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International Market Selection Model Using Newly Developed Geometric International Market Selection Space

(Model Pemilihan Pasaran Antarabangsa Menggunakan Ruang Pemilihan Pasaran Antarabangsa Geometri yang Baharu Dibangunkan)

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ABSTRACT

International Market Selection (IMS) is literally a process in identifying and selecting feasible international market opportunities for exporting. It is a methodological process whereby suitable variables are vetted through a model in order to produce output in the form of processed information that would help export marketers in decision-making. The new IMS model, introduced as Geometric International Market Selection Space (GIMSS), rooted from the Trade Intensity Index (TI) Index and Geometric Trade Intensity Space Box (GTISB) is proposed as a complimentary tool to be used by international marketers. The constructed GIMSS model utilises both trade elements (exports and imports) with no filtering and weighting processes, employs changes within changes measurement, embeds quality perspective measurement as alternative game changer in identifying International Export Opportunities (IEO), and able to do future projection of IEO. In addition, even though this GIMSS model does not have weighting scheme, it can still perform trade-off process between volume and quality elements. The GIMSS is capable of identifying and categorising the host country market potential into low, intermediate or high market potential at product level. With that policy maker would be able to employ this information conjointly with competitive index of exporting country and make assessment in the perspective of cross checking between host country market potential levels with exporting country competitive advantage status.

Keywords: international market selection; trade elements; market potential; volume; quality; trade-off

ABSTRAK

Pemilihan Pasaran Antarabangsa (PPA) secara literal adalah suatu proses untuk mengenal pasti dan memilih peluang pasaran antarabangsa yang praktikal untuk mengeksport. PPA adalah suatu proses metodologi yang mana pemboleh ubah yang sesuai dinilai melalui suatu model yang mengeluarkan ouput di dalam bentuk maklumat yang telah diproses yang mana membantu pemasar-pemasar eksport dalam membuat keputusan. Model baru PPA ini diperkenalkan sebagai Geometri Ruang Pemilihan Pasaran Antarabangsa (GRPPA) yang berakar umbi daripada Indeks Intensiti Perdagangan (IP) dan Geometri Ruang Kotak Intensiti Perdagangan (GRKIP) adalah dicadangkan sebagai alat tambahan untuk diguna pakai oleh pemasar-pemasar antarabangsa. Model GRPPA yang dibina ini menggunakan kedua-dua unsur perdagangan (eksport dan import) tanpa proses penapisan dan pewajaran, menggunakan perubahan dalam pengukuran perubahan, mengandungi pengukuran perspektif kualiti sebagai alternatif yang membawa perubahan ketara dalam proses mengenal pasti peluang eksport antarabangsa dan berkeupayaan untuk melakukan unjuran peluang eksport antarabangsa pada masa depan. Walaupun model GRPPA ini tidak mempunyai skim pewajaran, model ini masih boleh melakukan proses tukar ganti antara unsur jumlah dan kualiti. GRPPA juga berkeupayaan untuk mengenal pasti dan mengkategorikan potensi pasaran negara tuan rumah kepada potensi pasaran rendah, menengah atau tinggi pada peringkat produk. Dengan itu, penggubal dasar dapat menggunakan maklumat ini bersama dengan indeks persaingan negara pengeksport dan membuat penilaian daripada perspektif semakan silang antara tahap potensi pasaran negara tuan rumah dengan status kelebihan bersaingan negara pengeksport.

Kata kunci: pemilihan pasaran antarabangsa; unsur perdagangan; potensi pasaran; kuantiti; kualiti; perimbangan

INTRODUCTION

This paper represents the International Market Selection (IMS) model in identifying International Export Opportunities (IEO) across the globe. The IMS can be regarded as a structural and systematic procedural whereby various variables shall be input into a procedure. The procedure then processes the inputs in order to produce output which supplies marketer with processed information in making suitable decision. Cuyvers et al. (1995) denoted that a decision support system that offers data on export markets and data processing procedures is needed in order to derive appropriate actions in relevant export markets.

Literatures affirmed that there are available IMS models for marketers' usages. However the existing models faced several shortcomings such as concerns on usage complexity issues due to many variables, lack of either export or import element in their models, bias tendency issue due to weighting and missing potential niche market due to filtering. For example Papadopoulos et al. (2002) Trade-off Model employed methodology that uses many input variables in multiple steps in order to arrive at conclusion. With many input variables to be processed, this would make the procedure of decision making more complex. Steenkamp et al. (2009) indicated that Papadopoulos et al. (2002) Trade-off Model is very extensive and time consuming when dealing with large data of country/product combinations. In another IMS model by Cuyvers et al. (1995) and Cuyvers (2004) Decision Support Model (DSM) employed filtering scheme. Cuyvers et al. (1995) did point out that "such a procedure has its drawback" (p. 176). This means product/country combinations that have been filtered out would no longer be considered in the next stage. As such there is a risk of wrongly eliminating product/country that may have promising niche markets potentials. Furthermore DSM extensively used the traditionally Balassa's Reveal Comparative Advantage (BRCA) index as competitiveness measurement decision in its filtering process which Azhar and Elliott (2006) highlighted that BRCA index have issues of scaling, proportionality and symmetry that may cause doubtful result analysis interpretation.

There was attempt by Tong (2012) in geometrically addressing this issue via Geometrical Revealed Comparative Advantage (GRCA) index, however it was used as substitute of BRCA in DSM filtering processes, not as an IMS model. Green and Allaway (1985) Shift-Share Model utilised import element only. Papadopoulos et al. (2002) exposed empirical proof of unreliability and several theoretical shortcomings of this model such as bias, uncorrelated random noise in the variables and high association with the simple growth model which depicts redundancy. The GRCA (Tong 2012) used export element only. Thus there is a gap of an index or a model that utilises both import and export elements only which may turn the analysis not entirely holistic. Papadopoulos and Denis (1988) viewed this as a disadvantage as it does not examine the whole set of strategic or environmental dimensions in IMS. Multiple criteria methods and trade-off model do utilise both import and export elements. However besides those elements, they also utilised many others elements which makes the process complex and lengthy. To sum up, the existing simple IMS model does not produce a holistic analysis, while the more complex IMS model does produce the desired holistic analysis even though it requires more extensive works. In addition product quality perspective is yet to be incorporated as variable in IMS models. Through literatures review of Papadopoulos et al. (2002) Trade-off Model, Cuyvers et al. (1995) DSM model, Green and Allaway (1985) Shift-Share Model and Tong (2012) GRCA index there was no mentioning on product quality aspect. Cuyvers (2004) highlighted the importance of product quality as another aspect that requires awareness and concerns in determining exports success. However he did not incorporate quality as an input variable in his DSM model.

From the above paragraph highlighting problems of existing IMS models, the followings are research questions to be addressed in this paper. Is it possible to conceive an IMS model that; (1) utilise both trade element (import and export) only?; (2) can perform objective analysis without cognitive bias, free from firm's strategic direction, no filtering and perform trade-off between variables without weighting scheme?; (3) is embedded with product quality analysis?; (4) is uncomplicated that can suit both small and big firm business scenario?; (5) can be geometrically represented with scaling, proportionality and symmetry properties?; and (6) able to perform cross sectional analysis across span period of time?

The objective of this paper is to propose a new IMS model which applies the Marginal Intra Industry Trade (MIIT) concept used in measuring the Smooth Adjustment Hypothesis (SAH) of the adjustment costs of the market in responding to change in supply and demand via the changes in export and import of same product over a certain period of time but innovatively tweaking MIIT concept in the perspective of market potential in identifying IEO. Brülhart (2002) highlighted that trade by itself could not be the sole cause of the adjustment costs as trade flows are not exogenous but more exactly they are wrought by underlying factor endowments, demand patterns, technologies, income levels and policy regimes of the trading countries. With that the concept of "trade-induced" changes therefore implicitly alludes to ulterior causes which are manifested in the trade flows. Thus, the new proposed IMS model will also apply this "trade induced" concept but innovatively refine it in the viewpoint of market potential as it also could not be possibly regarded as the sole indicator of trade flows direction between countries. In gist, the new proposed IMS model will measure trade intensity between countries in the perspective of change in export and import of the same product over a period of time and decipher it in the sense of market potential. Its core foundation is rooted from the Trade Intensity (TI) Index and Geometrical Trade Intensity Space Box (GTISB) conceptual framework (Hussein et al. 2018). Alternatively, the objective of this paper is to construct a new IMS model that can be represented by a scaling, proportionality and symmetry geometrical square box, which to be called Geometric International Market Selection Space (GIMSS) that would consist of these features and functionality; (1) utilise

trade elements (import and export) variables only which enable a cross sectional analysis across a span period of time; (2) to introduce quality dimension as one of the feature in IMS model which is lack in existing IMS model.

This GIMSS model should be simpler, less time consuming and less complex to execute as it will be using two inputs variables only. With that small firms could utilise this new IMS model with less concerns of allocating special resources in order to implement it. Besides, GIMSS model comes with change concept that enables cross sectional change analysis that could supply firms and policy makers with international market potential historical trending information of target market condition at product/country level that can be utilised in crafting market penetration strategy. In addition, this GIMSS model has quality analysis perspective embedded in it on top of volume analysis perspective. As such firms can make use of this information as product differentiation strategy in lieu of stiff price competitions. Likewise, firms and policy makers may evaluate whether target market product/country emphasises on either quality or volume which can help shape their marketing strategy and be set as a new marketing game changer in market penetration.

Furthermore this GIMSS model can be used hand in hand with competitive advantage analysis. A cross checking test can be performed to probe a target country's market potential viability in a situation whereby a source country has a competitive advantage in exporting a product to that target country. This is beneficial to firms and policy makers as it facilitate them to assess whether to increase or decrease exporting or to perform some necessary adjustments in order to follow suit target market potential situation. Moreover the GIMSS model comes with scaling, proportionality and symmetry geometrical square box representation that permits an analysis to be confined within a uniform square space of impartial quadrants with proportional equi-lines that can be arranged within that space. This sets up a new way of performing analysis that could provide policy makers an alternative investigation of processed information in identifying international export opportunities.

The remainder of this paper is organised as follow; Section Two is a brief comparative review of existing IMS models with regard to GIMSS model. Section Three discusses methodological framework of the five stages of GIMSS. Section Four discusses on the empirical illustration of GIMSS model while Section Five concludes.

BRIEF LITERATURE REVIEW

A COMPARATIVE REVIEW OF EXISTING IMS MODELS WITH RESPECT TO GIMSS

Literature review reveals that existing IMS models have their strengths. However there are drawbacks that need to be addressed, too. Thus, this GIMSS model is leveraging and blending the strengths of those existing models and improving their weaknesses through the incorporation of new relevant parameters and variables in identifying feasible export destinations. It is envisaged that this GIMSS model would have a simplified process that uncover new perspective of analysis. The comparative review will focus on existing IMS models by Green and Allaway (1985) shift-share model, Papadopoulos et al. (2002) trade-off model, Cuyvers et al. (1995) DSM model and Cuyvers (2004) DSM model as these models can be regarded as prominent models and are closely related to the GIMSS model foundation.

The GIMSS model is a quantitative type of which is in agreement with Papadopoulos and Denis (1988) argument that quantitative type is non-bias, structured statistical format that can process large volume of data. The strength of Green and Allaway (1985) shift-share model is its simplicity and ability to measure and identify relative change on industry specific level. It introduced a concept of change over a period of time and that change is relative back to the totality of all changes that happened within that span of time for a specific product market. However the scope only covers change in import size and import growth rate perspective, which Green and Allaway (1985) called as the net shift. As such it does not reflect the total scenario of a country's market activity. Cuyvers (2004) stressed that by looking at imports only, it is implicitly assumed that the local demand is satisfied by imports, or that imports are a good proxy of local demand for a specific product. However, a target market can also be reached by local production. In GIMSS model, a change in export will be introduced as an additional variable. By considering export, the local production would implicitly be factored in. Additionally this is in conjunction with Papadopoulos et al. (2002) idea of considering both sides which they called as "pluses" and "minuses". A gap between both flows could be detected and identified whether import or export is dominant, which would translate to either potential opportunity or threat of the target market.

The GIMSS model would only be using two variables i.e. change in import and export. This is to minimise the problem whereby if many variables are used, not all the variables are applicable to all products. Many input variables would mean the need to collect many data and not all countries would have all the necessary data. Besides, some particular variables would have different impact of accuracy amongst product/country combination due to the nature of some of the selected variables. Hence, the end result could be inaccurate or irrelevant to certain products in the target market as highlighted by Papadopoulos et al. (2002). This resulted in the need to apply a variety of theoretically grounded ad hoc solutions as and when necessary, which added up to the complexity. Moreover, with many variables that need to be considered as in the model by Papadopoulos et al. (2002) trade-off model, Cuyvers et al. (1995) DSM model and Cuyvers (2004) DSM model makes the analysis more complex.

Multiple criteria methods (Górecka & Szałucka 2013; Miečinskienėa et al. 2014; Papadopoulos & Denis 1988) and trade-off model (Papadopoulos et al. 2002) do utilise both import and export variables. However there are many other

variables that are used too which utilises extensive information sources of secondary data. Thus this makes the process intricate as not all data are available for all countries. Marchi et al. (2014) categorised this approach as high-level of systemisation which is highly formalised and structured which allows the identification of rational choices. Thus they advised that the models that use this kind of rational approach have no consensus about the complete set of variables to be used to measure market attractiveness and their relative weights within multi-criteria settings and problems in secondary data collection frequently arise. Papadopoulos et al. (2002) also highlighted that there can be no single "best" set of variables and the selected set will limit any model's applicability in certain situations. For example, the Cuyvers et al. (1995) DSM model and Cuyvers (2004) DSM model filtering variables did experienced changes whenever referencing to Urban et al. (2014), Cuyvers (2004) and Cuyvers et al. (1995). Moreover Marchi et al. (2014) advised that small firms normally prefer less structured approaches to the IMS decision process. Due to the adoption of rigid IMS models, in which might be appropriate for large managerial structures, such approach seems to be unrealistic and rather costly for small firms.

The GIMSS model would not be imposing any weight mechanism. Papadopoulos et al. (2002) trade-off model used weight mechanism that is determined by firm strategy inclination. The applied weighting scheme that is tied up closely with the firm's strategic orientation can be regarded as bias on one side of the coin of the trade-off. Papadopoulos et al. (2002) themselves highlighted that different firms with different needs would assign different degrees of importance to each side of the trade-off. Firms with defensive strategy would incline on easily penetrable markets and would less likely prefer markets with high trade barriers, whereas firms with offensive strategy would consider markets with high trade barriers but present strong potential. According to Marchi et al. (2014), "when the entrepreneur's preference for stability and risk avoidance prevails, some specific cognitive biases are likely to occur and thus negatively influence the IMS process" (p.2199). In fact they indicated that cognitive biases prevail more in low systematic and descriptive models based on behavioural theory of adopting heuristics judgement that entice decision-makers away from making optimal decisions. Nevertheless, even though without weighting mechanism, GIMSS model is still capable of performing trade-off functions.

The GIMSS model will not apply filtering process as per Cuyvers et al. (1995) DSM model and Cuyvers (2004) DSM model. This is to avoid deleting any market that could potentially have niche opportunities. Cuyvers et al. (1995) themselves highlighted that such method has its downside in which product/country combinations that have been filtered out may have niche market prospective but could not be explored as they are no longer considered in the next stage. In addition, the GIMSS model incorporate quality in the decision-making process. Thus, there is a possibility to identify niche market opportunity in terms of product differentiation (quality) in view of stiff price competition and the rise concern from consumer on quality as highlighted in Cuyvers (2004). He highlighted that product quality in the aspects of meeting the required standards, as a strategy to compensate price disadvantage and the increasing trend of health awareness amongst consumers, even though he did not incorporate quality in Cuyvers (2004) DSM model. Additionally, the GIMSS model has the function of representing analysis in two-dimensional geometrical square boxes space. Hence, GIMSS would improve the symmetrical, scale and proportionality issue as highlighted by Azhar and Elliott (2006). The geometrical square box space shall populate the overall markets potential opportunities through a span period of defined time and perform a cross-sectional analysis that can be cross-checked with events happening during that span. Furthermore, this function enables the possibility of prediction when induced change in import and export is introduced.

Basically GIMSS model is based on identified product behaviour inside space index of host country as the target potential market. The populated behaviour in term of market potential of the identified product inside the volume and quality space of the host country is observed and analysed. The space analysis is done via geometrical illustration which is a new approach promoted by this GIMSS model. From that space geometrical analysis, a suitable marketing strategy is developed parallel with future market potential is projected. GIMSS uses net measurement between two trade flows; export and import of potential target market (host country) for a specified product under review. The exquisiteness of this net measurement is that it measures the net change within changes. As such, the net change between changes of export and import can be regarded as viable reflection of whether the host country possesses potential market or vice versa. By comparing with Papadopoulos et al. (2002) trade-off model, there is similarity in term of the fundamental concept of considering two sides, positive and negative, advantages and disadvantages of the object under review for effective decisions. In comparing with Green and Allaway (1985) shift-share model, similarity in the fundamental concept of considering net shift can be observed. Nevertheless this GIMSS model should prevail as it not just considers the two sides, but it also consider the changes within changes of those two sides under review.

Based on the literatures review of comparative analysis discussed above, Table 1 summarised the comparative analysis of existing models with GIMSS model. The structures and methods of the existing IMS models were studied and their strengths and weaknesses were systematically reviewed. This includes; for example, the functional forms of the parameters used by the existing IMS models in identifying export opportunities. From Table 1 it is observed that all models use ratio and mathematical equation elements, while geometrical analysis and quality elements are only available in GIMSS model whereas for other elements we can see a mixture of possessions amongst the models. As per Table 1, GIMSS model should triumph compared to the other existing models since it uses less variables, does not have risk of neglecting any product/country market potential by not employing filtering and weighting scheme, and possesses all other elements that other models have with extra speciality in geometrical analysis representation and future prediction.

TABLE 1. Summarisation of IMS models comparative analysis

Element	IMS Model				
	Green and Allaway (1985) shift-share	Papadopoulos et al. (2002) trade-off	Cuyvers et al. (1995) DSM	Cuyvers (2004) DSM	GIMSS
Number of variables used	One	Eight	Seven	Seven	Two
Filter	X	X	√	√	X
Trade-off	X	√	X	X	√
Geometrical analysis	X	X	X	X	√
Quality	X	X	X	X	√
Ratio	√	√	√	√	√
Mathematical equation	√	√	√	√	√
Change element consideration	√	√	X	X	√
Weighting scheme	X	√	X	X	X
Future prediction	√	√	X	X	√

Note: X indicates the model does not possesses that element while √ indicates the model possesses that element.

In short, GIMSS model is simple to use, only uses two elements, analysed at product specific level and can generalise for all products. With only elements of the changes for product export value and product import value are required, simplicity is achieved which should enable easiness in performing large number of specific country and product level analysis. In addition, quality analysis extension by using unit export value and unit import value changes makes product differentiation analysis visible and an added value. Moreover the time period of analysis can be broken into several phases that allow cross sectional change analysis. This analysis can provide trending info with cause and effect relation due to certain global or regional issues or events such as ASEAN financial crisis, EURO debt crisis to name a few. Cuyvers et al. (1995) did mention that export opportunities change over time. Thus the need to have a model that is user friendly, easily repeated and updated, adaptive and use easily accessible secondary data. This is achievable via GIMSS model. In the methodological framework section below, a detailed outline and process flow of GIMSS model application is to be discussed but prior to that, we will discuss the sample of data that will be used in this study.

METHODOLOGY DATA AND VARIABLES

AN OVERVIEW OF GIMSS MODEL

The GIMSS model is depicted in Figure 1. Both export and import of *product i* of a host country shall go through three core processes which are the volume and quality stages prior to going through volume quality stage. Then the marketing strategy and future projection stages follow suit. The volume analysis is encapsulated inside V index space whereas the quality analysis is encapsulated inside MQ index space while both of them are encapsulated within VQ index space. The VQ index space is divided into four quadrants. From those three indices populated geometrical locations in respective quadrants, marketing strategies are crafted and future projection is derived while both of them are entwined. Thus the idea of GIMSS model is through the framework flows of volume and quality calculation of equation (1), equation (2) and equation (3). Thus we can organise a flow of stages of equation (1) as stage one, equation (2) as stage two and equation (3) as stage three. After a product/country permutation has gone through those three stages, a host country market potential condition can be draw from the result of those calculations and an appropriate marketing strategy can be created. Furthermore, host country future market potential can be estimated too by applying the trade-off concept. Therefore, marketing strategy creation and future market potential estimation can be set as stage four and stage five accordingly.

This GIMSS model is inline with the objective of this paper to introduce a new IMS model that can be represented by a geometrical square box with scaling, proportionality and symmetry properties. Two trade elements which are import and export are the only input variables that will go through stage one, stage two and stage three of their respective square boxes prior to going through stage four and stage five accordingly. Stage two is the quality perspective as a new dimension introduced by GIMSS in IMS. Since GIMSS space is a square box hence it permit a cross sectional analysis within that space via change of export and import measurement. All calculations and Cartesian plane graphs can be executed by using standard Microsoft Office Excel software.

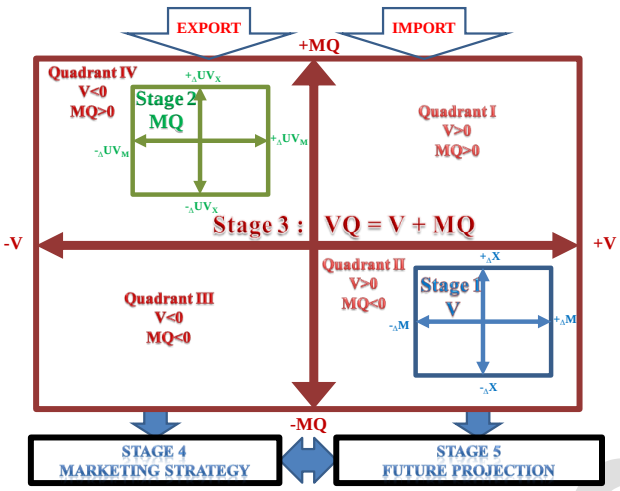

FIGURE 1. The GIMSS Model

A country export and import data shall be a secondary data which can be obtained from the International Trade Centre (ITC) or United Nation Commodity Trade (UNCOMTRADE) by using the Harmonised System (HS) or Standard International Trade Classification (SITC) product code. For this study, the data shall be obtained from ITC by using the HS product code. The period of the analysis can span as many years as possible, depending on the historical data availability. The ITC provides data period from 2001 up to 2016. However for this study, the period is limited to a 5-year span only. GIMSS shall be using two variables only i.e. country import and export data.

OUTLINE AND PROCESS FLOW OF GIMSS MODEL

The potential target market/country is set as Host Country (H) and the rest of the world are set as Foreign Countries (F). The product to be analysed is identified by using SITC or HS code. The GIMSS model consists of five stages (four plus one). An identified *product i* will undergo these five stages.

Stage one analyses the host country's market potential of *product i* trade intensity in volume change perspective. If import activity dominates, it will reflect that the host country is possessing market potential. The analysis is based on V index which is calculated as per equation (1):

$$Vi = \frac{(\Delta Xi - \Delta Mi)}{2(\max\{|\Delta Xi|, |\Delta Mi|\})}, -1 \le Vi \le 1 \qquad (1)$$

where V_i is volume index, ΔX is the changes for export value and ΔM is the changes for import value of *product i* . If V > 0 than F is having market potential while if V < 0 than H is having market potential. The distance of V from equilibrium isocline (V = 0) shall determine the intensity of the H and F market potential. The Host Market Potential (HMP) is to be ascertained in stage four. The calculated ΔX, ΔM and V indices values are then plotted in Cartesian plane which is then used to deduce the condition of host country volume market potential intensity.

Stage two analyses the host country's market potential of *product i* trade intensity in quality change perspective. If the host country's import on a better quality *product i* is superior than its export, it is reflecting that the host country is possessing market potential. The same process in Stage one is repeated with equation (1) substituted with equation (2) for MQ index.

$$MQi = \frac{(\Delta UXi - \Delta UMi)}{2\max\{|\Delta UXi|, |\Delta UMi|\}}, -1 \le MQi \le 1 \qquad (2)$$

where MQ_i is Marginal Quality index, ΔUX is the changes for unit export value and ΔUM is the changes for unit import value of *product i*. If MQ > 0 than F is having market potential while if MQ < 0 than H is having market potential. The distance of MQ from equilibrium isocline (MQ = 0) shall determine the intensity of the H and F market potential. The MQ_i index is similar to V_i index but translated for use in unit value space (UVS) in measuring changes of trade flows of quality differentiated products. Azhar and Elliott (2006) highlighted that the ground for using unit value in measuring quality is based on Stiglitz (1987) which pointed that products of a higher quality should charge a higher price so that price can be considered an (albeit imperfect) indicator of quality.

Stage three analyses the host country's market potential when both volume and quality change are combined. This stage describes which one has bigger possibility to predict the impact of trade-off between the two. The analysis is based on VQ index which is calculated as per equation (3):

$$V_i + MQ_i = VQ_i, \quad -2 \leq VQ_i \leq 2 \tag{3}$$

where VQ_i is the volume quality combination of *product i*. The calculated V, MQ and VQ indices values are then plotted and draw in Cartesian plane as illustrated in Figure 2 of the Geometric Volume Quality Intensity Space Box (GVQISB) diagram, which is an adapted version of Azhar and Elliott (2011) product Quality Adjusted Trade Adjustment Space (QTAS) diagram. Based on the values of V, MQ and VQ indices in Cartesian plane the condition of host country combine volume and quality market potential intensity can be deduced. The HMP is to be ascertained in stage four.

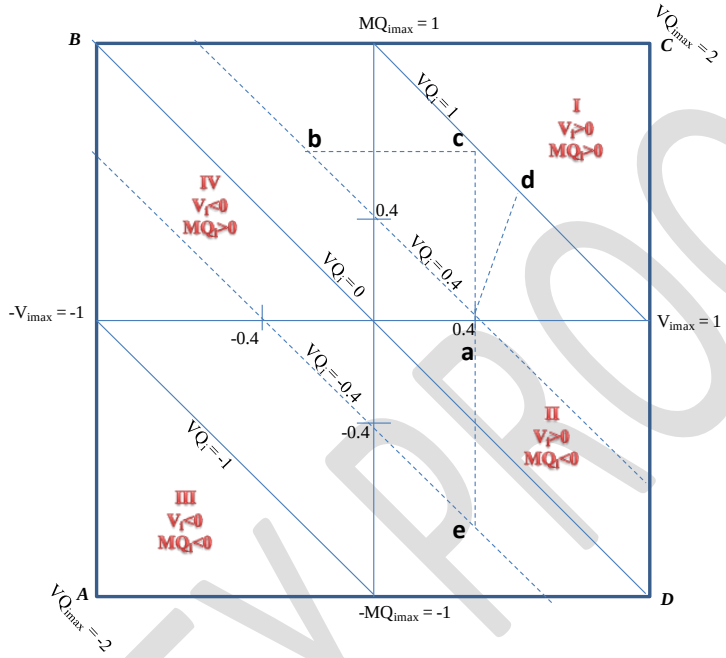

FIGURE 2. Illustration of adjusted V and MQ in GVQISB diagram
Source : Azhar & Elliot (2011)

Referring to Figure 2, the GVQISB is divided into four quadrants (*I*, *II*, *III*, and *IV*) to take into account every possible positive and negative changes in the values of V and MQ. Hence the location of the point of V, MQ and VQ in the Cartesian plane shall determine the condition of host country market potential. With that, the evolution of populated V, MQ and VQ indices can be observed and analyse for period of historical n years. Hence the condition of host country combine volume and quality market potential intensity can be deduced. From Figure 2, it can be seen that V_i and MQ_i can be trade-off while still maintaining the same respective VQ_i iso-line. It is either to increase V_i and decrease MQ_i or vice versa while the total trade-off will still be bound by the same respective VQ_i iso-line. Furthermore, if the trade-off of either V_i or MQ_i or both are too strong, it can causes jumping to other VQ_i iso-line. As such this provides marketer a flexi strategy in either to focus either on volume or quality or both while still maintaining the same objective or change to new objective. From an initial value of V_i and MQ_i, marketers can now have projected info and quantified visibility of what will happen by varying value of V_i or MQ_i. This is closely related to the objective of GIMSS model introducing quality perspective so that marketers have the prospects to manoeuvre their strategy in relation with volume and quality.

Consider illustration of the movement from a to b, b to c, c to a, a to d and a to e. The explanation is as per Table 2 below. From Table 2 below it can be observed that HMP prediction effect and consequence by varying volume and quality trade-off can be visualised and quantified. This should be a strong tool for marketer planning strategy. This is applicable in stage five subsection (second angle backward approach) later.

TABLE 2. Effect of V_i, MQ_i and VQ_i by projecting their movements

Movement	V_i		MQ_i		VQ_i		HMP	
	From	To	From	To	From	To	From	To
a to b	$V_i > 0$	$V_i < 0$	$MQ_i = 0$	$MQ_i > 0$	0.4	0.4	F_V	H_V, F_Q
b to c	$V_i < 0$	$V_i > 0$	$MQ_i > 0$	$MQ_i > 0$	0.4	1	H_V, F_Q	F_V, F_Q
c to a	$V_i > 0$	$V_i > 0$	$MQ_i > 0$	$MQ_i = 0$	1	0.4	F_V, F_Q	F_V
a to d	$V_i > 0$	$V_i > 0$	$MQ_i = 0$	$MQ_i > 0$	0.4	1	F_V	F_V, F_Q
a to e	$V_i > 0$	$V_i > 0$	$MQ_i = 0$	$MQ_i < 0$	0.4	-0.4	F_V	F_V, H_Q

Notes: H_V and H_Q is host country possessing market potential in volume and quality perspective; F_V and F_Q is foreign country possessing market potential in volume and quality perspective. For product i, V_i = volume index; MQ_i = marginal quality index; VQ_i = volume quality index; HMP = host market potential

Stage four identifies, crafts and proposes relevant marketing strategy suitable for *product i*. This stage is for determining appropriate marketing strategy from the potential market info of the identified *product i* base on the analysis in stage one, two and three above. From the populated values of V, MQ and VQ indices within their ranges as stated in equation (1), (2) and (3) respectively, the host country market potential can be grouped into several categories as proposed in Table 3 below.

TABLE 3. Host country market potential proposed grouping categories for V and MQ indices.

V and MQ index range	HMP on volume and quality perspective
$0.6 \leq$ V and MQ ≤ 1.0	Very low
V and MQ = 0.5	Intermediate low
$0.1 \leq$ V and MQ ≤ 0.4	Low
V and MQ = 0	Moderate (Equilibrium)
$-0.1 \leq$ V and MQ ≤ -0.4	High
V and MQ = -0.5	Intermediate high
$-0.6 \leq$ V and MQ ≤ -0.1	Very high

Notes: V = volume index; MQ = marginal quality index; HMP = host market potential

From Table 3, low market potential for V and MQ are deduced in situation whereby host country is still importing product i despite export is dominating. There is still existence of niche domestic demand in host country. High market potential for V and MQ is deduced in situation whereby host country importing of product i is dominating to cater for its domestic demand while host country does export to cater niche demand from foreign country. Thus with reference to Table 3 and Figure 2, the HMP can be ascertained and filled up. With that, through populated HMP levels, an appropriate marketing strategy can be proposed.

Low market potential is a situation whereby host country is still importing *product i* despite that export is dominating to cater its niche domestic demand. For low market potential, it is to propose two marketing strategy approaches. First approach, if the market potential is very low, it is to suggest not to promote actively. However the information obtained can be shared as awareness. Second approach, if the market potential is low (both intermediate low and low), it is to suggest exploring these opportunities further and deeper. Relevant government agencies and private companies should explore hand in hand mutually for short term and long term benefits. There could be niche market potential that could be tapped.

High market potential is a situation whereby host country importing *product i* dominates to cater for its domestic demand while host country exports to cater niche demand from foreign countries. For high market potential (high, intermediate high and very high), it is to propose for an offensive market exploration export promotion strategy, particularly for products where comparative advantage exists or viable to be developed. In parallel awareness on value-added creation and the degree of product homogeneity should also be considered. Since the market potential is high, many exporters would be interested too, hence high competition would be expected. As such, competitive edge strategy should also be tagged along as a weapon to defend market domination as well as market expansion strategy.

Stage five predicts and projects future market potential. In this stage, the host country's market potential is to be analysed by projecting the impacts when the volume and quality trade-off is induced as well as by looking at the trend of the historical populated change of export and import volume and quality. Basically this stage is predicting to bring the host market's potential to desire new level of *product i* beyond *historical n* year i.e. N future year. This can be approached from two angles. First angle (forward approach) is by predicting what is the expected growth rates of the change of export and import, hence the V and MQ, beyond *historical n* year. The second angle (backward approach) is by suggesting what is needed to be done in order to change the equation (3) equilibrium in order to move it to a desired new level, by inducing the V and MQ, hence the change of export and import respectively. There are two possible rationales for the two approaches; (1) the forward approach is based on average trending of existing known data in forecasting the possible N future year of host market potential; (2) the backward approach is an aspiration endeavour where the final year known data is used as the trade-off baseline between V and MQ in inducing the desire target of V and MQ. In both approaches, the forecasted N year and the aspired target of V and MQ are served as a look out reference with the marketing strategy crafted in stage four to check on realistic and synchrony.

FIRST ANGLE (FORWARD APPROACH)

Table 4 below listed out the definitions used in calculating the projected values of V_{n-1+N} and MQ_{n-1+N} respectively. Next the V_{n-1+N}, MQ_{n-1+N} and VQ_{n+N} are plotted in geometrical graph as per stage three for Y_{n+N} year. After that the marketing strategy crafted in stage four is reflected whether it is relevant or requires fine tuning. In essence, this approach is estimating the average rate of change of change in volume and quality of export and import base on available historical n data years. Then the expected value of V and MQ of N future years (actual n data year is not transpired yet) is calculated. This proposed calculation is related to addressing the future prediction comparative analysis highlighted in Table 1 in literature review section.

TABLE 4. Definition used in the calculation of V_{n-1+N} and MQ_{n-1+N}

Item	Formula
Rate of ΔX change	$= (X_n - X_{n-1}) / (X_{n-1} - X_{n-2})$
Rate of $\Delta X_{Average}$	$= \sum$Rate of ΔX / (n-2)
ΔX_{n+N}	$= \Delta X_n$*Rate of $\Delta X_{Average}$
Rate of ΔM change	$= (M_n - M_{n-1}) / (M_{n-1} - M_{n-2})$
Rate of $\Delta M_{Average}$	$= \sum$Rate of ΔM / (n-2)
ΔM_{n+N}	$= \Delta M_n$*Rate of $\Delta M_{Average}$
Rate of ΔUX change	$= (UX_n - UX_{n-1}) / (UX_{n-1} - UX_{n-2})$
Rate of $\Delta UX_{Average}$	$= \sum$Rate of ΔUX / (n-2)
ΔUX_{n+N}	$= \Delta UX_n$*Rate of $\Delta UX_{Average}$
Rate of ΔUM change	$= (M_n - M_{n-1}) / (M_{n-1} - M_{n-2})$
Rate of $\Delta UM_{Average}$	$= \sum$Rate of ΔUM / (n-2)
ΔUM_{n+N}	$= \Delta UM_n$*Rate of $\Delta UM_{Average}$
N (future year)	1,2,3,……..N

Notes: ΔX = change in export value; ΔM = change in import value; n = historical year; N = future year; X = export value; M = import value; $\sum$ = summation; UX = unit export value; UM = unit import value; ΔUX = change in unit export value; ΔUM = change in unit import value.

SECOND ANGLE (BACKWARD APPROACH)

To start with, the desired new quadrant of V and MQ based on Figure 2 needs to be determined upfront. From equation (1) and (2), the desired quadrant would be both $V < 0$ and $MQ < 0$ or either $V < 0$ or $MQ < 0$. Thus quadrants II, III and IV satisfy the conditions. Next, the populated values of V, MQ and VQ of *n historical* years of analysis in stage three is referred. The latest value of V, MQ and VQ of n final historical year is jotted as $V_{initial}$, $MQ_{initial}$ and $VQ_{initial}$. From these values, the desired or planned future values of V_N, MQ_N and VQ_N are then proposed with reference to equation (3) and Figure 2 quadrants as guidelines. There are two approaches than can be considered either by trade-off the values of V and MQ while value of VQ remains the same or by trade-off the values of V and MQ while value of VQ can change to new value. After obtaining V_N, MQ_N, and VQ_N values, the final n historical year of ΔX, ΔM, ΔUX and ΔUM calculated in stage two and three is jotted as $\Delta X_{initial}$, $\Delta M_{initial}$, $\Delta UX_{initial}$ and $\Delta UM_{initial}$.

The desire is to change and increase the host country's import in either volume or quality perspective if not both simultaneously, depending on the trade-off approach chosen above. As such, the host country's export change value (both volume and quality) in final n historical year is used as foundation. The rationale is that the host country's export strategy plan of future N year would be difficult to obtain the info as this could be regarded as classified information. Therefore, with V_N, MQ_N, $\Delta X_{initial}$ and $\Delta UX_{initial}$ values are known, hence ΔM_N and ΔUM_N can be calculated based on equation (1) and (2). Thus equations (4) and (8) are basically originated from equations (1) and (2) respectively but for calculating the unknown values of ΔM_N and ΔUM_N. Hence, rearranging equation (4) into the format of equations (5), (6) and (7), while depending on the scenario either $|\Delta X_{initial}|$ or $|\Delta M_N|$ is the highest, the value of ΔM_N can be computed. The same connotation goes for equation (8) by rearranging equation (8) into the format of equations (9), (10) and (11), while depending on the scenario either $|\Delta UX_{initial}|$ or $|\Delta UM_N|$ is the highest, the value of ΔUM_N can be computed.

$$V_N = \frac{(\Delta X_{initial} - \Delta M_N)}{2(\max\{|\Delta X_{initial}|, |\Delta M_N|\})} \quad (4)$$

$$V_N.2(\max\{|\Delta X_{initial}|, |\Delta M_N|\}) = \Delta X_{initial} - \Delta M_N \quad (5)$$

$$\text{If } |\Delta X_{initial}| \text{ highest then } \Delta M_N = \Delta X_{initial}(1 - 2.V_N) \quad (6)$$

$$\text{If } |\Delta M_N| \text{ highest then } \Delta M_N = \frac{\Delta X_{initial}}{2V_N + 1} \quad (7)$$

and

$$MQ_N = \frac{(\Delta UX_{initial} - \Delta UM_N)}{2(\max\{|\Delta UX_{initial}|, |\Delta UM_N|\})} \quad (8)$$

$$MQ_N.2(\max\{|\Delta UX_{initial}|, |\Delta UM_N|\}) = (\Delta UX_{initial} - \Delta UM_N) \quad (9)$$

$$\text{If } |\Delta UX_{initial}| \text{ highest then } \Delta UM_N = \Delta UX_{initial}(1 - 2MQ_N) \quad (10)$$

$$\text{If } |\Delta UM_N| \text{ highest then } \Delta UM_N = \frac{\Delta UX_{initial}}{(2.MQ_N + 1)} \quad (11)$$

In the n final year, if $|\Delta X_{initial}|$ and $|\Delta UX_{initial}|$ are the highest, then $|\Delta X_{initial}|$ and $|\Delta UX_{initial}|$ are to be chosen. If $|\Delta M_{initial}|$ and $|\Delta UM_{initial}|$ are the highest, then $|\Delta M_N|$ and $|\Delta UM_N|$ are chosen. From stage two and three, the $M_{initial}$ and $UM_{initial}$ are known (taken of n final historical year), thus:

$$\Delta M_N = M_N - M_{initial} \quad (12)$$

$$M_N = \Delta M_N + M_{initial} \quad (13)$$

and

$$\Delta UM_N = UM_N - UM_{initial} \quad (14)$$

$$UM_N = \Delta UM_N + UM_{initial} \quad (15)$$

Equation (12) described the calculation of change of import volume for N future year which is the difference between the initial import volumes with N future year import volumes. The value of ΔM_N is obtained from equation (6) or (7) and value of $M_{initial}$ is known from final n year in stage two. Then rearrange equation (12) into equation (13) format in order to compute the value of M_N accordingly. The same connotation goes for computing UM_N. Equation (14) described the calculation of change of import quality for N future year which is the differences between the initial import quality with N future year import quality. The value of ΔUM_N is obtained from equation (10) or (11) and value of $UM_{initial}$ is known from final n year in stage 3. Then rearrange equation (14) into equation (15) format in order to compute the value of UM_N accordingly.

With the new target objective set, a marketing strategy can be crafted in order to realise the plan. The challenge would be how to ensure and materialise the host country's market potential would move toward this M_N and UM_N. Nevertheless, it is a good thing to have a quantified objective for bearing setting direction in planning ahead. The N future year is to be determined after analysing and deciding when plan M_N and UM_N can be realised. It is to note that when $\Delta X_{initial} = 0$ and $\Delta UX_{initial} = 0$, a special attention and judgement needs to be considered in the host country's export condition (X_{plan}) based upon other relevant marketing inputs and knowledge. Based on equation (6), (7), (10) and (11), this situation will cause ΔM_N and ΔUM_N to be of zero value. Thus it will make the future prediction of M_N and UM_N will always remain as per $M_{initial}$ and $UM_{initial}$ i.e. the future market potential would remain constant which might not be the actual situation.

After the product i has gone through all five stages, the findings of each stage can be assembled and browsed through in order to infer and conclude the host country market potential situation. With that, policy maker could beneficial from that inference and conclusion and use it to outlined suitable marketing policy. In the next section, the application of GIMSS model is to be demonstrated with real data. If the outline of GIMSS model methodology and application demonstration is still insufficient for readers to understand this GIMSS model, kindly contact respective authors for further elaboration and explanation.

EMPIRICAL APPLICATION ILLUSTRATION OF GIMSS MODEL

The empirical application of GIMSS model is encompassed to Tong (2012) findings focusing on the intentions; (1) to show the practicality of GIMSS model via actual data application; and (2) GIMSS model exploratory analysis should lead to a new horizon of knowledge, information and experience. Hence, the chosen product/country permutation shall ties up with those that have been investigated by Tong (2012). She chose non-renewable energy industry with the reason it was one of

Malaysia's important export industries. Her empirical test involved Malaysia vis-à-vis Malaysia's top exporters with key destinations are Japan, Singapore, Korea and Australia. She collected data from UNCOMTRADE on crude oil, natural gas and charcoal energy exports from year 2005 to 2010 at product level data of HS 6-digit code.

Tong (2012) found out that Malaysia had highest specialisation and comparative advantage for HS271111 product, both years 2005 and 2010, in exporting to Japan. With that, this paper selects HS271111/Japan as product/country permutation in illustrating the GIMSS empirical application and comparison. The rationale is that it would be interesting to inspect Japan (host country) market potential condition, whether it is in the status of low, intermediate or high, in conjunction with exporting country specialisation and comparative advantage status. By knowing the host market potential condition, it could impacting the exporting country strategic marketing direction in the context of market expansion, maintain or keep exploring strategy. For example, in the case where Malaysia has high specialisation and comparative advantage in exporting HS271111/Japan, however Japan market potential for HS271111 product is intermediate, then perhaps the appropriate marketing strategy is to maintain market share as it is and allocate more resources in exploring other product/country permutations. Otherwise, there could be risk of over allocating resources to HS271111/Japan due to obsession with high specialisation and comparative advantage status.

Some minor adjustments are made to suit the GIMSS model structural design. The first adjustment is the analysis will be conducted by taking a sample of product/country combination done by Tong (2012) due to time constraint. The second adjustment is the export and import trade data will be collected from ITC instead of UNCOMTRADE. This is because UNCOMTRADE does not provide unit value data whereas ITC does provide this information. Since ITC is a subsidiary of World Trade Organisation (WTO) and United Nations Conference on Trade and Development (UNCTAD), hence it would suffice to imply that there would not be differences in data source obtained from ITC or UNCOMTRADE. The subsequent sections will demonstrate the applicability of this GIMSS model.

APPLICATION OF GIMSS MODEL FOR IEO OF NON-RENEWABLE ENERGY INDUSTRY

Consider Japan as host country for HS 6-digit product code HS271111 (natural gas, liquefied) in identifying market opportunity of Japan.

STAGE ONE

Table 5 below summarised the calculation matrix for analysing volume changes by using the V index as per equation (1) where Pr = Product, Y = Year, P = Period, $\Delta P = Y_n - Y_{n-1}$, $\Delta X_n = X_n - X_{n-1}$, $\Delta M_n = M_n - M_{n-1}$, n (historical years) = 1, 2, 3, ….., n, X = Export value, M = Import value, H = Host country, F = Foreign country and HMP = Host Market Potential. Based upon the values calculated in Table 5, populated points of ΔX and ΔM for the respective ΔPeriod are plotted in Figure 3 below together with the calculated isoclines of V indices.

TABLE 5. Japan HS271111 (natural gas) Stage one calculation of volume changes of V index

H											
Pr											
Y	ΔP	X	M	ΔX	ΔM	ΔX - ΔM	2max(|ΔX|,|ΔM|)	V	H	F	HMP
2005		3000	17983765000								
2006	2006-2005	8000	22867648000	5000	4883883000	-4883878000	9767766000	-0.5	H_v		
2007	2007-2006	20000	26717509000	12000	3849861000	-3849849000	7699722000	-0.5	H_v		Intermediate High on volume
2008	2008-2007	15000	44933146000	-5000	18215637000	-18215642000	36431274000	-0.5	H_v		
2009	2009-2008	0	30303232000	-15000	-14629914000	14629899000	29259828000	0.5		F_v	Intermediate Low on volume
2010	2010-2009	0	39655537000	0	9352305000	-9352305000	18704610000	-0.5	H_v		Intermediate High on volume

Notes: Pr = product; Y = year; ΔP = change in year; H = host country; F = foreign country; HMP = host market potential; ΔX = change in export value; ΔM = change in import value; X = export value; M = import value; V = volume index; H_V = host country possessing market potential in volume perspective; F_V = foreign country possessing market potential in volume perspective

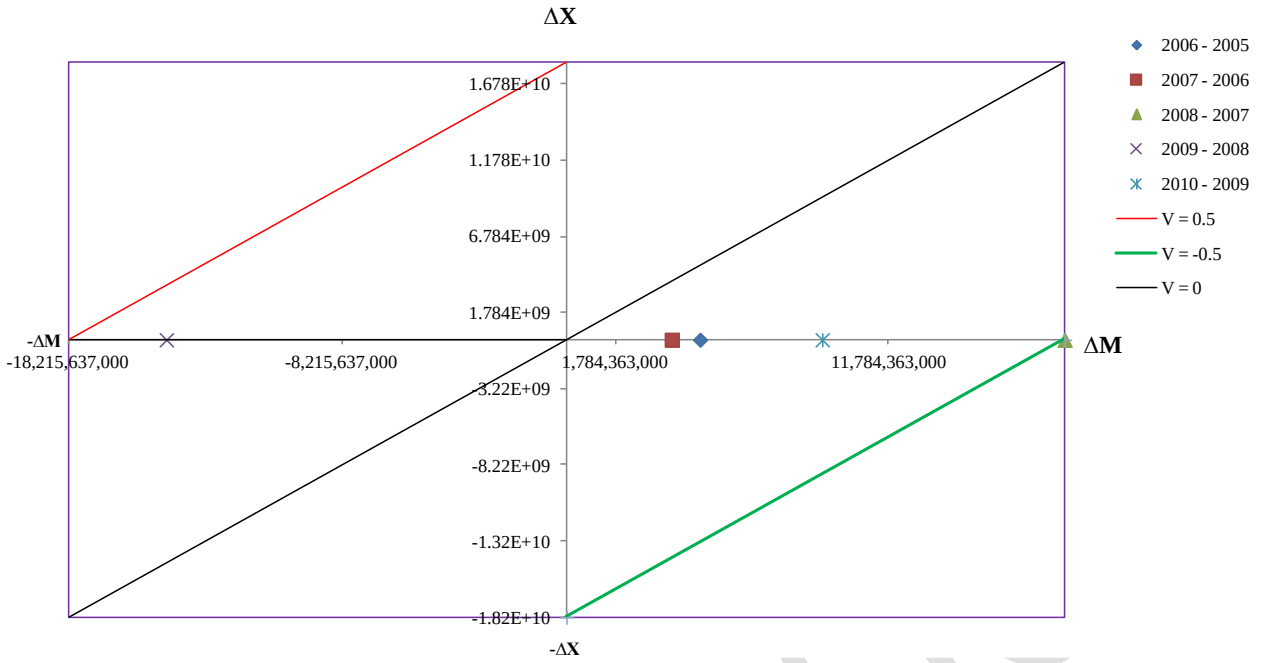

FIGURE 3. The V Index Diagram of Japan HS271111

From Table 5 it can be seen that Japan was also exporting this product for period 2005 – 2008. The value incremented year by year for 2005 - 2007 albeit the amount was not significant as compared to Japan's import values for the same period of time. Japan could be exporting this product to cater some niche markets opportunities. After this period the value started to decrease in 2008 and then for period 2009 – 2010 Japan stop exporting this product. As for Japan's import values, they were hugely significant as compared to its export with the values increased year by year for period 2005 – 2008. However its import values decreased in 2009 but increased again in 2010. The slump in import values in 2009 and the decreased in export values right until Japan stopped exporting for period 2008 – 2010 could be due to aftermath effect of world 2007 – 2008 financial crisis. Japan could be re-strategized its economy due to this event. Base on these facts, Japan could be regarded as having high market opportunities for exporters on volume perspective.

As for the change in export and import values, there were mixtures of positive and negative changes. The change in export was initially increased for period 2007 – 2006 but decreased tremendously for period 2008 – 2007 and further decreased for period 2009 – 2008 but increased again for period 2010 – 2009 (no change in export change value). As for change in import, the changes were fluctuated between decreased and increased. The change in import was initially decreased slightly for period 2007 – 2006 but increased tremendously for period 2008 – 2007. However the change in import hugely decreased again for period 2009 – 2008 but increased again impressively for period 2010 – 2009. The changes in export values were not significant as compared to the change in import values. Hence when plotted in Cartesian plane with ΔX as Y-axis and ΔM as X-axis, the plotted points are concentrated on the Y-axis (ΔX) while the values on the X-axis (ΔM) are spread significantly as illustrated in Figure 3 above. One significant point is observed for period 2009 – 2008 isolated on the negative side of the X-axis (ΔM) of Figure 3. This indicates a big slumped in change of import values. Again, this is in tandem with possibility due to aftermath effect of world 2007 – 2008 financial crisis. Nevertheless, the change in import value increased back again impressively the following period 2010 – 2009. As explained above, Japan could be re-strategized its economy due to this event. Again, base on these facts, Japan could be regarded as having high market opportunities for exporters on volume perspective.

As explained above the values of export and import as well as the values of change of export and change of import varies across period of 2005 – 2010. However the calculated V indices indicated a new viewpoint. As can be seen from Table 5, the V indices values are constant with V = - 0.5 throughout the whole period of changes except for one particular period 2009 – 2008 where V = 0.5. In the Figure 3 these space values are indicated by the green and red isocline respectively. This implying that the Japan market potential opportunities were remains constant despite changes in the export and import values. As such Japan market potential seems to have reached a maturity stage in term of product life cycle. Even after being hit by world 2007 – 2008 financial crisis Japan market potential for exporters retracted symmetrically (V = 0.5). It is fascinating to note how Japan's market potential reacted due to world 2007 – 2008 financial crisis. Japan had stopped exporting and import was reduced. This action had resulted in negative change for both export and import however change in export is bigger compare to change in import. As a consequence, Japan's market potential was symmetrically drew back the same value but in opposite position. Hence this could be inferred as Japan is reducing dependency on import while its own natural resources were totally used for domestic consumption in order to still maintain the same market potential maturity stage by reversing its economy strategy. This situation is shown in Figure 3, the red line and green line both are symmetrical but opposite position to each other.

The value of V = 0.5 indicated that, from equation (1), for product HS271111 (natural gas, liquefied), V > 0 which connote ΔX > ΔM i.e. change in export value is more than change in import value. As the value V = 0.5 is in the middle between 0 < V < 1, Japan market potential can be regarded as intermediate low on volume perspective for other exporting countries. Nevertheless this scenario only occurs once. As for the value of V = - 0.5 indicated that, from equation (1), for product HS271111 (natural gas, liquefied), V < 0 which connote ΔX < ΔM i.e. change in export value is less than change in import value. As the value V = - 0.5 is in the middle between 0 < V < -1 and this V = - 0.5 values occurred majority throughout the period hence Japan market potential can be regarded as intermediate high on volume perspective for other exporting countries.

In substance, from the above analysis Japan can be regarded as having intermediate high market potential for exporters on volume perspective for product HS271111 (natural gas, liquefied). Next stage is to analyse this same product on quality perspective (Stage Two).

STAGE TWO

Table 6 below summarised the calculation matrix for analysing quality changes by using the MQ index as per equation (2) where $\Delta UX_n = UX_n - UX_{n-1}$, $\Delta UM_n = UM_n - UM_{n-1}$, UX = Unit Export value and UM = Unit Import value, Xy = Export Quantity, My = Import Quantity. Based upon the values calculated in Table 6, populated points of ΔUX and ΔUM for the respective ΔPeriod are plotted in Figure 4 below together with the calculated isoclines of MQ indices.

From Table 6 it can be seen that change in Japan export quality perspective of this product was decreased initially (2006 – 2005) but later on increased for two periods (huge increased for 2007 – 2006 and slight increased for 2008 – 2007). However there was huge decreased again for period 2009 – 2008 but increased back again for period 2010 – 2009 (this was due to Japan stopped exporting hence change was zero). As for change in Japan import quality perspective of this product it can be observed as bouncing between increased and decreased. Initially it was increased (2006 – 2005) but decreased slightly in period 2007 – 2006. Then it was increased back again (2008 – 2007) but suffered deep decreased (2009 – 2008) nevertheless rose again in 2010 – 2009. Both change in export and import quality perspective suffered deep decreased in 2009 – 2008 due to world 2007 – 2008 financial crisis.

Both changes in export and import quality perspective which varied throughout the period had caused the Marginal Quality (MQ) space index experienced the same volatility. Nevertheless it was observed from Table 6 that for two periods (2008 – 2007 and 2009 – 2008) the MQ indices were stable (MQ = -0.3). This space index value is illustrated in Figure 4 with the purple line. In this space the home country market potential in quality perspective could be regarded as high. It is to note that the volatility did caused the MQ indices to go beyond MQ > 0 space. Only one period (2007 – 2006) which had the MQ index space positioned in the MQ > 0 space (MQ = 0.3) as illustrated in Figure 4 as the red line. In this space the host country market potential in quality perspective could be regarded as low. This happened prior to world 2007 and 2008 financial crisis.

Initially the host market potential (quality) space index was very high (MQ = -0.8) but then it decreased the following period. Nevertheless it was started to increased back again until it reached MQ = -0.5 (the green line in Figure 4). Hence the host market potential (quality) experienced very high initially, then dropped to low but then increased back again from high and settled at intermediate high throughout the whole period. From equation (2), for product HS271111 (natural gas, liquefied), MQ < 0 which connote $\Delta UX < \Delta UM$. This implies that host country is importing higher quality of product HS271111 and host country is exporting lesser quality of product HS271111. As such host country has high market potential for higher quality of product HS271111.

In substance, from the above analysis Japan can be regarded as having high market potential for exporters on quality perspective for product HS271111 (natural gas, liquefied). It is to note that for quality perspective, the Japan HS271111 market potential was low prior the world 2007 – 2008 financial crisis whereas for volume perspective the Japan HS271111 market potential was low after the world 2007 – 2008 financial crisis. Hence prior to the crisis, Japan was exporting high quality of this product but after the crisis Japan change strategy by importing high quality of this product. The change in strategy was symmetrical as illustrated in Figure 4 (red and purple line). This could be inferred as Japan was expecting and maintaining the same quality standard either in exporting or importing of this product. The higher quality product could be assumed for totally domestic consumption perhaps. Next stage is to analyse this same product on both volume and quality perspective (Stage Three).

TABLE 6. Japan HS271111 (natural gas) Stage two calculation of quality changes of MQ index

H								Japan							
Pr								HS271111							
Y	ΔP	X	Xy	M	My	UX	UM	ΔUX	ΔUM	ΔUX - ΔUM	2max(|ΔUX|,|ΔUM|)	MQ	H	F	HMP
2005		3000	9	17983765000	58013770	333.33	309.99								
2006	2006 – 2005	8000	32	22867648000	62189251	250.00	367.71	-83.33	57.72	-141.05	166.7	-0.8	H_Q		Very high on quality
2007	2007 – 2006	20000	58	26717509000	66816304	344.83	399.87	94.83	32.15	62.67	189.7	0.3		F_Q	Low on quality
2008	2008 – 2007	15000	33	44933146000	69262732	454.55	648.73	109.72	248.87	-139.15	497.7	-0.3	H_Q		High on quality
2009	2009 – 2008	0	0	30303232000	64552348	0.00	469.44	-454.55	-179.30	-275.25	909.1	-0.3	H_Q		
2010	2010 - 2009	0	0	39655537000	70007809	0.00	566.44	0.00	97.01	-97.01	194.0	-0.5	H_Q		Intermediate high on quality

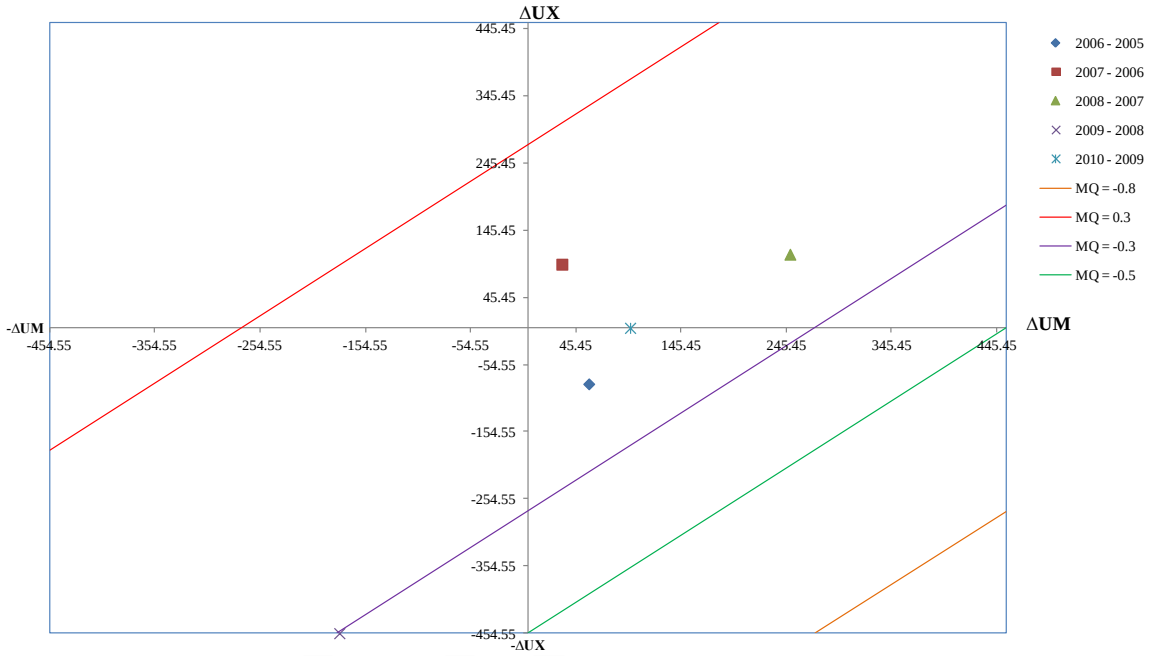

FIGURE 4. The MQ Index Diagram of Japan HS271111

STAGE THREE

Table 7 in below summarised the calculation matrix for analysing volume and quality changes by using the VQ index as per equation (3). Based upon the values calculated in Table 7, populated points of V and MQ for the respective ΔPeriod are plotted in Figure 5 below together with the calculated isoclines of VQ indices. From Table 7 it can be observed that the VQ indices varied across the period of analysis. However majority of the V and MQ indices varied within the quadrant III only of the GVQISB diagram whereby both V < 0 and MQ < 0. The associated space of VQ indices are as illustrated in Figure 5 in dark blue line (VQ = -1.3), light blue (VQ = -1.0) and green line (VQ = -0.8). One V and MQ indices situated in quadrant IV where V < 0 and MQ > 0 with associated space of VQ index in red line (VQ = -0.2). There is only one V and MQ indices which situated in quadrant II whereby V > 0 while MQ < 0. The associated space of VQ index as illustrated in Figure 5 in grey lines (VQ = 0.2). The related intensity of each V and MQ index grouping of host country market potential can be referred back to Table 3 respectively. With that it can be deduced that generally Japan HS271111 poses high market potential for exporters in term of both volume and quality perspective since majority of the V and MQ indices situated in quadrant III. Additionally it is perhaps to take note that whenever there is a world economic crisis happened, Japan can be viewed to change its economic strategy by stressing and weighted more on quality and less weighted on volume in its import perspective hence a good market potential for exporters in term of quality perspective.

TABLE 7. Japan HS271111 (natural gas) Stage three calculation of volume and quality changes of VQ index

H	Japan						
Pr	HS271111						
Y	ΔP	V	MQ	VQ	H	F	HMP
2005							
2006	2006-2005	-0.5	-0.8	-1.3	H_{VQ}		Intermediate high on volume, Very high on quality
2007	2007-2006	-0.5	0.3	-0.2	H_V	F_Q	Intermediate high on volume, low on quality
2008	2008-2007	-0.5	-0.3	-0.8	H_{VQ}		Intermediate high on volume, high on quality
2009	2009-2008	0.5	-0.3	0.2	H_Q	F_V	Intermediate low on volume, high on quality
2010	2010-2009	-0.5	-0.5	-1.0	H_{VQ}		Intermediate high on volume and quality

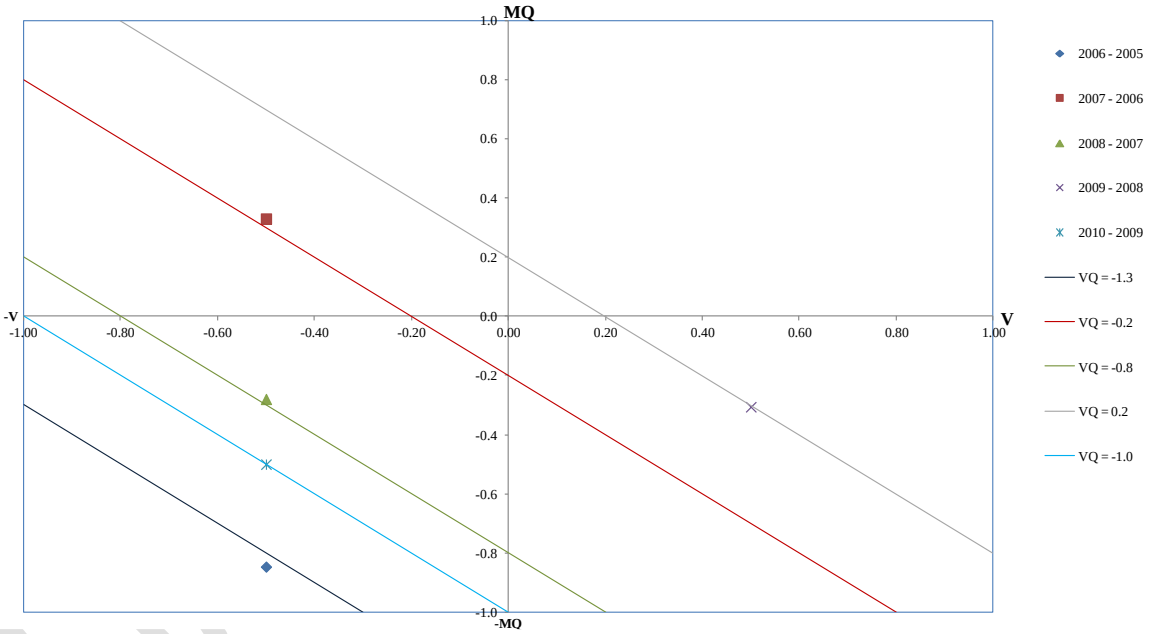

FIGURE 5. The VQ Index diagram of Japan HS271111

STAGE FOUR

From the observation and analysis done in Stage One, Two and Three above, it is obvious that Japan has high market potential for exporters for HS 6-digit product code HS271111 (natural gas, liquefied). As such the appropriate marketing strategy would be offensive market exploration export promotion and expansion. This strategy implies that exporting countries should be aggressive in expanding and capturing more market share in Japan for HS271111 product. In parallel with the market expansion strategy, awareness and focus on value add creation and the degree of product homogeneity should also factors to be considered. Since the market potential is high, many exporters would dive in the same market, hence competition would be expected to be high. As such competitive edge strategy should also be tagged along.

STAGE FIVE

As the period of study is 2005 – 2010 thus there is available data for beyond 2010 up to 2015 in ITC database. As such this first angle forward approach will be done twice, first by using average calculated data and second by using actual data obtained from ITC. The objective is to explore and test the resiliency of the proposed methodology. However for the second angle backward approach it shall be done by using calculated data only. This is because this second approach is more on bringing the V, MQ and VQ to new desire state rather than to predict what will be the new of state of V, MQ and VQ (first angle approach).

FIRST ANGLE (FORWARD APPROACH) - AVERAGE CALCULATED DATA METHOD

Tables 8, 9 and 10 below summarised the calculation matrix for analysing V, MQ and VQ changes by using the average calculated N year data. Based upon the values calculated in Tables 8, 9 and 10, populated points of ΔX, ΔM, ΔUX, ΔUM, V and MQ for the respective ΔPeriod are plotted in Figure 6, 7 and 8 together with the calculated isoclines of V, MQ and VQ indices as shown below.

From the Figures 6, 7 and 8 and Tables 8, 9 and 10 it can be seen that the forecasted of host (Japan) market potential for the next N (three) years are following the same trend as the last n year. There are no changes in the values of V, MQ and VQ indices in N years even though the value of ΔM does change. This implying the host country (Japan) market potential is forecasted to be stable for the next N (three) years in both volume and quality perspective. Japan market potential is forecasted to remain as intermediate high on both volume and quality for the next N (three) years.

As highlighted above since the period of study of n historical years is 2005 – 2010 thus there is available actual data for beyond 2010 up to 2015 in ITC database. Thus it would be interesting to explore and compare this average calculated data method with actual data method. This is to be explored in below sub-section.

TABLE 8. Japan HS271111 (natural gas) Stage five calculation of first angle forward approach of volume of V index (average calculated N data)

H							Japan						
Pr							HS271111						
Y	ΔP	X	M	ΔX	Rate of ΔX change	ΔM	Rate of ΔM change	ΔX - ΔM	2max(|ΔX|,|ΔM|)	V	H	F	HMP
2005		3000	17983765000										
2006	2006-2005	8000	22867648000	5000		4883883000		-4883878000	9767766000	-0.5	H_V		Intermediate high on volume
2007	2007-2006	20000	26717509000	12000	2.40	3849861000	0.79	-3849849000	7699722000	-0.5	H_V		
2008	2008-2007	15000	44933146000	-5000	-0.42	18215637000	4.73	-18215642000	36431274000	-0.5	H_V		
2009	2009-2008	0	30303232000	-15000	3.00	-14629914000	-0.80	14629899000	29259828000	0.5		F_V	Intermediate low on volume
2010	2010-2009	0	39655537000	0	000	9352305000	-0.64	-9352305000	18704610000	-0.5	H_V		Intermediate high on volume
		Rate of $\Delta X_{Average}$			1.25								
			Rate of $\Delta M_{Average}$				1.02						
2011	2011-2010			0		9533209881		-9533209881	19066419761	-0.5	H_V		Intermediate high on volume
2012	2012-2011			0		9717614067		-9717614067	19435228134	-0.5	H_V		
2013	2013-2012			0		9905585248		-9905585248	19811170495	-0.5	H_V		

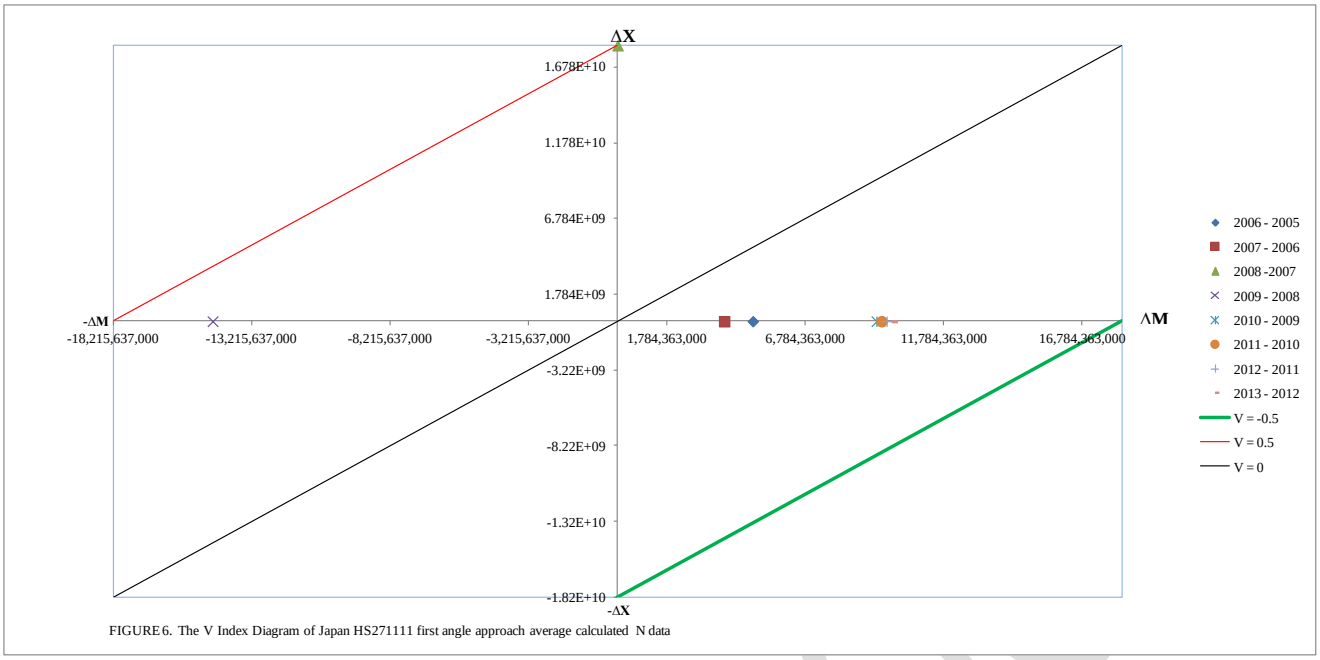

FIGURE 6. The V Index Diagram of Japan HS271111 first angle approach average calculated N data

FIGURE 6. The V index diagram of Japan HS271111 first angle approach average calculated N data

TABLE 9. Japan HS271111 (natural gas) Stage five calculation of first angle forward approach of quality of MQ index (average calculated N data)

H								Japan								
Pr								HS271111								
Y	ΔP	X	Xy	M	My	UX	UM	ΔUX	Rate of ΔUX change	ΔUM	Rate of ΔUM change	ΔUX - ΔUM	2max(|ΔUX|,|ΔUM|)	MQ	H	F	HMP
2005		3000	9	17983765000	58013770	333.33	309.99										
2006	2006-2005	8000	32	22867648000	62189251	250.00	367.71	-83.33		57.72		-141.05	166.7	-0.8	H_Q		Very high on quality
2007	2007-2006	20000	58	26717509000	66816304	344.83	399.87	94.83	-1.14	32.15	0.56	62.67	189.7	0.3		F_Q	Low on quality
2008	2008-2007	15000	33	44933146000	69262732	454.55	648.73	109.72	1.16	248.87	7.74	-139.15	497.7	-0.3	H_Q		High on quality
2009	2009-2008	0	0	30303232000	64552348	0.00	469.44	-454.55	-4.14	-179.30	-0.72	-275.25	909.1	-0.3	H_Q		
2010	2010-2009	0	0	39655537000	70007809	0.00	566.44	0.00	0.00	97.01	-0.54	-97.01	194.0	-0.5	H_Q		Intermediate high on quality
				Rate of $\Delta UX_{Average}$					-1.03								
				Rate of $\Delta UM_{Average}$							1.76						
2011	2011-2010							0.00		170.62		-170.62	341.24	-0.5	H_Q		
2012	2012-2011							0.00		300.10		-300.10	600.20	-0.5	H_Q		Intermediate high on quality
2013	2013-2012							0.00		527.83		-527.83	1055.66	-0.5	H_Q		

Notes: Pr = product; Y = year; ΔP = change in year; H = host country; F = foreign country; HMP = host market potential; ΔX = change in export value; ΔM = change in import value; X = export value; M = import value; V = volume index; H_Q = host country possessing market potential in quality perspective; F_Q = foreign country possessing market potential in quality perspective; X_y = export quantity; M_y = import quantity; UX = unit export value; UM = unit import value; ΔUX = change in unit export value; ΔUM = change in unit import value; MQ = marginal quality index

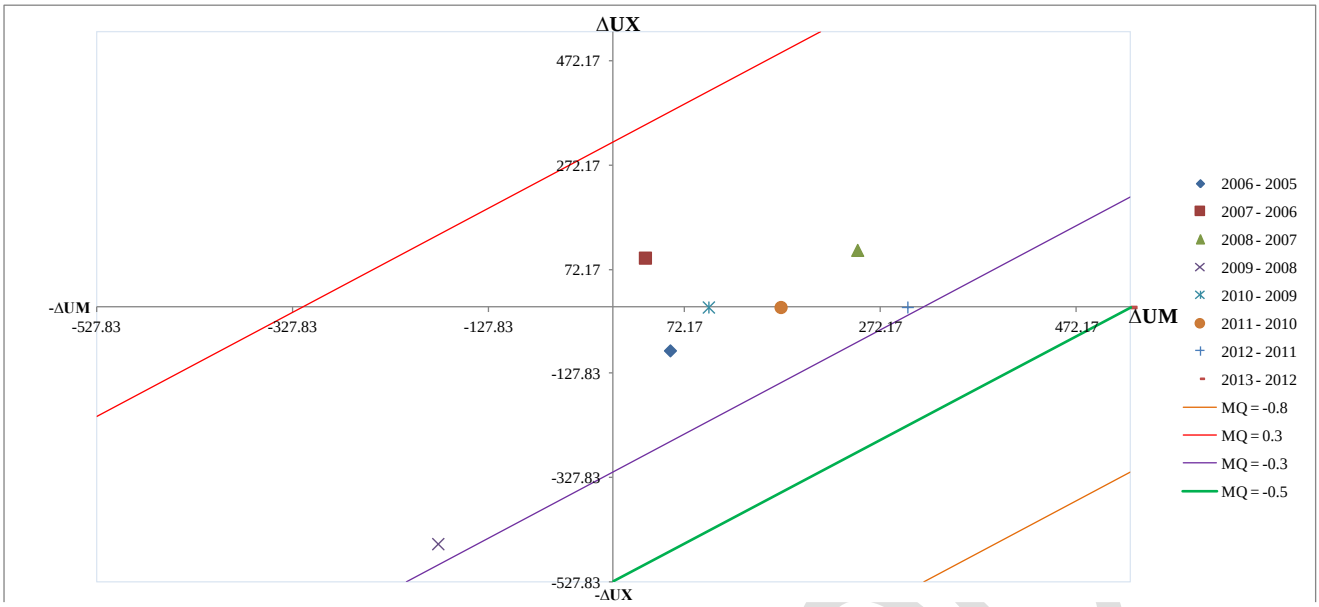

FIGURE 7. The MQ index diagram of Japan HS271111 first angle approach average calculated N data

TALE 10. Japan HS271111 (natural gas) Stage five calculation of first angle forward approach of volume and quality of VQ index (average calculated N data)

H				Japan			
Pr				HS271111			
Y	ΔP	V	MQ	VQ	H	F	HMP
2005							
2006	2006-2005	-0.5	-0.8	-1.3	H_{VQ}		Intermediate high on volume, Very high on quality
2007	2007-2006	-0.5	0.3	-0.2	H_V	F_Q	Intermediate high on volume, low on quality
2008	2008-2007	-0.5	-0.3	-0.8	H_{VQ}		Intermediate high on volume, high on quality
2009	2009-2008	0.5	-0.3	0.2	H_Q	F_V	Intermediate low on volume, high on quality
2010	2010-2009	-0.5	-0.5	-1.0	H_{VQ}		Intermediate high on volume and quality
2011	2011-2010	-0.5	-0.5	-1.0	H_{VQ}		
2012	2012-2011	-0.5	-0.5	-1.0	H_{VQ}		
2013	2013-2012	-0.5	-0.5	-1.0	H_{VQ}		

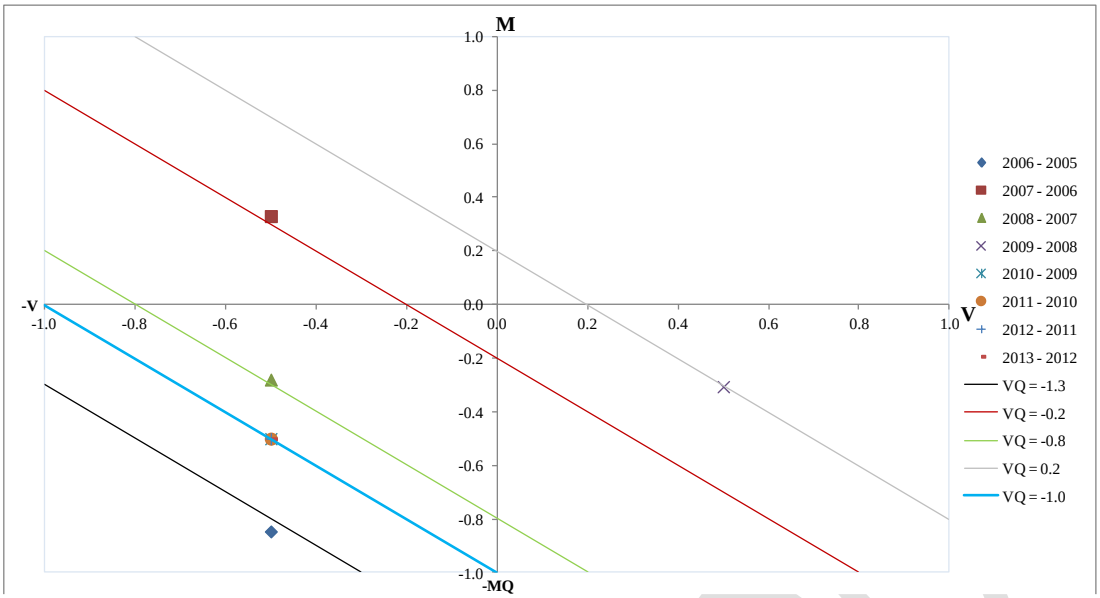

FIGURE 8. The VQ index diagram of Japan HS271111 first angle approach average calculated N data

FIRST ANGLE (FORWARD APPROACH) – ACTUAL DATA N YEARS METHOD

On the other hand when cross check with actual data for N (three) years, the host (Japan) market potential does not stay stable for the whole N (three) years. It stays stable for two years only and change in the final third year. Tables 11, 12 and 13 and Figures 9, 10 and 11 depicted the highlighted scenario. As can be seen from Tables 11, 12 and 13 and Figures 9, 10 and 11, in the final third year (2013) the value of V, MQ and VQ do changes due to the fact that in the third year Japan did export a small amount of this product even though it did not in the previous three years. Nevertheless the volume space of Japan market potential does not introduce any new V indices as shown by Figure 9, Figure 6 and Figure 3 do looks the same. In the final third year (2013) the V index reverted back to the same V index in year 2009. As for the quality perspective, in the final third year there is a new value of MQ index introduced as shown in Figure 10 with line MQ = 0.5. As such, for the combination of volume and quality space perspective, a new VQ index does also introduce as shown in Figure 11 with line VQ = 1.0.

As such, when using calculated data approach method, when the value of the previous year of export or import is zero, a special precaution needs to be alerted. This is because when the previous year has zero value, it will automatically make the next following years to be always zero value too. Thus, a judgemental decision needs to be applied whether to accept the calculated zero value or need to do adjustment based upon other relevant marketing inputs and knowledge. Nonetheless, except from the zero value situation that require special attention and precaution, the forecasted methodology (first angle forward approach) does have some credentials that can be relied upon in gauging the coming years host country market potential situation. Next is to explore forecasting by using second angle backward approach as to be illustrated in below subsection.

TABLE 11. Japan HS271111 (natural gas) Stage five calculation of first angle forward approach of volume of V index (actual N data)

H				Japan						
Pr				HS271111						
Y	ΔP	X	M	ΔX	ΔM	ΔX-ΔM	2max(|ΔX|,|ΔM|)	V	H	F	HMP
2005		3000	17983765000								
2006	2006-2005	8000	22867648000	5000	4883883000	-4883878000	9767766000	-0.5	H_V		
2007	2007-2006	20000	26717509000	12000	3849861000	-3849849000	7699722000	-0.5	H_V		Intermediate high on volume
2008	2008-2007	15000	44933146000	-5000	18215637000	-18215642000	36431274000	-0.5	H_V		
2009	2009-2008	0	30303232000	-15000	-14629914000	14629899000	29259828000	0.5		F_V	Intermediate Low on volume
2010	2010-2009	0	39655537000	0	9352305000	-9352305000	18704610000	-0.5	H_V		
2011	2011-2010	0	60120014000	0	20464477000	-20464477000	40928954000	-0.5	H_V		Intermediate high on volume
2012	2012-2011	0	75251801000	0	15131787000	-15131787000	30263574000	-0.5	H_V		
2013	2013-2012	2000	72347669000	2000	-2904132000	2904134000	5808264000	0.5		F_V	Intermediate Low on volume

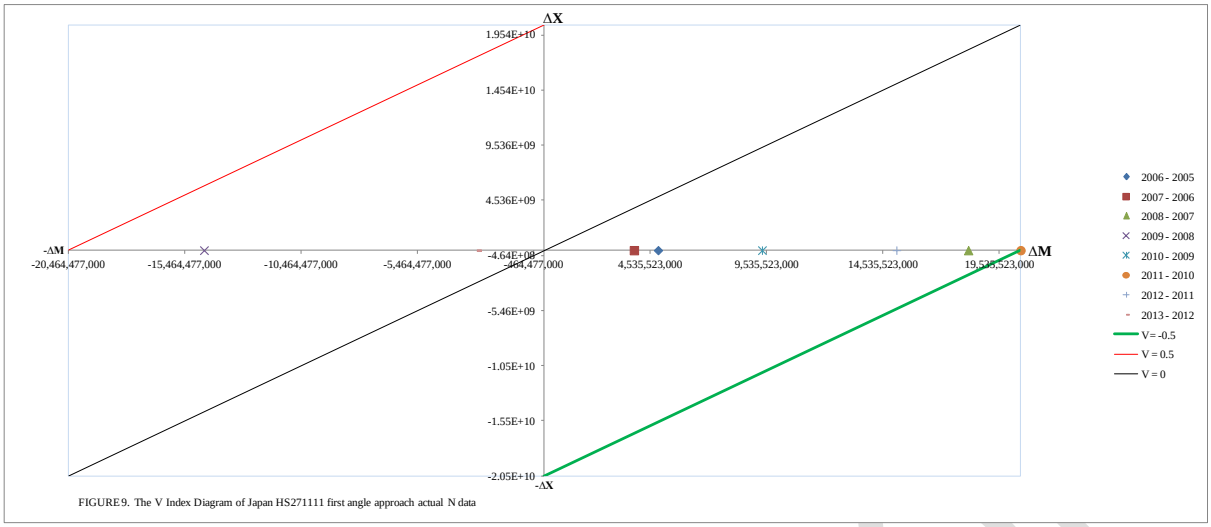

FIGURE 9. The V Index Diagram of Japan HS271111 first angle approach actual N data

FIGURE 9. The V index diagram of Japan HS271111 first angle approach actual N data

TABLE 12. Japan HS271111 (natural gas) Stage five calculation of first angle forward approach of quality of MQ index (actual N data)

H					Japan									
Pr					HS271111									
Y	ΔP	X	Xy	M	My	UX	UM	ΔUX	ΔUM	ΔUX - ΔUM	2max(|ΔUX|,|ΔUM|)	MQ	H	F	HMP
2005		3000	9	17983765000	58013770	333.33	309.99								
2006	2006-2005	8000	32	22867648000	62189251	250.00	367.71	-83.33	57.72	-141.05	166.7	-0.8	H_Q		Very high on quality
2007	2007-2006	20000	58	26717509000	66816304	344.83	399.87	94.83	32.15	62.67	189.7	0.3		F_Q	Low on quality
2008	2008-2007	15000	33	44933146000	69262732	454.55	648.73	109.72	248.87	-139.15	497.7	-0.3	H_Q		High on quality
2009	2009-2008	0	0	30303232000	64552348	0.00	469.44	-454.55	-179.30	-275.25	909.1	-0.3	H_Q		
2010	2010-2009	0	0	39655537000	70007809	0.00	566.44	0.00	97.01	-97.01	194.0	-0.5	H_Q		
2011	2011-2010	0	0	60120014000	78531629	0.00	765.55	0.00	199.11	-199.11	398.2	-0.5	H_Q		Intermediate high on quality
2012	2012-2011	0	0	75251801000	87314285	0.00	861.85	0.00	96.30	-96.30	192.6	-0.5	H_Q		
2013	2013-2012	2000	4	72347669000	87491099	500.00	826.91	500.00	-34.94	534.94	1000.0	0.5		F_Q	Intermediate low on quality

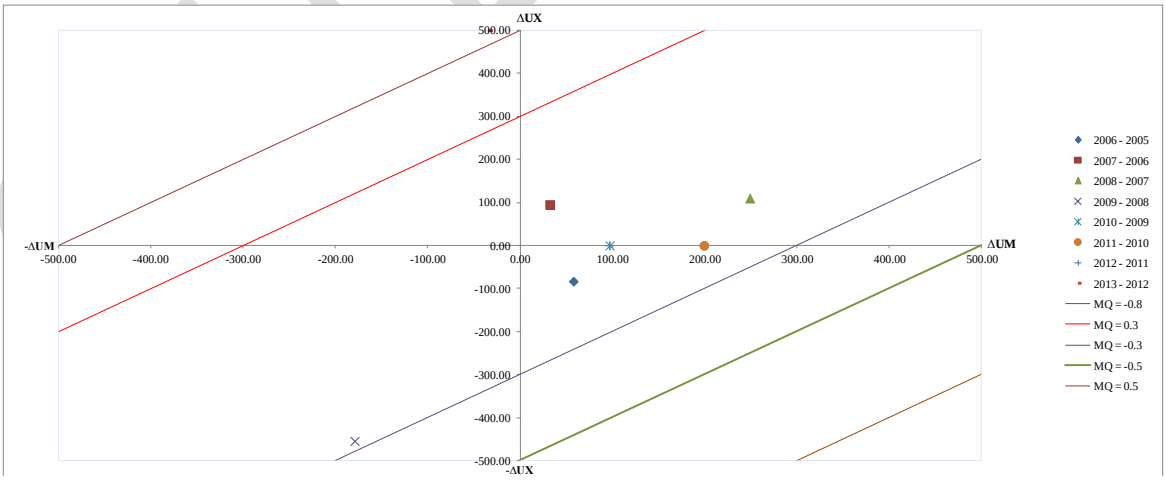

FIGURE 10. The MQ index diagram of Japan HS271111 first angle approach actual N data

TABLE 13. Japan HS271111 (natural gas) Stage five calculation of first angle forward approach of volume and quality of VQ index (actual N data)

H				Japan			
Pr				HS271111			
Y	ΔP	V	MQ	VQ	H	F	HMP
2005							
2006	2006-2005	-0.5	-0.8	-1.3	H_{VQ}		Intermediate high on volume, Very high on quality
2007	2007-2006	-0.5	0.3	-0.2	H_V	F_Q	Intermediate high on volume, low on quality
2008	2008-2007	-0.5	-0.3	-0.8	H_{VQ}		Intermediate high on volume, high on quality
2009	2009-2008	0.5	-0.3	0.2	H_Q	F_V	Intermediate low on volume, high on quality
2010	2010-2009	-0.5	-0.5	-1.0	H_{VQ}		Intermediate high on volume and quality
2011	2011-2010	-0.5	-0.5	-1.0	H_{VQ}		
2012	2012-2011	-0.5	-0.5	-1.0	H_{VQ}		
2013	2013-2012	0.5	0.5	1.0		F_{VQ}	Intermediate low on volume and quality

Notes: Pr = product; Y = year; ΔP = change in year; H = host country; F = foreign country; HMP = host market potential; H_V and H_Q is host country possessing market potential in volume and quality perspective; F_V and F_Q is foreign country possessing market potential in volume and quality perspective; V = volume index; MQ = marginal quality index; VQ = volume quality index

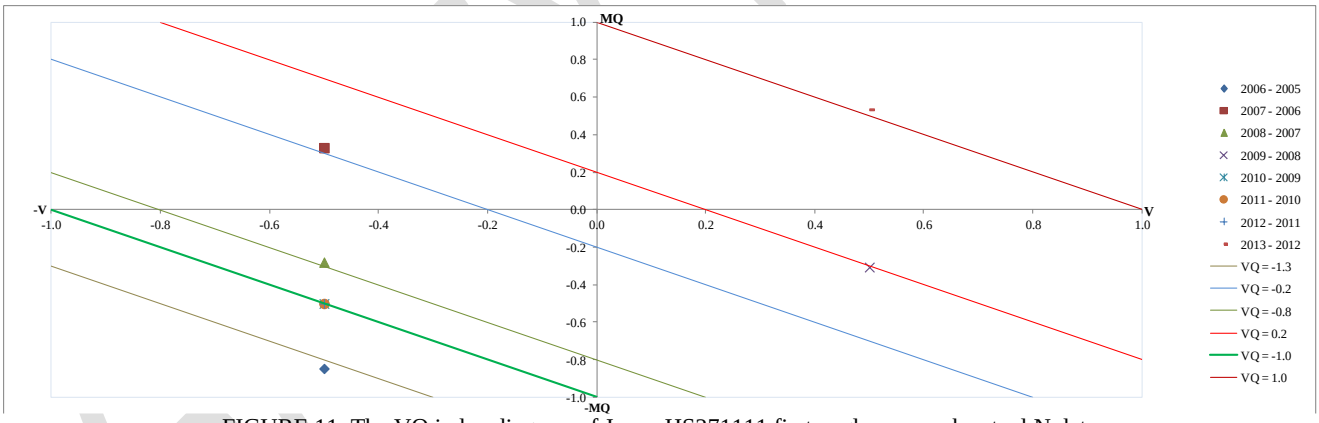

FIGURE 11. The VQ index diagram of Japan HS271111 first angle approach actual N data

SECOND ANGLE (BACKWARD APPROACH)

Table 14 below summarised the calculation matrix for applying stage five calculation of second angle backward approach of V, MQ and VQ indices for N year. As described in Outline and Process Flow of GIMSS Model Second Angle (Backward Approach) section previously, the Table 7 and Figure 5 are referred accordingly in order to set the desire quadrant and foundation. Hence, the plan is to maintain $V_{plan} = V_{initial} = -0.5$ while $MQ_{initial}$ to be further reduced by 0.2 point which resulted $MQ_{plan} = -0.7$ in order to aspire HMP to be in a new state which is intermediate high on volume, very high on quality.

This plan is a rationale plan since the HMP on volume perspective is forecasted to remain as intermediate high while on the quality perspective, even though it is also forecasted to remain as intermediate high, from the track record it did once recorded HMP very high (MQ = -0.8). Hence it is possible to aspire $MQ_{plan} = -0.7$ which the offensive market exploration export promotion and expansion marketing strategy devised in stage four would further spur this aspiration. The calculation as follows:

Initial state: $V_{initial} + MQ_{initial} = VQ_{initial} \rightarrow -0.5 + (-0.5) = -1.0$

Plan state: $V_{plan} + MQ_{plan} = VQ_{plan} \rightarrow -0.5 + (-0.7) = -1.2$

Then the M_{plan} and UM_{plan} are calculated correspondingly.

From the calculation tabulated in Table 14 it is found that this future N year projection falls under special situation whereby $\Delta X_{initial} = 0$ and $\Delta UX_{initial} = 0$. Hence the future N year of HMP_{plan} is a bit sceptical to be directly accepted as tabulated in Table 14 unless host country export future plan information can be obtained. Extra research work need to be done in coming to decision whether need to do adjustment based upon other relevant marketing inputs and knowledge on host country export forecast value.

SUMMARY AND CONCLUSIONS

After all five stages have been gone through the following summary can be derived for Japan HS271111 (natural gas, liquefied). Firstly, base on stage one, Japan HMP can be concluded as intermediate high on volume. Secondly, base on stage two, Japan HMP can be concluded as high on quality. Thirdly, based on stage three, the combination of both volume and quality, Japan HMP can be concluded as high on volume and quality. Fourthly, based on stage four, the appropriate marketing strategy would be an offensive market exploration export promotion and expansion. Fifthly, based on stage five, there are two conclusions can be derived. First, based on First Angle (Forward Approach), Japan HMP is forecasted to remain as intermediate high on both volume and quality for the next N (three) years. Second, based on Second Angle (Backward Approach), Japan HMP is desired to be as intermediate high on volume, very high on quality.

As such, it can be concluded that after going through stage one, two and three of the GIMSS model, Japan HMP for HS271111 (natural gas, liquefied) can be concluded as high both on volume and quality. As observed, there are spikes of HMP in intermediate and high space regions which indicate the HMP possibly potential to be extended into those spaces. The marketing strategy to be employed which is an offensive expansion and exploration is harmonised with the forecasted HMP (stage five). Thus, as per Figure 1, the check and balance as proposed by the GIMSS model between stage four and stage five of the marketing strategy is achieved and good to proceed.

According to Economic Research Institute for ASEAN and East Asia (ERIA) report 2017 for Liquefied Natural Gas Demand in Asia, Japan is considered as a traditional demand and consuming country for this product. ERIA also indicated that natural gas market in Asia has significant potential and could grow 2.5 times between years 2017 to 2030. Hence, as Japan is resided in Asia, hence it can be generally inferred that Japan has high market potential for this product. According to the 'export.gov', a website to assist U.S. business in accessing international markets which was created through collaboration between U.S. Department of Commerce's International Trade Administration and nineteen U.S. Government Agencies, indicated that Japan is the largest liquefied natural gas (LNG) buyer in the world, importing almost 84 million tons in 2017. As stated by The Japan Times, Japan's largest and oldest English language newspaper, on Jun 24, 2018, Japan turned to alternative sources of energy after the Fukushima nuclear disaster in 2011, and one of the most important options has been LNG. A surge in demand for LNG in the aftermath of Fukushima disaster had turned Japan into the world's larger importer of LNG, importing around 83.5 million tons annually. However future projection is uncertain as Japan has started to power up again its nuclear power plants, thus initial forecast anticipate decreases as Japan reduces reliance on LNG while the usage of renewable energy such solar power increases. However nuclear re-power up is subject to stringent scrutiny and the concern on volatile energy prices is prompting Japanese utilities to lock in longer-term contracts that somehow would sustain demand on LNG.

TABLE 14. Japan HS271111 (natural gas) Stage five calculation of second angle backward approach of V, MQ and VQ indices for N year

H																						
Pr																						
Y	ΔP	$V_{initial}$	$MQ_{initial}$	$VQ_{initial}$	$H_{initial}$	$F_{initial}$	$HMP_{initial}$	$\|\Delta X_{initial}\|$ or $\|\Delta M_{initial}\|$ highest?	$\Delta X_{initial}$	$\|\Delta UX_{initial}\|$ or $\|\Delta UM_{initial}\|$ highest?	$\Delta UX_{initial}$	V_N	MQ_N	VQ_N	H_N	F_N	HMP_N	ΔM_N	ΔUM_N	$M_{initial}$	$UM_{initial}$	M_N	UM_N
2009																						
2010	2010-2009	-0.5	-0.5	-1.0	H_{VQ}		Intermediate high on volume and quality	$\|\Delta M_{initial}\|$ highest	0	$\|\Delta UM_{initial}\|$ highest	0.0												
Y_N	Y_N-2010											-0.5	-0.7	-1.2	H_{VQ}		Intermediate high on volume, very high on quality	0	0	39655537000	566.44	39655537000	566.44

Notes: Pr = product; Y = year; Δ = change in year; H = host country; F = foreign country; HMP = host market potential; ΔX = change in export value; ΔM = change in import value; X = export value; M = import value; V = volume index; H_V and H_Q is host country possessing market potential in volume and quality perspective; F_V and F_Q is foreign country possessing market potential in volume and quality perspective; UX = unit export value; UM = unit import value; ΔUX = change in unit export value; ΔUM = change in unit import value; MQ = marginal quality index; VQ = volume quality index; N = future year

REFERENCES

Azhar, A. K. M., & Elliott, R. J. R. 2006. On the measurement of product quality in intra-industry trade. *Review of World Economics* 142(3): 476−495.

Azhar, A. K. M., & Elliott, R. J. R. 2011. A measure of trade induced adjustment in volume and quality space. *Open Economies Review* 22(5): 955–968.

Balassa, B. 1965. Traded liberalization and "revealed" comparative advantage 1. *Manchester School* 33: 93−123.

Brülhart M. 2002. Marginal intra-industry trade: Towards a measure of non-disruptive trade expansion. In P. J. Lloyd & H. H. Lee (Eds.), *Frontiers of Research in Intra-Industry Trade* (pp. 109−130). London: Palgrave Macmillan.

Cuyvers, L. 2004. Identifying export opportunities: The case of Thailand. *International Marketing Review* 21(3): 255−278.

Cuyvers, L., De Pelsmacker, P., Rayp, G., & Roozan, I. T. M. 1995. A decision support model for the planning and assessment of export promotion activities by government promotion institutions: Belgian Case. *International Journal of Research in Marketing* 12(2): 173−186.

Górecka, D., & Szałucka, M. 2013. Country market selection in international expansion using multicriteria decision aiding methods. *Multiple Criteria Decision Making* 8: 32−55.

Green, R. T., & Allaway, A. W. 1985. Identification of export opportunities: A shift-share approach. *Journal of Marketing* 49(1): 83−88.

Hussein, M., Hassan, A., Wan Ngah, W.A.S., Raja Yusof, R. N. & Awang, K.W. 2018. A Measure of Trade Intensity and Country Market Potential. *International Journal of Economics and Management* 12(2): 585-605.

International Trade Centre (ITC) Trade Map. 2018. *List of supplying markets for a product imported by Malaysia product: Total all products*. Retrieved January 14.

Marchi, G., Vignola, M., Facchinetti, G., & Mastroleo, G. 2014. International market selection for small firms: A fuzzy-based decision process. *European Journal of Marketing* 48(11/12): 2198−2212.

Miečinskienėa, A., Stasytytėa, V., & Kazlauskaitėb, J. 2014. Reasoning of export market selection. *Procedia - Social and Behavioral Sciences* 110: 1166–1175.

Papadopoulos, N., & Denis, J.-E. 1988. Inventory, taxonomy and assessment of methods for international market selection. *International Marketing Review* 5(3): 38–51.

Papadopoulos, N., Chen H., & Thomas D. R. 2002. Towards a tradeoff model for international market selection. *International Business Review* 11(2): 165–192.

Steenkamp, E., Rossouw, R., Viviers, W., & Cuyvers L. 2009. *Export market selection methods and the identification of realistic export opportunities for South Africa using a decision support model* (Working Paper Series 2009-03).

Stiglitz, J. E. 1987. The causes and consequences of the dependence of quality on price. *Journal of Economics Literature*, 25(1): 1–48.

Tong, V. M. H. 2012. Trade-based measures of international competitiveness and the identification of export opportunities (Doctoral dissertation, University Putra Malaysia).

Urban, M., Mejstřík, M., & Chvalkovská, J. G. 2014. Application of the decision support model to Czech exports. *Acta Oeconomica Pragensia* 2 :33−47.

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