Integration and Regional Industrial Development: Theoretical Frameworks and Literature Reviews

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Abstract: Integration, a phenomenon in the process of economic growth, has been acting as essential to productivity growth and regional industrial development. It enhances regional economy through certain economic relationships between economic entities and between regions, including exchange and agglomeration. Hence, economists have long been attracted to the continued exploration of internal mechanisms and functions of integration that would lead to improved productivity and industrial performance. Aiming to provide a theoretical reference with a practical value in planning the prospects of industrial resource integration, so as to balance the industrial distribution of regions and promote their economic development, this paper starts a theoretical review of integration from defining key concepts, and then follows with the factors that influence integration, a theoretical study on integration and regional industrial development, along with the unveiling of the dynamic mechanisms of integration and regional industrial development.

Keywords: Regional integration, regional industrial development, theoretical frameworks, reviews.

Introduction

Since the late 1970s, interest in specialisation and integration has resurfaced in academic economics discourse. Up to this day, crucial to this revival is the fact that more and more contemporary economists, when dealing with the fundamental mechanisms of various forms of economic development, such as industrialisation, urbanisation, institutional transition, economic growth and the structural change of the firm, have become aware of increasing returns of the division of labour to account for observed phenomena (Kim, 2006).

On the face of it, as a phenomenon in the process of economic growth, integration has been acting as essential for productivity growth and regional industrial development. This paper intends to clarify the assumption that regional integration is the fundamental pursuit of economic entities and multi-governments from different regions in the context of globalisation. The key to verifying

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the reciprocal interaction between integration and regional industrial development is to formulate a systematic theoretical basis, which will be derived from analysing relevant theories and then accordingly mapping a dynamic mechanism to allow integration to make a direct impact on regional industrial development in a positive way.

Definitions and Influence Factors of Integration

Industrial developmental structures which feature a diverse range of influence factors will directly shape integration in certain economic spaces. In this light, here, this paper will not only present the concepts of integration but also examine the regularity in the flow of factors of production within regions, the regularity in evolution and development of regional industries, as well as the regularity in integration and cooperation of economic entities.

Definitions of Integration

As Walker and Sayer (1992) claimed, integration theory begins with neoclassical presumptions: the fundamental problem of economic life is the allocation and organisation of scarce resources, the exchange is the basis of action, businesses are rational actors seeking efficient solutions, and the essence of production is cost minimisation. At present, in the context of globalised industrialisation, the present-day organisational problem in the industrial economy begins with production rather than exchange. At the heart of integration, which includes regional integration and industrial integration, bringing together labour, materials and machinery poses an elemental organisational problem (Walker and Sayer, 1992; Choe, 2001).

The concept of regional integration is an important criterion to assess regional development. Regional integration first appeared in 1995 in the first project by European Spatial Development Perspective (ESDP), then under the term spatial articulation. Initially centring on specific aspects of cross-border relationships, the concept gradually extended to a more comprehensive vision as summarised in the first official project of the ESDP: “Regional integration expressed the opportunities for and level of (economic, cultural) interaction within and between areas and may reflect the willingness to co-operate. Regional integration is positively influenced by the presence of efficient administrative bodies, physical and functional complementarity between areas and the absence of cultural and political controversies.” (De Boe, Grasland, & Healy, 1999:8) To sum up,

the creation of trade regions and the emergence of ties between the core and surrounding areas eliminate settlement frontiers, thus leading to regional integration.

Next, industrial integration shall be clearly delineated in terms of its connotation and main participants. Industrial integration exists as the outcome of the division of labour and also its driver. During industrialisation, factors of production are reallocated across industries and across ownerships, according to patterns of industrial development. Serving as base units, firms and enterprises build up and adjust new organisation of capital, leading to advantageous leading industries and relevant industrial structures. In pursuit of long-term competitive advantages, the major entities of industrial integration consist of large enterprises and groups (Lu, 2017).

Both regional aggregation and industrial aggregation constitute the objective economic foundations for the development of regional economy and the formation of cities. Industrial aggregation leads to the formation of specialised industrial zones. Regional aggregation of industries, on the other hand, requires economies of scale and economies of scope, both of which would lead to the emergence of new cities or further expansion from existing cities. In practice, there are usually three dimensions to integration, namely regional, industrial and institutional (Baumol and Alan, 2009). Among them, the regional dimension is the foundation that most embodies and represents the operations of industries. Industrial dimension is the core content created within spaces. The institutional dimension is the assurance for economic and regional integration.

Influence Factors of Integration

This section will illustrate an array of influencing factors, including regional endowments, industrial level and institutional status, that determine the choices of profit-driven regional economic entities. The motivation for regional economic profits would drive economic entities to opt for local industrial planning and seek out regional cooperation for the purpose of industrial development. So, the attainment of maximum regional economic efficiency becomes the driving force for the integration (Lo. 2004). Following overall regional industrial developmental plans, regional advantages are fully utilised and complemented with integration.

Regional industrial division of labour and integration can be viewed as the process for the economic agents to facilitate the flow of production factors and decisions of resource allocation,

and simultaneously such decisions and changes would shape these economic agents. (Guan, 2007). The decision is not just about the excavation and utilisation of endowed resources for each area within the region. It also involves an optimisation for the better allocation of such resources and factors of production within geographic spaces. In order to achieve maximum industrial development, economic agents would consider various factors and their influences in the decision-making process so that overall interaction across factors would bring about expected social economic benefits. Various factors of influence are crucial for our understanding of the formation and realisation of the regional industrial division of labour and integration.

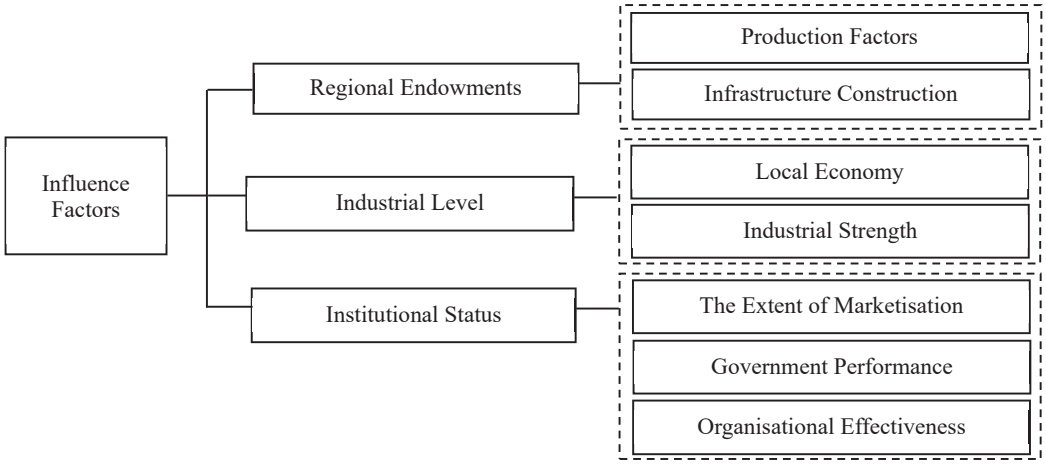

Figure 1: Influence Factors
Sources: Author's Own Figure

As is shown in Figure 1, these factors would include regional endowments that are closely linked with the specific geographic traits of the region, the industrial level that is linked to the degree of regional industrial development and the institutional status that is linked to the institutional structures of the region. Each factor entails different content and meaning, leading to varying degrees of impact on the regional industrial division of labour and integration.

Since different regions are situated in different geographic locations, they are endowed with varying geographic conditions. Based on factor endowment theory, for each country or region endowed with different factors of production, each region would spend the factor for which it is more endowed to produce certain goods, and thus lead to a comparative advantage in that good (Heckscher and Ohlin, 1933). In the context of industrialisation, for each geographic space range, there would exist differences in geographic conditions, labour resources, and capital stock, level

of science and technology as well as infrastructure construction. These factors fundamentally alter the industrial division of labour and integration for the regions.

Since different regions are situated in different geographic locations, they are endowed with varying geographic conditions. Based on the factor endowment theory, for each country or region that is endowed with different factors of production, each region would produce goods requiring inputs that are relatively abundant in the region, thus leading to a comparative advantage in that good (Heckscher, 1919; Ohlin, 1933). In the context of industrialisation, for each geographic space range, there would exist differences in geographic conditions, labour resources, and capital stock, level of science and technology, as well as infrastructure construction. These factors fundamentally alter industrial integration for the regions.

Regional endowments constitute dynamic comparative advantages over regions. There is a relatively higher degree of flow in production factors, as social economic activities continue to change in quantity and spatial allocation. In this process, with different input and scale of endowments, this would directly determine the economic outcome, and at the same time differences in demand for factor input and attractiveness for production factors would arise, each having significant influence over the formation and construction of regional industrial integration.

The impact of institutional status on integration is reflected in the functions of various organisations, ranging from the determination of property rights for economic entities, transference of information, planning of the developmental model for regional economies, and the formulation of laws and policies for the balancing of interests between parties. Especially for regional industrial integration, regional production factors and industries would be distributed spatially, based on the principles of market mechanisms with the participation and coordination of government and non-government bodies (Baumol and Alan, 2009). Accordingly, economic growth within regions can be achieved given the comprehensive impact of market, government and organisations.

Literature Reviews on Integration and Regional Industrial Development

There are various strands of literature discussions over time about the process of regional industrial development. To take the following examples: Marshallian economies of scale, Thünen's theory of the isolated state, Weber's industrial location theory, Christaller's central place theory, Losch's location theory, and Perroux's growth pole theory. These theories address, among other things, the

optimisation of location along industrial chains to varying degrees and effectiveness. For Friedman (1966), the core-periphery theory relates to the industrial communications between regions, resource allocation, factor flow, and the regional industrial division of labour. Since the age of modern globalisation, world economic activities are spatially mapped in novel landscapes. With that in mind, new economic geography and other derivative studies utilise specialisation, social networks, increasing returns, path dependency, and institutional factors as theoretical backbones to enrich the prolific academic field that revolves around the integration of industrial chains and industrial spatial formation and distribution.

Expansion of Production and Economics of Scale

Economies of scale is a practical concept that may explain real-world phenomena such as patterns of international trade or the number of firms in a market. The exploitation of economies of scale helps explain why companies grow large in some industries. From a microeconomic point of view, economies of scale are the cost advantages that enterprises obtain due to size, output, or scale of operation. Generally, cost per unit of output decreases with increasing scale since fixed costs are spread out over more units of output. It can be applied to a variety of organisational and business situations and at various levels, such as a business or manufacturing unit, plant or an entire enterprise (Marius and Johan, 1998; Brülhart, 1998).

The concept of economies of scale and the idea of obtaining larger production returns through the use of the division of labour date back to Smith, while diseconomies of scale are the opposite. This inspired Marshall (1923) who studied industrial organisation from neoclassical economics view, indirectly showing that firms are inclined to converge in pursuit of economies of scale. To account for the phenomenon he observed, Marshal proposes the concept of the industrial district a geographical region which has emerged from the concentration of industries under the influences of both historical and natural forces, featured by refinement in the division of labour for productive activities within a region. The division of labour can rapidly improve productivity for producing organisations within the region, creating a solid material basis for the continued interaction between given region and external spaces including suppliers and clients from this region or other regions. Hence, industrial district frequently features the following characteristics: value system upheld and commonly recognised within the region, connected productive

organisation groups, the full division of labour and cooperation, optimal allocation of human resources, and steadily functioning credit system (Baldwin and Venables, 1995).

The economies of scale that occur in the industrial district can be divided into two types. The first is external economies of scale, which means an increase in the number of enterprises within an industry leads to the expansion of the scale of the industry. In this process, there are other similar industries continuously converging in specific regions, creating or attracting related organisations, leading to the development of industrial districts. Hence, an external economy of scale not only affects the development in production for enterprises within an industry but also promotes clustering aggregation and the emergence of integration that encompass greater scope (Greenaway and Hine, 1991). The second is internal economies of scale, which means firm-specific organisations expand their productive capacity in the process of profit maximisation. Because of expansion in productive capacity and output, the fixed costs, including managerial costs, information costs, costs for designing, and those for research and development, are evenly and decreasingly spread out onto each unit (Zhou, 1999). Firms possessing sizeable internal economies of scale are usually conglomerates or large enterprises, and mostly focus on manufacturing and information industries featuring high design, managerial, and sales costs (Zhou, 1999). In contrast, external economies of scale allow all firms within the industry to benefit, while internal economies of scale are geared towards improving firm-specific productivity for individual enterprises which strive for greater profits (Zhou, 1999).

To sum up, Krugman (1991) views the sharing of a labour market, the supply of productive forces, and technological spillover as the three key factors of the Marshallian theory of economies of scale. However, Marshallian economies of scale theory, constrained by temporal industrial developmental level, fails to consider dynamic factors like the growth of enterprises within region and enterprises moving in- and out-of-region. It also neglects external links between regional industrial organisations (Chen and Zhang, 2003).

Industrial Agglomeration and Location Theory

Differentiated from economies of scale, location theory is concerned with the geographic location of economic activity; it has become an integral part of economic geography, regional science, and spatial economics. Location theory addresses questions of which economic activities are located

where and why. Location theory rests on the assumption that entities act in their own self-interest. Firms thus choose locations that maximise their profits and individuals choose locations that maximise their utility (Chinitz, 1961).

Continuing on J. H. Von Thünen's (1826) research on land use, Alfred Weber (1929) examined the advantages of aggregation and cost comparison, which is then used to determine if enterprises choose to locate close to one another under the premise of modern transportation modes in the industrial age. Based on this, Weber (1929) investigated some reasons for the spatial aggregation of industries in certain regions, formulating an industrial location theory. Industrial integration can be separated into two stages; the first being a simple expansion from within an enterprise, and the second being development led by big enterprises. Weber believed that there are four core reasons for industrial clustering. The first factor is the development of technical equipment. With the overall improvement in functionality and the specialisation of technical equipment, co-dependency in technical equipment would drive regional concentrations. The second factor is the emergence of productive organisations. A fully developed and comprehensive productive organisation is seen as 'equipment' in a certain sense. Its degree of specialisation leads to the clustering of industrial regions. The third factor is market forces. Industrial clustering can maximise the level of bulk purchases and sales and allow the acquisition of credit at a lower cost of financing. The fourth factor is a frequent reduction in expenditure costs. Industrial clustering would lead to the construction of relevant infrastructure, leading to a reduction in recurrent expenditure costs (Weber, 1929).

Subsequently, works by Walter Christaller (1933) and August Losch (1940) were likewise fundamental to location theory. They tried to explain the spatial organisation of economy from a different view than Weber's cost approach. Christaller (1933) initially raised a theory of central locality that aims to understand how products and services which characterise urban functions are organised over a territory and then create an urban hierarchy. In this theory, central places are cities that provide a surrounding area with goods and services that could be of low- or high-order. The hierarchy of goods and services depends on the goods threshold and distance ranges. Firstly, the threshold that guarantees a minimum quantity of goods products in an efficient way; secondly, the range that decides the maximum distance that people will travel to buy services and goods. And, the price of the product must include the cost of the travel. In these concepts, the assumption that

a good is produced only if this flow exceeds the threshold's minimum territorial distance and is located along a hierarchy of goods identified by the size of the respective thresholds is derived. Hence, Christaller proposed the formation of the hexagonal lattice as a spatial structure of production, where a higher-order good, i.e. the centre, is localised at the central area and located at the same distance from each edge of the hexagons[2], associated with the production of a lower-order good, i.e. sub-centres. Different from Christaller, Losch highlighted different factor of proportionality along the urban hierarchy. He responded to the three principles about organisation market, including market, transportation and administration, that Christaller was concerned with. Another important concept of *economic regions* was introduced by Losch, deriving from but equivalent to those political, cultural and geographical units. For Losch, a market area corresponds to an economic region. Assuming same transportation conditions, abundance in productive resources, even population distribution and the same level of residential consumption, Losch linked profits to sales scope of products connected to market location, analysing market area, market nets and systems of hexagonal trade areas. He pointed to different production costs among regions and used the profit to estimate the spatial allocation of enterprises. Later, Isard (1956) integrated the models of Thünen, Weber, Christaller, Losch and others into a unified model and established *General Equilibrium Theory*, which deals with an economy where all factors and producers, commodities and consumers are, in effect, congregated at one point.

In addition, Hoover (1936) explained locational patterns under different economic development stages from historical points of view. Hoover proposed the optimal scale of industrial agglomeration and separated industrial economies of scale into three layers. The first is the economy determined by individual locational units, such as factories and shops. The second is economy determined by the scale of the single company. The third is the economy determined by

[2] The shape of trading area is not a circle, as we have so far assumed. Even if the whole country were filled with such circular areas that are close enough to touch each other, a number of people could successfully try to enter the brewer business. So, we have a dark corner. The way to make use of the dark corners is to change the circular form into a regular hexagon. Also, two other possibilities of avoiding dark corners are conceivable, namely the square and the triangle. But it can be shown that the hexagon has an economic advantage over both: it affords the larger demand per square mile, provided the total area is the same in all cases. The hexagon is, therefore, the most economical shape for trading areas (Losch, 1938).

the scale of the aggregation of such industry. When these economies achieve their respective maximum scales, it would constitute the optimal scale for locational units, enterprises, and aggregated entities. The economic effects from such an aggregation are conducive for the development of trained labour forces and managerial individuals. In addition, a steady flow of information from a geographical concentration also stimulates operating productive entities to reform and innovate. In the pursuit of greater efficiency in profit, enterprises would compete and cooperate at the same time.

Therefore, industrial activities exhibit a general tendency for spatial aggregation. Under external constraints from environments, such as historical incidents, trade protectionism, and geographical segmentation, etc., the spatial pattern of industrial location is diversified. Once specific industrial spatial aggregations are established, they tend to be self-sustaining (Krugman, 1991). In this process, industrial clustering is divided into two stages. In the primary stage, aggregation advantages only arise from expansion in scale from the productive organisation itself. In the advanced stage, concentration is led by large enterprises, cohesively linking various productive organisations within the industry, leading to integration (Kim, 2001).

Local Planning and Growth Pole Theory

Growth pole theory is basically concerned with the phenomenon of economic development and with the process of structural change that accompanied this phenomenon. In growth pole theory, the explanation for modern economic growth deviates from the stationary conception of equilibrium growth.

Based on the Schumpeterian theory of innovations, large-scale firms and development[3], the growth pole theory was originally raised by Francois Perroux (1950, 1955) and was further developed by Jacques Raoul Boudeville (1966). Perroux (1955) argued that development does not appear everywhere all at once. Rather, development appears in points or development poles with

[3] In Schumpeter's analysis, development occurs as a result of discontinuous spurts in a dynamic world. Such discontinuous spurts are caused by the innovative entrepreneur whose activities generally take place in large-scale firms which are able to dominate their environment in the sense of exercising reversible and partially reversible influences on other economic units by reason of their dimension, negotiating strength, and by the nature of their operations (Schumpeter, 1934).

variable intensities and spreads along diverse channels and with varying terminal effects to the whole of the economy. In his idea, an economic space can be viewed as a field of forces consisting of centres, from which centrifugal forces emanate, and to which centripetal forces are attracted. Each centre, being a centre of attraction and repulsion, has its proper field which is set in the field of other centres. During the process of the pole-development in an economic space, the scale of operation, dominance, and impulse have close relationships to innovation. Also, the intensity of a propulsive firm's interrelation with other sectors of the economy is important enough for the induced effect to be transmitted to them (Perroux, 1950, 1955). Therefore, Perroux believes that the effect of agglomeration has a high ability to propel regional economic performance.

Boudeville (1966) further elaborated the developmental process of growth pole concept by giving it a more geographical orientation. It was with Boudeville that the growth pole theory received a specific geographical and regional importance. He defines a regional growth pole as a place where a set of expanding industries is located, and further development of economic activity occurs throughout its zone of influence. The external economies, therefore, become available in the area constituting the growth pole of a region. There are mainly three types of external economies that include economies that can be internal to the firms and industry, economies that can be external to the firm but internal to the industry, and economies that can be external to the industry but internal to the urban area[4] (Chand and Puri, 1983). Where these expanding, propulsive or leading firms and industry are regionally located, the place consequently becomes the regional pole, in turn promoting agglomeration tendencies.

In addition, Gunnar Myrdal (1957) and A.O. Hirschman (1958) are another two names in this field of study. Despite the exaggerated space preferences of economic operators, development in geographical growth will set in motion certain forces that will either be favourable or not. For

[4] Economies that can be internal to the firms: there are the lower average costs of production resulting from an increased rate of output. These are the economies that any single firm by its own organisation and effort can enjoy; economies external to the firm but internal to the industry: these are associated with the localisation of industry. On account of the close locational proximity of linked firms, as industry expands at a particular location, the cost per unit of output for a firm declines; economies external to the industry but internal to the urban area: these include the development of urban labour markets, access to a large market, and the provision of a wider range of services (Kenea, N.D.).

Hirschman, trickle-down effects are more favoured than polarisation effects for one set favouring convergence, and the other set divergence. Hirschman's trickle-down and polarisation effects are very much like Myrdal's spread and backwash effects. Myrdal explains the process of cumulative causation that perpetuates interregional income differentials with spread effects and backwash effects[5], which are diametrically opposed to each other functionally. Backwash effects are those forces that ensure the growth of the North at the cost of the South, whereas spread effects are those forces that enable the South to grow by ensuring the transmission of growth-promoting forces from North to South. However, the balance between these two kinds of effects is not a stable equilibrium. In Myrdal's opinion, spread effects are weaker than backwash effects. From this point of view, Myrdal (1957) draws conclusions on two perspectives: regional inequalities are much wider in poorer countries than in richer countries; and while regional inequalities have been diminishing in richer countries, the tendency has been the opposite in poor countries.

The growth theory places emphasis on various policy-oriented concepts, including propulsive firms, leading industries, polarisation and agglomeration, which results in various external economies. This emphasis promises the ensuing spread effects. According to these above-mentioned classic traditions in growth theory, spatial distribution and the innately uneven distribution of resources and population, economic growth is frequently observed as a dotted distribution, with differing distributive intensity and impact on other regions. Development for dotted regions can bring up development in other regions. By driving dominant industry, it results in a series of aggregated entities within regions, which form the regional centres of growth, promoting regional economic development. Therefore, the key to economic development is promoting industrial development. In this process, government and relevant non-government or

[5] The spread effects cause economic activities to be spread out among the different regions of the economy and thereby to the convergence among per capita regional incomes. They consist mainly of an increasing demand for the products of lagging or backward regions, and the diffusion of technology and knowledge. On the contrary, the backwash effects cause the concentration of economic activities in certain regions and thereby cause greater disparities or divergence among regions. They include labour migration, capital movement, and trade which are detrimental to the growth of the backward regions (Hummels and Yi, 2001).

non-profit industrial organisations that are gradually formed can function well as guidance and support mechanisms for industrial integration.

Regional Integration and New Economic Geography

Economic Geography (EG) is the study of the location, distribution, and spatial organisation of economic activities across the world. It represents a traditional subfield of the discipline of geography. However, in recent decades, EG has taken a variety of approaches to many different subject matters, including but not limited to the location of industries, economies of agglomeration, international trade, development, core-periphery theory, globalisation, and so on. These subject matters investigated are strongly influenced by the researcher's methodological approach. Among them, initially raised by Paul Krugman (1991), New Economic Geography (NEG) forms a body of research stemming from international trade theory that fundamentally attempts to explain the formation of a large variety of economic agglomeration in geographic spaces. It principally accounts for the uneven distribution of economic activity across space in terms of a combination of a variety of preference, increasing returns to scale, and transport costs (Fujita and Krugman, 1995, 2004). Moreover, most of the concepts and tools employed by the NEG, as well as the ambiguous impact of economic integration on development, were well known before the appearance of NEG. For instance, the crucial role of increasing returns to scale for agglomeration to occur is anticipated by Myrdal (1957)'s concept of "cumulative causation", the importance of externalities for localisation is firstly discussed by Marshall (1910, 1923), and the fact that economic integration might reveal detrimental effects for the economic performance of less developed regions to the advantage of those initially developed is anticipated by Kaldor (1970). Yet, the innovative contribution of the NEG consists of the rigorous formalisation of such concepts, which basically allows accounting for the dynamics of spatial clustering (and dispersing) of economic activity when trade barriers are progressively removed, which is hardly explainable with traditional theory.

As was mentioned above, the mechanism of the NEG is therefore based on a number of fundamental elements that provide a plausible theorisation of those self-reinforcing centripetal forces that pull economic activity into a location that occur and persist over time. More specifically, increasing returns to scale, monopolistic competition, transaction cost, and the occurrence of external economies collectively underpin the general functioning of the NEG models

and hence shape firms' and industries' locational or spatial behaviour. Based on four fundamental elements, by employing tools described as a slogan "D-S, iceberg, evolution and the computer"[6], there are three classes of models necessitated to be embedded into the theoretical framework of the NEG: regional models (or core-periphery models), urban system models, and international models. This respectively signifies the process of industrial agglomeration, the formation of the urban system, and the process of economic regionalisation and globalisation.

In this sight, the NEG explains the various spatial scales of economic phenomena, ranging from economic globalisation and regionalisation, the growth of international manufacturing bases, the geographical allocation of multinational enterprises, as well as processes of urbanisation. Krugman (1991) asserts that, in the context of economic globalisation, trade in manufactured goods between developed countries are very free. Each country would develop its locally specific industries, exporting goods from them and importing goods from industries not found locally. Hence, even if labour and capital cannot flow between countries, trade in goods can still "reshape economies under globalisation". Conditioned on increasing marginal return, the initial stage of globalisation sees the gradual aggregation of industries towards developed countries and regions. But, as the scale of industries expands for these countries and regions, the cost of production factors and prices of products rise, leading to a shift towards imports of productive factors and goods from other regions. If certain productive factors, for instance, labour forces, cannot flow freely, or certain goods that are crucial to consumption, like housing, cannot be traded internationally, then

[6] "D-S" refers to an ingenious analytical model introduced by Avinash Dixit and Joseph Stiglitz (1977), which takes an idea of monopolistic completion and gives it a sharper-edged formulation; "Iceberg" refers to a clever model of transportation introduced by Samuelson (1952), imagining that goods can be shipped freely but that part of the shipment "melts" in transit. It sidesteps the need to analyse transportation itself as another industry, and it also serves to simplify the description of how monopolistic firms set their prices; "Evolution" refers to how one thinks about how the economy selects one of several possible geographical structures. In the new economic geography, it essentially refers to the decision not to let the hypothetical players be that forward-looking, to assume that decisions about where to locate are based on current conditions, and therefore to rule out self-fulfilling prophecies. The geography of an economy therefore evolves in a way that reflects history and accident, but not expectations of the future; "Computer" refers to the tendency of new geography theorists to use high-technology numerical examples (reference surname and date.).

further globalisation would negate the importance of market externality. The price differential of non-flowing goods and productive factors would drive enterprises to relocate investments and labour forces to migrate to other countries and regions, initiating a process of diffusion from core developed countries and regions to less developed peripheral countries and regions, therefore promoting the industrialisation process on a global scale.

Krugman and Venables (1995) link industrial integration and factors of international trade. They point out that the trade activities of goods effectively and indirectly function as a trade of productive factors. No matter the initial allocation status for productive resources, through international trade, the production of certain goods would always converge in some industrial zones, demonstrating a general trend in the spatial concentration of manufacturing industrial activities. But, with the existence of trade barriers, with increasing domestic demand for a certain good, this country would produce locally rather than import. With an expansion in productive scales, economies of scale would play a role in promoting the competitiveness of this country in producing such a good, therefore reducing imports. In extreme cases, the production of this good would monopolise the world market, causing the country to be the dominant producer and exporter of said goods.

Thus, the contributions of the NEG are first to show how the spatial structure of an economy is determined by the interplay between the costs of transactions across space and various types of increasing returns to scale, and secondly to investigate the industrial concentration in the process of regional economic integration. Also, the NEG also explains the geographical unevenness of the economic landscape as a situation of equilibrium. In general, it emerges that the NEG's theoretical predictions have come to be tested in empirical studies in recent years and this represents a further step towards a better understanding of the implications of EG on the spatial structure of economic processes.

Patterns of Integration and Regional Development Policy

Regions that have reached a certain stage in the development of their economies are frequently beset by regional problems. It would be more accurate to refer to them as problems of spatial organisation. Inherited and inspired from research completed by Schumpeter, Myrdal, Hirschman, and Williamson, etc., Friedman (1966) believes that, for any nation, its regional economic system

is formed through both the core and the peripheral economic spaces. The core region constitutes a city or city clusters or its surrounding regions, a spatial system with a relatively stronger capacity for innovation and revolutionary changes. The function of the peripheral region is determined by the degree of its dependence on the economic core areas. The delineation between these two regions is determined by their relationship. More specifically, economic core regions occupy a dominant position within the system of regional economic spaces, while the economic periphery, for its lack of autonomy, remains subordinate to the core. In many cases, the regional space economy experiences four stages, from discrete equilibrium (minimal contact between regions), aggregated non-equilibrium (one region gains dominance), to a diffused stage (development of semi-periphery), and network equilibrium (bidirectional flow and full dependence), which corresponds to pre-industrial, transitional, industrial, and post-industrial stages respectively.

In the pre-industrial stage, regional economic spaces are homogenous and random, and several regional cores exist with no particular difference in their rankings or structures. Because of the lower productivity and lower stages of economic development in this period, agriculture enjoys an absolute advantage in economic structure, while industrial products account for less than 10 percent of overall products (Henderson, 1988). The differences in economic development between various regions are minimal, as most of them are at a low level of equilibrium. In line with this, regional economic space is formed by some of the independent regional cores and vast rural lands, each occupying a relatively small geographic space. Since areas within the larger region are closed off from one another, few or no essential economic ties exist.

As regions move towards transitions or the initial stages of industrialisation, industrial products would account for around 10% to 15% of overall products (Henderson, 1988). In the process of industrialisation, a region would gain developmental momentum, either through long-term accumulation or external stimulus, accelerating its pace of economic development and emerging as the economic core of the said region. The establishment of this single core would break the original low-level equilibrium of the regional economic space. At this stage, a regional space is formed, with a singular economic core that is comparatively stronger and peripheral areas that fall behind. The regional economic core, with its comparative advantage in economic development, constantly attracts factors of production from peripheral areas to itself, continually

enhancing its economic prowess, with the peripheral areas gradually falling behind, contributing to regional inequality and imbalances that become gradually more apparent.

Then, in the industrial stage, or in the mid-to-late industrial stage, regional industrial products account for roughly 25% to 50% of the total products (Henderson, 1988). With expansion in activity from regional economic cores, new economic cores would emerge elsewhere in the region. The interdependence and cooperation between the new and original economic cores would create a system of regional space economy. For each regional economic core, there exist relevant peripheral regions of varying sizes, and for each region there exist several core-periphery structures of varying scales. These core-periphery structures, modelled after each of their unique positions and relationships within the regional economic system, would become interconnected and form a regional economy space, which features greater complexity and more stability, reinforcing a positive impact on regional economic development.

At last, in the post-industrial era, economic development reaches a relatively higher level, with each area within the region forming closer and wider economic ties (Henderson, 1988). The connection between various regional economic cores and peripheries becomes more close-knit, narrowing gaps in economic developmental stages between them, leading to a new economic spatial structure where functional integration is achieved. With the gradual dissolution of physical and administrative boundaries between economic cores and peripheries, regional economics would realise developmental integration through market-led self-initiated aggregation and government-led policy implementation.

Thus, regional economic development is a non-continuous process of accumulation from a series of foundational innovative clusters that ultimately formulate large-scale innovative systems. Fast-developing metropolises often have conducive prerequisites for innovation, which often stem from cities and expand into peripheries. Hence, policymakers should prioritise the manufacturing of hi-tech products and relevant scientific and scholarly research in economic cores and should locate production activities in peripheries that are often labour-intensive with lower wages.

Dynamic Mechanism of Integration and Regional Industrial Development

Based on the evolutionary theory of integration and regional industrial development, we know that, under the influence of above-mentioned factor system, regional economic entities, with their

pursuit of regional economic profits, would opt for local industrial planning, and seek out regional cooperation for the purpose of regional development. So, the attainment of maximum regional economic efficiency becomes the driving force for the integration (Lo, 2004). Following overall regional economic development plans, regional advantages are fully utilised and complemented with integration. The interaction facilitates the formation of a clearly dynamic mechanism of regional industrial integration, and during specific periods, it would give rise to certain patterns of industrial regional integration.

Economic mechanism refers to the interaction and mutual constraints between elements of economic activities. Collectively, the concrete management of economic activity ensures the proper functioning of the social economy, comprised of economic agency, economic leverage, and economic policy (Lemoine, 2000). Empirically, within the economic process of production, distribution, exchange, and consumption, economic development is collectively determined by the participation and action of market forces, government and organisations (Lundvall, 1992). Therefore, the level of integration will result in an industrial level within a region. With application to the concept of industrial integration and regional integration, this shows that mechanism of integration-driven industrial development refers to the function of actors, including regional

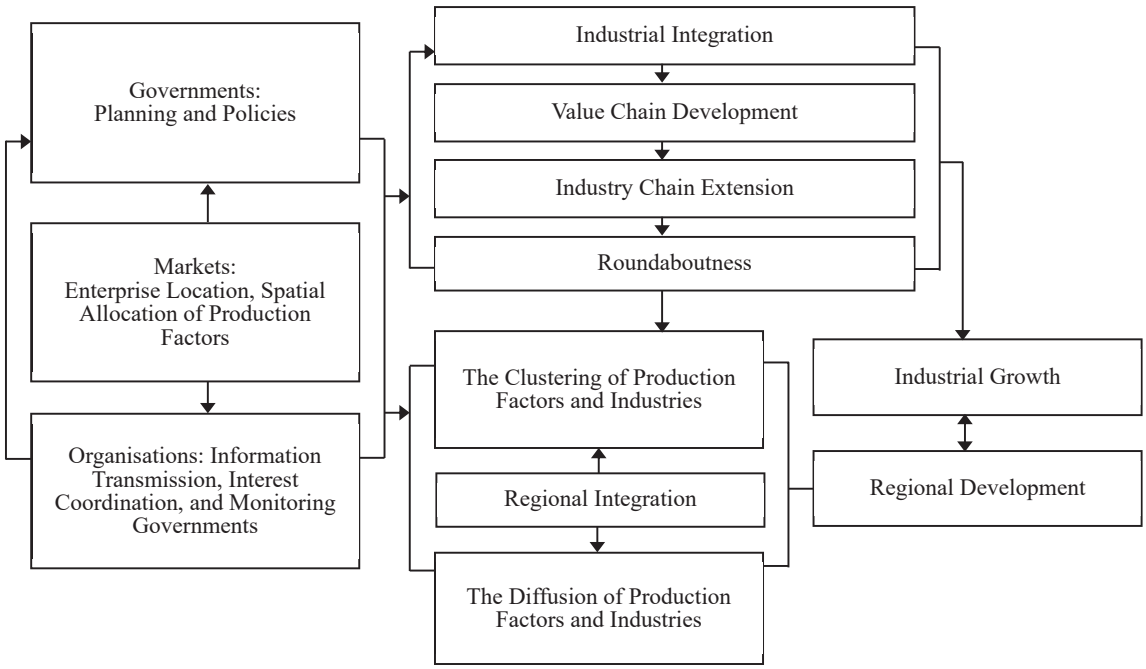

Figure 2: Mechanism of Integration-driven Industrial Development

Sources: Author's own figure

owners of factors of production, various local level governments within regions, a government with direct administrative power over the whole region, non-governmental organisations maintaining and promoting regional industrial development, who have a mutual relationship that connects and constrains players (Figure 2).

Markets determine the allocation of resources and spatial factors and influence how firms choose to locate. In terms of resource allocation, markets function through the transmission of information, promotion for competition, optimisation of institutions and structure, and pushing for technological advancement and efficiency improvement, among others (Lundvall, 1988). The major mechanisms include price, supply and demand, competition, and risks[7]. Resource allocation in the market economy results in economies of agglomeration, as enterprises keep attracting financial resources and talents, outputting new products and new enterprises, and quickly strengthening the economic power of units within the region. Correspondingly, the effects of diffusion are observed, since centres of agglomeration expand outwards with productive factors and economic activity, therefore accelerating economic development for peripheral and neighbouring regions, which then, in turn, feedback to and further promote the core regions. In terms of spatial allocation and the selection of firm location, the aggregation of enterprises and economic entities affects the product market. Through resource sharing, industrial matching and knowledge acquisition, external expansion and the spillover of technological expertise are achieved, accentuating the vertical division of industrial units which evolve into web-like structures (North, 1990). Accordingly, the vertical division of productive units leads to changes in the organisational structure of enterprise production and industrial structures. This leads to flexible specialisation [8] featuring modern large enterprises with multiple factories and multiple

[7] Through price signals in the market, prices reflect the demand-supply relationship, regulate production and logistics, and promote competition and innovation, in turn allowing for resource allocation and income distribution adjustment. Supply and demand affects a combination of factors of production through conflicting movements between products, labour, and social resources. Competition affects the operation of markets through price or non-price competition, preserving the performers and eliminating the less competent. Risk is a constraining mechanism for markets, acting on market entities as external pressure and regulating market supply and demand in conjunction with the competition (Walker, 1988).

[8] The key elements of the flexible specialisation concept are: 1) has multi-purpose equipment and innovation, skilled labour with an innovative mentality, uses general-purpose equipment to

departments, and a high degree of specialisation. Consequently, changes in transaction cost, the organisational structure of production at the enterprise level, as well as the organisational structure of industrial space all have an impact on how enterprises choose to locate[9]. Cost-savings and efficiency improvements arise because of geographical concentration, and then increased industrial interconnectedness and heightened resource usage ratios. This, in addition to the mutual interaction between productive organisations and enterprise location, actively pushes forward the agglomeration, transfer, and expansion of industrial spaces, greatly affecting spatial and geographic structures (Fujita and Krugman, 2004).

Governments, in grasping the overall situation and institutional planning efforts, can provide a more robust foundation for the development of regional economic units and regions, while at the same time correcting for market failures[10]. In terms of policy formulation, execution, and reassurance, the government is responsible for breaking the administrative divisions among individual regional economic units and enhancing the coordination and guidance of economic development across various regional economic units (Bresnahan and Greenstein, 1999). This is achieved through the formulation of medium- and long-term strategic planning appropriate to the industrial and regional integration of the specific space. In terms of regional infrastructure and

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produce whatever is in demand; 2) cluster of enterprises or small firm communities, the seedbed for an exchange of ideas. Physical nearness facilitates the exchange of ideas and it also makes the development of institutions and their interventions easier and more effective; 3) interaction/networking, the whole set of sub-contracting relations and collaboration efforts between small enterprises and between smaller and larger ones; 4) collective efficiency, the results of the new physical presence of other innovative producers.

[9] Geographical allocation for enterprises is usually distributed in clustered or dispersed forms. For enterprises with close economic ties, or hard-to-scale service industries such as research and development, sales, and financial companies, they tend to aggregate in core regions in order to save transaction cost and enjoy spillover benefits. For enterprises or productive manufacturing firms that can be easily scaled and are more sensitive to cost changes, they tend to locate in regions with the lowest cost of production and are thus more inclined to disperse towards peripheral regions (Fujita, Krugman, and Venables, 1999).

[10] Market failure is a situation in which the allocation of goods and services is not efficient. That is, there exists another conceivable outcome where an individual may be made better off without making someone else worse-off. They are often associated with time-inconsistent preferences, information asymmetries, non-competitive markets, principal--agent problems, externalities, or public goods.

public information network, the government can utilise public resources and administrative capacity to empower road network layouts, productive infrastructure, and ecological management. Simultaneously, it is possible to focus on electronic administrative and information and resource sharing on the enterprise level, allowing the government to build comprehensive information exchanges and sharing platforms with the premise of advancing communication network facilities (Sun, 2012). In terms of promoting productive factor flows, the government can clean up various types of legal regulations, effectively removing rules and regulatory requirements that prohibit the free flow of productive factors within a region. By establishing unified productive factor market rules and regulatory norms, protection for property rights and improvement to productive factors the market can be realised. In terms of optimising industrial layout, the government can promote a more reasonable allocation of industrial and spatial structure, according to the comparative advantages of economic geographical units. This is especially crucial because structural convergence among economic units can lead to excessive competition regionally. At the same time, by pushing for equal treatment at a regional level, the government can reduce the potential scope for vicious competition (Pheng, 1990). Thus, the government can make up for market failures through such intervention paths as improving regional infrastructure, nurturing the market system, providing a public good, reconciling economic externality, protecting competition, and preventing monopolies, thereby pushing for industrial development.

Organisations can make up for government failure through participation in public decision-making, the transmission of information, and the coordination of interests, playing their role as synergising participants. Specifically, organisations refer to non-government or not-for-profit organisations. They participate in market adjustment through non-administrative and non-market means like social ethics, public opinion, and public participation (Ram, 1986). In terms of participating in government policy formulation, organisations, for instance, industrial associations, can form specific groups that aggregate dispersed enterprises by their functions and principles, therefore representing enterprises in government decision-making. This approach not only reduces and shares the transaction cost of negotiations between individual enterprises and governments but also allows for the government to holistically consider the opinions and demands of industries in question while making policy decisions that would alter their economic spaces. In terms of information transmission, organisations are in the middle between governments and markets. They possess first-hand information on developmental trends, statistical resources, and policy changes

which can be transmitted between governments and enterprises in both directions. This reduces time delay between parties, enhances enterprises' ability to forecast market performance, and also weakens barriers and costs to policy implementation. In terms of interest coordination, especially when it comes to spatial adjustments and integration, in order to coordinate interest differentials between various economic geographical units, local governments, and enterprises, organisations can break such regional blockades and segmentation, given their special status as non-government, non-profit institutions, therefore achieving the effective adjustment and reorganisation of regional economic spatial allocation (Scott, 1988). On the other hand, by utilising their function as industrial organisers, they can promote productive differentiation through restructuring and empower regional industrial capacity. Hence, with the help of non-government or non-profit organisations, regional economic cooperation can be achieved at a low cost and with high efficiency, not only easing the administrative pressure for regional interests, but also allowing for the establishment of cross-regional enterprises.

In summary, with the participation, planning, and monitoring of non-government organisations, governments conduct unified construction for basic infrastructure, and direct factors of production and industries through unified planning and policy guidance to achieve reasonable agglomeration and the expansion of industries and spaces, including enterprises, industrial parks, and economic regions. This would eventually promote the development of local industries.

Conclusion

In this paper, a theoretical study on integration and regional industrial development is presented, which firstly offers key concepts and influence factors which concern integration and are composed of documentation overviews that are made from diverse perspectives. Both regional aggregation and industrial aggregation constitute the objective economic foundations for the development of regional economy and the formation of cities. Industrial aggregation leads to the formation of specialised industrial zones. Spatial aggregation of industries, on the other hand, requires economies of scale and economies of scope, both of which would lead to the emergence of new cities or further expansion from existing cities. Furthermore, factors influencing integration within economic regional spaces and implications are presented and categorised into three major types, namely regional endowments, industrial level, and institutional status. Regional industrial integration is affected by these factors, which can cancel one another out, and create interacting

effects between them. Through constant refinement, they would promote the growth of a regional economy.

Secondly, relating to industrial development, economies of scale, location theory, central place theory, growth pole theory, and core-periphery theory are employed in order to examine economic location. These theories also partially explain industrial clustering, industrial chain integration, and the spatial phenomenon in industrial activities, shedding light on the spatial allocation of industries within regions. However, as orthodox theories examine their subjects of study in static and isolated cases with too much emphasis on external factors, the theoretical study only abstracts quantitative relationships in technical spheres, without much consideration for the linkages between relevant industries. This would lead to certain limitations for understanding and decipher the allocation of regional industrial chains and the division of labour. Since the era of globalisation, world economic activity presents whole new spatial landscapes, with traditional economic theories unable to provide convincing explanations for some of these industrial spectacles. For instance, the emergence of drastically different industrial landscapes from locations of similar natural resources, or the rise to industrial centres of places without the necessary natural resource advantages. Hence, NEG and other derivative studies utilise specialisation, social networks, increasing returns, path dependency, and institutional factors as foundations for theory, enriching and contributing to the theoretical studies of industrial chain integration, formation, and distribution of industrial spaces.

Finally, given theories of integration and regional industrial development and the impact of said factors, the dynamic mechanism and interactive mechanism of integration that comes along are stated and explained. Since different influence factors lead to different integration patterns, it is necessary to theoretically elaborate the internal linkages and influential pathways of relevant factors and choices over regional industrial integration and cooperation, enabling economic entities to conduct more informed decision-making.

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