-5) have also implemented various diaspora engagement initiatives since the 1970s to compensate for the outflows of highly skilled persons and promote brain circulation between the destination and home countries (Saxenian, 2003; Ullah et al., 2019). The eminent examples include the *Balik* Scientists Program of the Philippines (Panela, 2019), the Overseas Singaporean Unit (OSU) of Singapore (Ho and Boyle, 2015), the Reserve Brain Drain Programme (RBD) of Thailand

[1] Dr. Fok, Kuk Fai Faculty of Accountancy and Management Universiti Tunku Abdul Rahman (UTAR) 43000 Kajang, Selangor, Malaysia Tel: (603) 90860288 Ext: 181 Fax: (603) 9019 1095 E-mail: fokkukfai@gmail.com.
[2] Prof. Cheng, Universiti Tunku Abdul Rahman, Malaysia. E-mail: chengmy@utar.edu.my.
[3] Dr Tan, YPC International College, Malaysia. E-mail: tanhoipiew@ypccollege.edu.my.

(International Labour Organisation, 2015), the diaspora engagement initiatives implemented by the Talent Corporation of Malaysia (Talent Corporation Malaysia Berhad, 2018) and the Indonesian Diaspora Network (IDN) promoted by the Indonesian government (Indonesian Diaspora Network, 2018).

However, although diaspora networks have become the focus of the diaspora engagement initiatives around the world, not much has been devoted to study the mechanisms on how to tap the resources embedded in HSDs (Setijadi, 2017; Bilecen et al., 2018). The objective of this study is to investigate the capabilities of ASEAN-5 to tap the diaspora resources from the destination countries of their HSDs. The Social Network Analysis (SNA) is employed to study the problem from the perspective of Global Diaspora Network (GDN) (Clemens et al. 2014; Danchev and Porter, 2018; Windzio, 2018). The centrality metrics of SNA are used to map the network proximity of ASEAN-5 to diaspora resources located at the destinations of their HSDs (Badi and Diamantidou, 2017; Antinyan et al., 2019). The study contributes to evaluate quantitatively the effectiveness of diaspora engagement of countries based on the spatial distribution of their HSDs (Danchev and Porter, 2018).

Major destinations of the HSDs from ASEAN-5

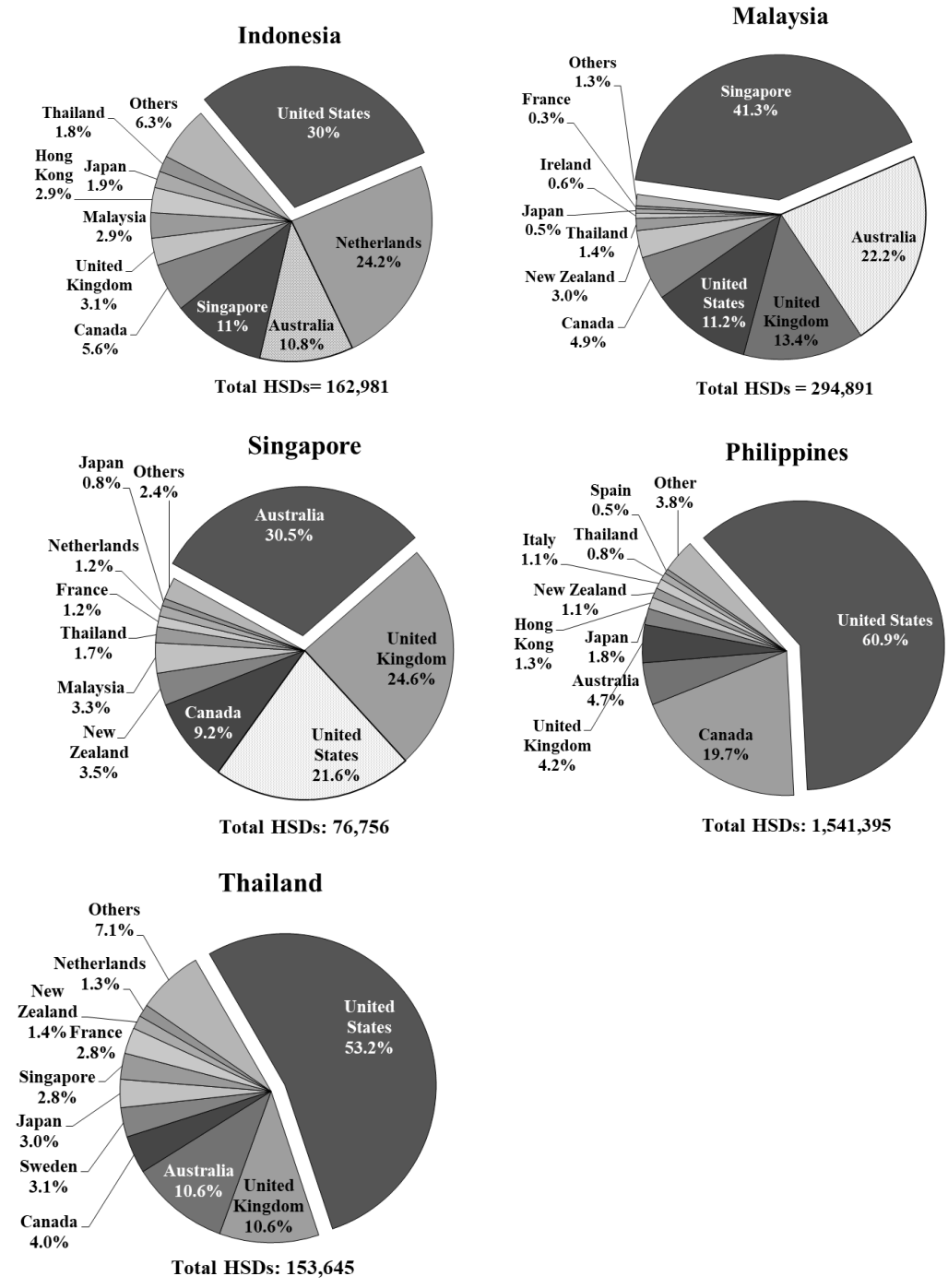
Figure 1 exhibits the total numbers of HSDs from ASEAN-5 and their major destinations in 2010. The Philippines had accumulated a huge number of HSDs as a result of its outmigration policy since the 1970s (OECD, 2017, p. 50). Malaysia ranked second in terms of the number of HSDs, followed by Thailand, Indonesia and Singapore.

The spatial distribution of the HSDs from ASEAN-5 was driven by major forces such as: 1) better overseas careers, especially in advanced economies; 2) geographical proximity and/or strong economic ties with ASEAN-5; and 3) selective migration policies implemented by advanced economies to attract highly skilled immigrants (Fok et al, 2018; Hercog and Sandoz, 2018). As shown in Figure 1, the destinations with a large number of the HSDs from ASEAN-5 are advanced economies such as the United States, the United Kingdom, Canada, Australia and Japan. Notably, the second most popular destination for Indonesian HSDs is the

Netherlands, a country which had colonised Indonesia for more than 300 years and maintained a strong economic link with the latter (Setijadi, 2017). A substantial portion of Malaysian and Indonesian HSDs was found in Singapore, driven by the geographical proximity and strong economic ties between the countries (Ho and Boyle, 2015; Fok et al., 2018).

The emigration of highly skilled persons had resulted in talent outflows, for examples, the outflows of Thai talents in science and technology (S&T) to seek for better overseas careers (Raksaphaeng, 2016; Bangkok Post, 2018). However, the concentration of the HSDs in advanced economies also implies that ASEAN-5 could mobilise their HSDs to strengthen the economic and technological ties with these destinations.

Figure 1. The Major Destinations of Highly Skilled Diasporas (HSDs) from ASEAN-5



Sources: OECD (2010; 2016)

Literature Review

Social scientists found that after HSDs had migrated to other countries, they tended to maintain long-distanced social networks with their home countries (Cangia and Zittoun, 2018; Cohen, 2018). Such diaspora linkages are either in the form of informal linkages such as kinship, family ties, friendships and hometown relations or formal connections such as business networks, co-workers, scientific collaboration and memberships in diaspora oriented organisations (Faist, 2015; de Jong and Dannecker, 2018). Faist (2014, 2015) conceptualised the diaspora links spanning across two or more countries as transnational network, to study the financial transfers and social remittances such as knowledge, innovative ideas and business opportunities transmitted by diasporas from destination to home countries.

The contemporary diaspora engagement initiatives have also targeted at the transnational network of HSDs, to promote brain circulation and transmissions of economic opportunities between destination and home countries (Newland and Tanaka, 2010; Keusch and Schuster, 2012, p. 21; Gamlen, 2014; Faist, 2015). Vandor and Franke (2016) and Sommer and Gamper (2018) argued strongly for the role played by HSDs as transnational entrepreneurs (TEs) to channel overseas business opportunities to their home countries. Similarly, Ho and Boyle (2015) and Malecki (2017) discovered that Diaspora Knowledge Networks (DKNs) established by HSDs are instrumental in facilitating knowledge transfers between destination and home countries.

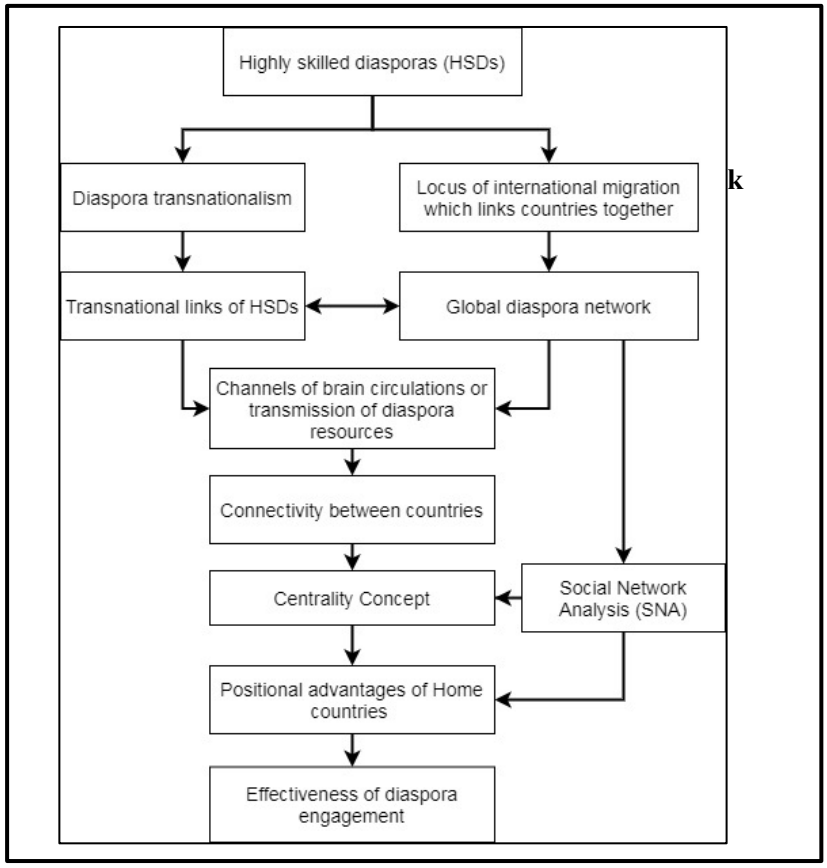
However, Bilecen et al. (2018) contended that there was a gap between the concept of diaspora transnationalism and a more systematic approach to understand the network proximity between destination and home countries. Bilecen et al. (2018) introduced Social Network Analysis (SNA) to study the transnational links of diasporas from the perspective of a Global Diaspora Network (GDN). Danchev and Porter (2018) and Windzio (2018) constructed GDN as the locus of the international migration which links countries together. The application of SNA operationalises the links between countries as channels for the transmission of diaspora resources (Bilecen et al., 2018). The centrality metrics of SNA, which were widely used to study scientific and business collaboration networks (Wu and Duan, 2015; Jessani et al., 2016; Micleusanu, 2017), could be adopted to assess the capabilities of home countries to harness overseas economic opportunities through their HSDs (Prell, 2012, p. 96-114; Borgatti et al., 2018, pp. 191-202).

Research Method

Theoretical Framework

Figure 2 exhibits the theoretical framework of this study. The framework integrates two conceptual aspects of HSDs, i.e. the diaspora transnationalism (Saxenian, 2003; Faist, 2014, 2015) and the locus of international migration of HSDs, which links countries into a GDN (Windzio, 2018). From the perspective of GDN, the transnational links of HSDs, namely HSD links could be operationalised as channels for brain circulation or transmission of diaspora resources between countries. Thus, the countries with higher connectivity in GDN can gain access to diaspora resources from heterogeneous destination countries. The centrality concept of SNA would be employed to investigate positional advantages of home countries in the GDN, in terms of their capabilities to gain access to overseas economic resources through their HSDs (Borgatti et al., 2018, pp. 191-202).

Figure 2. Theoretical Framework



Data

This study employed the data for the bilateral HSDs between countries/economies to construct an adjacency matrix, which represents the GDN. The data were obtained from the DIOC-E 2010 (Release 1.0) dataset, published by the Organisation of Economic Cooperation and Development (OECD) for 2010. The DIOC-E 2010 (Release 1.0) is widely accepted as the latest, comprehensive and harmonised records on the international migration of highly skilled persons for both OECD and non-OECD countries (OECD, 2010; 2016, p. 116). The dataset classifies the international migrants in 2010 according to their home country, destination and education or skill levels.

Based on the DICO-E 2010 (Release 1.0), the HSDs are defined as the stock of emigrants aged 25 and above (+25), with tertiary education or equivalent professional training as defined by ISCED 5 and ISCED 6 according to the International Standard Classification of Education (ISCED) (OECD, 2019). The age category +25 includes HSDs who are economically active in destination countries but excludes international undergraduate students who may stay abroad temporarily for educational purpose (World Bank, 2011, p. 93; Fok et al., 2018).

Adjacency Matrix for GDN

An adjacency matrix was constructed from the dataset to represent the GDN of 2010. The adjacency matrix comprises 203 x 203 cells, indicating that there are a total of 203 countries/economies (nodes) in the GDN. A given cell M_{jk} indicates the number of HSDs originating from home country j and residing in destination country k. Thus, an M_{jk} also represents the HDS link connecting home country j (row) with destination country k (column) (Danchev and Porter, 2018; Windzio, 2018). The HSD links are conceived as conduits which channel the diaspora resources of HSDs from destination to home countries. In this study, the GDN contains a total of 7,146 HSD links between countries/economies. Assuming that the quality of each HSD member is homogenous, it could be inferred that the capacity of flows transferable between a pair of countries/economies is proportional to the size of M_{jk}.

Data Transformation for the Adjacency Matrix

Most of the SNA techniques are developed to analyse data in symmetric and binary form (Borgatti et al., 2018, pp. 86-88). Thus, before analysing the adjacency matrix, the matrix will undergo some transformations to generate the data in the format required for SNA analysis. First of all, all M_{jk} in the adjacency matrix were normalised by standardising the Euclidean norm of the corresponding row to value one, in order to produce nM_{jk}, and $0 \leq nM_{jk} \leq 1$. The normalisation removes the scale effects and indicates only the relative strength of each HSD link of the home country j (Hanneman & Riddle, 2005; Borgatti et al., 2018, pp. 92-94).

The normalised adjacent matrix was symmetrised by UCINET routine in order to reflect that the flows of diaspora resources between countries can be two ways or undirected, i.e. $nM_{jk} = nM_{kj}$ (Hanneman and Riddle, 2005; Borgatti et al., 2018, pp. 86-87). The symmetric adjacency matrix was further dichotomised to produce a binary network, which reduced the network size of GDN and retain only the more important links between countries/economies (Borgatti et al., 2018, pp. 87-88). A cut point $c = 0.003$ was determined through an interactive process so as the cells with $nM_{jk} \geq 0.003$ were set to 1 and the remaining cells were set to 0.

Centrality Analysis

The centrality analysis was performed to measure the positions of ASEAN-5 in relation to other countries/economies in GDN. The positions of ASEAN-5 reflect their network proximity with other countries, hence their capabilities to tap diaspora resources from GDN (Vandor and Franke, 2016). The analysis was executed by the centrality routine of UCINET, a popular software package for SNA (Scott, 2017, p. 69). There are three centrality metrics used in this study:

Degree centrality (C_D)

C_D counts the number of destination countries directly linked with (or adjacent to) a focal home country j. A higher C_D indicates that country j is connected to a relatively large number of destination countries, implying greater capability to channel diaspora resources from heterogeneous destination countries (Borgatti et al., 2018, pp. 191-194).

Eigenvector centrality (C_E)

C_E measures how the position of a focal home country j is augmented by its links to well-connected destination countries (i.e. country k with high C_D). A relatively high C_E implies that

country *j* is capable of channelling diaspora resources from destination countries which are also well connected with other countries/economies (Bahar and Rapoport, 2018; Borgatti et al., 2018, pp. 194-196).

Betweenness Centrality (C_B)

C_B measures how often the home country *j* sits on the geodesics (shortest paths) connecting other pairs of destination countries. Hence, it investigates the capability of country *j* to mediate or control the transmission of diaspora resources between other countries. The advantage associated with higher C_B could be leveraged to promote the home country *j* into an international hub for business or knowledge exchanges (Borgatti et al., 2018, pp. 201-202).

All the centrality values were calculated in normalised terms, which were expressed in proportions, i.e. between 0 and 1 (Prell, 2012, pp. 96-107). The normalised centrality metrics for C_D, C_B and C_E are denoted as C_D', C_E' and C_B' respectively.

Results

Table 1 exhibits 30 countries which score the highest C_D' out of 203 countries/economies in GDN. The sub-columns *R* rank the normalised centrality metrics of a given country in relation to other 202 countries/economies. The United States and Sweden score the highest for all normalised centrality metrics, indicating that the two countries lead all other 201 countries/economies in term of the capabilities to tap diaspora resources from GDN. Among other most central countries are Netherlands, Italy, Great Britain, France, South Africa, Norway, Spain, Russia, Canada, Ireland, Denmark, Switzerland, Thailand and Australia. Most of those in the top 30 list are advanced countries or emerging economies. The centrality analysis shows that the developed countries as popular migratory destinations have not only benefited from the inflows of highly skilled persons (Ullah et al., 2019) but also occupied the most central positions in GDN which facilitate their interaction with talents from heterogeneous countries (Vandor and Franke, 2016; Sommer and Gamper, 2018).

The bottom part of Table 1 reports the centrality scores of ASEAN-5. Thailand and the Philippines are also among the top 30 countries with the highest C_D' in GDN. The relatively high C_E' of Thailand and the Philippines show that they are linked to a larger number of well-connected destinations than Indonesia, Malaysia and Singapore, implying a greater advantage in term of mobilising HSDs to interact with talents originating from heterogeneous countries (Bahar and Rapoport, 2018). Similarly, the relatively high C_B' also indicates that the Philippines and Thailand are well-positioned in GDN to engage their HSDs to mediate economic resources exchanged between other countries.

Table 1. Centrality Metrics for the Global Diaspora Network in 2010

Country	ISO 3 Digit Alphabetic Code for Countries	Normalised Degree Centrality C'_D		Normalised Eigenvector Centrality C'_E		Normalised Betweenness Centrality C'_B	
		Score	*R.*	Score	*R.*	Score	*R.*
United States	USA	0.589	*1*	0.321	*2*	0.206	*1*
Sweden	SWE	0.569	*2*	0.343	*1*	0.109	*2*
Netherlands	NLD	0.500	*3*	0.320	*3*	0.078	*4*
Italy	ITA	0.460	*4*	0.320	*4*	0.054	*5*
United Kingdom	GBR	0.401	*5*	0.286	*6*	0.040	*7*
France	FRA	0.386	*6*	0.298	*5*	0.027	*9*
South Africa	ZAF	0.371	*7*	0.217	*9*	0.099	*3*
Norway	NOR	0.361	*8*	0.258	*8*	0.036	*8*
Spain	ESP	0.332	*9*	0.264	*7*	0.017	*11*
Russia	RUS	0.297	*10*	0.182	*17*	0.043	*6*
Canada	CAN	0.238	*11*	0.197	*14*	0.010	*14*
Ireland	IRL	0.238	*12*	0.206	*11*	0.008	*16*
Denmark	DNK	0.213	*13*	0.212	*10*	0.004	*23*
Greece	GRC	0.213	*14*	0.202	*13*	0.006	*19*
New Zealand	NZL	0.213	*15*	0.178	*19*	0.024	*10*
Switzerland	CHE	0.198	*16*	0.204	*12*	0.004	*24*
Thailand	THA	0.193	*17*	0.156	*22*	0.009	*15*
Australia	AUS	0.188	*18*	0.176	*20*	0.008	*17*
Belgium	BEL	0.178	*19*	0.185	*16*	0.004	*22*
Germany	DEU	0.178	*20*	0.181	*18*	0.003	*25*
Austria	AUT	0.173	*21*	0.186	*15*	0.003	*27*
Portugal	PRT	0.168	*22*	0.150	*26*	0.007	*18*
Mexico	MEX	0.163	*23*	0.132	*33*	0.005	*20*
Philippines	PHL	0.163	*24*	0.141	*30*	0.016	*12*
Hungary	HUN	0.153	*25*	0.163	*21*	0.002	*31*
Luxembourg	LUX	0.149	*26*	0.150	*27*	0.003	*26*
Chile	CHL	0.144	*27*	0.149	*29*	0.002	*34*
Turkey	TUR	0.144	*28*	0.109	*37*	0.015	*13*
Brazil	BRA	0.139	*29*	0.151	*24*	0.001	*36*
Czech Republic	CZE	0.139	*30*	0.156	*23*	0.002	*35*
ASEAN-5							
Thailand	THA	0.193	*17*	0.156	*22*	0.009	*16*
Philippines	PHL	0.163	*24*	0.141	*30*	0.016	*12*
Malaysia	MYS	0.124	*35*	0.102	*47*	0.003	*32*
Indonesia	IDN	0.054	*89*	0.073	*73*	0.000	*111*

Country	ISO 3 Digit Alphabetic Code for Countries	Normalised Degree Centrality C'_D		Normalised Eigenvector Centrality C'_E		Normalised Betweenness Centrality C'_B	
		Score	*R.*	Score	*R.*	Score	*R.*
Singapore	SGP	0.015	*157*	0.024	*139*	0.000	*156*

Note:
1. Countries are labelled according to the International Standards Organization (ISO) 3-digit alphabetic codes.
2. Sub-column R. under each normalised centrality metric ranks the corresponding countries in relation to others in the global diaspora network

The implications of the centrality analysis for diaspora engagement of ASEAN-5 can be further elaborated through the visualised GDN as shown in Figure 3 and Figure 4. The visualisation exhibits the topology of the countries/economies interconnected by HSD links, as done by the graph-theoretic layout algorithm of UCINET (Borgatti et al., 2018, pp. 119-121). Figure 3 classifies the countries/economies in GDN according to their development status and international trade volumes (in USD billion), whereas Figure 4 labels the countries/economies in GDN based on their development status and innovation levels. The innovation level of a given country/economy is measured by its number of patent applications filed through national patent offices and the Patent Cooperation Treaty route (PCT) in 2010 (Burhan et al., 2017; World Intelligence Property Organisation, 2019).

The countries/economies in GDN are placed according to the geodesic distance or the shortest path length between them. Geodesic is also the key factor for computing C'_B, thus the distance between countries is positively related to how strong they are linked to each other through both direct and indirect HSD links. The most central countries/economies are placed in the core region of GDN. Conversely, the less central countries/economies are located farther away from the core, whereas those least central are placed at the periphery of GDN.

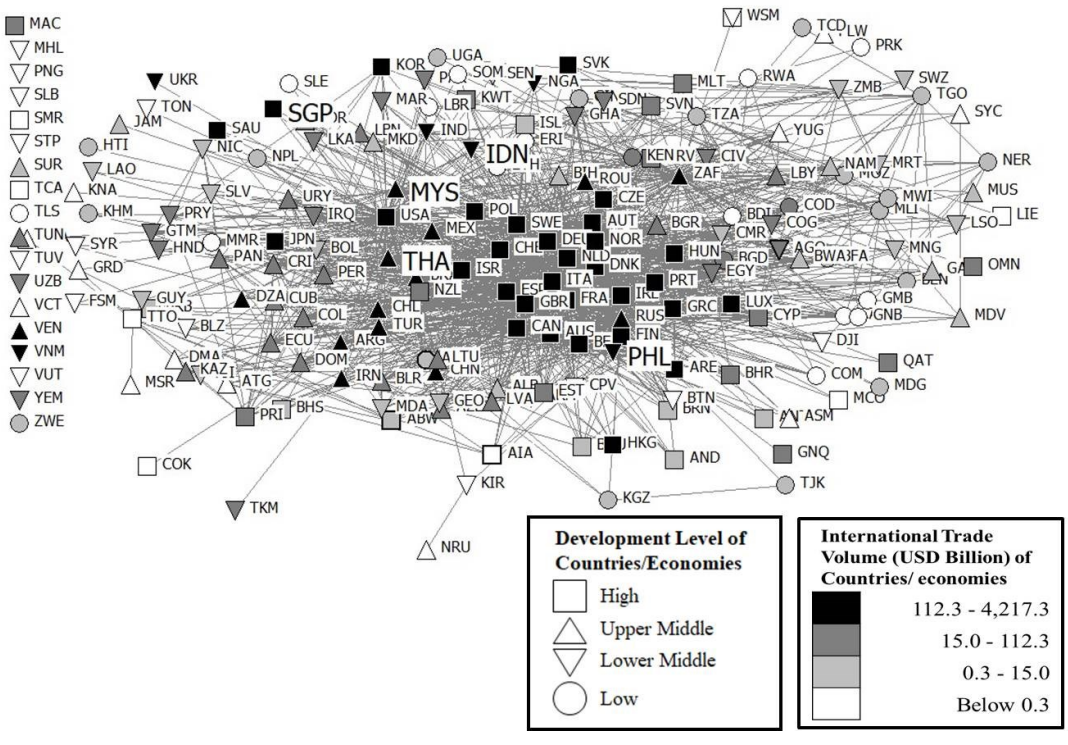
Figure 3 and Figure 4 show that the countries/economies located at the core are mostly active in both international trades and innovation activities. Among them are developed nations such as the United States, Sweden, Netherlands, the United Kingdom, Italy, France, Switzerland, Norway, Germany, Canada, Israel and emerging economies like South Africa and Mexico. These countries are also densely interconnected with each other, implying that the diffusion of international trade and innovation opportunities could take place intensely at the core region of GDN. Thus, it is apparent that the major target of ASEAN-5's diaspora engagement should be the core of GDN, to tap into the diaspora resources generated and stored within such destination countries.

Among ASEAN-5, Thailand and the Philippines are closely adjacent to the core region, implying close network proximity with the most central nodes in GDN. As shown in Figure 3, Thailand and the Philippines could leverage the positional advantages to engage their HSDs to identify and capture international trade opportunities from the large trading nations located at the core of GDN. The extant literature has well documented the Thai HSDs' entrepreneurial activities abroad as providers of various types of professional and business services (Beasley et al., 2014; Weng and Chanwong, 2016; Webster and Haandrikman, 2017). Similarly, the HSDs from the Philippines tend to establish their professional and business networks through memberships in diaspora oriented organisations or business associations (Migration Policy Institute, 2014). Thus, the advantageous positions of Thailand and the

Philippines in GDN should be optimised to mobilise their HSDs as transnational entrepreneurs (TEs) connecting the destination and home countries.

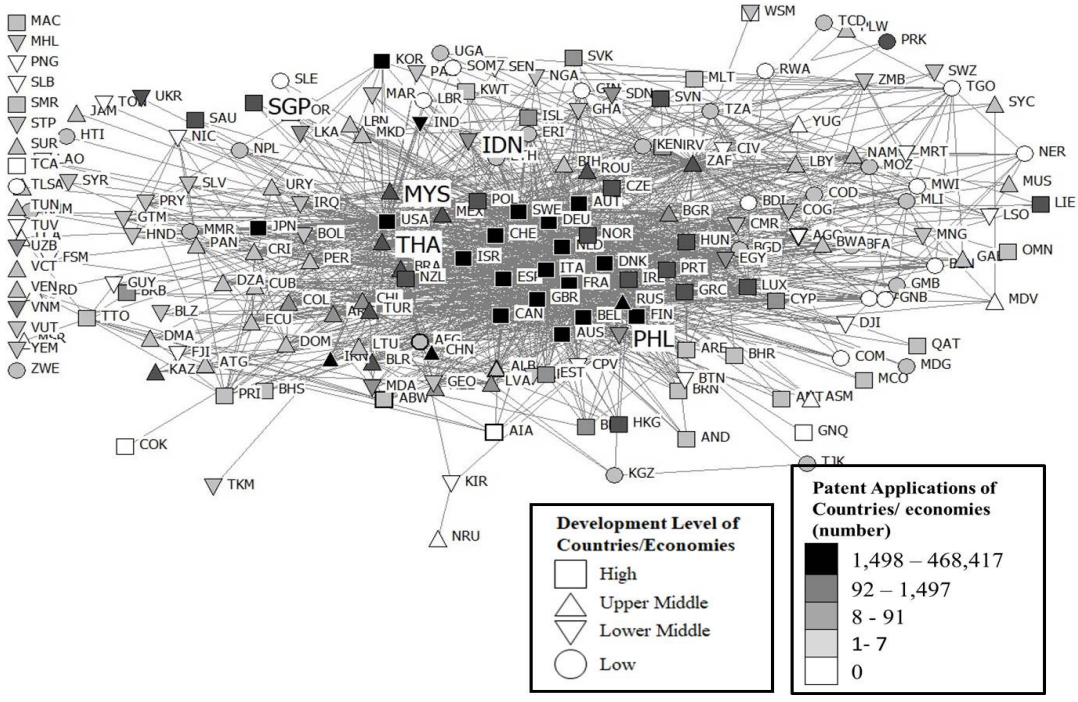
Figure 4 also shows that Thailand and the Philippines possess network proximity with a large number of innovative countries, among others include the United States, Germany, France, the United Kingdom, Switzerland, Netherlands, Sweden, Finland, Denmark, Israel, Norway and Ireland. Such a positional advantage is beneficial for Thailand and the Philippines to mobilise their HSDs to contribute to the development of their home countries as international hubs for knowledge exchanges and innovation activities. Thailand and the Philippines should encourage their HSDs to establish diaspora network networks (DKNs) to mediate transmissions of innovative ideas between countries/economies in GDN. For the Philippines, the formation of such DKNs is essential to enhance its science and technology-oriented diaspora engagement initiatives, for instance, the *Balik* Scientists Programme which mobilises Filipino talents living abroad to contribute to the technological development of their home country (Migration Policy Institute, 2014; Caunan, 2017).

Figure 3: International Trade Volumes of Countries/Economies in the Global Diaspora Network



Source: World Bank Data.
Note: The international trade volumes are categorised according to quartiles.
Note: Countries are labelled by the International Standards Organization (ISO) 3-digit alphabetic codes.

Figure 4. Innovation Levels of Countries/Economies in the Global Diaspora Network



Source: World Intellectual Property Organisation (WIPO)
Note: The numbers of patent applications are categorised according to 20th, 40th, 60th and 80th percentile
Note: Countries are labelled by the International Standards Organization (ISO) 3-digit alphabetic codes.

As shown in Figure 3 and Figure 4, the position of Malaysia in GDN is less advantageous than Thailand and the Philippines, in term of the network proximity with countries located at the core of GDN. To overcome the shortcoming of connectivity, Malaysia should implement a more targeted diaspora engagement strategy. For example in Figure 3, Malaysia could focus on the few destinations which are withitantn its network proximity, i.e. the United States, Mexico, Poland, Brazil, India, Indonesia and Thailand. The HSDs of Malaysia in such destinations could be developed as nodes linking their home country to the international trade opportunities in Eastern Europe, the American continent, South Asia and ASEAN countries (Talent Corporation Malaysia Berhad, 2018, p. 6). Similarly, Figure 4 reveals that Malaysia should focus on developing its HSDs in the United States, Mexico, Poland, Sweden and Switzerland as DKNs connecting to other innovative countries (Talent Corporation Malaysia Berhad, 2019).

Figure 3 and Figure 4 show that Indonesia is located relatively far from the core of GDN, reflecting low centrality as reported in Table 1. The disadvantageous position might dampen the diaspora engagement efforts of Indonesia to channel international trade opportunities and overseas innovations to the development programmes under the Masterplan for Acceleration and Expansion of Indonesia's Economic Development (MP3EI), particularly the development in four main areas of energy, maritime and transportation, food sovereignty and public housing (Al'ayubby, 2018; Salim and Negara, 2018). To overcome the weak

connectivity, Indonesia could leverage its HSDs in the United States and the Netherlands to establish business and innovation networks with immigrant talents from other advanced economies.

The periphery position of Singapore in Figure 3 and Figure 4 indicates that it has the lowest centrality among ASEAN-5. Although the major destinations of Singaporean HSDs are Australia, the United Kingdom and the United States, the distribution of Singaporean HSDs is less extensive across other countries/economies in GDN. The weak connectivity also suggests that Singapore might have to actively promote its HSDs in a few destination countries as global links to business opportunities and technological innovation abroad (Saha, 2009; Ho and Boyle, 2015).

Conclusion

This study employs social network analysis (SNA) to investigate the diaspora engagement capabilities of countries from the perspective of a Global Diaspora Network (GDN). The GDN perspective operationalises the transnational links of HSDs as channels to transfer diaspora resources between destination and home countries. By focusing on ASEAN-5, this study found that Thailand and the Philippines possess network proximity with a large number of advance countries and emerging economies. Thailand and the Philippines should optimise the positional advantages to engage their HSDs to harness diaspora resources, such as international trade opportunities and technological innovation for the economic development of the home country.

The position of Malaysia in GDN shows that it is connected with a less heterogeneous pool of destination countries. The findings recommended that Malaysia should implement a more targeted diaspora engagement strategy to develop its HSDs in the few advanced and emerging economies as nodes linking to the economic opportunities in other continents. Both Indonesia and Singapore are found to be weakly connected in GDN. To overcome the disadvantageous position, Indonesia may focus on mobilising its HSDs in the popular migratory destinations, for examples the United States and the Netherlands to develop business and knowledge networks with talents originating from other countries. For Singapore to compensate for the weak connectivity in GDN, it should maintain its open-door policy to expatriate talents to channel economic opportunities and innovative ideas from different parts of the world (Siau, 2018).

The study demonstrates that ASEAN-5 differ from each other in terms of the capabilities to engage HSDs as agents of development. It is recommended that ASEAN-5 may complement each other by setting up a collaborative platform to pool the expertise, transnational networks and diaspora resources of their HSDs. The collaborative platform would contribute to strengthening the connectivity of ASEAN-5 with the technological hubs and industrial clusters scattering around the world (Fok et al., 2018).

References

Al'ayubby, A. (2018). Displacement in the name of infrastructure development. *Asian Labour Update, (88)*, 41–47.

Antinyan, A., Horvath, G., & Jia, M. (2019). *Positional concerns and social network structure : An experiment*. Researchgate.Net, (March). Retrieved from https://www.researchgate.net/publication/332069956

Badi, S., & Diamantidou, D. (2017). A social network perspective of building information modelling in Greek construction projects. *Architectural Engineering and Design Management, 13(6),* 406–422.

Bahar, D., & Rapoport, H. (2018). Migration, Knowledge Diffusion and the Comparative Advantage of Nations. *Economic Journal*, *128*(612), F273–F305.

Bangkok Post. (2018, November 21). Thailand a non-mover in talent index. *Bangkok Post*. Retrieved from https://www.bangkokpost.com/business/1579302/thailand-a-non-mover-in-talent-index

Beasley, T., Hirsch, P., & Rungmanee, S. (2014). *Thailand in Australia*. Sydney, Australia.

Bilecen, B., Gamper, M., & Lubbers, M. J. (2018). The missing link: Social network analysis in migration and transnationalism. *Social Networks*, *53*.

Borgatti, S. P., Everett, M. G., & Johnson, J. C. (2018). *Analyzing social networks* (2nd Ed.). London, England: SAGE Publications Ltd.

Burhan, M., Singh, A. K., & Jain, S. K. (2017). Patents as proxy for measuring innovations: A case of changing patent filing behavior in Indian public funded research organizations. *Technological Forecasting and Social Change, 123*, 181–190.

Cangia, F., & Zittoun, T. (2018). When "expatriation" is a matter of family. Opportunities, barriers and intimacies in international mobility. *Migration Letters, 15(1),* 1–16.

Caunan, O. (2017). *"Balik" scientists program to have more benefits, incentives*. Retrieved from http://www.senate.gov.ph/press_release/2017/1127_prib2.asp

Cheng, J. (2016). Engaging diasporas: The case of Australia and other key countries. Melbourne, Australia.

Clemens, M, A., Ozden, C., & Rapoport, H. (2014). Migration and development research is moving far beyond remittances. *World Development, Vol 64 (Dec 2014)*, 121-124.

Cohen, J. H. (2018). Approaching migration: The dynamics nature of human mobility. *Migration Letters, 15(3)*, 301-302.

Coordinating Ministry For Economic Affairs, Republic of Indonesia. (2011). *Masterplan for acceleration and expansion of Indonesia economic development 2011-2025*. Jakarta: Coordinating Ministry for Economic Affairs, Republic of Indonesia.

Danchev, V., & Porter, M. A. (2018). Neither global nor local: Heterogeneous connectivity in spatial network structures of world migration. *Social Networks, 53*, 4–19. de Jong, S., & Dannecker, P. (2018). Connecting and confronting transnationalism: bridging concepts and moving critique. *Identities, 25(5),* 493–506.

Faist, T. (2014). *"We are all transnationals now": The relevance of transnationality for under standing social inequalities* (Working Papers- Center on Migration, Citizenship an Development No. 122). Bielefeld.

Faist, T. (2015). *Making and remaking the transnational: Of boundaries , social spaces and social mechanisms* (COMCAD Working Papers No. 132). Beilefeld.

Fok, K. F., Cheng, M. Y., & Tan, H. P. (2018). Determinants of spatial distribution of highly skilled diasporas of five ASEAN countries. *Journal of Southeas Asian Economies*, *35*(*2*), 275–292.

Gamlen, A. (2014). Diaspora institutions and diaspora governance. *International Migration Review*, *48*(s1), S180–S217.

Hanneman, R. A., & Riddle, M. (2005). *Introduction to social network methods*. Riverside, CA: University of California. Retrieved from http://faculty.ucr.edu/~hanneman/nettext/

Hercog, M., & Sandoz, L. (2018). Highly skilled or highly wanted migrants? Conceptualisations, policy designs and implementations of highly skilled migration policies. *Migration Letters, 15(4),* 453–460.

Ho, E. L., & Boyle, M. (2015). Migration as development repackaged? The globalising imperative of the Singaporean state's diaspora strategies. *Singapore Journal of Tropical Geography*, *36* (2), 164–182.

Indonesian Diaspora Network. (2018). *About IDN*. Retrieved from https://www.indonesiandiasporanetwork.com/about-idn/

International Labour Organisation. (2015). *The reverse brain drain project, Thailand*. Retrieved from http://www.ilo.org/dyn/migpractice/migmain.showPractice? p_lang=en&p_practice_id=43

Jessani, N. S., Boulay, M. G., & Bennett, S. C. (2016). Do academic knowledge brokers exist? Using social network analysis to explore academic research-to-policy networks from six schools of public health in Kenya. *Health Policy and Planning, 31(5)*, 600–611.

Keusch, M., & Schuster, N. (2012). *European good practice: examples of migration and development initiatives with a particular focus on diaspora engagement*. Vienna: Vienna Institute for International Dialogue and Cooperation.

Malecki, A. (2017). *Repoliticising development: The diaspora knowledge network (DKN) ChileGlobal and its contribution to development in Chile*, (Unpublished PhD thesis). Massey University, Manawatu, New Zealand.

Micleusanu, A. M. (2017). *Knowledge diffusion innovation in the ceramic cluster: SNA of patent data*. Universitat Jaume I. Retrieved from http://repositori.uji.es/xmlui/bitstream/handle/10234/173001/TFM_2017_Micleusanu_Andrei.pdf?sequence=1&isAllowed=y

Migration Policy Institute. (2014). *The Filipino diaspora in the United States*. Retrieved from https://www.migrationpolicy. org/ sites/default/files/publications/RAD-PhilippinesII.pdf

Newland, K., & Tanaka, H. (2010). *Mobilizing diaspora entrepreneurship for eevelopment*. Washington, DC: Migration Policy Institute.

OECD. (2010). *Database on immigrants in OECD and non-OECD countries (DIOC-E)* [Data file]. Retrieved from http://www.oecd.org/els/mig/dioc.htm

OECD. (2016). *Perspectives on global development 2017: International migration in a shifting world*. Paris: OECD Publishing.

OECD. (2017). *Interrelations between public policies, migration and development in the Philippines*. Paris: OECD Publishing.

OECD. (2019). DIOC-E 2010 (Release 1.0): Methodology. Paris. Retrieved from http://www.oecd.org/els/mig/DIOC-E-2010-11-methodology.pdf

Panela, S. (2019). *Bringing Filipino scientists home*. Retrieved from https://www.asianscientist.com/2020/01/features/ipi-yang-wenxin-wisqo/

Prell, C. (2012). *Social network analysis: History, theory & methodology*. London, England: SAGE Publication Ltd.

Raksaphaeng, P. (2016). *PM meets with representatives of Association of Thai Professionals in America and Canada*. Retrieved from http://www.atpac.org/pm-meets-with-representatives-of-association-of-thai-professionals-in-america-and-canada/

Saha, J. M. (2009). Dynamics of global mobility and brain gain. *humanCapital*, (April), 56–58.

Salim, W., & Negara, S. (2018). Infrastructure Development under the Jokowi Administration: Progress, Challenges and Policies. *Journal of Southeast Asian Economies, 35*(3), 386-401. Retrieved from www.jstor.org/stable/26545320

Saxenian, A. (2003). Brain circulation and capitalist dynamics: The Silicon Valley-Hsinchu-Shanghai Triangle. Paper prepared for the forthcoming volume: Swedberg, R. and Nee, V. (Eds). The Economic Sociology of Capitalism, under review at Cambridge University Press.

Scott, J. (2017). *Social network analysis* (4th Ed.). London: SAGE Publication Ltd.

Setijadi, C. (2017). *Harnessing the potential of the Indonesian diaspora* (Trends in Southeast Asia No. 18/17). Singapore. Retrieved from https://www.iseas.edu.sg/images/pdf/TRS18_17.pdf

Siau, M. E. (2018). *Singapore must keep its doors open to talent: Chan Chun Sing*. Retrieved from https://www.todayonline.com/singapore/keeping-doors-open-talent-reality-singapore

Sommer, E., & Gamper, M. (2018). Transnational entrepreneurial activities: A qualitative network study of self-employed migrants from the former Soviet Union in Germany. *Social Networks, 53,* 136–147.

Talent Corporation Malaysia Berhad. (2018). *Annual review 2017*. Malaysia.

Talent Corporation Malaysia Berhad. (2019). *YAB prime minster calls for foreign business to step up efforts to help strengthen Malaysia's future-ready competitiveness*. Retrieved from https://www.talentcorp.com.my/resources/press-releases/yab-prime-minister-calls-for-foreign-businesses-to-step-up-efforts-to-help-strengthen-malaysias-future-ready-competitiveness

Ullah, A.K.M.A., Mohamad, S.M., Hassan, N.H. and Chattoraj, D. (2019). Global skills deficiency: perspectives of skill mobility in Southeast Asian countries. *Asian Education and Development Studies*, *8*(4), 416-432.

Vandor, P., & Franke, N. (2016). See Paris and... found a business? The impact of cross-cultural experience on opportunity recognition capabilities. *Journal of Business Venturing*, *31*(4), 388–407.

Webster, N. A., & Haandrikman, K. (2017). Thai women entrepreneurs in Sweden: Critical perspectives on migrant small businesses. *Women's Studies International Forum, 60(2017)*, 17–27.

Weng, H., & Chanwong, P. (2016). *Investigating the common barriers that high-skilled Asian immigrant entrepreneurs face in the western countries*. (Unpublished master thesis). Lund University.

Windzio, M. (2018). The network of global migration 1990-2013. Using ERGMs to test theories of migration between countries. *Social Networks*, *53*, 20–29.

World Bank. (2011). *Malaysia economic monitor*. Bangkok, Thailand: The World Bank.

World Intellectual Property Organisation. (2019). *Patent Cooperation Treaty (PCT) applicant's guide: International phase. Geneva*. Retrieved from ttps://www.wipo.int/pct/en/guide/index.html

Wu, Y., & Duan, Z. (2015). Social network analysis of international scientific collaboration on psychiatry research. *International Journal of Mental Health Systems*. doi: 10.1186/1752-4458-9-2