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APPLY THE HYBRID OF DEMATEL AND ANP TO EXPLORE THE DETERMINANTS OF MNES' FDI ABROAD: THE CASE OF JAPANESE ENTERPRISES INVEST IN TAIWAN

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Abstract - **This article employs a hybrid model that combines DEMATEL and ANP to explore the determinants of Japanese MNEs invest in Taiwan. In addition to the four motives (namely Market Seeking, Efficiency Seeking, Resource Seeking, and Strategic-asset Seeking) Dunning (1993) classified, this article proposes a new Network Seeking motive to catch the Taiwan-Japan historical ties.**

Research results show that Efficiency Seeking is the most strength-of-influence with other motive. Besides, Network Seeking dispatches the strongest influence on the other motives. These results highlight the important roles of Efficiency Seeking and Network Seeking play in the Japanese MNEs investment in Taiwan. Especially, most Japanese MNEs regard Taiwan as a "step stone", they will expand to invest in other countries in the future instead of to invest in Taiwan permanently.

Keywords: DEMATEL, ANP, Foreign Direct Investment (FDI), Multinational Enterprises (MNEs)

I. INTRODUCTION

Over the past four decades, Taiwan had experienced one of the world's highest sustained economic growth. Taiwan's foreign trade had also grown in a rapid pace at the same time. According to Goetz and Hu (1996), economic growth is positively related to capital accumulation. The huge amount of inward FDI results in a significant influence on economic growth in Taiwan. Therefore, how to attract inward FDI is the major task for the economic agency of Taiwan government.

For attracting inward FDI, Taiwan government has adopted several investment encouragement incentive strategies such as: tax holidays and tax ceilings in the 1960s, accelerated depreciation in the late 1960s and 1970s, and more-specific depreciation measures and tax credits in the 1980s (Chang and Cheng, 1992). In recent years, Taiwan government promulgated "The Stature for Upgrading Industries" (SUI) on 1991. The main incentive offered by SUI was R&D credit which noted that Taiwan's corporate income tax has recently been reduced from 25% to 17%. On 2010, the newly version of "Statute for Industrial Innovation" (SII) focuses on the interest of creating a fair and competitive tax environment. The main points of the incentive are that the firms may be entitled to a tax credit of up to 15% of the R&D expenditure against its income tax liability. In addition to tax incentives, Taiwan government also established Export Processing Zones, Science Parks, and Free Trade Zones to provide an environment conducive for attracting FDI and the development of Taiwan's high-tech industry (Lin et al., 2010). However, unilateral policies adopted by host country government can never be a guarantee for successfully attracting inward FDI.

Traditionally, Taiwan and Japan have close relationship in economic and international trade affairs. This closed relationship is built not only by the geographical proximity between the two countries but also with their historical ties. For the economic development condition, Japan is much advanced than Taiwan. Therefore, Taiwan relies heavily on the investment of Japanese MNEs.

What are the determinants for MNEs to invest abroad? Dunning (1993) classified MNEs' FDI motives into four orientations: Market Seeking, Efficiency Seeking, Resource Seeking, and Strategic-asset Seeking. In addition to the above Dunning motives, this article also discusses a newly classified Network Seeking.

Market Seeking – Large market size is often found in regions with high per capita GDP, implying that more developed areas attract firms with a strong Market Seeking orientation. Luo and Tung (2007) concluded that due to their high per capita GDP, most advanced assets are more attracted in more developed regions. Moreover, many articles emphasized that market size has a positive effect of outward FDI (Herzer et al., 2008; Chan et al., 2013). Buckley et al. (2007) found that a large market tends to have higher profit opportunities than a small one. Makino et al. (2002) indicated that specify market size is the antecedent that positively impacts FDI location choice.

Resource Seeking – The resource includes most minerals, raw materials, and agricultural. Large sources of natural resources are attracted to outward FDI (Kolstad and Wiig, 2012; Ramasamy et al., 2004). Deng (2004) showed that gaining security over access to raw materials is often cited as a reason for Chinese firms to invest overseas. Human resource comprises plentiful supplies of cheap and well motivated unskilled or semi-skilled labors. Zhang (2005) found that Hong Kong and Taiwan's direct investment in China was primarily motivated by low labor costs. Bellak et al. (2008) expressed that higher unit labor cost as well as higher total labor cost negatively affect FDI, whereas higher labor productivity impacts positively on FDI.

Strategic-asset Seeking – Strategic-asset Seeking is defined as MNEs aim at acquiring a technological rather than exploiting an existing asset. The Strategies asset Seeking can be classified as R&D, patent, technology, knowledge, and human resource. Previous study indicated that R&D significant affect MNEs' outward investment decision. MNEs endeavor in overseas R&D focus on learning from developed countries. Overseas R&D emphasizes its role as knowledge seekers and learners for new and relevant technology (Minin

et al., 2012). Human resource of host countries is also a key factor attracting MNEs to undertake R&D activities in host country (Li and Zhong, 2003).

Efficiency Seeking – Efficiency Seeking can be classified into three elements: host country infrastructure, agglomeration economies, economic of scale. Insufficient development of infrastructure in least developed country raise the operation costs for MNEs , thus, has a negative impact on MNEs' FDI decisions and increasingly arises the costs of attracting investment for host countries (Yamin and Sinkovics, 2009). The availability of infrastructure in a country definitely can attract inward FDI (Backar et al., 2012; Sun et al., 2010). Combine with specific agglomeration, production costs of MNEs may decline significantly. For host country, specific agglomeration and diverse industry of local division exist positive impact on attracting inward FDI (Chen 2009; Tuan and Linda, 2004). Political risk of host country includes government stability, internal and external conflict, corruption and ethnic tensions, law and order, democratic accountability of government, and quality of bureaucracy are highly significant determinants of outward FDI (Busse and Hefeker, 2006).

Network Seeking – In addition to survey the four categories Dunning (1993) had classified, there are still some considerations, e.g., ethnical ties, historical ties, or cultural proximity, which motivate MNEs' FDI activities. Ethnic ties are specific aspects of social networks which are characterized by personal relationship elements such as mother tongue, national origins, ethnic group, and region of birth (Zaheer et al., 2009). Ethnic ties may facilitate FDI location choice (Jean et al., 2011). Moreover, cultural proximity between host country and MNEs is also an important factor that affects FDI. Pangarkar and Lim (2003) found that cultural proximity has a positive impact on performance measure of FDI.

This article adopts a hybrid of DEMATEL and ANP methodology to explore the determinants of Japanese MNEs investing in Taiwan. The remainder of this article is organized as follows: Section 2 introduces the research methodology (DEMATEL and ANP) and research procedure. The research results are shown in section 3. Conclusion will be summarized in section 4.

II. RESEARCH METHODOLOGY

A hybrid MCDM model that combined DEMATEL and ANP can comprehensively solute the dependence and feedback problems, thus can more accurately reflect the real world situations.

A. Set up Research Architecture

This article classifies five categories of motives for Japanese enterprises to invest in Taiwan. The first four motives, namely Market Seeking, Efficiency Seeking, Resource Seeking, and Strategic-asset Seeking, follow from Dunning (1993). The fifth Network Seeking motive is newly created by this article to catch the Taiwan-Japan historical ties. The determinants in each motive are concluded from past literature survey and interview with experts who are senior managers of Japanese enterprises work in Taiwan.

While collects and rearranges potential candidate determinants from literature survey and export opinions, this article concludes the determinants that are affecting Japanese MNEs to invest in Taiwan and pigeonholes each of those determinants into the five motives categories respectively, showing as Table 1.

Table 1 Determinants description

Motives Categories	Determinants	Description
A. Market Seeking	a1 Population	The number of domestic residents in Taiwan
	a2 Market size	The domestic market capacity in Taiwan
	a3 GDP	The gross domestic product (GDP) in Taiwan
	a4 Market potential	The possibility to expand sales amount in Taiwan in the near future
B. Resource Seeking	b1 Raw material	Domestic natural resource: agriculture, forest, fishery, pasture, and mineral products, etc. in Taiwan
	b2 Human resource	The supply of domestic skilled labors and knowledge workers in Taiwan
C. Efficiency Seeking	c1 Geography distance	The distance from Taiwan to ASEAN nations, China, South Korea, and Japan
	c2 Infrastructure	The level of domestic infrastructure: water supply, electricity, traffic, communication, etc. in Taiwan
	c3 Cluster	The level of similar industries centered at a specific area in Taiwan
	c4 Tax	Tax incentives provided by Taiwan government
	c5 Political risk	The possibility of political turbulence in Taiwan
D. Strategic-asset Seeking	d1 Technology	The level of domestic technology in Taiwan
	d2 Protection of intellectual property right	The level of enforcement for protecting intellectual property right in Taiwan
E. Network Seeking	e1 Ethnic ties	The ethnic relationship perceived by Taiwanese and Japanese
	e2 History	The historical relationship between Taiwan and Japan
	e3 Step stone	The strategic thinking to invest in Taiwan as a prelude for expanding to a third county

B. Create the Questionnaires

This article creates the DEMATEL questionnaire for collecting the cause-effect relationship among the five categories motives while interviewing with selected senior managers of the seven Japanese MNEs. Then, a self-structured ANP questionnaire is designed to measure the relative importance between two determinants by pair-wise comparison. After completing DEMATEL questionnaire, interviewee implements ANP questionnaire with the same respondent of the seven Japanese MNEs to collect the relative importance of the dyad determinants while interviewing with selected senior managers of the seven Japanese MNEs.

C. Data Processing Steps

The steps of processing the received data summarize as follows:

Step 1: Calculate the direct relation matrix

All the problematic determinants and strength are extracted for finding the causality. Respondents are asked to make sets of the pairwise comparisons in terms of influence and direction between determinants. Calculate the direct relation matrix:

$$\boldsymbol{D}=\begin{bmatrix} d_{11} & \cdots & d_{1j} & \cdots & d_{1n} \\ \vdots & & \vdots & & \vdots \\ d_{i1} & \cdots & d_{ij} & \cdots & d_{in} \\ \vdots & & \vdots & & \vdots \\ d_{n1} & \cdots & d_{nj} & \cdots & d_{nn} \end{bmatrix} \quad (1)$$

where d_{ij} indicates the scale of the degree to which the determinant *i* affects the determinant *j*.

Step 2: Normalizing the direct-relation matrix.

On the base of the direct-relation matrix D, the normalized direct-relation matrix $\boldsymbol{X}$ can be obtained through formulas

$$\boldsymbol{X}=S\times\boldsymbol{D},\quad S=1/\underset{1\le i\le n}{MAX}\sum_{j=1}^{n}x_{ij} \quad (2)$$

Step 3: Derive the total-relation matrix.

The total relation matrix $\boldsymbol{T}$ can be acquired by Eq. (3), in which the $\boldsymbol{I}$ is denoted as the identity matrix. Matrix $\boldsymbol{T}$ is the direct/indirect matrix. The (i, j) element t_{ij} of matrix $\boldsymbol{T}$ denotes the direct and indirect influence from factor i to factor j.

$$\boldsymbol{T}=\lim_{k\to\infty}\left(\boldsymbol{X}+\boldsymbol{X}^{2}+\ldots+\boldsymbol{X}^{k}\right)=\boldsymbol{X}\left(\boldsymbol{I}-\boldsymbol{X}\right)^{-1} \quad (3)$$

Step 4: Calculate the causal diagram.

$$r_i=\sum_{i=1}^{n}t_{ij},\ i=1,2,\ldots,n\ ,\ c_j=\sum_{j=1}^{n}t_{ij},\ j=1,2,\ldots,n \quad (4)$$

where c_j and r_i denote the sum of j th row and i th column of matrix $\boldsymbol{T}=\left[t_{ij}\right]_{n\times 1}$ respectively and show the direct and indirect effects of factor/element on the other factors/elements. (r_i+c_i) provides an index of the strength of influences given and received. If (r_i+c_i) is positive, factor i is affecting other factors; if (r_i+c_i) is negative, factor i is being influenced (Tamura et al., 2002; Tzeng et al., 2007).

Step 5: Drawing to obtain the inner dependence matrix and impact-relation-map (IRM).

The sum of each column in total relation matrix equals to 1 by the normalization method, and then the inner dependence matrix can be acquired. On the basis of the matrix $\boldsymbol{T}$, each element (t_{ij}) of matrix $\boldsymbol{T}$ provides information about how determinant i affects determinant j.

Step 6: Pairwise comparisons matrix

In this step, the ANP is used to compare the determinants in whole system to form the supermatrix. The pairwise comparison matrix is shown as:

$$\boldsymbol{A}=\left[a_{ij}\right]=\begin{bmatrix} 1 & a_{12} & \cdots & a_{1n} \\ a_{21} & 1 & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \cdots & 1 \end{bmatrix} \quad (5)$$

Step 7: Calculate the supermatrix.

The general form of the supermatrix can be described as follows:

$$\boldsymbol{W}=\begin{array}{c} \\ c_1\ \begin{matrix} e_{11} \\ e_{12} \\ \vdots \\ e_{1m_1} \end{matrix} \\ c_2\ \begin{matrix} e_{21} \\ e_{22} \\ \vdots \\ e_{2m_2} \end{matrix} \\ \vdots \\ c_n\ \begin{matrix} e_{n1} \\ e_{n2} \\ \vdots \\ e_{nm_n} \end{matrix} \end{array}\begin{array}{c} \begin{matrix} c_1 & & & c_2 & & \cdots & c_n \\ e_{11}\ \cdots\ e_{1m_1} & & & e_{21}\ \cdots\ e_{2n_2} & & & e_{n1}\ \cdots\ e_{nm_n} \end{matrix} \\ \begin{bmatrix} W_{11} & W_{12} & \cdots & W_{1n} \\ W_{21} & W_{22} & \cdots & W_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ W_{n1} & W_{n2} & \cdots & W_{nn} \end{bmatrix} \end{array} \quad (6)$$

where c_n denotes the n th motive, e_{mn} denotes the m th determinant in the n th motive, and $\boldsymbol{W}_{ij}$ is the principal eigenvector of the influence of the determinants in the j th motive compared to the i th motive. In addition, if the j th motive has no influence on the i th motive, then $\boldsymbol{W}_{ij}=[0]$.

Step 8: Obtain the weighted supermatrix by multiplying the normalized matrix which is derived according to the DEMATEL technique.

Utilize the IRM to the drive the total influence $\boldsymbol{T}$.

$$\boldsymbol{T}_{\alpha}=\begin{bmatrix} t_{11}^{\alpha} & \cdots & t_{1j}^{\alpha} & \cdots & t_{1n}^{\alpha} \\ \vdots & & \vdots & & \vdots \\ t_{i1}^{\alpha} & \cdots & t_{ij}^{\alpha} & \cdots & t_{in}^{\alpha} \\ \vdots & & \vdots & & \vdots \\ t_{n1}^{\alpha} & \cdots & t_{nj}^{\alpha} & \cdots & t_{nn}^{\alpha} \end{bmatrix},\quad d_i=\sum_{j=1}^{n}t_{ij}^{\alpha} \quad (7)$$

The α-cut total-influence matrix could be normalize and represented as $\boldsymbol{T}_s$.

$$\boldsymbol{T}_s=\begin{bmatrix} t_{11}^{\alpha}/d_1 & \cdots & t_{1j}^{\alpha}/d_1 & \cdots & t_{1n}^{\alpha}/d_1 \\ \vdots & & \vdots & & \vdots \\ t_{i1}^{\alpha}/d_i & \cdots & t_{ij}^{\alpha}/d_i & \cdots & t_{in}^{\alpha}/d_i \\ \vdots & & \vdots & & \vdots \\ t_{n1}^{\alpha}/d_n & \cdots & t_{nj}^{\alpha}/d_n & \cdots & t_{nn}^{\alpha}/d_n \end{bmatrix}=\begin{bmatrix} t_{11}^{s} & \cdots & t_{1j}^{s} & \cdots & t_{1n}^{s} \\ \vdots & & \vdots & & \vdots \\ t_{i1}^{s} & \cdots & t_{ij}^{s} & \cdots & t_{in}^{s} \\ \vdots & & \vdots & & \vdots \\ t_{n1}^{s} & \cdots & t_{nj}^{s} & \cdots & t_{nn}^{s} \end{bmatrix} \quad (8)$$

where $t_{ij}^{s}=t_{ij}^{\alpha}/d_{i.}$.

Using Eq. (9) to calculate the weighted supermatrix $\boldsymbol{W}_w$. Eq. (9) shows these influence level values as the basis of the normalization for determining the weighted supermatrix.

$$\boldsymbol{W}_w=\begin{bmatrix} t_{11}^{s}\times W_{11} & t_{21}^{s}\times W_{12} & \cdots & \cdots & t_{n1}^{s}\times W_{1n} \\ t_{12}^{s}\times W_{21} & t_{22}^{s}\times W_{22} & \vdots & & \vdots \\ \vdots & \cdots & t_{ij}^{s}\times W_{ij} & \cdots & t_{ni}^{s}\times W_{in} \\ \vdots & & \vdots & & \vdots \\ t_{1n}^{s}\times W_{n1} & t_{2n}^{s}\times W_{n2} & \cdots & \cdots & t_{nn}^{s}\times W_{nn} \end{bmatrix} \quad (9)$$

Step: 9 Limit the weighted supermatrix by raising it to a sufficiently large power k, as Eq. (10)

The weighted supermatrix can be raised to limiting power until it has converged and become a long-term stable supermatrix to obtain the global priority vector or called the ANP weighted (Chen et al., 2011).

$$\lim_{k\to\infty}\boldsymbol{W}_w^{k} \quad (10)$$

The overall weights are calculated using the above steps to derive a stable limiting supermatrix.

III. RESEARCH RESULTS

A. Measuring relationships among motives

DEMATEL questionnaire were used to specify the relationships between the five motives. The matrix indicates the degree to which the respondent believes motive i affects motive j. If $i=j$, the elements are zero.

The average matrix $\boldsymbol{D}$ is shown as

$$\boldsymbol{D}=\begin{bmatrix} 0 & 1.857 & 3.143 & 2.571 & 2.714 \\ 2.143 & 0 & 2.857 & 3.183 & 2.857 \\ 2.857 & 3.000 & 0 & 2.857 & 2.714 \\ 2.714 & 2.286 & 2.714 & 0 & 2.714 \\ 2.286 & 2.286 & 3.000 & 3.000 & 0 \end{bmatrix}$$

From the previous procedure, it is not practical to know the causal relationship among motives. Thus, this procedure still needs to calculate normalization direct-relationship. By Eqs. (2) and (3), the total influence matrix $\boldsymbol{T}$ is listed as

$$\boldsymbol{T} = \begin{bmatrix} 1.113 & 1.234 & 1.562 & 1.489 & 1.280 \\ 1.385 & 1.238 & 1.616 & 1.687 & 1.385 \\ 1.394 & 1.483 & 1.460 & 1.634 & 1.394 \\ 1.279 & 1.297 & 1.492 & 1.327 & 1.279 \\ 1.502 & 1.528 & 1.821 & 1.824 & 1.335 \end{bmatrix}$$

From matrix $\boldsymbol{T}$, the gives and received influences of each motive are calculated as Table 2. The motive with higher value of $(r_i + c_i)$ has stronger relationships with other motives, while the motive with lower value of $(r_i + c_i)$ means weaker relationship with other motives. The motives with positive value of $(r_i - c_i)$ will influence the other motives greatly, these motives are called dispatchers; however, the motives with negative values of $(r_i - c_i)$ are thus greatly influenced by other motives, called receivers. A significantly positive value of $(r_i - c_i)$ represents that the motive is known to affect the other motives for more than other motives affecting it. This implies that certain motives should be considered as a priority for maximizing influence (Chen et al., 2011).

Motives	r_i	c_i	$(r_i + c_i)$	$(r_i - c_i)$
A. Market Seeking	6.678	6.673	13.351	0.005
B. Resource Seeking	7.311	6.780	14.091	0.531
C. Efficiency Seeking	7.365	7.951	15.316	-0.586
D. Strategic-asset Seeking	6.674	7.961	14.635	-1.287
E. Network Seeking	8.010	6.673	14.683	1.337

Table 2 The gives and received influences of each motive

Observe Table 2, it can be seen that the rank of strength-of-influence gives and received $(r_i + c_i)$ is motive C (Efficiency Seeking: 15.316), E (Network Seeking: 14.683), D (Strategic-asset Seeking: 14.635), B (Resource Seeking: 14.091), A (Market Seeking: 13.351); The rank of $(r_i - c_i)$ is motive E (Network Seeking: 1.337), B (Resource Seeking: 0.531), A (Market Seeking: 0.005), C (Efficiency Seeking: -0.586), D (Strategic-asset Seeking: -1.287), respectively. The causal diagram of total relationship is depicted as Fig. 1.

These results reveal that Efficiency Seeking, with the highest $(r + c)$ value, has the most relationship with other motives and is located in the central role among motives. Network Seeking, with the highest $(r - c)$ value, dispatches the strongest influence on the other motives, is called the "main cause-factor" among the motives; while Strategic-asset Seeking, with the lowest $(r - c)$ value, receives the strongest influence from the other motives, is called the "main effect-factor" among the motives.

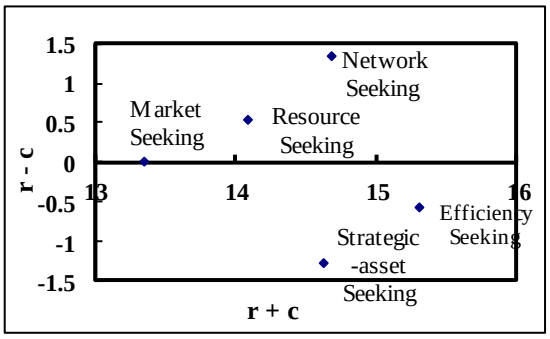

Fig. 1 Causal diagram of total relationship

From Table 2, it can be used to establish the IRM (also is called causal diagram of total relationship strategic map). Firstly, a threshold is calculated from the elements of matrix $\boldsymbol{T}$ by $\sum t_{ij} / 25 = 1.442$ as the screening criteria to eliminate trivial relations derived from DEMATEL analysis (Liou et al., 2008). In addition, the second quartile (1.394) and third quartile (1.545) are set as separate points to divide weak and strong influence between motives. The strategic map is constructed as Fig. 2 (See Appendix). The "dotted arrows" denote weak influence between motives, while the "bold solid arrows" represent strong influence. Further observes Fig. 2, only Efficiency Seeking motive exists weak inner dependency.

B. Measuring the priority of determinants

After applying interview by ANP questionnaire, each determinant is compared pairwisely with respect to its impact on every other determinant to catch the collective opinion of the seven respondents. Through Eqs. (6) to (9), the weighted supermatrix $\boldsymbol{W}_w$ (Table 3, See Appendix) is obtained by multiplying the normalized matrix.

The weighted supermatrix $\boldsymbol{W}_w$ needs to converge to a long-term stable supermatrix for obtaining the global priority vector. By Eq. (10), the weighted supermatrix $\boldsymbol{W}_w$ is multiplied with itself multiple times to raises to the nth power until the convergence occurs. While the weighted supermatrix is multiplied with itself multiple times, the limiting supermatrix $\boldsymbol{W}^*$ is obtained (Table 4, See Appendix). The limiting supermatrix is a stable supermatrix reveals the global priority/influentience.

C. Weights and Ranking

From the limiting supermatrix, the global weights of motives and local weights of determinants are rearranged in Table 5 (See Appendix). From Table 5, it can be seen that the motive ranks is Efficiency Seeking (0.374), Network Seeking (0.256), Market Seeking (0.174), Strategic-asset Seeking (0.126), and Resource Seeking (0.069). Table 5 also shows that among the overall 16 determinants, Japanese MNEs believe that Step stone with a weight of 0.101 is the first priority determinant. It means, Taiwan plays the role of midway that most Japanese MNEs will expand to other countries in the future instead of to invest in Taiwan permanently. Especially, many respondents expressed in the interview that their companies plan to or had already formed joint venture with Taiwanese company to invest in China. Infrastructure (0.097) is followed in the second place. Infrastructure can be ranked in high priority is account for its ability to provide convenient water, electric, traffic, communication, etc. for Japanese MNEs compared to adjacent Asia countries. The third is Geography (0.089). Geographic distance among Taiwan and adjacent Asia countries is much shorter, and can significantly reduce transportation costs of raw materials and final products and the costs of acquiring information from the home country. The fourth determinant is History (0.078). History is an important determinant for Japanese MNEs. Since Japan had ruled Taiwan for fifty years before WWII, many Taiwanese entrepreneurs can speak Japanese fluently, and can also fully understand Japanese culture and lifestyle. Japanese MNEs may easily communicate with Taiwanese and perceive their friendship. The fifth determinant is Political risk (0.077). The political situation in Taiwan is relative stable. No hostile political turbulence or

terroristic attack happened in Taiwan.

IV. CONCLUSION

Taiwan is an export-oriented country, her economic growth relies heavily on foreign capital accumulation. Even Taiwan has provided many incentives to attract FDI, however, unilateral policies can never be a guarantee for successfully attracting inward FDI.

Research results show that Efficiency Seeking has the most relationship with other motives and is located in the central role among motives. Network Seeking, dispatches the strongest influence on the other motives; while Strategic-asset Seeking, receives the strongest influence from the other motives. Only Efficiency Seeking motive exists weak inner dependency.

Many Japanese MNEs regard Step stone determinant as the first priority. Infrastructure is in the second place. Geographic distance among Taiwan and adjacent Asia countries is much shorter, therefore, Geography ranks the third. The fourth determinant is History. The fifth determinant is Political risk.

Most of the worst 5 determinants are concentrated in the Market Seeking motive. This result indicates that Taiwan's population and market size is relative smaller and her market potential is also lower.

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Appendix

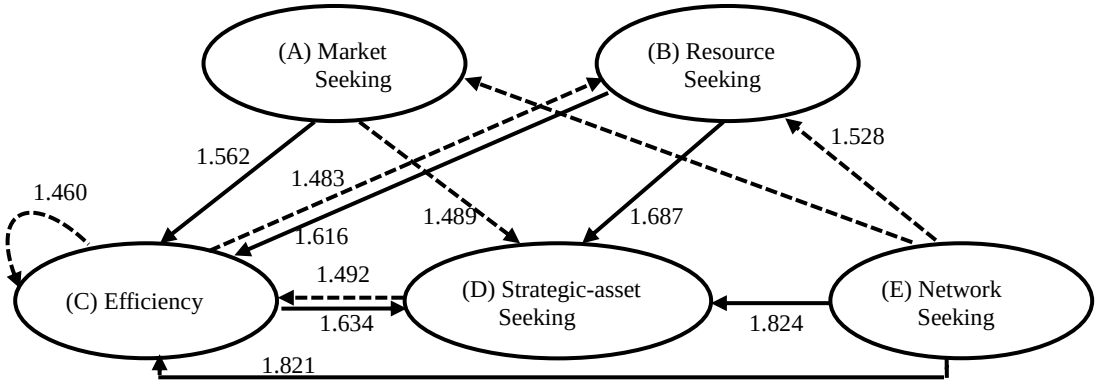

Fig. 2 Causal diagram of total relationship strategic map
(Threshold: 1.442; Weak ⇢ 1.394~ 1.545; Strong → 1.545~ 1.824)

Table 3 The weighted super matrix (W_w)

	a1	a2	a3	a4	b1	b2	c1	c2	c3	c4	c5	d1	d2	e1	e2	e3
a1	0.014	0.016	0.012	0.013	0.063	0.008	0.015	0.015	0.011	0.014	0.072	0.014	0.008	0.009	0.008	0.071
a2	0.031	0.018	0.015	0.008	0.058	0.008	0.007	0.025	0.016	0.048	0.036	0.015	0.047	0.039	0.025	0.059
a3	0.033	0.029	0.019	0.020	0.060	0.011	0.015	0.016	0.021	0.025	0.019	0.021	0.013	0.024	0.023	0.070
a4	0.054	0.080	0.065	0.030	0.061	0.047	0.057	0.026	0.084	0.070	0.068	0.092	0.066	0.038	0.035	0.072
b1	0.002	0.003	0.003	0.005	0.009	0.004	0.006	0.006	0.004	0.005	0.007	0.006	0.005	0.010	0.009	0.020
b2	0.079	0.091	0.088	0.029	0.069	0.031	0.043	0.051	0.083	0.020	0.020	0.044	0.018	0.052	0.048	0.096
c1	0.065	0.117	0.076	0.035	0.067	0.064	0.039	0.115	0.076	0.108	0.122	0.115	0.115	0.146	0.149	0.024
c2	0.084	0.108	0.099	0.091	0.071	0.077	0.052	0.047	0.077	0.085	0.135	0.101	0.139	0.146	0.163	0.040
c3	0.065	0.058	0.050	0.051	0.067	0.077	0.055	0.043	0.031	0.027	0.028	0.029	0.060	0.030	0.041	0.035
c4	0.062	0.045	0.057	0.074	0.071	0.112	0.096	0.058	0.056	0.037	0.041	0.047	0.039	0.065	0.059	0.058
c5	0.071	0.058	0.084	0.086	0.072	0.130	0.110	0.089	0.112	0.060	0.054	0.090	0.095	0.077	0.072	0.045
d1	0.073	0.077	0.073	0.081	0.067	0.089	0.073	0.057	0.062	0.062	0.038	0.041	0.048	0.065	0.062	0.041
d2	0.073	0.063	0.084	0.092	0.071	0.124	0.072	0.080	0.069	0.077	0.059	0.067	0.036	0.068	0.064	0.079
e1	0.109	0.062	0.103	0.109	0.071	0.081	0.094	0.123	0.130	0.108	0.091	0.118	0.130	0.074	0.097	0.093
e2	0.109	0.080	0.099	0.115	0.072	0.075	0.094	0.118	0.081	0.123	0.091	0.110	0.123	0.064	0.069	0.132
e3	0.076	0.092	0.073	0.159	0.052	0.063	0.171	0.131	0.087	0.130	0.118	0.090	0.059	0.093	0.076	0.064

Table 4 The limiting supermatrix (W^*)

	a1	a2	a3	a4	b1	b2	c1	c2	c3	c4	c5	d1	d2	e1	e2	e3
a1	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043
a2	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
a3	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042	0.042
a4	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055
b1	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
b2	0.057	0.057	0.057	0.057	0.057	0.057	0.057	0.057	0.057	0.057	0.057	0.057	0.057	0.057	0.057	0.057
c1	0.089	0.089	0.089	0.089	0.089	0.089	0.089	0.089	0.089	0.089	0.089	0.089	0.089	0.089	0.089	0.089
c2	0.097	0.097	0.097	0.097	0.097	0.097	0.097	0.097	0.097	0.097	0.097	0.097	0.097	0.097	0.097	0.097
c3	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046	0.046
c4	0.066	0.066	0.066	0.066	0.066	0.066	0.066	0.066	0.066	0.066	0.066	0.066	0.066	0.066	0.066	0.066
c5	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077
d1	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053
d2	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074
e1	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077
e2	0.078	0.078	0.078	0.078	0.078	0.078	0.078	0.078	0.078	0.078	0.078	0.078	0.078	0.078	0.078	0.078
e3	0.101	0.101	0.101	0.101	0.101	0.101	0.101	0.101	0.101	0.101	0.101	0.101	0.101	0.101	0.101	0.101

Table 5 Weights and ranking

Motives	Determinants	Local weight	Global weight	Ranks
A. Market Seeking		**0.174**		**3**
	a1 Population	0.246	0.0429	14
	a2 Market size	0.201	0.0351	15
	a3 GDP	0.238	0.0416	8
	a4 Market potential	0.314	0.0548	12
B. Resource Seeking		**0.069**		**5**
	b1 Raw material	0.175	0.0120	16
	b2 Human resource	0.825	0.0568	9
C. Efficiency-asset		**0.374**		**1**
Seeking	c1 Geography	0.237	0.0885	3
	c2 Infrastructure	0.258	0.0967	2
	c3 Cluster	0.122	0.0455	13
	c4 Tax	0.177	0.0662	8
	c5 Political risk	0.206	0.0772	5
D. Strategic Seeking		**0.126**		**4**
	d1 Technology	0.417	0.0527	11
	d2 Protect patent	0.583	0.0736	7
E. Network Seeking		**0.256**		**2**
	e1 Ethnic ties	0.301	0.0771	6
	e2 History	0.304	0.0779	4
	e3 Step stone	0.395	0.1013	1