Salient Beliefs that Influence the Malaysian Engineers' Intention to Migrate Abroad

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Abstract

Malaysia is one of the countries which face serious outflow of high skilled workers. In particular, high levels of brain drain among the engineers in the country has created a critical shortage of highly skilled workers in Malaysia. Migration studies in Malaysia in the past mostly focused on economic and socio-political aspects but migration among engineers received very little attention. The main purpose of this study is to analyse the intention of Malaysian engineers to migrate abroad from a behavioural perspective. The study also intended to identify the engineers' salient beliefs about migration that could explain their intentions. The knowledge regarding the beliefs can be useful for policy makers in order to develop behavioural intervention policies to manipulate (i.e. lower) the engineers' intention to move abroad. The engineers' intention was analysed using the Theory of Planned Behaviour (TPB). Among the three direct predictors in TPB model, the engineers' attitude and their subjective norms were significant in explaining the engineers' intentions to move abroad. In turn, a number of salient behavioural and normative beliefs were found to be significant in explaining the engineers' attitude and subjective norms.

Keywords: *brain drain; high skilled migration; intention to migrate abroad; salient beliefs; theory of planned behaviour; MIMIC model.*

Introduction

Docquier (2014, p. 2) defines brain drain as "international transfer of human capital resources, and it applied to the migration of highly educated individuals from developing to developed countries". The international movement of high skilled workers, which refers to workers with at least one year of tertiary education, keep increasing in the last two decades. The rate of international migration of these workers have increased nearly 130 percent between 1990 and 2010 (Kerr, et al. 2016). In contrast, the migration rate of low skilled workers only increased by about 40 percent in the same period of time.

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Though brain drain studies refer mostly to flows from developing to developed countries, it does not mean that the developed countries are free from the phenomenon. According to a report by Organization of Economic Co-operation and Development (OECD) and United Nations Department of Economics and Social Affair (UNDESA), some of the developed countries also saw high levels of migration among highly skilled workers (OECD-UNDESA, 2013). In the past, countries like United Kingdom (UK), Germany, South Korea, Canada, Italy, Mexico and Poland have experienced large outflow of highly skilled workers (Dunnewijk, 2008). However, the issue of brain drain among the professionals never reach a critical stage in these countries. It is because the countries were able to attract large number of high skilled workers from developing countries to replace the migration of their own high skilled workers (Docquier and Rappoport, 2012). However, the situation in developing countries are different. Arslan et al. (2014) noted that the migration of skilled workers do cause negative effect to many developing countries. One such country is Malaysia, where the high rate of brain drain continue to impede the country's desire to become a high income nation.

Malaysia, which is categorised as an upper middle income country, is aiming to become high income country by year 2020. However, the country is still facing challenges in terms of low productivity of labour and capital due to lack of human capital. Some multinational companies (MNCs) were reluctant to invest in industries that emphasize on high technology investment due to insufficient engineers and scientists in the country (New Straits Times, 2014). Similar issue was highlighted in a report by the World Bank (2016) which stated that MNCs in Malaysia found difficult to hire high skilled workers in the managerial and technical fields. Therefore, bulk of the firms continue to invest in low productivity sector which could not raise the locals' income significantly. In 2011, the Prime Minister's Department of Malaysia established a new agency named TalentCorp to counter the large outflow of talents from the country (TalentCorp, 2012). The agency has two main roles – to bring back the professionals who have migrated abroad and to retain the existing professionals in the country. Nevertheless, the number of high skilled workers who are leaving Malaysia country continue to rise (Nadaraj, 2016; OECD-UNDESA, 2013). It is probably because the existing policies and programs to tackle the issue of brain drain in Malaysia are either not sufficient or not effective.

Past literatures that analysed the issue of brain drain in Malaysia were mostly from macro perspectives – based on economic and socio-political factors (as discussed in Chandar, et al. 2015; Foo, 2011; Ho and Tyson, 2011; Jauhar, et al., 2009; Wahab, 2014; World Bank, 2011; Yeow, et al., 2013).

From the field of economic, the factors commonly cited are insufficient career opportunities and law salary in Malaysia (Chandar et al., 2015; Choong, et al., 2013; Foo, 2011; Wahab, 2014). Meanwhile, lack of social justice in Malaysia was stated as one of the main social factors that determine the respondents' intention to move abroad (Choong et al., 2013; Quah et al., 2014; Tyson et al., 2011). The minority ethnics in the country felt the chances for them to pursue higher education at public universities or being employed in public sector were limited. A weaker political environment in Malaysia was also identified as one of the factors that drive more Malaysian professionals to work abroad. Quah et al. (2014) noted that if the country's political situation deteriorated, more professionals are expected to seek opportunities abroad. In a nutshell, the studies have suggested policies based on macro framework to stop the migration of the high skilled workers. However, as discussed earlier, the rate of brain drain in the country is alarming. Alternative policy to reduce the phenomenon is urgently required.

Among the high skilled workers in Malaysia, shortage of engineers is seen as a major stumbling block to the country's effort to increase its talent base. As noted earlier, firms in Malaysia is finding difficult to hire workers with technical skills due to shortages of engineers in the local labour market (Sharmila, 2016). It was reported that many engineers form Malaysia have opted to work abroad due to high wages and opportunity to engage in research and development activities. Since the high rate of migration among the Malaysian engineers is affecting the inflow of foreign direct investment into the country, it is important to investigate the engineers' *intention to migrate abroad* (IMA) from the behavioural perspective. Prior to this, there is limited knowledge on the engineers' IMA. In addition, this study focuses only on the generation Y (gen-Y) engineers who were born between 1979 and 1995 (Macmillan Dictionary, 2010). According to Sebastian (2013), gen-Y in Malaysia has higher tendency to move abroad than the generation X. The attitude of gen-Y workers that prefer to take up new challenges contributed to their higher rate of international movement (TalentCorp, 2012).

Existing studies on migration of high skilled workers tend to approach the issue from economics and socio-political perspectives, which have been criticised. For example, Castles (2000) and Arango (2004) argued that policies from macro perspectives were costly and less effective. Their argument were further supported by Anderson and Stamoulis (2006) and World Bank (2015) who stated that such policies were not efficient and may contribute to the wastage of public fund. Instead, they suggested that studies on migration should move away from macro perspectives to micro

perspective. One of the area suggested was behavioural psychology, which can help policy makers to develop behavioural intervention policy to reduce the behaviour of migration. Moreover, behavioural policies can be first tested on a smaller sample using the Randomised Controlled Trial (RCT) method, and if successful, can be expanded to the target group (Haynes et al., 2012). However, the existence of such studies or policies in the field of migration is limited. Hence, the current study intend to fill up the literature gap by using a behavioural model - Theory of Planned Behaviour (TPB) – to assess the Malaysian gen-Y engineers' IMA. Thus, this study had two specific objectives:

- To determine which among the three antecedents of behavioural intention (attitude [ATDE], subjective norms [SJNM] and perceived behavioural control [PCBC]) in the TPB model that significantly predict the gen-Y engineers' IMA directly
- To identify the engineers' salient beliefs about migration that significantly predict the gen-Y engineers' IMA indirectly

Though past literatures on IMA (see Engle, et al., 2015; Remhof, et al., 2014; Suwandi, 2015; Weerasinghe & Kumar, 2014) have applied TPB model in determining the factors that influence the intention, none of them have actually applied the full model. As a result, the participants' salient beliefs were not elicited, thus they did not discuss or suggest any behavioural intervention policy to lower IMA. The current study's contribution should be seen in the way that the engineers' salient beliefs about migration are elicited and identified. In turn, this study attempts to suggest policies to reduce brain drain from a behavioural perspective. Such approach could lead to a more cost effective policies with higher rate of success. Thus this study may be considered as a pioneer in migration research from behavioural psychological perspectives.

In the Malaysian context, this study is expected to provide the authorities new information on the IMA among the gen-Y engineers in the country. The study's descriptive analysis could provide more specific details on the severity of brain drain among the engineers in the coming years. A significant contribution to the policymakers in Malaysia is expected to be achieved by identifying the engineers' salient beliefs that could significantly explain their IMA. The authorities can use this information to develop relevant intervention programs to discourage the engineers from migrating abroad. In summary, it is expected that this study will give the authorities a new approach in handling the issue of high brain drain in Malaysia.

Modelling a Theoretical Framework of Intention to Migrate Abroad

In the past, behavioural models and theories such as Expectancy-Value Theory (EVT), Theory of Reasoned Action (TRA) and TPB were applied in migration related studies. EVT was applied by de Jong and Fawcett (1981) and de Jong (2000) to analyse individuals' expected outcome from the behaviour of migration and the values they attached to those outcomes. However, the studies did not develop any particular framework to study the behaviour of migration. In fact, the theory itself was criticised as it did not develop any theoretical framework that could be used to predict the behaviour of interest (Fishbein and Ajzen, 1975).

TRA was first developed by Fishbein and Ajzen (1975) to predict intention to perform a behaviour and also the actual behaviour. The model included two factors – *attitude (ATDE)* and *subjective norms (SJNM)* – as the predictors of the intention. It was first applied by McHugh (1984) to evaluate individuals' intention to migrate within the states of the United States (US). Recently, Froese, et al. (2013) tested the utility of the theory in comparing the intention of business undergraduates in Germany and South Korean to work abroad. The application of the model is generally limited because the model's failure in considering the extent of control that an individual has in performing the behaviour (Ajzen, 1991). According to Ajzen, behavioural intention is also depend on how individuals perceive about the control that they have over the behaviour. It resulted in Ajzen (1991) introducing TPB model, which is an extended version of TRA model by adding a new construct – *perceived behavioural control (PCBC)*.

Since the behaviour of migration is not entirely within the control of an individual, TRA model is less suitable in this study. In the decision to migrate abroad, the gen-Y engineers may face many obstacles in migrating abroad, such as getting the working visa from the destination countries. Thus, relative to EVT and TRA, TPB model is more appropriate in analysing the engineers' IMA. In addition, TPB is useful to identify the engineers' salient beliefs about migration, which is essential in developing appropriate intervention program to stem the behaviour of migration.

In the past, literatures from various field of studies have utilised TPB model to elicit individuals' beliefs and have successfully developed intervention programs. Webb and Sheeran (2006) performed meta-analysis to assess the utilisation of TPB in developing behavioural intervention programs. The analysis found exactly half of the eighteen studies reviewed had applied the model successfully. The studies have managed to record significant changes in the participants' intention and behaviour. The authors found that the other studies which failed to achieve the desired

goals did not make any attempt to elicit the participants' salient beliefs. Webb and Sheeran (2006) concluded that in order to develop effective behavioural intervention policy, the participants salient belief about the behaviour of interest must be first identified. In the context of migration, none of the previous studies have either elicited individuals' salient beliefs or have suggested any behavioural intervention programs to stop brain drain. The current study attempts to fill up this gap in the literature by eliciting the engineers' salient beliefs about migration.

Figure 1 illustrates the TPB model that includes the three direct antecedents of intention and their respective belief constructs.

Figure 1. Theory of Planned behaviour Model
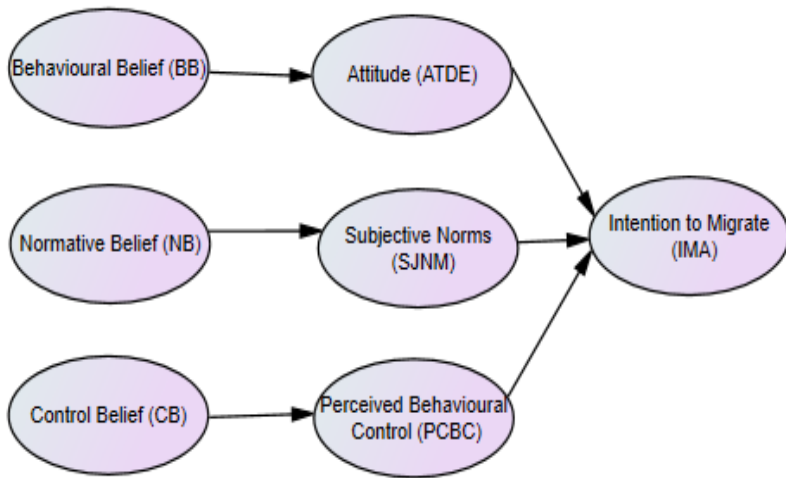
In Ajzen (1991, p. 181), intention is an indication of "*how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behaviour*". ATDE, SJNM and PCBC are the three psychological factors that influence intention directly. ATDE refers to "*the degree to which a person has a favourable or unfavourable evaluation or appraisal of the behaviour in question*" (Ajzen, 1991, p. 188). SJNM is "*a social factor that refers to the perceived social pressure to perform or not to perform the behaviour*" (Ajzen, 1991, p. 188). Lastly, PCBC is defined as "*perceived ease or difficulty of performing the behaviour*".

As illustrated in figure 1, the three predictors are influenced by their respective belief constructs. An individual's attitude is influenced by the behavioural belief (BB). It is described as "*the subjective probability that the*

behaviour will produce a given outcome" (Knabe, 2012, p. 31). The second belief is normative belief (NB), which influence subjective norms. It measures the extent to which individuals' belief that their important others will support them in performing the behaviour of interest (Azjen, 2006). Meanwhile, control belief (CB) measures individuals' belief on factors that will facilitate or hinder their decision to perform the behaviour. It acts as antecedents of PCBC.

Figure 2. Conceptual Model for the Present Study
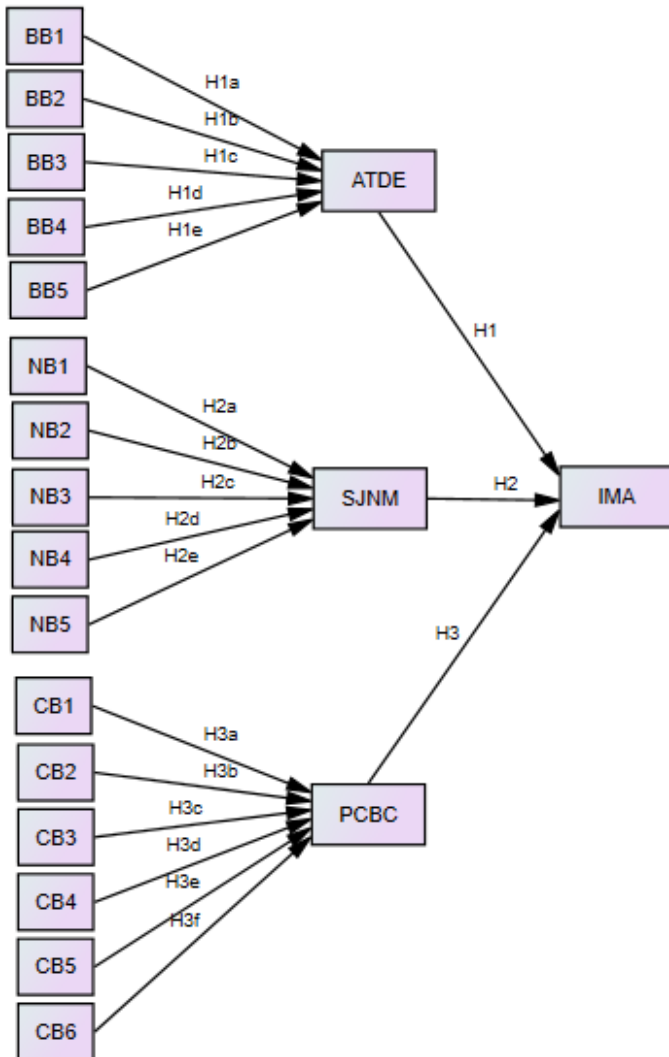
ATDE, SJNM and PCBC can be measured directly as well as indirectly by the belief constructs (Ajzen, 1991). When the variables are measured

directly by their standard observable items, the items are known as reflective indicators and the model as reflective model (Diamantopoulos and Siguaw, 2006). The items are seen as functions of their respective latern constructs. Causal arrows are drawn from the three constructs to their respective items to show that changes in the items are due to changes in their underlying constructs. Meanwhile, when the three constructs are measured indirectly by their respective belief items, the items are known as formative indicators, while the model is called formative model. Contrary to reflective model, the three latern constructs in the formative model are formed by their respective belief items (Diamantopoulos and Siguaw, 2006). Since the changes in the constructs are caused by the changes in the belief items, causal arrows are drawn from the items to the constructs. According to Hennessy et al. (2012), when belief constructs are added into the TPB model, both formative and reflective models can be combined to develop a multiple indicators and multiple causes (MIMIC) model. According to Posey, et al. (2014: 7), MIMIC model is *"a single, mixed model latent construct with both reflective and formative indicators"*. Using MIMIC models for ATDE, SJNM and PCBC, Figure 2 illustrates the conceptual model for the present study.

The IMA is hypothesised to be predicted by its three direct antecedents – ATDE, SJNM and PCBC. In the present study, IMA refers to the extent to which the Malaysian gen-Y engineers do intend to migrate abroad for at least a year in the next two years. It was constructed by three items, and measured by seven-point Likert scale, from 'Strongly Disagree (1)' to 'Strongly Agree (7)'. ATDE can be best defined as the degree to which the engineers appraise the behaviour of migrating abroad for at least a year, favourably or otherwise. It was constructed by five different adjectives that describe the engineers' attitude towards migration, and measured by semantic differential scale, from one to seven. SJNM refers to the extent to which the engineers' important others do pressure them to migrate abroad. The construct is developed by four items based on the suggestion by Lapinski and Rimal (2005). Seven-point Likert scale, from 'Strongly Disagree (1)' to 'Strongly Agree (7)' is used to measure the items. Meanwhile, PCBC measures the extent to which the engineers' perceived ease or difficult in migrating abroad for at least a year. In measuring PCBC, factors like time, resources, and self-efficacy are used in the questionnaire. A total of four items were constructed and measured by similar scale used to measure SJNM.

Based on the discussions in Ajzen (1991, 2006), intention is predicted positively by the three direct antecedents. In line with the predictions as well the relationships established in migration related studies such as Engle

et al. (2015), Remhof et al. (2014), Suwandi (2015) and Weerasinghe and Kumar (2014), the following three hypotheses are formed:

H_1: *The engineers' IMA is positively influenced by ATDE*
H_2: *The engineers' IMA is positively influenced by SJNM*
H_3: *The engineers' IMA is positively influenced by PCBC*

As noted by Ajzen (2011), the three belief constructs are developed by eliciting the engineers' immediate beliefs about the behaviour of migration. A preliminary investigation with 20 engineers were performed and reported in Ramoo, et al. (2017). Based on semi-structured interviews and the subsequent content analysis carried out, the study identified five BB, five NB and six CB as the engineers' salient beliefs (summarised in Table 1). Each of the five BB outcomes are measured by the extent to which the outcomes are evaluated, and weighted by their importance. NB is referred as the extent to which the five important referents have influence on the engineers' decision to migrate abroad, multiplied by the probability of complying with their wishes. In regards to IMA, CB measures the gen-Y engineers' belief on factors that will facilitate or hinder their planning to migrate abroad, weighted by the perceived control over those factors. All the items are measured using seven-point Likert scale, from -3 to +3.

Research Methodology

The behaviour of migration in this study refers to long term migration. Beine, et al. (2008) argued that short term migration does generally brings benefit to the sending countries because when workers return home, they usually bring back new experience from abroad. However, long term migration, which is staying abroad for more than 12 months, could influence the emigrants to stay permanently abroad. Hence, it can cause serious negative effect to the home countries. Besides that, de Groot et al. (2011) stated that when individuals form intention to migrate, the actual behaviour usually occur within two years. Therefore, IMA for this paper is defined as the *Malaysian gen-Y engineers' intention to migrate abroad for at least a year in the next two years*.

The initial questionnaire was validated by two experts from the field of behavioural psychology who are familiar with TPB. The questionnaire was then pilot tested with 40 engineers to ensure reliability and face validity. Unlike the common practice of checking internal reliability using the Cronbach's alpha, the reliability of the three belief constructs were tested using test-retest reliability technique. According to Ajzen (2011), the items in a belief construct do not need to have high internal reliability because

individuals may have positive beliefs toward certain items while negative beliefs toward others. The Pearson Correlation coefficient values for all the items were above 0.7, indicate high reliability of all the three belief constructs. Meanwhile, the internal reliabilities of the other four constructs - ATDE, SJNM, PCBC and IMA – were checked using Cronbach's alpha method. All the four constructs have values above 0.9, indicate very high reliability.

Table 1. Elicited Salient Belief Items

Belief Constructs	Belief Items
Behavioural Belief	Higher standard of living
	Safer and secure environment to live
	Better job opportunities
	Able to learn new skills
	Better education opportunity for children
Normative Belief	Parents
	Spouse
	Friends
	Working colleagues
	Superiors
Control Belief	Monetary cost
	Job skills
	Having networks abroad
	Good command of English language
	Ability to adapt to new culture
	Ability to find the right jobs

The population for this study were Malaysian gen-Y engineers. The study covered most of the industrial areas in the Peninsula of Malaysia, where most of the engineers were located. As the database of the engineers in Malaysia is lacking, the data were collected using the convenience sampling method. The survey questionnaires were handed personally to the engineers to ensure higher rate of responses. In deciding the sample size, Kline (2005) suggested a minimum of 200 when Structural Equation Modelling (SEM) analysis is applied and the data are normally distributed. In the case of non-normal, a larger sample of 400 was suggested. Hence, this study distributed the questionnaire to 420 engineers. Since all the constructs in this study are in the form of latern constructs, covariance-

based SEM (CB-SEM) analysis technique was applied in testing all the hypotheses (Lei and Wu, 2007).

Data Analysis

Although the data were collected from 420 engineers, only 402 were useful. The other eighteen responses were removed from the final sample because there were too many missing values in the returned questionnaires. The demographic background of the respondents are summarised in Table 2.

About two third (65%) of the engineers in the survey were male. All the engineers were in the age category of gen-Y (between 21 and 36 years old). Among them, about 40 percent were between 29 and 32, while those within 33 to 36 consist of 35 percent. The results also indicate that nearly 80 percent of them have bachelor degree as their highest qualifications. Those with masters' degree and diploma represent 10 percent each. In terms of the ethnic distribution, 80 percent of the engineers in the sample were Chinese ethnic, followed by 10 percent each of Malay and Indian ethnics. Married engineers consist nearly three quarters of the total engineers in the sample. Majority of them have two children (40 percent), while another 20 percent have one child. Hence, the typical engineers that represent the sample of this study are male, in the range of 29 – 32 years old, Chinese ethnic and married with two children.

The descriptive analysis performed on the dependent variable of this study revealed that the mean score of IMA was 4.67. It shows that a typical engineer in the sample do have some intention to migrate abroad. The analysis also revealed that almost 60 percent of the participants are intended to migrate abroad. This reveals that the issue of brain drain in Malaysia remains critical as high proportion of the engineers in this sample have indicated IMA in the next two years. In order to identify the behavioural factors that determine the Malaysian gen-Y engineers' IMA, SEM analysis was performed. The screening of the data was first conducted to identify the presence of missing values and outliers. The missing values were replaced using multiple imputation method (Hair et al., 2006). Based on the Mahalanobis Distance values generated to assess the presence of multivariate outliers, none was detected. Hence, the final sample size remains 402.

In meeting the objectives of this study, the hypothesised model was tested using SEM analysis. The analysis involves two stages – first is the analysis of measurement model and followed by the analysis of structural model.

Table 2. Respondents' Demographic Profile

Demographic Profile	Number of Respondents (N= 402)	Valid Percentage (percent)
Gender		
Male	264	65.7
Female	138	34.3
Age		
21-24	18	4.5
25-28	85	21.1
29-32	158	39.3
33-36	141	35.1
Education		
Diploma and below	39	9.7
Bachelor	316	78.6
Masters	47	11.7
Ethnic		
Chinese	320	79.6
Indian	41	10.2
Malay	41	10.2
Marital status		
Single	91	22.6
Married	300	74.6
Widowed	4	1.0
Divorced	7	1.7
Number of children		
0	110	27.4
1	91	22.6
2	157	39.1
3	36	9.0
4	7	1.7
5+	1	0.2

Measurement model analysis

The measurement model consists of the four constructs that measure IMA, ATDE, SJNM and PCBC. The formative indicators were excluded because the indicators are not expected to have high internal consistency. According to Jarvis, MacKenzie and Podsakoff (2003), the validity for the formative components should be tested separately. The result of the various model fit indices shown in Table 3 indicates that the model has a good fit. The values of Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and normed chi-

square statistic (Chi-sq/df) indices are within the cuts-off points suggested in Awang (2015) and Kline (2005).

Table 3. Model Fit Indices for Measurement Model

Name of category	Name of index	Level of acceptance	Result
1. Absolute fit	Chi-Square	P-value > 0.05	0.000
	RMSEA	RMSEA < 0.08	0.058
2. Incremental fit	CFI	CFI > 0.90	0.982
	TLI	TLI > 0.90	0.978
3. Parsimonious fit	Normed Chi-Square	Chi-Square/ df < 3.0	2.365

Note: Root Mean Square Error of Approximation (RMSEA), Standardised Root Mean Square Residual (SRMR), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), normed chi-square statistic (Chi-sq/df).

Results in Table 4 show that all the items have standardised loadings above 0.7. This means that all the items load well into their underlying constructs, thus all the 16 items are retained in the model.

Table 4. Standardized Loadings

Latern construct	Items	Loading
Attitude (ATDE)	AT1	.854
	AT2	.893
	AT3	.896
	AT4	.918
	AT5	.900
Subjective Norms (SJNM)	SN1	.854
	SN2	.938
	SN3	.922
	SN4	.816
Perceived Behavioural Control (PCBC)	PBC1	.916
	PBC2	.934
	PBC3	.932
	PBC4	.931
Intention to Migrate Abroad (IMA)	INT1	.966
	INT2	.982
	INT3	.940

Next, confirmatory factor analysis (CFA) was performed to assess the reliability and validity of the four constructs. As shown in Table 5, all the constructs have composite reliability (CR) values above 0.7, which shows that they have high internal reliability (Sekaran, 2000). The results also

indicate that all the constructs cleared the convergent validity test (their average variance-extracted [AVE] values exceeded 0.6). Meanwhile, the results for the discriminant validity test indicate that the four constructs are conceptually different. The square root of AVE for each construct (in bald) exceeded the value of correlation between any two constructs. Hence, there is sufficient evidence that all the four constructs are theoretically constructed and achieved construct validity.

Table 5: Confirmatory Factor Analysis Results

	CR	AVE	MSV	ASV	ATDE	SJNM	PCBC	IMA
ATDE	0.951	0.796	0.504	0.356	0.892			
SJNM	0.934	0.781	0.504	0.277	0.710	0.884		
PCBC	0.961	0.862	0.211	0.120	0.459	0.311	0.928	
IMA	0.974	0.927	0.354	0.213	0.595	0.480	0.232	0.963

Note: Composite Reliability (CR), Average Variance-Extracted (AVE), Maximum Shared Variance (MSV)

In determining the internal validity of the formative components of ATDE, SJNM and PCBC, the procedure explained in Cenfetelli and Bassellier (2009) was applied. Initial internal validity was tested by regressing the formative indicators (i.e. belief items) against their respective constructs. Since some of the belief items were significant in predicting their respective constructs, internal validity were achieved. Moreover the value of Pearson Correlation coefficients between the indicators for each constructs were below 0.6, indicate that the indicators do not have high internal consistency (a condition for formative model). Thus, all the formative indicators are retained in the model.

Structural model analysis

The effect of the ATDE, SJNM and PCBC on IMA were established using the structural model analysis. Initially, the hypothesised model did not have good fit. The RMSEA value was 0.109, exceeded the cuts-off value of 0.08. Similarly, the CFI was 0.785, below the cuts-off value of 0.90. In order to improve the model fit, the model was re-specified based on the modification indices suggested by the AMOS program. As shown in Figure 3, correlations between some of the belief items as well as between the error terms were allowed. In addition, new paths were drawn from SJNM and PCBC to ATDE. Based on the result of model fit indices in Table 6, the modified model fits the data appropriately.

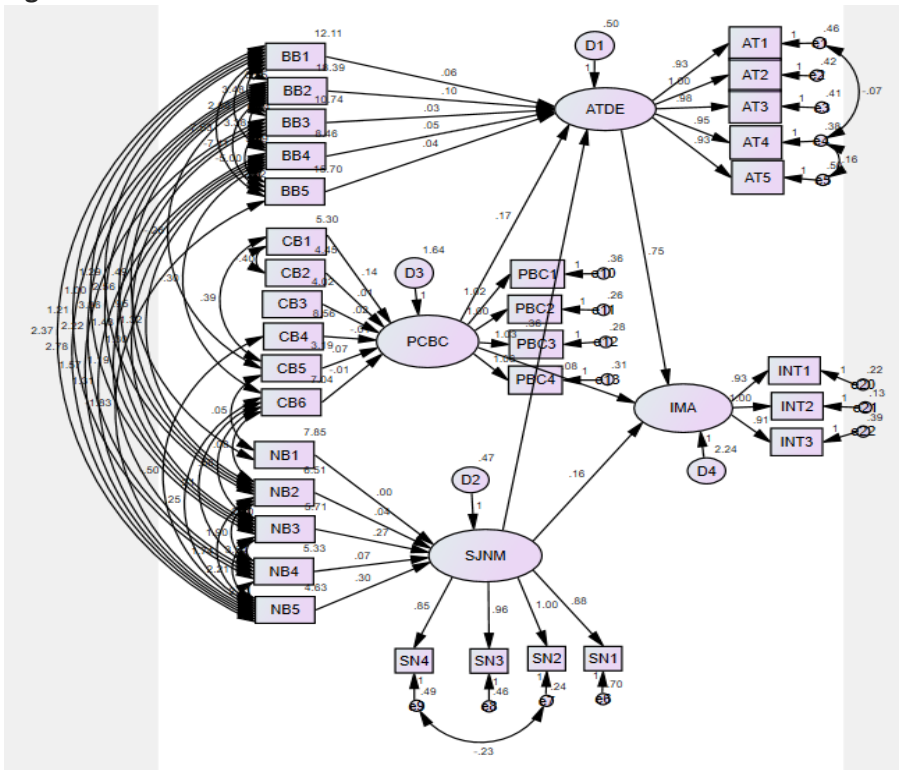**Figure 3**. Modified Structural Model

Table 6. Model Fit Indices for Measurement Model

Name of category	Name of index	Level of acceptance	Result
1. Absolute fit	Chi-Square	P-value > 0.05	0.000
	RMSEA	RMSEA < 0.08	0.063
2. Incremental fit	CFI	CFI > 0.90	0.966
	TLI	TLI > 0.90	0.961
3. Parsimonious fit	Normed Chi-Square	Chi-Square/ df < 3.0	2.593

Note: Root Mean Square Error of Approximation (RMSEA), Standardised Root Mean Square Residual (SRMR), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), normed chi-square statistic (Chi-sq/df).

Using the Bollen-Stine bootstrapping approach, the SEM analysis provided a coefficient of determination (R^2) value of 0.418, meaning that close to 42 percent changes in the engineers' IMA can be is explained by the changes in ATDE, SJNM and PCBC. The variance is similar to the value found in Remhof et al. (2014) and Engle et al. (2015). The results of the structural model analysis revealed that the engineers' attitude and their perceived subjective norms towards migration have significant positive

effect on their IMA. However, as the p-value for PCBC is 0.200, (which is above 0.05), it does not have significant effect on the intention. In addition, the standardised beta value for Attitude is larger than of SN, thus the engineers' attitude towards migration has strongest effect on IMA.

Table 7. Results of Hypotheses Testing

Hypotheses	p-value	Std. Beta	SE (CR)	Significance (Direction)
H_1: Malaysian engineers' positive attitude towards migrating abroad will significantly increase their intention to migrate abroad	0.000*	0.488	.093 (8.097)	YES (positive)
H_2: Positive subjective norms on migrating abroad will influence the Malaysian engineers' intention to migrate abroad positively	0.025**	0.127	.073 (2.239)	YES (positive)
H_3: Perceived positive control over migration behaviour by the Malaysian engineers do significantly influence their intention to migrate abroad	0.200	0.057	.061 (1.282)	NO
H_{1a}: The belief that migrating abroad will lead to better standard of living is expected to significantly enhance the engineers' positive attitudes toward migrating abroad.	0.000*	0.180	0.014 (4.365)	YES (positive)
H_{1b}: The belief that migrating abroad will contribute to safe and secure environment to live is expected to significantly enhance the engineers' positive attitudes toward migrating abroad.	0.000*	0.370	0.012 (8.843)	YES (positive)
H_{1c}: The belief that migrating abroad will provide better job opportunity is expected to significantly enhance the engineers' positive attitudes toward migrating abroad.	0.030**	0.087	0.014 (2.175)	YES (positive)
H_{1d}: The belief that migrating abroad will increase the ability to learn new skills is expected to significantly enhance the engineers' positive attitudes toward migrating abroad.	0.001*	0.118	0.015 (3.187)	YES (positive)
H_{1e}: The belief that migrating abroad will provide better education opportunity for their children in the future is expected to significantly enhance the engineers' positive attitudes toward migrating abroad.	0.002*	0.129	0.013 (3.076)	YES (positive)

H$_{2a}$: The belief that the engineers' parents will think they should migrate abroad will significantly increase the engineers' positive subjective norms on migrating abroad.	0.830	0.006	0.013 (0.215)	NO
H$_{2b}$: The belief that the engineers' spouses/friends/fiancé will think they should migrate abroad will significantly increase the engineers' positive subjective norms on migrating abroad.	0.019**	0.066	0.016 (2.348)	YES (positive)
H$_{2c}$: The belief that the engineers' friends will think they should migrate abroad will significantly increase the engineers' positive subjective norms on migrating abroad.	0.000*	0.0453	0.021 (12.74)	YES (positive)
	0.001*	0.113	0.022 (3.232)	YES (positive)
H$_{2d}$: The belief that the engineers' working colleagues will think they should migrate abroad will significantly increase the engineers' positive subjective norms on migrating abroad.	0.000*	0.450	0.020 (14.55)	YES (positive
H$_{2e}$: The belief that the engineers' superiors will think they should migrate abroad will significantly increase the engineers' positive subjective norms on migrating abroad				

Note: Standardized estimator (Std. Beta), Standard error (SE), Critical ratio (CR), *significant at 1%, **significant at 5%

Ajzen (2006) and Fishbein and Ajzen (2010) explained that when behavioural intervention programs are developed, only the beliefs that influence the direct predictors that significantly affect the intention need to be targeted. Since hypothesis test results indicated that only ATDE and SJNM are significant, the intervention program should only target to change their respective beliefs - behavioural beliefs and normative beliefs. The results indicate that all the five behavioural beliefs (*higher standard of living, safer and secure environment, better job opportunities, able to learn new skills,* and *better education for children*) do significantly influence the engineers' attitude towards migration. Meanwhile, there are four important referents who have significant influence on the engineers' subjective norms toward migration. They are spouses, friends, working colleagues and superiors. However, the engineers' parents were not expected to significantly influence the engineers' SJNM. The signs of all the parameters are positive, indicate that the higher the pressure from the four groups, the engineers' SJNM towards migration will be stronger.

Discussion and Conclusion

The purpose of this study was to assess the Malaysian gen-Y engineers' IMA from a behavioural perspective, using a TPB framework. The present findings show that the hypothesised TPB model was able to explain slightly more than 40 percent variance in the engineers' IMA. This result further highlight the utility of TPB in the development of behavioural intervention policy in the field of migration. In accomplishing the first objective, the results in Table 7 revealed that the engineers' ATDE and SJNM were significant predictors of IMA. This indicates that the engineers' IMA increase when they have positive attitude towards migration. For engineers who evaluate the outcomes of migrating abroad negatively, their IMA is expected to be lower. The result is consistent with Engle et al. (2015) and Remhof et al. (2014), where positive attitude increase undergraduates' intention to work abroad. In contrast, Suwandi (2015) found that the intention to work as domestic workers in Egypt by Indonesian migrants was not influenced by their attitude. Unlike in the study by Suwandi (2015), the participants in Engle et al. (2015), Remhof et al. (2014) and the current study were high skilled workers. This demonstrates that high skilled workers' IMA is significantly influenced by their positive attitudes toward migration.

Meanwhile, the finding of this study that the gen-Y engineers' SJNM do significantly influence their IMA is consistent with previous findings in the migration literatures. The positive relationship between the two variables were established in studies like Engle et al. (2015), Remhof et al. (2014) and Suwandi (2014). Hence, there is clear evidence that individuals' IMA is significantly influenced by their important referents. However, the effect of PCBC on the engineers' IMA was not significant. It implies that even if the engineers have sufficient control over the behaviour of migration, it cannot be translated into stronger IMA. The finding is consistent with Suwandi (2014), who also failed to establish any significant relationship between PCBC and IMA. In contrast, Engle et al. (2015) and Remhof et al. (2014) have established significant relationship between the two variables. This probably indicates that individuals from developed countries (referring to participants in the studies by Engle et al. and Remhof et al.) may perceive that they have sufficient control over the behaviour of migration, thus significantly influence their intention to move abroad.

In accomplishing the second objective of the study, the findings have revealed some significant BB and NB that influence ATDE and SJNM respectively. First, all the five BBs - *higher standard of living, safer and secure environment, better job opportunities, able to learn new skills,* and

better education for children – are found to have significant effect on ATDE. It shows that the engineers' attitude towards migration is influenced by the five beliefs. When these beliefs are stronger, the engineers are expected to form positive attitude, and in turn, their IMA will increase. Meanwhile, among the five important referents, only parents are found to be non-significant in influencing the engineers' positive SJNM. The other four groups – spouses, friends, working colleagues and superiors – are expected to influence the engineers' positive subjective norms toward migration. In other words, the four important referents can indirectly influence the engineers' IMA.

The above findings provide new insights into our understanding about the salient beliefs of high skilled workers that influence their intention to move abroad. Such understanding is critical in the development of relevant behavioural intervention policy to tackle the issue of brain drain in developing countries. Future studies in migration may further explore the role of the salient beliefs in influencing IMA.

This study has some important implications to the policy makers in Malaysia. The descriptive analysis result revealed that more than half (60 percent) of the engineers in the sample have at least some IMA in the next two years. This finding shows that the brain drain phenomenon among the engineers in Malaysia can get more serious. Hence, it is the time for the policy makers to explore new strategy to tackle the issue. The authorities should complement existing policies with new policy from behavioural perspective. Since this study has established attitude of the engineers as the strongest determinant of IMA, the authorities could target all or some of the five BB that significantly influence ATDE. For example, the engineers believe that the environment at abroad are safer and secure compared to Malaysia. However, in a report on global peace by Institute for Economics and Peace (2017), Malaysia was ranked higher (29) compared to UK (41) and United States (114). The two countries are among the top four destination countries for Malaysian professionals to migrate. Thus, in developing the intervention program, Malaysian authorities should highlight this kind of information to create awareness among the engineers that the country is relatively peace compared to many other countries. Besides that, the programs also could highlight the difficulty faced by many migrants to get the desired jobs abroad. According to Boo (2017), many Malaysians are either unemployed or under employed while abroad due to weak job environment abroad.

Moreover, when implementing the behavioural intervention programs, the authorities could include all or some of the engineers' important referents – spouses, friends, working colleagues and superiors. Efforts must

be taken to change their beliefs too that migration does not necessarily bring benefits to the engineers. They should be aware that migration can be a risky decision in the long run. In changing the belief of important others, Borzendowski (2014) and Tomasone et al. (2014) have shown that the target participants' intention to perform a behaviour could be changed as well.

In implementing the intervention programs, the authorities could apply the Randomised Controlled Trial (RCT) method by first selecting few small group of engineers who have high intention to migrate. Next, different intervention programs could be applied to the different groups, while one group (i.e. the controlled group) is not subjected to any intervention program (Haynes et al., 2012). The authorities can use some intervention tools that were used successfully in the past such as face to face seminar, workshops, sending factual and emotional messages through emails and social media to the participants (as discussed in Borzendowski, 2014; Tomasone, Ginis, Estabrooks, & Domenicucci, 2014; Adewuyi and Adefemi, 2016). For example, during a seminar or workshop, the authority in Malaysia could invite an engineer (who had previously migrated abroad but returned to Malaysia after failed to find relevant jobs) to share his unpleasant experience while abroad. The emotional message shared during the seminar could probably change the participants' attitude toward migration from positive to negative. Meanwhile Tomasone et al. (2014) have suggested that any intervention programs should be conducted on regular basis to achieve higher success rate. At the end, the authorities could decide a combination of the most effective programs that could significantly lower the engineers' intention to migrate. According to Haynes et al. (2012), the use of RCT method in implementing behavioural intervention programs has not only increases the programs' effectiveness but also managed to lower the cost of implementation.

In conclusion, this study has provided the academics and policy makers a new dimension to tackle the issue of brain drain. Existing policies to stop brain drain were mostly at macro level, aimed at improving a country's economic conditions as well as its socio-political environment. However, the policies failed to target the right individuals who have high intention to migrate, thus contribute to less effective but costly policies. The current study has suggested a more effective policy in the form of behavioural intervention that could target the high skilled workers who have high intention to migrate abroad. TPB could be applied to identify individuals' beliefs about migration, which the authorities can target to change their intention to migrate. Nevertheless, this study did not make any attempt to explore the engineers' beliefs in details – a limitation of the present study.

Only structured interviews were performed. For future studies, it is important to perform unstructured interviews to further explore the engineers thought that determine these beliefs. Qualitative analysis will contribute more insights regarding the professionals' behaviour and beliefs toward migration.

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