

# การศึกษาความสามารถในการแข่งขันของประเทศ: แนวทางและวิธีการของแบบจำลองเพชร แบบจำลองเพชรสองเท่า และแบบจำลองเพชรคู่สองเท่า

## A Study of National Competitiveness, Using the Single Diamond, Generalized Double Diamond (GDD, and Dual Double Diamond (DDD) approaches

วิลาวณีย์ พึ่งด้วง\*

Wilawan Phungtua

คณะบดีคณะบริหารธุรกิจ มหาวิทยาลัยอีสเทิร์นเอเซีย

E-mail: wilawan@eau.ac.th

### บทคัดย่อ

เนื่องจากความสามารถในการแข่งขันของประเทศมีความสำคัญต่อบริษัทข้ามชาติที่ประสบความสำเร็จในการแข่งขันระดับโลก ดังนั้นการศึกษานี้จึงนำเสนอประเด็นด้านความสามารถในการแข่งขันของประเทศผ่านแบบจำลองเพชรของพอร์เตอร์ซึ่งมี 4 ปัจจัยในการแข่งขันของประเทศและแบบจำลองนี้ยังได้ศึกษาเพิ่มเติมเกี่ยวกับบริษัทธุรกิจข้ามชาติเพื่อที่จะอธิบายและวิเคราะห์ความได้เปรียบของประเทศขนาดเล็ก นอกจากนี้การขยายตัวของการลงทุนโดยตรงระหว่างประเทศในระดับโลกนั้นยังต้องการตัวชี้วัดในการแข่งขันระดับประเทศเพื่อการตัดสินใจด้านที่ตั้งที่ได้เปรียบและความได้เปรียบเฉพาะของประเทศ ดังนั้นการศึกษานี้จึงได้นำเสนอแนวทางและวิธีการที่ถูกนำมาขยายต่อจากแบบจำลองเพชรดั้งเดิมของพอร์เตอร์ โดยใช้แบบจำลองเพชรสองเท่าและแบบจำลองเพชรคู่สองเท่าในแง่ของขีดความสามารถที่กว้างขึ้นและการวิเคราะห์รายข้อเพื่อการประเมินความได้เปรียบของประเทศ

**คำสำคัญ :** แบบจำลองเพชร, แบบจำลองเพชรสองเท่า, แบบจำลองเพชรคู่สองเท่า, ความสามารถในการแข่งขันของประเทศ, บริษัทข้ามชาติ

### Abstract

The concept of national competitiveness dominates the thinking of those multinational corporations (MNC'S) which thrive in the global market place. The study of this concept is derived from Porter's National Diamond model (1990) ,which identifies the four determinants of a country's competitiveness. Other studies have pointed out the shortcomings of Porter's model, extending it to cover multinational corporations (MNC's), in order to account for and analyze the competitiveness of the economies of small countries. The expansion of Foreign Direct Investment (FDI) on a global scale also requires extensive measurements of national competitiveness, in order to make location decisions and to gauge a country's specific economic advantages. This paper presents the various approaches, starting with Porter's original National Diamond, then dealing with the Generalized Double Diamond Model, and the Dual Double Diamond Model, in terms of their respective capacities. The research is a comprehensive analysis of the problems of assessing national competitiveness.

**Keywords:** single diamond, generalized double diamond model, dual double model, national competitiveness, multinational corporations (MNCs)

## Introduction

The comprehensive understanding of national competitiveness requires various aspects of country differences in representing key roles of being home and host country for MNCs. Determinants on business environment, size, economic status, resources and scope of competitiveness describe level of degrees and differences how country specific advantages (CSAs) differ from one country to another. According to Cho, Moon, Kim (2008), the study of country differences in terms of national competitiveness and country specific advantages should be in unified and structured for worldwide assessment from large developed countries to small open economic countries.

Moon, Rugman, and Verbeke (1998) suggested the important focus of international activities emphasizing nation's global competitiveness was not included in Porter's single diamond model but incorporated in the extended approach of generalized double diamond model. Nonetheless, the attempts to invigorate the model was delivered in nine-factor model (Cho & Moon 2000) and the most remarkable implications of dual double diamond (DDD) delivered comprehensive model describing not only firm-specific factors, but with better understanding on classification of country groups.

This paper outlines literature on national competitiveness, analysis and comparison of Porter's single diamond model, generalized double diamond (GDD) and dual double diamond model (DDD), and lastly the discussion of measures in sources, scopes,

international connectivity, human factor dependency that explain assessment of national competitiveness.

## Literature Review on National Competitiveness

Traditional trade theories regarded capital, labor, country resources to determine sources of national competitiveness. Momaya (2008) discussed the changing global situation back in few decades and investment landscape of multiple industrial clusters across countries requires insight understanding of competitive dynamics. Many researchers presented various dimensions of competitiveness across country, industry, and firm levels. Realizing conventional trade-based model of Adam Smith and David Ricardo, the Competitive Advantage of Nations by Porter (1990) introduced a comprehensive development and revolutionary approach in explaining endogenous variables of Factor Conditions, Demand Conditions, Firm Strategy, Structure and Rivalry, Related and Supporting Industries, as well as, Government and Chances for exogenous variables.

Despite the basis of 4 year study in 10 countries, Porter's diamond model was put under criticism on local emphasis, scopes and sources of national competitiveness, the generalized double diamond later emerged and combine international context of MNCs multinational activities into Porter's diamond model (Rugman & D'Cruz, 1993) Preliminary works on competitiveness were studied by researchers in Asia introducing prominent concepts and strategies. A study by Ketels (2006) discussed research priorities

of Porter's competitiveness framework and Ketels (2007) presented significance of country's competitive advantages initiated by long term visions of incentive policies and human factor approaches.

According to Cho and Moon (2005), nation's competitiveness can be classified, firstly, country group of small, medium, large population and land size, secondly, strong, intermediate and weak classification of variables from competitiveness index. Suggestions were also made to compare and assess among similar nations of characteristics competing in relevant industries. For example, it is more comparable characteristics in terms of country's competitive advantages between countries of similar economic fundamentals in closer geography than other countries

outside. Moreover, country rankings in groups and countries world ranking should be considered.

Cho and Moon (2005) discussed weakness of the two most mentioned and referenced reports, The Global Competitiveness Report by World Economic Forum and World Competitiveness Year Book by International Institute for Management Development and later initiated nine factors model to clarify stronger theoretical base on to dual double diamond model incorporating with strong advantages of IPS Competitiveness Report.

The authors further developed Table of Typology of Country Groups (Figure1) illustrated strategic choices of portfolio which classified countries by size and competitiveness.

Size		Small	Medium	Large
Competitiveness	Strong	<b>Strong-Small Countries (SSC)</b>	<b>Strong-Medium Countries (SMC)</b>	<b>Strong-Large Countries (SLC)</b>
	Intermediary	<b>Intermediary-Small Countries (ISC)</b>	<b>Intermediary-Medium Countries (IMC)</b>	<b>Intermediary-Large Countries (ILC)</b>
	Weak	<b>Weak-Small Countries (WSC)</b>	<b>Weak-Medium Countries (WMC)</b>	<b>Weak-Large Countries (WLC)</b>

**Figure1.** Typology of country groups

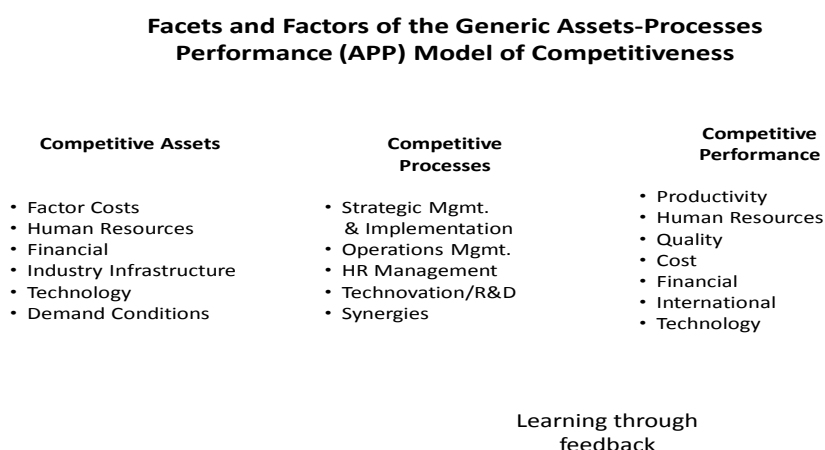
*Note.* From *Adam Smith to Michael Porter*, by Cho and Moon (2005), Annual JIBS/AIB/CIBER Invitational Conference.

The matrix presented facts and evaluation on competitiveness based on secondary data, forecast

techniques to accommodate expert opinions in defining analysis of country's industry and segments. For

instance the key classifications are firm's capacity and industry life cycle from research and development process to commercialization which emerging industry or countries with intermediary competitiveness need detail choices and strategic decision to identify competitiveness of industry and segments.

The Assets-Process-Performance (APP), in addition, was developed and extended from diamond model in various practices and contexts of North America, India, Japan and Korea including emerging industry.

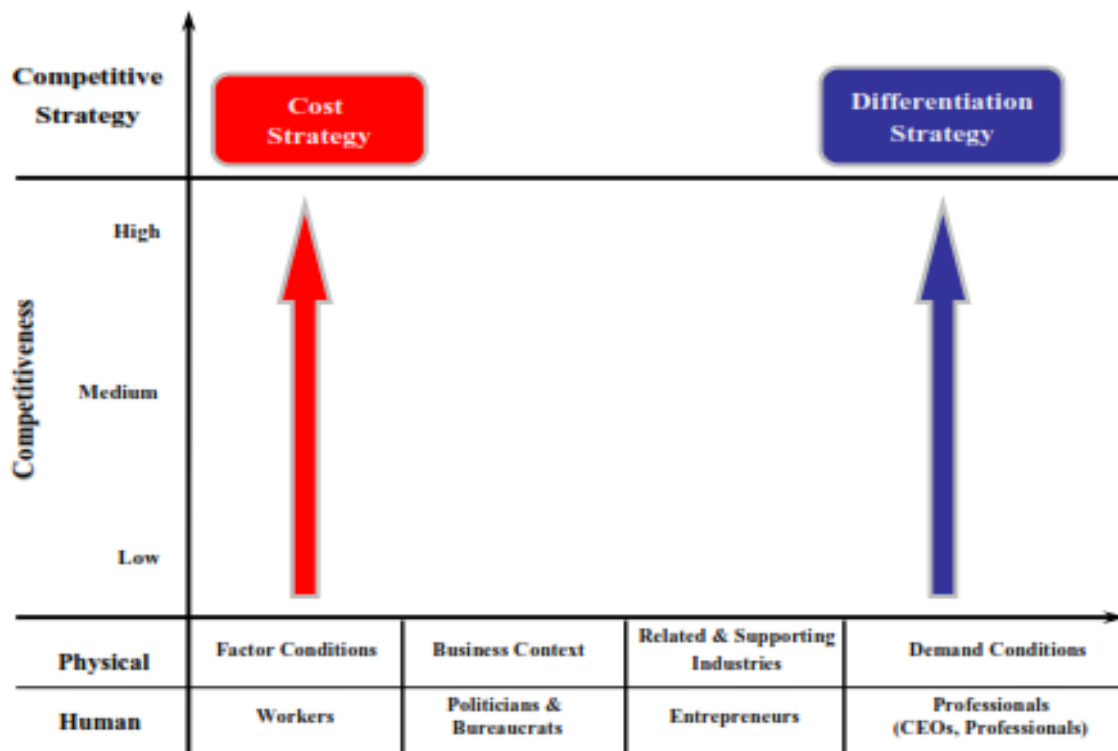


**Figure 2.** Facets and Factors of the Generic Assets-Processes Performance (APP) Model of Competitiveness

*Note.* From *Journal of International Business and Economy*, 9(1), (pp. 37-58 ), by Momaya (2008).

The model was studied to evaluate competitiveness after decisive criteria of critical success factors were made. Such factors outline quick evaluation of competitiveness by prioritizing most relevant factors of APP and available data from competitiveness reports (Ambastha & Momaya, 2004)

According to Porter (1980, 1996), the analysis of national competitiveness can also be derived from various business models. The two generic strategies on cost and differentiation used at corporate level were able to apply to the national level.



**Figure 3.** Competitive Strategies on Nations

*Note.* From *Research in International Business and Finance*, 22(2), (pp. 175-192), by Cho and Moon (2007).

At national level, the competitive advantage of cost strategy is low cost and high efficiency which utilize low cost factor conditions and workers during less developed process. In contrast, differentiation strategy of high cost and high value focus on highly developed stages of business and demand condition. International Competitiveness Traditionally when analyzing the level of country level competitiveness, there are two schools of thought: the economic school, which rejects Porter's notion of country competitiveness, and the management school, which supports the notion of competitiveness at the country level. From, *The competitive advantage of nations: is Porter's Diamond Framework a new theory the explains the international competitiveness of countries?*, Smit (2010) aimed to clarify the meaning

of international competitiveness at the country level in the context of Porter's National Diamond Framework (1990).

Smit (2010) reviewed and contrasted the theories pertaining to the two schools of thought with specific references to trade theories and the theory of the competitive advantage of nations originally advanced by Porter. In Smit's view, countries compete in the international market for market share, business growth and profits, just like companies, and that Porter's Diamond Framework is not a new theory that explains the competitiveness of countries, but rather a framework that enhances the understanding of the international competitiveness of firms. To facilitate and maintain business and economic growth, companies as well as countries compete in the world

market, productivity, product quality, prices, and images become essential. Companies and countries try to move the business and the economy into high-value added sectors that attract investments, create jobs for present and future, and in order to be more competitive and sustainable, they forge a new government and private sector partnership.

The economic school, according to Krugmann (2003), where the thinking and principles were popular among businessmen, business journals, management academics, and even the World Economic Forum's Global Competitiveness Report which ranks countries in terms of their international competitiveness, Krugmann (2003) believed these statements and reports were "meaningless when applied to national economies" because countries do not compete internationally like firms that compete with rival firms in the global market. Kohler (2006) supports Krugmann's notion that countries do not compete internationally because trade is a positive-sum game, a country's growth is determined by its value of productivity and not by international competitiveness index and ranking. The management school, on the other hand, argues that international competitiveness of countries is a growing concern for governments, businesses and academics in the understanding of its meaning, measurement, and policy application (Ketel 2006). Many scholars of management theories believe that firm competitiveness can be extended to country competitiveness as Porter (1990) suggested through his Diamond Framework, which is a multi-level theory that realistically connects firms, industries and countries.

The basis for analyzing competitiveness at the country level becomes more articulated as international competitiveness at the company level has changed over the last decade due to the changing patterns of world trade (i.e. increasing regional cooperation as well as bilateral trade agreements), globalization of the world economy, rapid innovation and information technology advancement, and the rise of transnational organizations. The emphasis on company level competitiveness has renewed the interest of management scholars on international competitiveness at the country level.

Porter: The National Diamond Model (Single Diamond) Traditional trade theory and the theory of comparative advantage are inadequate in explaining why some countries are more successful in some industries than others, and how location advantages are determined. Porter (1990) introduced a new thinking, in contrary to the prevailing economic trade theories, to explain national competitive advantage. He identified "the national diamond," four categories of country attributes that provide the conditions for the determination of national competitiveness of nations. Namely, factor conditions including demand conditions, company strategy, structure and rivalry, and related and support industries. Two other factors, government policy and chance are included as external shocks that would not create sustainable competitive advantages.

**Factor Conditions:** Traditional economic trade theories define factor conditions as land, labor and capital. Porter (1990) categorized the differences between human resources, physical resources, knowledge resources, capital resources and

infrastructure. These are also subdivided into basic and advanced factors that can be either general or specialized. The advanced factor conditions can be created and upgraded through investment and innovation to achieve specialization, which form a basis for sustainable competitive advantage of a country.

**Demand Conditions:** Porter emphasized demand differences more than demand similarities in order to explain country's competitiveness. It is not only the size of home demand that matters, but also the sophistication of the home country buyers preferences that companies interpret, consider, and respond to. This forces companies to innovate, to specialize, and to upgrade their competitive positions to meet the higher standards in terms of product quality, durability, and service. Porter also regarded domestic demand as the lead to international demand, and it also provides the basis for understanding resource-driven location advantage for companies.

#### **Company Strategy, Structure and Rivalry:**

Company's strategy and structure depend on the national environment, and that the business sectors are systematically different from country to country, and therefore, competitive advantages of countries are different. Rivalry is identified by Porter (1990) as the crucial determinant of competitive advantage of a country's companies. Domestic rivalry forces companies to improve cost efficiency, to improve quality and to innovate in order to compete.

#### **Related and Support Industries:**

Porter (1997) advanced that specialization leads to "staying put" location advantages of companies, and that is the important source of sustainable competitive advantage of a countries. The presence of related and support industry "clusters" including the network of specialized input suppliers, academic and private research institutions, and local competitors operate in an environment where learning, research and development, innovation and improved productivity can prevail. These local clusters are the true sources of competitive advantage of a country, which are prominent in developed countries, but are lacking in developing countries, which substantially limits growth in productivity in those countries. Countries wanting to achieve economic growth must build clusters to support the main industries, and public policies should emphasize removing business obstacles to improve productivity and foster innovation.

Porter (1990), viewed the four determinants of the National Diamond as "constituting and interactive system", and this interaction leads to the competitiveness of countries. The National Diamond provides rationale that "it is firms that ultimately compete internationally, but it is the international competitiveness of a country that shapes the international competitive advantage of firms" (Smit, 2010).

The Generalized Double Diamond Model (GDD) Moon Rugman & Verbeke (1995 and 1998) defined national competitiveness as the capability of firms producing value-added products in a specific industry in a particular country to continue to sustain

value-added activities in the long term in spite of international competition. Revised and further expanded from double diamond model, a generalized double diamond was accommodated to analyze small economies.

GDD delivers explanation to international context into national competitiveness. The model assesses high international activities and connectivity to Porter's diamond model.

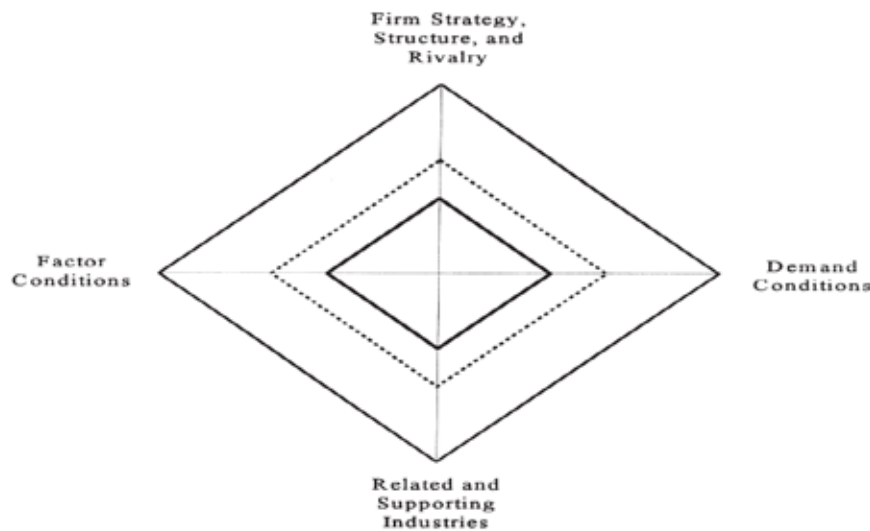


Fig. 2. The generalized double diamond.

**Figure 4.** The Generalized Double Diamond Model

The outside diamond represents the global elements, and the inside diamond represents the domestic elements. The dotted diamond between the two is the international diamond, representing the country's competitiveness as determined by domestic and international variables. The differences between the domestic diamond and the international diamond represents the international or multinational activities, both inbounds and outbounds.

Moon, Rugman & Verbeke (1995) applied the generalized double diamond model to small economies such as Korea and Singapore. The result of study demonstrated that both countries depended on multinational activities to gain foreign capital and advance technology, and also access to cheap labour and natural resources outside their own countries,

leading to greater comparative advantages. In this regard, domestic and foreign-owned firms may contribute to the sustained value-added activities, a linkage between domestic diamond and other country's diamond. Therefore, the international diamond represents national competitiveness determined by domestic and international parameters. Foreign direct investment (FDI) is one such parameter that impacts the domestic diamond resulting from multinational activities. FDI enable small open economies to advance its modern technologies, R&D and innovation, and export orientation to the global market to enhance their national competitive advantage. The generalized double diamond incorporates the multinational activities into the four



determinants of Porter (1990), which makes effective in analyzing small open economies.

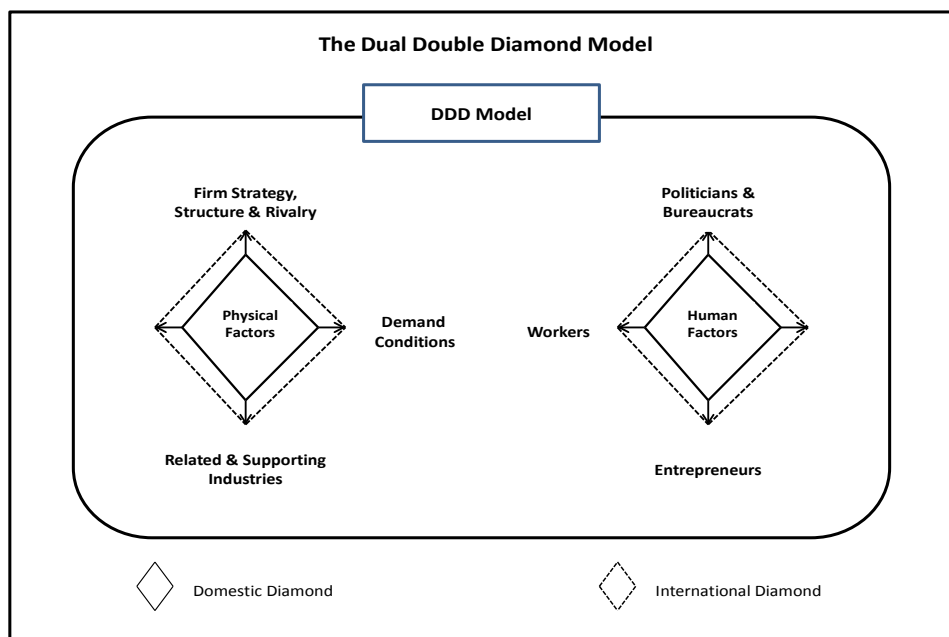
Moon, Rugman, Verbeke (1998) adopted the generalized double diamond approach to analyze the competitiveness of Korea and Singapore, the results of which validated the findings of Moon Moon Rugman & Verbeke (1995; 1998) and extended Porter's original national diamond in three areas. First, the GDD openly incorporates multinational activities, while Porter's national diamond mainly presented the impact of the home-based firm activities. Second, the GDD provides a basis to operationalize the competitiveness of a country – especially the sizes and shapes of the domestic and

international diamonds illustrate strategic differences, whereas Porter's approach is more difficult to do so.

Third, the GDD incorporates government as an important endogenous parameter that can influence the four determinants of the national diamond model.

#### The Dual Double Diamond Model

The study of Cho, Moon, Kim (2008) introduced dual double diamond model (DDD) as a new model integrating four factors of national competitiveness in one single model. The DDD model presented comprehensive analysis on 4 different attributes of national competitiveness regarding physical and human factors in domestic and international contexts.



**Figure 5.** The Dual Double Diamond Model

*Note.* From *Journal of International Business and Economy*, (p. 35), by Cho and Moon (2005).

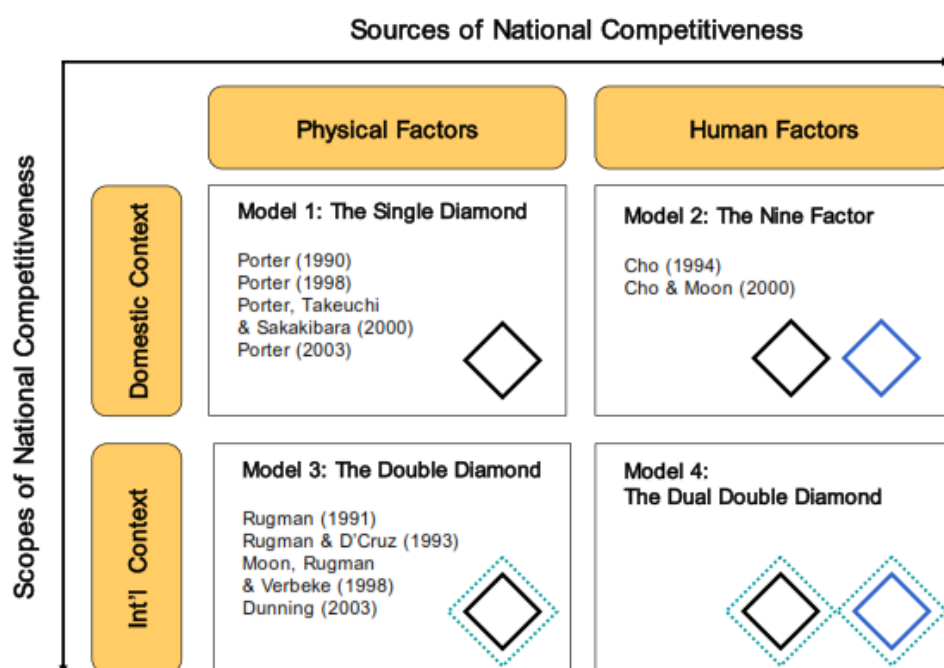
The DDD model explains four physical factors of factor conditions, firm strategy, structure and rivalry, related and supporting industries, and

demand conditions both in domestic and international contexts. In addition to human factors, the model analyzes domestic and international factors of country

competitiveness on workers, politicians and bureaucrats, entrepreneurs and professionals. The model reflects extensive details for better understanding of country competitiveness in various characteristics. Firstly, scopes and sources of national competitiveness are associated in more justify perspectives and definitions. Secondly, the environment of business, corporates and globalization requires the progressive analysis and thorough understanding of competitive roles and international capacity on human factors. Lastly, to obtain comprehensive analysis, a highly accountable measure should deliver four dimensions of domestic

physical factors, domestic human factors as well as international physical factors and international human factors incorporating in one single model.

To fully understand transition and changes, from and to, the latest model of DDD, this paper discussed the study of Mamoya (2008) on Cho et al. (2000, 2007, 2008) on the efforts to overcome bias of Porter's single diamond on advanced economies, and transformation of limitations from the lack of international outreach to domestic and international connectivity on physical and human factors to describe scopes and sources of national competitive diagrams.



**Figure 6.** Porter's diamond model and its extension model

Figure 6 illustrated horizontal axis which represented sources of national competitiveness whereby the vertical axis presented scope of national competitiveness. The extension of GGD model (model 3) was deliberated to impose international

connectivity to the first single domestic diamond. The nine factor model (model 2) introduced human factors to the physical factors. Lastly, the addition of international human factors was resulted to dual

double diamond model in lower right corner (model 4).

## Conclusion

Modern studies on country competitiveness rely much on Porter's single diamond model. However, the model was critique for its incomplete analysis and found inapplicable to small country economies. The country diamond focuses on the home-base enterprises and does not take into consideration the contributions of the home country's largest trading partners. It also omits the role of multinational organizations that have played a significant role in influencing the competitiveness success of the country (Rugman 1990, Dunning 1992, Smit, 2010). As a result, Porter's diamond framework was discussed widely for not fully matching to the context of smaller developing economies, but rather it is appropriate for analyzing the more advanced developed countries. Both the management school and the economic school criticized the diamond framework to include key attributes of the largest trading partners of home country and the activities of multinational corporations – MNCs (Dunning, 1992). These suggestions were based on the notion that if a company to compete successfully internationally it must understand and able to exploit the dynamics of foreign companies in order to be globally competitive. Porter model could not describe the integration and success of export-dependent and resource-based industries (Cartwright 1993). Later Moon, Rugman and Verbeke (1995 ; 1998) extended the generalized double diamond to facilitate the analysis of smaller

less-industrialized countries and the influence of MNCs activities on national diamond.

“An international comparison of empirical generalized double diamond model approaches to Taiwan and Korea” regards Porter diamond model being limited as the analysis of the national competitiveness is based on the industries in the home-based market and does not consider industries located outside the countries, or the MNCs (Liu & Hsu, 2009). Therefore, Porter's model should take into consideration on foreign firms' activities, trade partners' foreign policies, markets, and resources. Moon, Rugman, Verbeke (1995, 1998), additionally, concluded generalized double diamond model, with MNCs activities as an endogenous variables, not exogenous variables as Porter's.

Despite the fact that generalized double diamond model has greater capacity to explain and assess national competitiveness and global environment competition, dual double diamond model however, measures and analyzes more comprehensively than other existing models. It is utmost necessary for MNCs competing in global environment to obtain comprehensive analysis on country specific advantages (CSAs) and heterogeneous attributes for survival, profitability, growth. Moreover, DDD model explains deeper on domestic and international connectivity of physical factors and human dependency factor how counties differ from one another in terms of sources and scopes of national competitiveness.

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